

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
SCIENTIFIC AND STATISTICAL COMMITTEE

Webinar

April 27-29 and May 3, 2021

TRANSCRIPT

SSC Members

Dr. Genny Nessler, Chair
Dustin Addis
Dr. Scott Crosson
Dr. Jared Flowers
Dr. Eric Johnson
Dr. Wilson Laney
Dr. Fred Scharf
Dr. George Sedberry
Dr. Alexei Sharov

Dr. Jeffrey Buckle, Vice Chair
Dr. Walter Bubley
Dr. Chris Dumas
Dr. Churchill Grimes
Anne Lange
Dr. Yan Li
Dr. Amy Schueller
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Cindy Chaya
John Hadley
Allie Iberle
Dr. Julie Neer
Dr Michael Schmidtke
Christina Wiegand

Attendees and Invited Participants

Rick DeVactor

Monica Smit-Brunello

Additional attendees and invited participants attached.

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened via webinar on April 27, 2021 and was called to order by Chairman Genny Nesslage.

INTRODUCTION

DR. NESSLAGE: Good morning, everyone, and welcome to the April 2021 meeting of the South Atlantic Fishery Management Council's Scientific and Statistical Committee. My name is Genny Nesslage, and I'm Chair of the SSC and a faculty member at the University of Maryland Center for Environmental Science Chesapeake Biological Lab.

I would like to start off, if we could, doing a roll call of the SSC members who are here, so we can get their voices on the record for the minutes, and I would just like to go down the list as Chip has it displayed here on the screen, and so it's alphabetical order, starting with Dustin, and so if you could just give your name and your affiliation, and then we'll just go right down the list. Dustin, do you mind kicking this off?

MR. ADDIS: Dustin Addis, Florida FWC.

DR. BUBLEY: Wally Buble, South Carolina Department of Natural Resources.

DR. BUCKEL: Jeff Buckel, North Carolina State University.

DR. FLOWERS: Jared Flowers, Georgia Department of Natural Resources.

DR. GRIMES: Churchill Grimes, SSC.

DR. JOHNSON: Erick Johnson, University of North Florida.

DR. LANEY: Wilson Laney, North Carolina State University.

MS. LANGE: Anne Lange, SSC.

DR. LI: Yan Li, North Carolina Division of Marine Fisheries.

DR. SCHARF: Fred Scharf, UNC Wilmington.

DR. SCHUELLER: Amy Schueller, National Marine Fisheries Service.

DR. SEDBERRY: George Sedberry, SSC.

DR. SERCHUK: Fred Serchuk, SSC.

DR. SHAROV: Alexei Sharov, Maryland Department of Natural Resources.

DR. CROSSON: Scott Crosson, NOAA Southeast Fisheries Science Center.

DR. NESSLAGE: Great. Thank you, all. I appreciate that. Chip, would you like to just quickly introduce yourself as well, for the record?

DR. COLLIER: My name is Chip Collier, and I work with the South Atlantic Fishery Management Council. I am the Deputy Director for Science.

DR. NESSLAGE: Great. Thanks. Then I just want to recognize that we have a few council members here attending today, and I believe Mel Bel, our Chair, is here.

MR. BELL: Thanks, Genny. It's good to be here, and thanks to everybody else for being here.

DR. NESSLAGE: Thank you, and I think we also have Steve Poland, our Vice Chair and liaison.

MR. POLAND: Good morning, everyone. Thank you for being here.

DR. NESSLAGE: Thank you, and I think we also have Anna Beckwith. Are you on, Anna?

MS. BECKWITH: Yes, I am. Good morning.

DR. NESSLAGE: Good morning. Thank you for being here. Did I miss any other council members?

DR. COLLIER: I am not seeing any others right now, but some others might join throughout the day and throughout the meeting.

DR. NESSLAGE: Understood. Thank you for your attendance, and thank you all for your patience with another marathon webinar.

DR. COLLIER: Tim Griner is here. Sorry. I had missed his name.

DR. NESSLAGE: Excellent. Thank you, Tim, for your attendance as well.

DR. COLLIER: Jie Cao is here, and he's signed in under Yan's name. Let me unmute him.

DR. NESSLAGE: Great. Do you mind just saying your name and your affiliation really quick, for the record?

DR. CAO: Sorry, guys. I am using Yan's link to sign in, and so I'm Jie Cao with NC State University.

DR. NESSLAGE: Great. Thank you. Are we missing anyone else?

DR. COLLIER: Chris Dumas was missing, and let me see if -- He's here now.

DR. NESSLAGE: Great. Chris, do you mind doing a quick intro there?

DR. DUMAS: Hi, folks. I'm Chris Dumas, and I'm a natural resource economist at the University of North Carolina Wilmington. Thanks. Good morning, everyone.

DR. NESSLAGE: Thank you.

DR. COLLIER: The only other one is Tracy Yandle, and she has moved to New Zealand, and so she might not be available for this meeting.

DR. CROSSON: I've spoken with her, and she's not going to be able to attend. I don't know if she's sent in her letter or not to you yet.

DR. COLLIER: I don't believe we've gotten one yet.

DR. CROSSON: Just for everybody, Tracy has moved to New Zealand, and so she's going to be stepping down off the SSC.

DR. NESSLAGE: Unfortunately, and she will be greatly missed, and she did contact me and say that, by the time she would be up and awake, we would be almost done our meeting, and so she wouldn't be much help, but she sent her thoughts for us, and we will definitely be thanking her for her service. She's been an excellent contributor to our SSC. All right. I think that covers introductions. Is that right, Chip?

DR. COLLIER: Yes, it does.

DR. NESSLAGE: All right. Then let's move on to reviewing and approving the agenda, if we could. We have a very packed agenda for these three days next week and then Monday, and so Tuesday, Wednesday, Thursday, and then the following Monday. There is quite a bit in here, but, if you have any questions or suggested edits, please raise those concerns now, and, by raising your hand, SSC members, we will call on you. If I don't see any hands raised, we will consider the agenda approved. Wilson Laney.

DR. LANEY: Thank you, Madam Chair. I would like to request the addition of an item under Other Business at the end of the meeting, which you and I have already discussed, I believe.

DR. NESSLAGE: Yes, and I have a placeholder for that, and we will not forget it, but, if I manage to forget it by the time we get to the end of the day on Monday, please remind me.

DR. LANEY: I will try and remember to do that.

DR. NESSLAGE: Between our two brains, hopefully one of us will remember. Thank you. Are there any other suggestions or additions or subtractions? We're not allowed to subtract anything, at this point, and we're going to try and get through this. All right. I'm not seeing any other hands raised, and then we will consider the agenda approved.

We do have two sets of minutes. One set is Attachment 1 from our October 2020 meeting and another from our January 2021 meeting. If you have taken a chance to look at those, if you have any edits, this would be the time to bring those up. If not, we will consider them approved. If you have any edits or concerns with the verbatim minutes, please raise your hand now. No hands. All right. Then we will consider both sets of minutes approved. Thank you very much.

Then we will move on to Agenda Item 2, which is general Public Comment. Chip is going to pull up a slide and explain how folks from the public can raise their hand if they have something they would like to say and share with us. We are going to take a moment now for general public comment, but do note that there will be opportunity for public comment for each agenda item as we proceed through the meeting, and so, if now isn't the best time for you, or if you want to wait until we're talking about a topic that you're particularly interested in, please do so, but, if you have something you would like to say now, Chip will walk you through how to do that.

PUBLIC COMMENT

DR. COLLIER: Thank you, Genny. I recognize most of the names on here, but, if there is someone new, I want to go through on how to work a webinar that we use with the South Atlantic Council. All the different platforms are slightly different, and so I just want to make it as easy as possible.

The first thing that you need to do is you will have to click on your microphone, after the staff member recognizes you, to unmute yourself. If it's red, that means you're muted, and you can see if you're muted by the organizer or if you're muted by yourself. If you would like to ask a question, raise your hand, and it's this icon here that is highlighted. It looks kind of like a turkey. If you see the arrow is green, that means your hand is down. If you see your hand is red, that means your hand is raised, and, finally, you are welcome to ask any questions, and you can type them into the question log. Also, if you're having any technical issues throughout this meeting, SSC members or the public, please don't hesitate to enter your question into the question box.

Before we go on to the next portion, I do want to point out to the SSC members that there are some public comments that have been provided to the SSC. If you go to the SSC briefing book page, you will see this list of options, where you have the webinar registration and the briefing book review, but there is also an ability to submit comments as well as read comments, and, so far, we've had one public comment come in for the meeting.

It was from Jimmy Hull, and I will pull that comment up. Here are the comments from Mr. Hull, Captain Hull, and I will read the letter to you, real quickly, and then we can go into the other public comments, and I see there is one hand raised right now.

Thank you, South Atlantic Fishery Management Council SSC members, for giving me, Captain Jimmy Hull, current Chairman of the South Atlantic Fishery Management Council Snapper Grouper Advisory Panel, the opportunity to provide a written comment on the Atlantic red snapper final SEDAR 73 results.

Having been a commercial fisherman landing red snapper for over forty-five years from offshore of Ponce de Leon Inlet, Florida, I have seen many changes in the abundance of the red snapper population during those decades, for various reasons. Then he has a section titled "Red Snapper Abundance". Many years of abundance, followed by some years of decline, then increased abundance again, has been a normal cycle for the fishery, but never, in my forty-five years of fishing off Ponce Inlet, Florida, has there been as many red snappers in the population of all sizes than over the past several years.

Now every piece of bottom habitat has been populated with red snapper of all sizes. Now, in the summer, every piece of bottom is a spawning site, with animals from the bottom to the surface. It was never like this before. In the past, we used to find random spawning aggregations many miles apart.

In 2010, the red snapper fishery was closed. Since then, we have had little opportunity, with only mini-seasons to harvest the stock. However, we encounter red snapper on every trip and every bait drop for other species. Red Snapper have reached their rebuilding pinnacle, and there is no more room, and their numbers can only decline from here. In the terms of abundance, the stock is rebuilt, and he provided a biomass figure from the stock assessment.

Then he has a section entitled “Sizes”. In the past forty-five years, we have had red snapper of all sizes, but with most of abundance in smaller sizes. Now, we have a lot more abundance of larger animals, equal to the number of smaller sizes. Most of these large fish have reached their maximum length. The stock is rebuilt in terms of size and length of the animals. Then he provides a couple of Von Bertalanffy growth curves, as well as a length distribution from a survey that he was involved with.

The next section is called “Age and Recruitment”. Red snappers reach their maximum length at ten years old, and now we have a full stock of ten-year-old animals. Red snapper are sexually mature at two years. That is very early for a supposed long-lived animal. When they are born, they burn the candle at both ends, and very few fish ever live past twenty years old.

The assumption prior to 1978 of a large portion of twenty-plus animals is not proven by any observed data, and it does not fit the life history of this animal. Very aggressive and fast-growing, they can overwhelm other species and take over the habitat. Now they have taken over the habitat and recruitment for millions of spawning animals on all the bottom-fishing reefs, is what we see in the abundance success of the stock. The stock’s recruitment is that of a rebuilt stock. Then he provides it looks like -- I think that is a recruitment time series as well as the abundance plots.

In the past forty-two years, and with 30,705 fisheries-dependent samples that have been taken, and this only yielded 141 animals over the age of twenty. That is a very small percentage that has done nothing to stop this stock from rebuilding. It is clear that abundance is much more important than old age for a stock to reach high levels of recruitment, abundance and sustainability. The stock is rebuilt and is able to have an open year-round fishery at harvest levels of maximum sustainable yield.

Then he has a section called “What is the End Game?” A closed fishery, until we can intercept enough assumed proportion of twenty-plus-age animals to consider it sustainable for harvest. How can you interpret this red snapper stock to have overfishing when it is has more recruitment during the past six years than ever before, and now the red snapper population has more animals in abundance than ever before. This includes assumptions from prior to 1978.

How can you interpret the red snappers to be overfished because of the assumed proportions of older aged animals are not high enough? Yet, this red snapper stock is full of maximum length fish, about ten years old, that are producing this record recruitment and abundance. If this stock is not opened for harvest now, it will never be opened for harvest. You do not even have a chance to intercept the few older animals unless the fishery is open.

You need to open the red snapper fishery. Sample it year-round, monitor it, observe it, and increase our knowledge of this amazing red snapper rebuilt resource. Clearly, you can see a much closer to reality model result from the SEDAR-73 high recruitment sensitivity run below. Here, with the high recruitment projected forward, we have a rebuilt stock by 2024. This is based on high abundance of young animals and not old animals. This is much closer to a realistic outcome than the chosen base run. Please bring us closer to reality after ten years of a closed fishery. Captain Jimmy Hull. Then I see Rusty Hudson has his hand raised.

MR. HUDSON: Thank you for reading Jimmy's comment, and I just wanted to note that it was there, and I will probably provide comment at the end of the red snapper presentation, I believe it is, before you all start the dialogue, and then also later, during the golden tile, and I participated in both of those stock assessments, and I look forward to hoping for a positive outcome for the council and for the fishermen. Thank you.

SEDAR 73 RED SNAPPER ASSESSMENT REVIEW

DR. NESSLAGE: Thank you very much, Rusty. Thank you, Captain Hull, as well. Is there any other public comment? I am not seeing any other hands raised. All right. Thank you, both, for that, and thank you, Chip, for reading Captain Hull's letter. With that then, I believe it's time that we move on to the big agenda item of the day, which is our review of SEDAR 73, the red snapper assessment.

I would draw your attention to Attachment 3, which is the actual assessment report, and we have been tasked with reviewing this assessment and identifying and characterizing the impacts of the various uncertainties in the assessment, and then, of course, to provide fishing level recommendations.

Dr. Kyle Shertzer will be providing a presentation on that, and you can find his presentation at Attachment 3, which Chip circulated last night, and I believe it's in the briefing book now, although I shouldn't say that, because I haven't checked, but, if you don't have it, email me, and I will make sure that you have a copy, SSC members.

A couple of things to note. Because there is interest in moving very quickly on the results of this assessment, the SSC, at our last meeting, or perhaps the meeting before, and I'm not recalling, but we formed a working group of the SSC that was made up of the panelists who served on the SEDAR panel, as representatives from the SSC, and they met early on in the process to kind of provide some preliminary ideas for what our ABC Control Rule decision might be.

They brainstormed a number of potential P* levels and projection scenarios that they thought the SSC might ask for, so we could frontload a bit of that work, and Kyle was kind of enough to do that for us, and so we'll be seeing some of the results of that work and those options today, and I will give the chair of that working group, Anne Lange, a chance to walk us through their thought process a little later in the meeting, but, first, we're going to start with Kyle's presentation.

I will say, if you're interested, you can take a look as well at Attachment 3a, which is the workgroup's report. I would also ask that folks -- Remember that, for several of our agenda items,

we'll be having breakout groups after we have completed our question-and-discussion period, and we'll be moving to breakout webinar sessions, and there are four of them for red snapper. The public is welcome to join any one of those that they would like. We ask though that you remain muted, and then we'll have a chance for public comment when we come back to the main session as well.

In these breakout groups, the SSC members will be generating some strawman language for our consensus statements, and it's not any final decisions, but they will be generating some strawman language, and then we'll bring it back and display it on the screen, and the public will have a chance to comment, and then the SSC will finalize their consensus statements for inclusion in our final report.

I would ask the SSC members to take a look at which action item they have been assigned to for red snapper, and there is four different action items, or portions of an action item, and then I have also assigned a rapporteur for each group, so that we know who will be taking notes and will be responsible for walking the group through your thoughts and decisions, and so please take a look at that, so, as we go through the agenda item today, you know which you need to pay particular attention to. Are there any questions about that before we go into Kyle's presentation?

I believe Kyle has a copy or access to the hand-raised function as well, or the sheet that has been displayed, and so, Kyle, if you're game, I think we can entertain questions as you go along, because this is a long presentation. Is that still the case? Are you okay with that?

DR. SHERTZER: That's fine. I prefer it that way, although I, unfortunately, don't have that in front of me. I think Chip sent that to me, but I don't have it operational right now, and so, if somebody could just let me know when there's a question, that would be helpful.

DR. NESSLAGE: I do have access. Do you want me to do that, or, Chip, how would you like to do that?

DR. COLLIER: I will leave that up to you. I can do it, or you can do it, Genny. I will do it for you.

DR. NESSLAGE: Okay. Just in case I have to be looking at something else, and that would be really nice, but, if I spot someone has been sitting there for a while, I will jump in too, and so we'll try to keep on top of that. I think that's everything, unless -- I don't see any hands raised, and so, Kyle, if you're ready, take it away.

DR. SHERTZER: Okay. Thanks for your attention, everybody, and I do prefer that you ask questions along the way, as they come up, but there are also some break points throughout the talk, and so feel free to ask you go or at the break points.

What I'm going to attempt to do, over the next probably couple of hours, is walk you through how the SEDAR 73 update assessment landed on its results that I would say are a mixture of good news and bad news, the bad news being that it still suggests that overfishing is occurring and the stock is not yet rebuilt, conditional on the council's selection of F 30 percent as a proxy for FMSY, but, on the other hand, the good news is that it is certainly showing substantial progress toward rebuilding over the last decade or so, since we first started doing assessments of red snapper, with

SEDAR 15 and then SEDAR 24 and then SEDAR 41 and now SEDAR 73. In particular, in the last five years or so, that rebuilding has accelerated, to the point where, in the terminal years of the assessment, the abundance is higher than we've seen, in the predictions of the assessment, since the 1950s.

The general topics that we'll walk through are the background and then the data, including new data that are used in this assessment that were not used in SEDAR 41, and the assessment model and any modifications since the SEDAR 41 results, and then forecasts, and there are some forecasts in the report, but I think there's also some room here for discussion on what you might need for making catch advice, and we can have some back-and-forth about modifications to the forecast.

Starting with the background, the SEDAR 41 benchmark had a terminal year of 2014, and that assessment found the stock to be overfished and undergoing overfishing, and that is based on the 30 percent proxy for FMSY, and that is something that has been codified, and so that wasn't a choice by any assessment panel along the way, and that actually is in the regulations, and so we reproduced that here for SEDAR 73, and then, for the terminal fishery and stock status indicators from SEDAR 41, the overfishing indicator was at 2.84, and the overfished indicator was at 0.14, and so some very low biomass relative to where you would want to see it at F 30.

SEDAR 73, this update, has a terminal year of 2019, and so we added five years of data since the last assessment, and it is an update assessment, but I would say we, compared to most update assessments, we had a very liberal allowance for including new data, and most of those new data, or all of those new data, sources and any assessment modifications we discussed at a previous webinar in January, and so none of that should come as a surprise in this presentation, but I will review it again, just so it's fresh in your mind.

The assessment itself was conducted via a series of webinars, and not officially part of this assessment, but still contributed some ideas, important ideas, to this assessment was a selectivity working group that met last fall, and the focus of that working group was the selectivity of the fishery-independent survey of SERFS, and, in particular, the selectivity of the video gear relative to the trap gear.

In the previous assessment, the video and trap indices were combined, with the implicit assumption that selectivities of the two gears were the same, and so this selectivity workgroup revisited that assumption and leaned very heavily on work done by the State of Florida, Ted Sweitzer's group, on using stereo video cameras to examine the lengths of fish that are seen by video and comparing that to the lengths of fish that are being caught in traps, and we also had some similar data from SERFS itself, from some special studies that were done in one summer, and, based on those data, it seemed apparent that the trap gear had a dome-shaped selectivity, but that the video gear was not necessarily dome shaped, and so, for this assessment, we split apart those two indices, and they're not combined, but they're treated as separate indices.

Also, for SEDAR 73, we had a data workshop that was called an in-person workshop, but we did it through webinars, and that went December 1 through 4, and then we had a follow-up on the 16th, where we discussed mostly data issues, but also a little bit of assessment issues, and then we had three follow-up assessment webinars in January and February of this year.

So enough background, and now we'll talk about the data. SEDAR 41 and this assessment used three growth curves, and the first one was a population growth curve, and that was for characterizing size-at-age of the population at-large, but, to characterize the landings, we had two different growth curves. One was based on fish taken from when there was a twenty-inch minimum size limit in place, and then the other was taken from outside of that minimum size limit, and then these two fishery growth curves were applied, as appropriate, to the landings, based on whether they were caught during or outside of the size limit.

There's an age-based natural mortality, and this is something that was updated for this assessment. This assessment used the Lorenzen curve, and it was scaled to Then et al. data, but it was only based on lutjanids, and that's different from SEDAR 41, which used the Charnov curve, and it was also scaled to Then et al., but all the fishes that were in the Then et al. paper and not just the lutjanids.

Spawning biomass modeled as population fecundity, and it's assumed that spawning occurs in the mid-summer, so that there's a portion of the year with mortality applied before computing spawning biomass. There's a 50-50 sex ratio, and there's a logistic model of female maturity. Batch size is estimated as a function of body size, and this is something that was updated for this assessment since SEDAR 41, with additional data and I would say an improved model that characterized the data better, better patterns in the residuals, and then an age-specific number of batches, which was not modified since SEDAR 41.

The fleet structure for this assessment was that there were three fleets. There was a commercial fleet that was predominantly handline, but any other -- A small amount of landings from other gears were pooled into the handline. Then two recreational fleets, the headboat fleet and then the general recreational, which is the private and charter boats, and then each of these had landings associated with them and then dead discards, where the dead discards were modeled as their own fleets, and so they're modeled as a separate fleet.

To give you an idea of the scale of landings and discards, these are in numbers. What I'm showing in the top-left panel shows the landings, in numbers by fleet. On this slide, and throughout the presentation, if you see "GR", that stands for general recreational, "HB" for headboat, and "CH" for commercial handline, and so what this is showing is that there has been a substantial amount of commercial handlines, but that the general recreational fleet is certainly a major player, and, for a lot of this time series, the dominant source of landings removals. If you look in the bottom-left panel, that shows the removals by proportion.

The top-right panel shows dead discards, in numbers, and clearly the general recreational dead discards is the major player in that, in the dead discards, and you can see that with the bottom-right panel, showing the proportions. In a few years, the commercial proportion is approaching 50 percent, but, by and large, most of the dead discards are coming from the general recreational fleet.

The composition data available for this assessment, for the length composition, we had commercial landings, starting in 1984, and we used those through 1992. They were available later than that, but not used, because we had age comps after that that were considered more informative. We had commercial discard length comps, and those had very small sample sizes, and only a few years, and so they were pooled into sort of two stanzas, one prior to 2010 and then the other after 2010, and that split of 2010 was chosen because of the moratorium that went in place in 2010.

The headboat discards are available 2005 through 2019, and then, for this assessment, but not for SEDAR 41, we had information on the general rec discards. For the age comps, we had commercial landings, headboat landings, the general recreational landings, and then we also had age comps from the SERFS chevron trap.

We had, for this assessment, five indices of abundance, and there were three fishery-dependent indices of abundance, and those were the headboat logbook, which starts in 1976 and went through 2009, and the commercial handline logbooks that started in 1993 and also went through 2009, and then we have the headboat discards from the states' observer programs, and so it's a headboat discard index, and that included only fish that were less than twenty inches, and the reason for that was because the twenty-inch size limit was in place up until the mini-seasons, but, to make this index consistent after the mini-seasons, in terms of the sizes, it was just constrained to fish that fell into that previous size limit. It was also intended to give some information on recruitment strength.

The logbook indices were truncated in 2009, and that's the headboat and commercial indices, because of the regulations that started in 2010, and after which we didn't think a fishery-dependent index would be very informative about abundance.

Two fishery-independent indices, both from SERFS. As I mentioned previously, in SEDAR 41, the trap and video indices were combined, because of the non-independence of the sampling, or the video cameras are placed on top of the traps, and, in this assessment, the two indices were split, and there is still the issue of the non-independence, but the issue of different selectivities was considered to be the more important issue of the two, and so we split them and tried to handle the non-independence in a different way that I will get to later. The chevron trap index starts in 2010, and it ended in 2019, and the video index started in 2011 and ended in 2019.

This is just a picture of those five indices through time, and they do have fairly strong agreement, and there is a high correlation, which is good, and we don't often see this strong of a correlation among the indices, and black sea bass might be the exception, where we see a stronger correlation than this, but this is a pretty good agreement for indices in the South Atlantic. Even the headboat at-sea observer index that appears to be increasing a bit prior to some of the other indices is actually in agreement, if you take into account that it's the smaller fish, and so you would expect, as year classes move through, that you would see that index increase first, with a bit of an offset, before the other indices, as the fish sort of enter into the selectivity availability.

Then this messy slide is a summary of all of the data that are available as input to the assessment. The first year of the assessment is 1950, where we have the commercial landings starting, and then the general recreational landings start in 1955, and the headboat landings start a little later than that, 1978, but, prior to 1978, it's not that we don't have the headboat landings, but it's just that they were pooled in with the general recreational landings, and so those removals are still there, and the assumption of the same selectivity in that time period between headboat and general recreational makes it so that it's inconsequential whether you split them out into the two separate fleets or pool them all into the general recreational. In fact, pooling them saved having to estimate the F parameters for these years of 1955 through 1977 for the headboat.

The estimates of discards don't start until a bit later, in the 1980s or 1990s, depending on which fleet, and then we have our various indices, with fishery-independent not starting until 2010, and

various years of age comps for the different fleets, and then length comps for the different fleets, and just, again, the commercial handline discard, and it shows only two years, but those are actually the pooled years, and the other years were included in the assessment, but they had low sample size, and the pooling was treated that way within the assessment, and so the assessment would pool the comps across years before trying to fit to the pooled comps, so that it didn't try to force all of those fits to occur in a single year. Then the general recreational discards is new information, and we only have the three years available, and that was from a special study that the State of Florida did with some MARFIN funding.

Then some new data for SEDAR 73, and this is largely what we discussed last January on an SSC call, and we have the general recreational landings and discards are coming from current MRIP methodology, and so FES, and so those values are -- Those estimates are higher than they were for SEDAR 41, and it gives us a little bit of a different perception of the ratio of recreational to commercial, especially in the earlier years, and we have some life history -- New information on life history, and I mentioned the batch fecundity new data and the revised model, and then also natural mortality that I mentioned previously, and we're now using a Lorenzen, scaled to Then et al., with lutjanids only.

The indices of abundance, trap and video, are treated as a separate time series for this assessment, and we also had an additional index, and that's the FWRI repetitive time drop survey, the hook-and-line survey, and the corresponding age comps, and the reason for including those was some discussion about the selectivity of that gear, including some of the older fish that we wanted to be aware of when they're in the population.

We had some new information on discard length comps from the commercial side, and there's the shark bottom longline observer program, and that's, I guess, a little bit of an unfortunate name, because it's not all sharks, and it's not all bottom longline. They also sample from handline, bottom fishing for reef fishes, and so we have some information there. For the headboats, there is Captain Steve Amick's data from Georgia, where he and his crew were measuring I guess almost all of the red snapper that they were capturing and releasing over the past several years, and so those were included in the headboat discards, and also weighted appropriately by the discards in Georgia.

We had, for the general recreational, the FWRI charter boat observers, and so those three years that I mentioned, and then there was also some information from MyFishCount that anglers were submitting through that program, and we were able to take advantage of those data as well and include those in a sensitivity run. Then we have some new information on discard mortality, in particular how it may have changed with the use of descender devices.

This is to give you some sense for the change in natural mortality, because it's a really critical input for this assessment, and perhaps the most critical input for this assessment, and I mentioned that we're scaling now to Then et al., the lutjanids only, and so I wanted to give you a sense for how the two different curves compare when we're scaling to the same thing, and so, in this top-left panel, the Charnov curve is shown in blue, and the Lorenzen curve is shown in red, and the Lorenzen curve is the natural mortality curve that we're using in this assessment. I guess the take-home here is that the difference between the two curves themselves, or the shape of the two curves, is primarily in the younger fish, with a bit of a steeper descent in the Charnov model.

The bottom-right panel shows the Then et al., and the two curves, when they're scaled to Then et al., all of the species, and the blue curve is, again, the Charnov, and that's the curve that was used for SEDAR 41, and then the red curve would be the Lorenzen curve that would be scaled to all species, and so, again, that's the main difference. When the two are scaled similarly, the main difference is in the younger fish, with higher mortality from Charnov.

Discard mortality was somewhat different here, and we still had different blocks, as we did in SEDAR 41, and Block 1 was the same, and this was the information leading up to, for the recreational, 2011, and, for the commercial, it's 2007, and this was initially the discard mortality that would be expected from the use of j-hooks, but then, as the circle hook regulation took effect, and it was being used and implemented, then there was a change in the discard mortality, and so, for the recreational, that was 2011 through 2016, and the commercial was 2007 through 2016.

Then the additional use of descender devices -- Starting in 2017, we had another reduction, and this is new for this assessment, and we had another reduction, with the assumption of about a 25 percent descender device use, and that led to a reduction, a fleet-specific reduction, in Block 3, and then we had a Block 4 that didn't affect the assessment, but it was used for the forecasts, thinking that there would be increased descender device usage going forward in time, and so, after 2020, there was an additional decrease in the discard mortality rate, due to the increased use of descender devices.

These reductions in Blocks 3 and 4 are based on discussions that were had by the assessment panel, but largely based on this working paper by Vecchio et al. that is on the SEDAR webpage. This might be a good place to pause, if there's any questions, before we get into the assessment model, if there are any questions on the data.

DR. COLLIER: Kyle, Jie Cao has a question.

DR. CAO: Thanks, Chip. Thanks, Kyle. I have a question about the discard mortality. It seems like the -- So this discard mortality is constant across the ages, right, or size? I guess my question is, is there any evidence suggesting this discard mortality is size dependent? I mean, for example, a large fish is more likely to survive up to release, or maybe it's more likely to be vented or to be released in a better condition, and, I mean, I feel like the discards being the dominant source of fishing mortality I think might be something to consider, if it's not size dependent in this case.

DR. SHERTZER: That's a good question, Jie, and you're right that it's treated as constant across the ages or sizes that are released, and there is the selectivity curve that is applied, so that not all fish are released, or caught, but, of those that are released, it's a constant rate. I don't know about evidence for age or size dependence on the rate, and it may be there, but I'm not familiar with it, and there is certainly evidence of depth dependence and hook location dependence, and so fish that are gut-hooked, as opposed to lip-hooked, have a higher mortality rate, and fish that are captured and released in deeper water have a higher mortality rate. The rates that are here are intended to be an average across what would be expected of hooking location and depths, and so it's accounted for in that regard, but it's not an explicit function of those things.

DR. COLLIER: Wilson Laney had a question.

DR. LANEY: Thank you, Chip. So, Kyle, my question may be more appropriate for research recommendations at some point, but I was wondering -- You had indicated, and the assessment indicates, that the peak of the spawning for red snapper occurs in mid-summer, and I am presuming that's based on some sort of sampling of eggs or larvae, and I was wondering if, in terms of trying to do projections for the future, is there any indication at all that in temperature -- That red snapper spawning is strongly dependent on a certain optimal temperature, and, if that changes in the future, then would that need to be taken into consideration in the projections?

DR. SHERTZER: That's a great question, Wilson. I guess I will leave it at that. It's a great question, and I don't have an answer for it, other than that, if it's something that is important, then we should try to study that, or we should study it first, and find out if it's important, and, if it is important, we should try to account for that in the forecast.

DR. LANEY: Thanks. I mean, I don't -- Obviously, I don't know the answer either, and maybe somebody else, like Marcel, might comment on that, or somebody that has actually done observations on red snapper spawning and/or looked at whether or not there's a preferred optimum for spawning, but maybe we can stick that one in research recommendations.

DR. COLLIER: Okay. Scott Crosson had a question.

DR. CROSSON: Not the discard mortality rate, and that's really important information, but the discard rate itself, and you indicated, on Slide 14, that's coming from MRIP. Given those projections, can you tell me how MRIP derives those discard rate numbers? I mean, is that coming from the intercept survey, and are they making adjustments for potential underreporting?

DR. SHERTZER: Yes, it is coming from the MRIP intercept, and I don't know the answer to that, if they're making an adjustment for underreporting. I presume not, because I don't know how they would do that, but I'm not certain about that.

DR. COLLIER: All right. Fred Serchuk was next.

DR. SERCHUK: Thank you. In the slide that you showed of the data summaries, it's clear that most of the information, except for landings, most of the ancillary information really comes in from 1980 onwards. Before that, almost the only sources of information were the landings, and, in a few years, the headboat index, and, if you start looking, and we'll get to it in some of the results, you'll find that things change quite a bit after 1980 in the assessments, and landings were very much higher before 1980.

After that, they're very much lower, and so on and so forth, and I'm just wondering. Have you done any exploratory analysis because of that, to say what would happen if we started the assessment in 1980, where we have multiple data sources now coming in, and see whether -- How congruent that is with the results starting in 1950, which, for almost thirty years, we've only had landings data?

DR. SHERTZER: That's a good question, too. You're right that the reason for this 1950 start year is because of the high levels of landings in the 1960s and 1970s, and it was thought that it would be important to include that source of mortality, and, in particular, in previous assessments, the commercial landings were sort of the highest then, and that's still true, although we have a

little different perception now of the relative effect of that, with the revised MRIP, or recreational landings, going back in time that are on similar scales.

In this assessment, no, we did not investigate the later start year, and we investigated different levels of landings in the historic period, but, as an update, we didn't change the start year for this assessment, but I will say that the previous two assessments, SEDAR 24 and SEDAR 41, both did run sensitivity runs, where they started the model in the 1980s, and so after age and length comp data were available, and, in both of those cases, the results were very, very similar to what we get when we started it in 1950.

DR. SERCHUK: That would also include the estimation of the reference points, that is being the BMSY and FMSY based on the results of 1980 forward, even with the 30 percent proxy?

DR. SHERTZER: I would have to go back to look at what the scale of the reference points -- When I said they were very similar, I was mostly thinking about the ratio, the relative F, F relative to its reference points, and its reference point at SSB relative to its reference point, and I would have to go back to look at the scale of the reference points themselves though.

DR. SERCHUK: Okay. I'm not trying to be a bug-bear about this, Kyle, but I am just concerned that those thirty years' worth of data, in which we basically only had landings, it's possible, because the landings were so high there, that we may be trying to rebuild the stock to a level which, either because of productivity changes or because of the overall influence of those early years, it may not be possible any longer. That's just a question I have, and I have no basis for thinking about that, other than to compare an assessment from 1980 forward to the complete data series that you start in 1950. Thank you.

DR. SHERTZER: It's a really good point. It's always a seesaw of trying to capture the prevailing conditions while also considering stock potential, and so start year is always an important consideration and trying to balance those two ideas.

DR. COLLIER: Fred Scharf had a question.

DR. SCHARF: Kyle, I just wanted to ask a little bit about the change in the natural mortality curves. You talked about how you guys switched from the Charnov model to the Lorenzen and then rescaled based on just the subset of lutjanids in the Then paper, and so, in looking at those plots, it seems like certainly the scaling has an effect, but the model shift probably is more impactful. If that's correct, what was -- Could you just talk a little bit, maybe for a second, about what informed the change and why you guys decided to shift from the Charnov to the Lorenzen model, given how important this input is?

DR. SHERTZER: Sure. We had Kai Lorenzen that joined one of our webinars, just to help us walk through this topic, and we were considering whether to change from Charnov to Lorenzen, and I think, based on his arguments, we thought that Lorenzen was probably a better characterization of actual mortality, and Charnov is more of a theoretical construct, based on some ideas from life history evolution, but the Lorenzen curve was more informed by empirical observations.

Then, the scaling, that one just seemed more intuitive, that red snapper mortality should be more similar to other lutjanids than to the gobies or all of the fishes that were in the Then et al. paper, and I did run several sensitivity analyses, to investigate the influence of these decisions, and the sensitivity analyses were run after making the decisions, and so the decisions weren't informed by the sensitivity runs, but what I actually found was that curve itself is less impactful than the scale.

DR. SCHARF: That's interesting. Okay. Thanks, Kyle.

DR. COLLIER: Dustin had his hand raised.

MR. ADDIS: Since you brought up life history, I thought I would bring up this question. I'm looking at Table 2 in the assessment report, and I had a question about the female maturity. It looks like 43 percent of age-one females are mature, and, in the text, it says there's 50 percent maturity by age 1.3. I guess, when I referred to SEDAR 31 and Gulf red snapper, and their first age at maturity in that assessment is two years.

There is this difference in maturity between Gulf and South Atlantic, and I even dug a little further, and I looked at the review workshop report for SEDAR 41, and it said the low estimate of age at first maturity in females was considered by the review panel to be unusual for snappers. I guess I'm just wondering about this early maturity in the South Atlantic versus the Gulf, and could you comment on that?

DR. SHERTZER: Only that I agree with your observation. It is a very young age at maturity, and I'm not sure about the difference between the Gulf and the Atlantic, but the Atlantic was based on data from the Atlantic stock that was developed by the MARMAP scientists, and so, yes, certainly it's a very young age at maturity, and, in particular, it's a very young age for a species that lives as long as it does. It's an unusual life history.

MR. ADDIS: I was also -- In the same table, I'm looking at the batches per year, and I'm assuming this is spawning occurrences per year, and they're batch spawners, red snapper, and I am assuming their spawning season is like April to October-ish, and so some of these batches, I guess in some of these older fish -- I mean, these fish are spawning every-other-day, very frequently, and I just wanted to bring that up.

DR. SHERTZER: Yes. Another good observation. There has been some speculation on the maturation, that that's something that is plastic and perhaps a response to the high exploitation rates in the past.

MR. ADDIS: Thanks, Kyle. That's all I had.

DR. COLLIER: That is all the hands that were raised for this section, Kyle.

DR. SHERTZER: Okay. I will move into the assessment model section. The assessment uses the Beaufort Assessment Model, which is basically the same structure that was used in SEDAR 41, and it's an integrated catch-age formulation, and it's fit to the data available using penalized maximum likelihood. It estimates the fishing mortality rates by matching landings with the Baranov catch equation. The spawning stock is based on population fecundity, which depends on the length-dependent batch size and age-dependent number of batches, and I should have also

included the sex ratio and the maturity schedule in this list, and then it has the age-based natural mortality scaled Lorenzen.

The initial age structure, in 1950, is estimated as an equilibrium age structure, because we don't have information on age structure in the first year, and so it's the equilibrium age structure conditioned on an estimated initial fishing mortality rate, and then we have recruitment deviations that start in 1978, when they can be informed by the age and length comps, and the ages modeled are one through twenty-plus, and twenty is a plus group.

We have constant CV of size-at-age that is estimated for each of the three growth curves, the population growth curve, the fishery twenty-inch size limit growth curve, and the fishery no size limit growth curve, and then the assessment characterized uncertainty using a Monte Carlo Bootstrap Ensemble approach.

The selectivity structure for the assessment, which is very similar to SEDAR 41, with the exception of the chevron trap and video indices that we discussed, and so I just put this table together to indicate the shape of the curve, but, in this slide, they are color-coded to show you which ones are mirroring each other, and so, in this first block, the 1950 through 1991 block, the headboat and general recreational landings are dome-shaped, and they share a selectivity curve.

For Blocks 1 and 2, for the headboat and general recreational discards, it's dome-shaped, and they share a single curve, and then the headboat discard index has a consistent selectivity, dome-shaped throughout its time period, until the end of the assessment. However, it keeps the same selectivity as the headboat discards from when the twenty-inch size limit was in place, and that's, again, because of focusing that index on only fish that were smaller than twenty inches.

Then the chevron trap video index, those are color-coded, and sort of only halfway color-coded, and the reason for that is because they share the ascending limb of the selectivity, but the descending limbs are different for a chevron trap, and it's allowed to be dome-shaped, and the video is forced to be flat-topped, but the ascending limbs are the same, and both of those are informed by the age comps from the chevron traps.

A few modifications for this assessment, and the SERFS trap and video indices were included as separate time series, and I just mentioned this, but the selectivity of the traps was dome-shaped, rather than flat-topped, as it was in SEDAR 41, and the selectivity of video was flat-topped, where the ascending limb mirrored the ascending limb of the trap index. The video index here was upweighted, and so we've divided the CVs by three, to achieve a closer fit to -- Mostly to the high observed values in the terminal years, and this was a decision made by the assessment panel, where we noticed that the video index fit wasn't as tight as we would like to see it in those last few years, especially because of the indication here of the high abundance, and so we gave extra weight to the video index.

Then each of the likelihoods was multiplied by 0.5, to account for the non-independence of sampling, and we discussed this in January, and we did try to get the bivariate likelihood approach to work, and it works in the sense of fitting the data, but it didn't actually converge, and it had a very high maximum gradient, which we don't like to see, and so we really need some more time to develop this approach and vet it before applying it in an actual assessment.

Another difference was that the plus group for fitting the age comps was thirteen-plus for the commercial, but it was ten-plus for the headboat, general recreational, and chevron trap, and that was because of the many zeroes that are observed in the older age classes, and this is similar to what was done in SEDAR 41, but, in that assessment, thirteen-plus was used for the commercial, but also the general recreational and the chevron trap, and so here it was ten-plus for the general recreational and chevron trap.

The recruitment model here is effectively the same, but subtly different, in the sense that we used a mean recruitment model, where SEDAR 41 applied a Beverton-Holt model, but, because of the steepness parameter, it will go to its upper bound, and it was just fixed at something very high, 0.99, and the idea there was to approximate a mean recruitment model, but, in this assessment, we now have the mean recruitment model built in as an option in BAM, and so we used that directly, and then, similar to SEDAR 41, we had lognormal deviations in the recruitment.

The comp data were fit using the Dirichlet multinomial in this assessment, rather than the robust multinomial that was used in SEDAR 41. The Dirichlet multinomial is recommended in several recent studies, including one out of the Southeast that isn't published yet, but is a simulation study by Nick Fisch at the University of Florida, where he was able to look at a lot of different circumstances and spatial fishing and the effects on overdispersion and correlation that he would see, and he found that the Dirichlet multinomial was an appropriate likelihood for fitting those data, particularly when sample sizes are not large, as we have here for comp data.

The Dirichlet multinomial better accounts for overdispersion than the robust multinomial, and this can result from intra-haul correlation, where landings from one trip, or one set, have much higher correlation in the age structure than across different trips.

In my mind, probably the biggest advantage of the Dirichlet multinomial is that it's self-weighting, so that we don't need to go through the iterative reweighting process, and we can just estimate a parameter that weights the comp data. Also, this has become standard practice in SEDAR assessments, both in the Atlantic and in the Gulf of Mexico.

As I mentioned, the iterative reweighting was not done in SEDAR 73. In part, that's not necessary for the comps, because of using the Dirichlet multinomial, and it was not done to the indices here, because we examined it, and it degraded the fits to the indices, which is not something we want to see, as the indices, especially the fishery-independent indices, are our primary sources of information on population dynamics.

We examined two different alternative measures of fishing intensity, in addition to apical F , and so the apical F was still used as our primary measure, but, based on the SSC review from the previous assessment, from SEDAR 41, and acknowledging that the focal age that is caught can vary through time when selectivities are changing through time, and relative F s across fleets are changing through time, and you can see a change in which age has the highest exploitation rate, and so there is some concern about that, and so we examined alternative fishing metrics. We used the SPR, sort of a static SPR measure, conditional on that year's F and selectivity patterns, and then also exploitation rate, the number of fish that are killed divided by the number in the population, and you can look at that in either numbers or weight, although numbers is usually the go-to metric for exploitation rate.

Then, characterizing uncertainty, again, we used the MCBE formulation, in which we bootstrap across -- We bootstrap the data. For age and length comps, this involves a multinomial resampling process. For indices, landings, and discards, it's based on the multiplicative lognormal process, and then there's a Monte Carlo that's happening alongside the bootstrap, and so all simultaneously, and the Monte Carlo includes drawing any parameters that are fixed in the assessment that may be important, and so natural mortality is an obvious one to include for this.

In this case, we bootstrapped on the Then et al. data themselves, to estimate a new Then et al. equation, and it was sort of necessary to bootstrap the data, so that we could keep any correlation structure that existed in the model estimates and the parameters that are being estimated for the Then et al. equation, and then that was paired with drawing a univariate, or a random uniform, draw for the Tmax that was assumed to be between forty-eight and fifty-three, and that range was straight from SEDAR 41. The maximum observed age in the Atlantic was fifty-one.

The discard mortality was drawn from normal, truncated normal, values, based on the values that I showed previously in the tables, and so the discard mortality rates, given those ranges, and it was forced to be decreasing over time, and so, for any given fleet, the upper bound on the normal deviate would be the value that was drawn in the previous time block, and that was to preserve that structure that discard mortality should only decrease through time, because of the regulations that had been placed on it, going from j-hooks to circle hooks and then implementing descender devices.

The batch fecundity, that was bootstrapped on the raw data, to estimate the model, and batch number is the same, bootstrapped on the raw data, and, again, that was to preserve any correlation structure in the estimated parameters of the model. The scale of historic recreational landings was another draw, and this was a truncated normal deviate with a mean of one and a CV, or, in this case, standard deviation, because the mean is one and 0.59, and that value -- A CV of 0.59 comes from the data providers, and then this scale was used as a multiplier on the values that were being input, the historical recreational landings, in addition to the bootstrapping that was occurring on those values.

There were 4,000 model runs attempted, and most of them converged, but about 8 percent of them were culled and thrown out because they didn't converge, or a parameter hit a bound, and so they weren't considered valid runs and were removed.

A little bit more on this process, this would be the natural mortality that was drawn at random, and this was the range that was drawn, and then the value coming out of this was used to scale the age-dependent Lorenzen M. Here's an example of the discard mortality rate draws across the time blocks, and the top panel is Time Block 1, and this is the general recreational discard, the range that would show up in the MCBE runs, and we would draw from this distribution, and then the next time block -- We would draw, again, from the same distribution, but using the upper bound of the value that was drawn in the previous run for each given iteration, and then the same thing for Period 3.

The vertical line is the value that was used in the base run, and so that's the mean of the distribution that I showed in the table previously. The distribution shown is what was used in the MCBEs, and so you can see, in this third time block, that you do start to see an effect of using an upper bound of the value from the previous block, in the sense that the value used in the base run is no longer

centered at the peak of the distribution that is being used in the MCBE process. Something similar would have been done for each of the three fleets.

This is the reproductive output, and so this scales the mature females, and this would be the reproductive output, and the values shown here combines the uncertainty from batch fecundity and the number of batches, and the solid line was the value, the curve, used in the base run, and this is true of -- Any time I show MCBE output, the solid line is the base run, and the dashed line is the median from the 92 percent of 4,000 MCBE runs, and then the range shown is a 95 percent interval across all of those several thousand runs.

You can see here that the maturity happens at the very young age, but those younger fish, the age-ones and age-tvos, are really contributing very little to the spawning population, in terms of their fecundity, and so you do see an increase, even after age-ten and up to through age-twenty, and it does saturate as they become teenagers, to some degree, but there is still an increased value of say fifteen-year-olds relative to ten-year-olds, in terms of their spawning contributions. I think this is an important curve to keep in mind when weighing the value of age structure in the population. My PowerPoint is frozen.

DR. COLLIER: While you're frozen a little bit, Fred Serchuk has a question.

DR. SERCHUK: Kyle, I think the reproductive output graph that you put up is very informative. I wonder, also -- For a number of other species, it's been shown that the egg viability of younger, mature animals is very much less than egg viability of larger, mature animals. Is there any evidence of this in red snapper?

DR. SERCHUK: I am not aware of that for red snapper specifically. I am aware of it for other species as well, and if any of the MARMAP scientists or others who are more well versed in the reproductive biological information, then maybe they can chime in.

DR. SERCHUK: The only reason I raise it is, if you have a population in which you have a lot of young animals contributing to the population fecundity, and they make up perhaps a large proportion, or maybe a significant proportion, but the egg viability of those younger animals is very low, and you are going to get a misleading picture of the total reproductive output, potential reproductive output, because of the differences in egg viability between the young and older animals. That's just a thought. Thank you.

DR. SHERTZER: That's a good point, and so the curve that I just showed about the fecundity, if that were indeed happening with egg viability, that that would be an increased reason for values of the older fish relative to the younger fish, and that's not represented in the curve that I showed.

DR. COLLIER: Wally Bublely has his hand raised.

DR. BUBLEY: Just to jump in Fred, I do not know of any studies that have looked at egg viability by age for red snapper in particular, and so that's not very useful, other than to say that I'm not aware of any.

DR. SHERTZER: It's been show for west coast rock fishes, but I haven't seen those studies for red snapper, specifically. This is just a little bit more of an example on the bootstrapping on the

data. In this case, this also has a scaling of recreational landings, and so this top-left panel is the truncated normal distribution, centered on one, with a CV of 0.59, and it's truncated plus or minus one standard deviation, and that was applied as a multiplier on the historic landings, but, when you put that in with the bootstrapping, what we see is the bottom-right panel, and the thick black line was the original data series, but, for any one of the MCBE runs, we would draw one of these multicolored runs, and I know you can't pick out these individual runs, but the point here is that there is a lot of variability that's captured by the process in the landings.

This is a series of sensitivity runs that were included, and let's walk through the list here. The MyFishCount data were included, and these are the comps on the general recreational discards, the length comps. Then the RTD index, the handline, the Florida handline, index, along with the corresponding age comps, was included. There was a series of sensitivity runs where we dropped an index, and the first one was where we dropped the chevron trap index, and then, for the next one, we dropped the video index, but, in this case, we also upweighted the chevron trap index, because, in the base run, the video index was upweighted, and so the upweighting to the chevron trap index was the same as in the base run, where we just divided the base run by three.

Then there was a run where we dropped the headboat discard index, and there were two alternative weightings on the video index, and so, again, the base run had a weight of three, and so we upweighted it to four, and we downweighted it two, and then a series of natural mortality sensitivity runs. There was a high M, where we used a scaling of similar to a constant M of 0.15. Based on the Then et al. equation, this would imply a maximum age of thirty-eight. Again, the maximum observed age is fifty-one. Then we had a low M of 0.07, and it was scaled to this value, and this low M would imply a maximum age of eighty-seven.

We used the SEDAR 41 M, and this was the Charnov M, scaled to 0.13, and then the Charnov M scaled to 0.11, which is the value used in SEDAR 73, and, Fred, this was sort of trying to get at the question of what's the driving issue, is it the scaling or is it the shape of the curve.

We used the robust multinomial likelihood for the comp data. In this case, we did use the iterative reweighting, similar to what was done in SEDAR 41, and then there were a couple of what we considered to be just purely hypothetical sensitivity runs. One was where we took the discards, and, starting in 2010, we adjusted them downward to 10 percent of the observed values, and there the question was, if discards were very low, much lower than the observed values, what effect does this have on our perception of fishing or overfishing?

The next one was to adjust M upward until the stock was considered rebuilt, and so, with higher M, we get a more favorable stock status, and the question was just how high would M have to be, and we do have uncertainty in M, but just how high would it have to be to where we would perceive a stock as no longer being overfished, and, there, the M that would get us there is 0.2. Then there was a series of retrospective analyses that were run, and this is another break point.

DR. COLLIER: I am not seeing any hands raised right now, Kyle. They're going up now. Jie.

DR. CAO: Thanks, Chip. Thanks, Kyle. I just have a quick question, and I think you mentioned the exploitation rate, and I don't remember, and do we have an exploitation rate in terms of spawning stock biomass? I think you mentioned the total abundance and total biomass. The reason

I ask that is because I think it's important to look at that, because we've seen the age structure has shifted towards the young fish.

DR. SHERTZER: I did not compute that based on spawning biomass, and only -- The focus was on numbers, because that's how it's usually handled, and then we just computed it in biomass as well, and it is age-one-plus. It would also be possible to change that to age-three-plus or anything X-plus. One-plus was chosen because of the selectivity, because it was included in the selectivity, particularly of discards, but I did not compute it just based on SSB.

DR. CAO: Thanks, Kyle.

DR. COLLIER: I am not seeing any other hands raised. Chris Dumas.

DR. DUMAS: Thanks, Kyle. This is a great presentation, and I've got a question about combining the different landings series and indices series together, when you do the estimation, and what's the assumption on the -- If you think of the variance-covariance matrix across the different time series, and I'm looking at the documentation for the BAM model, and it's got like first order autocorrelation across time, but, across the series, is there -- Is there an adjustment made or is it allowed for the errors to be correlated across the series at a given point in time, and so contemporaneous correlation across the different series, when you do the estimation?

DR. SHERTZER: They are not treated as correlated estimates. Each time series is fitted using lognormal distribution.

DR. DUMAS: So the series were assumed to be independent, in a sense?

DR. SHERTZER: Well, I mean, they're not independent, in the sense that they're all coming from the same underlying biomass, but, when they're fitted, the likelihood is treated as its own likelihood.

DR. DUMAS: Right, and so, in the slide where you show that the indices follow each other pretty well over time, and I can't remember which slide that was, but that would seem to indicate that there is contemporaneous correlation going on. If something bumps up one of the series in a given year, the other series bump up too in that year, bump up or down, and so we might be able to get some improvement by allowing for contemporaneous correlation, correlation in the errors across the time series at a given point in time.

Here, you're saying that, when you had multiple time series, they tended to move together, and the HB at-sea observer series maybe had one time period, and it had a one-time period lag compared to the other series, and you could put that in with the time period, the one time period lag, but then, if they're moving together, up and down, that's contemporaneous correlation, and, by allowing for that, thinking of sort of a variance-covariance matrix across the time series, that could improve the precision of the estimates. That's all. Thanks.

DR. SHERTZER: Thanks for that comment.

DR. DUMAS: So, basically, you would be estimating all the series together as a system and allowing for correlation in the errors across the series. Thanks.

DR. SHERTZER: I'm actually not aware of any assessment packages that fit these time series in that way, and I hear what you're saying, and that could be important, in terms of the estimates of variance that you get as output from the assessment, and it certainly seems true -- We're not using -- In this case, we're not using any of the asymptotic estimates that we get for variance estimates to characterize uncertainty. Instead, we're using sort of the ensemble modeling approach, and we're just pooling all of the MCB output in the end.

DR. DUMAS: But you got a separate estimate for each time series of that uncertainty?

DR. SHERTZER: Yes.

DR. DUMAS: Which is great, but then, also, allow for basic covariance across those uncertainties, and so some packages, and so SAS and R might -- The package would be seemingly unrelated to regression, and I think there are also maximum likelihood versions of that. Seemingly unrelated regression.

DR. SHERTZER: I mean, that is what I tried to implement for the SERFS indices, where they were considered correlated, the bivariate distribution with a covariance that was input.

DR. DUMAS: Right, and this might fit, or converge, better, because it's not as general as the bivariate, and it's got a little bit more structure on it, but at least you're allowing for covariance between them, and, if they're moving together like this pretty well, then that tells you there is some covariance there, and so you might be able to get some benefit by looking at it.

DR. SHERTZER: Yes. I mean, we would expect to see covariance. If they're tracking abundance, they should covariate, because they're all, presumably, tracking the same underlying abundance, offset by selectivities.

DR. DUMAS: The same thing could be said, also, possibly, for the video and the chevron traps, if they move together.

DR. SHERTZER: Yes.

DR. DUMAS: Thanks. I won't belabor it any more. Sorry. Thanks, folks.

DR. SHERTZER: Thanks for the comment.

DR. COLLIER: I am not seeing any other hands right now, Kyle. Erik Williams had his hand up for a second, but it went back down, and I see that Genny is unmuted right now.

DR. NESSLAGE: Chip, do we want to take a quick, five-minute biological break right now, since we're at a kind of midpoint here? I don't know why I'm phrasing that in the form of a question. Kyle, do you mind if we take a quick, five-minute break?

DR. SHERTZER: Not only do I not mind, but I would appreciate it.

DR. NESSLAGE: All right. Why don't we do that, since you're at pending results here, and we'll come back and wrap up with results and projections before lunch, and does that sound like a plan?

DR. COLLIER: That sounds good, and, Kyle, I am going to take the presentation from you, and so we're going to take a break until 10:50, and does that sound good?

DR. NESSLAGE: Yes, and I would also ask the SSC -- Given that we have a very packed agenda this week, but I would like to end around 5:00 each day, if folks would consider taking a half-hour lunch break, instead of an hour like we usually do when we're together and going out and grabbing lunch, and I wanted to toss that idea out there, but I recognize that some people may have obligations, et cetera, and so, if you have a strong opinion one way or the other, please email me before noon. Thank you, and we'll see everybody back at 10:50.

(Whereupon, recess was taken.)

DR. COLLIER: It looks like we have most people back, and I will send the presentation back to Kyle.

DR. SHERTZER: Are we ready to go on, or are we still waiting for some?

DR. COLLIER: I think we're ready to go, and I saw Amy and Fred both had their hands raised, and I wasn't certain if that was a question or if they were just indicating that they were back. Amy's hand came back up.

DR. SCHUELLER: I don't know how that happened. I thought I had put it down.

DR. COLLIER: Okay. Kyle, I think you can go ahead, if Genny is okay with it.

DR. NESSLAGE: Yes, please do.

DR. COLLIER: Amy, I see your hand is back up.

DR. SCHUELLER: I'm not doing that. It keeps going up, and I keep putting it down, and I'm not really sure why it's doing that.

DR. COLLIER: It picks on some people every once in a while, and so I guess it's picking on you today.

DR. SCHUELLER: I guess. If it keeps doing it, I will just log out and log back in.

DR. COLLIER: Okay.

DR. SHERTZER: The next section is on results, and we can go through this fairly quickly, and this is fits to the data. The first several fits will be to the landings and discard time series, and so this is the fit to the commercial landings, and it's a very tight fit, and that's sort of by design. It's configured to fit the landings and discards closely, and this is commercial landings in weight, and then these are the recreational landings in numbers, and they're fitted in numbers, with headboat on the left, with the time series starting in 1978, and then recreational on the right.

These are fits to the commercial dead discards, in numbers, and then the recreational headboat and general rec dead discards, with headboat on the left and general recreational on the right. The next series of plots are fits to the composition data, and the panels here will indicate whether it's length comps, L comp for length comp, and then the fleet, and so this first set is the length comps from the commercial handline, and each panel will also indicate year, and the observed values are the open circles, and the fits are the solid curve.

The first two columns on the left are the commercial handline and then the commercial handline discard starts, and, again, we just have these two, and these are the pooled years, and they are just indicator years, but they are pooled across stanzas, and it's still a low sample size, even after pooling, and then it starts the length comp for the headboat discards, and that continues through this slide. Reading down the columns are the years, and you can progress through time by reading down the columns.

I am just going to scroll through these and call out which ones we're looking at, but, if you see something that you want to discuss in more detail, then just let me know. These are the length comps from the general recreational discards, three years of those, 2013 through 2015, and then we start the age comps for the commercial handline, starting in 1996 through time. That continues on this slide through the terminal year, and then we start the age comps for the headboat fleet, starting in 1978. It's fairly low sample sizes early on, and then that continues on this slide from 1985 through the bottom-right panel, which is 2014. Then the last year of those data are in 2018. Then the age comps for the chevron trap start in 2010, and those go through 2019, and then age comps from the general recreational fleet, and that goes through 2019.

Then we have fits to the indices, and this is the commercial handline index, and the open circles, again, are the observed data, and the lines being shown are the 95 percent confidence interval from the CVs from the data, which may get adjusted. For example, with the video index, they are divided by three, and so they're smaller CVs for fitting than what is input from the data providers. The bottom panel shows the scale residuals.

This is the headboat index, headboat discard index, and this is the chevron trap index, which is some of our very important information on this increase of abundance over the last decade, and then the video index, and so you can see that the confidence bands on these are much smaller, and that's because, again, the CVs were divided by three, and that was to try to achieve this closer fit to the terminal years. If we didn't divide the CV, if we didn't give it a smaller CV, than the fit, especially in the terminal year, was degrading, and it was underfitting the last few years of this index, which we didn't want to see, and we wanted to try to capture this increase in abundance.

This is the estimated abundance at-age, color-coded by age through time, starting in 1950, but the equilibrium age structure is conditional on an initial F, and then it decreases, especially starting in the late 1970s and early 1980s, but then some increases in the terminal years that are really being driven by some high recruitment events in the mid-2000s. In 2006 through 2008, we saw some high recruitment, and then, in the last years of the assessment, again, high recruitment, and that's driving the estimates of abundance, total abundance to be at least on par to what we saw, if not higher than what we saw, over this entire time period.

This plot shows the age structures that are scaled by abundance-at-age, and so the bubbles are scaled to represent abundance-at-age, and the curve is showing the average age through time, which started at a little older than six as an average, and went back in time, but, when abundance decreased, then the average age decreased, and it has stayed somewhat low, largely because of these high-recruitment events, where we have large abundances of recruits, and so that sort of pulls this average down, but you can see a little bit of the age structure sort of filling out.

These year classes, in the mid-2000s, you can see that they do progress through time, and I'm going to show this plot again in a little bit with the biomass, and you can see it a lot stronger in the biomass, with the age structure beginning to fill out in these terminal years.

This plot shows the equilibrium abundance-at-age that we would expect to see at F 30, and that's what is in black, and then certain years, decades and the terminal year, where the stock was estimated to be relative to the F 30 equilibrium in those years, and this shows the age structure, and that was depressed in the 1980s and 1990s, but then this terminal year -- The age structure is a lot closer to what we would expect to see at F 30. The youngest ages are larger than we would expect to see them, because of the high recruitment, and then even the 2006, 2007, and 2008 year classes that were very high are now teenagers, and those are very close to what you would expect to see at the equilibrium.

That is despite having the estimate of overfishing occurring throughout that time period, and so those year classes were so high that, even after levels of overfishing throughout their life period, they're still very close to what we would see at equilibrium.

This is the biomass, estimates of biomass-at-age, over time, and it's a similar pattern to the abundance-at-age, but the increase at the end isn't nearly as substantial, because of it being tilted toward younger fish that are smaller, but we still see, in the biomass, that the -- In these terminal years, this rapid increase in the total biomass.

Then, when you look at the weighted trends of biomass-at-age, and this is what I wanted to point out with this slide, is that, in these terminal years, these year classes that are surviving through to the end of the assessment period, and you can see that the rebuilding of the age structure, especially when you look at it in terms of biomass, that these teenagers are there, and we are seeing the rebuilding.

If you track the spawning biomass through time, it kind of shows that similar trend as the total biomass, that it decreases throughout the earlier part of the first few decades of the assessment, and hits a bottom in the 1990s, but, in recent years, it's been increasing, and it's just not quite to the level yet that we would expect to see at F 30, and the metric for being rebuilt is this SSB at F 30, and so it's not there yet, but it certainly has been in the right direction.

These panels show recruitment, the estimated recruitment over time, and, in the first few years -- The one on the left is the actual levels of recruitment, in terms of numbers of fish, and these are age-one fish.

I mentioned earlier that the recruitment residuals were not estimated until 1978, and so the first few years of the assessment is just the equilibrium mean level of recruitment that is applied, and so we're using that mean recruitment model, and this is showing the level, the mean level, that is

applied, but then recruitment residuals are estimated started in 1978, and recruitment is quite variable, and then you can see the strong recruitment classes in 2006, 2007, and 2008 and then again in the last few years of the assessment. You can ignore this value in 2020. It's not actually an estimated value, and it doesn't play any role in the assessment, and it's just sort of a forecast that's brought back down to the mean value, because there's no information on that, the level of recruitment in 2020, because the data stopped in 2019.

Then the panel on the right shows the actual recruitment residuals that are applied, and so we have the mean recruitment model, and then we apply these lognormal recruitment residuals, and I guess the take-home here is that there has been this run, at the end of the time series, of these high-recruitment events, and the last six years of estimated recruitments are much higher than average, and that may be an important consideration for the forecasts.

This shows the mean recruitment model, and it's just estimating a mean value, and then it's a median unbiased value, and then we have a mean unbiased value, and it's the dashed lines, and the mean unbiased, or expected values, that we apply in the back in time and then also for computing benchmarks, and then, also, around that is the variability, starting in 1978, and we track that through time up until the last year, 2020, which isn't, again, actually estimated, but is forced to fall on the expectation.

The SPR values, and this is the spawning potential ratio, and so spawners per recruit, given F divided by spawners per recruit, with F equals zero, and so it starts at a value of one and decreases as the fishing rate increases, and this is conditional on selectivity patterns in the recent years. This is where we compute F_{30} from, and so we're looking for where does SPR equal 0.3 and then what's the fishing mortality rate that corresponds to that value of SPR, and so, here, it's about 0.21, and this is the base model spawning potential ratio.

Then, if we take that F_{30} and look at rates of F divided by F_{30} , and it says FMSY, but F_{30} is being used as the proxy for FMSY, and so the relative fishing rates through time shows that overfishing started right around 1980, 1979 or 1980, and has been continuing through to the end of the assessment period, 2019. If you look at this broken out by fleet, and that's on the right, the general recreational fleet, again, has been the dominant player, in terms of fishing mortality. Throughout most of the time series, it was the landings, but then, starting in 2010, when the moratorium went into place and the mini-seasons, the dominant source of fishing mortality has been the general recreational discards, and you can see that in the purple in the plot on the right.

This plot shows the alternative fishing mortality metrics. The one on the top is the SPR, conditional on F , and so, to interpret this, there's a reference line at 0.3, which is, again, the SPR value that the council has chosen for their benchmark, and there's the proxy for FMSY. If the fishing rate is too high, relative to the SPR of 0.3, then the curve will be below 0.3, and that means that SPR is lower than the reference line, and so it's an indication of overfishing when the SPR, the static SPR, of fishing rate is lower than 0.3. It's sort of the reverse of how we're often used to looking at fishing rates, or it's overfishing if it's above a threshold. In this case, it's overfishing if we're below the threshold.

Then the bottom panel shows exploitation rate, and I found this to be an informative way to look at fishing mortality. The black line is the total exploitation rate, and this is in numbers, and so total number killed divided by total abundance in each year, and that's the black line.

The green line is just the portion of exploitation that is going toward landings, and so the green line, where, in the early part of this time series, up until say 1990, the exploitation from landings really tracks the total exploitation, and so almost all of the exploitation is in terms of landings, and then, starting around 1990, and this is where a lot of our discard estimates begin, or start to come into play, then we have a mix of exploitation that's coming from landings and discards, and a fairly even mix, up until the moratorium, where landings is being held very low, and so there is very little exploitation coming from landings, but almost all of the exploitation is coming from discards, and so there's this shift throughout time, and there's really three time periods that I would characterize this as, where it's exploitation from landings, exploitation with an even mix between landings and discards, and then, at the end, where it's almost all discards.

This plot shows the abundance, estimated abundance, through time, along with the 95 percent intervals from the MCB ensembles, and, again, the solid black circles are from the base run. The dashed line, which is sort of hard to see here, is the median from the MCBs, and then the gray shows the 95 percentiles from the MCB runs, and the top panel is showing abundance of all fish, age-one-plus, and another way to look at this idea that abundance in the terminal years is higher, or at least as high as we've seen it throughout this full assessment period. There's more fish out there, and even, if you just look at the two pluses, and so excluding the new recruits, and that's the bottom panel, and, even doing it that way, we're still seeing very high abundance at the end of the time series relative to all the other years.

If we look at the spawners and recruits, the top panel shows the spawning biomass, in terms of population fecundity, and there's a large uncertainty in the early part of the time series, and there's less uncertainty as time goes on, and a general increase at the end of the time series. Recruits shows recruitment variability over time, and I did want to point out that these are different X-axis scales here.

The recruitment time series starts in 1970, but, if you just project the line back from 1970 back to 1950, it would look just the same as this, and so just a flat line, because we can't really estimate recruitment variability in the early part of the time series, but, once we do estimate it, it's variable through time, but, again, the take-home of high recruitment at the end of the time series, and also these in the 2006, 2007, and 2008 recruitment classes.

The apical F through time, and uncertainty in the benchmarks, and here are the -- For each of these panels, the vertical solid line is the base run, and the dashed lines are the medians, and then the distribution is the full distribution from all of the ensemble output. The top-left panel is F 30. The top-right panel is the spawning biomass at F 30, and the bottom-left panel would be the landings at F 30, or MSY, and then the bottom-right panel is the biomass at F 30.

This plot summarizes all of the ensemble runs in one plot, in terms of fisheries status, which is shown on the X-axis, and stock status, which is shown on the Y-axis, and each circle here is an individual model fit, and the cross in the middle intersects at the value from the base run, and the width of the pieces are at the 95 percent interval for each of those indicators, status indicators, and most of the runs ended up here in the quadrant that shows an estimate of overfishing and still overfished. I think the take-home from this is that the MCB analysis showed very robust results with low uncertainty in the assessment results.

This is another way to look at the same thing, and so a slice of the last plot that we looked at, and the top panel is the stock status, spawning biomass in the terminal year relative to SSB at F 30, and the distribution. From that distribution, there is 97.8 of it that lies below the value of one, which would indicate that the stock is not yet rebuilt. The bottom panel shows the terminal three years of fishing, which is here an average of 2017 through 2019 divided by F 30, and, in this case, it's 99.8 percent of the distribution exceeds one, which would indicate overfishing occurring.

Then we can look at those similar distributions for the alternative fishing metrics. The top one is labeled as static SPR, but that's just the SPR F that we were looking at earlier, averaged over 2017 through 2019, and, again, here, a value of less than 0.3 would indicate overfishing. The middle panel is exploitation rate relative to exploitation of F 30, and that's computed in numbers for the terminal three years, and so, here, a value of greater than one indicates overexploitation. The bottom panel is the same thing, but it's computed in weight instead of numbers, and, again, a value greater than one would indicate overexploitation.

This is just a paste from the report, to have an easy reference to the benchmarks that are being estimated by this assessment, and I highlighted the estimates of overfishing in yellow here, and the base estimate was at a value of 2.2, and the median from the MCBEs was 1.95, and then I also put in, to the right here, the values from SEDAR 41, which that was the base run estimated 2.84, and so the overfishing is a little lower than what was estimated in SEDAR 41, but still overfishing.

SSB in the terminal year, relative to SSB F 30, the base run estimated 0.44. The median from the ensembles was 0.49, and, if you look at that in comparison to SEDAR 41, which was 0.41, that shows that there has been much progress in the terminal five years of rebuilding this stock.

Sensitivity runs, the first one was sensitivity to including the MyFishCount comps, and there were three years of these comps, and there was only two of those years that met a minimum sample size threshold to be included in the assessment, and so, as far as what's being fitted here, there's only two years of data from MyFishCount, and including those data did not have a large effect on the outcome of the assessment. In each of these sensitivity run plots, I will show the F over F 30 in the top panel, and then the SSB over SSB F 30 in the bottom panel.

The next one was the sensitivity to including the FWRI index as well as the age comps for that index and then estimating the selectivity, which was a flat-top selectivity, and I was expecting to see a little bit more sensitivity to including this index, but it was very insensitive. The results were insensitive to inclusion of this index.

There are a series of sensitivities where we dropped one index. We dropped the chevron trap, we dropped the video index, we dropped the headboat discards index, and the results were fairly robust to all of these iterations, and there's a little tweak in the estimated biomass at the end of the time series, and a little different for the one where we dropped the video index, but, other than that, they're nearly identical. This is sensitivity runs where we adjusted the weight that was applied to the video index, a weight of three for the base run, and we upped that weight to four and put it down to two, and it's similar results.

There is more sensitivity to the scale of M, and so these fits were based on using the Lorenzen M, and the base run scaled to 0.11, but then rescaling the Lorenzen M to 0.15 or to 0.07, and the results

go in the direction that you would expect. If M is higher, we have lower overfishing and higher rates of rebuilding. If M is lower, we have more overfishing, and the stock status is not as high.

Sensitivity to the shape and to the scale of M , and, in this case, this is using the Charnov M , whether it's scaled to 0.13 or 0.11, and, when we scale it to 0.11, the results are very similar to the Lorenzen scaled to 0.11. When it's scaled to 0.13, then we get a little bit of a different result. It's the same patterns, but it's lower overfishing and higher levels of relative spawning biomass. Fred, I think this is the sensitivity run that you were asking about earlier.

DR. SCHARF: Yes, and so I guess I'm a little surprised, right? Were you surprised that it was more sensitive to the scale shift than the shape, since the shape -- That the difference really was -- The magnitude of the effect was pretty strong in those early years, from ages like one to five, and so would this suggest that just the scale shift in general throughout the entire age structure, from five plus, is more meaningful than the change in those younger ages?

DR. SHERTZER: Yes, and I think especially if we're looking at these status indicators, and so this may look a little different if I was just looking at absolute levels, and so I think, in the case that we're using a Charnov M , the M was higher on those younger ages, and so I can go back and look at this, if you're interested, but I suspect it's producing more fish, and so the recruitment estimates are higher.

DR. SCHARF: Right.

DR. SHERTZER: But then those fish die by natural mortality before they enter into the fishery, and so it's sort of the scale of the exploitable population is similar between the two.

DR. SCHARF: I guess the real take-home is that it doesn't change the status.

DR. SHERTZER: Right. It doesn't change the status, and so it's robust to the range that we looked at, but -- Qualitatively, there's not a difference, but, quantitatively, there is a difference, and I do want to emphasize that we are, for this assessment, using natural mortality that is not based directly off of red snapper, but is based on meta-analyses of lots of species, and so it's sort of our best average estimate of what red snapper mortality is, and it's the approach that we use really for all of our South Atlantic SEDAR assessments, because for none of these stocks do we have direct estimates for that particular stock, and so I think it's still an important source of uncertainty in the quantitative results of the assessment.

DR. COLLIER: Wally Bubley had a question.

DR. BUBLEY: Just because you mentioned that you don't have direct estimates, I was looking at the Gulf's most recent assessments, and they do have some estimates of the youngest age classes, and so like age-one fish. Did we ever look into setting some sort of level for like age-one fish? They have age-zero and age-one, but we didn't use age-zero in the assessment, or in the model, and so I was wondering, did we look into using some sort of value based on some studies in the Gulf, potentially, to set an age-one natural mortality?

DR. SHERTZER: No, we did not look at borrowing natural mortality of age-ones from the Gulf for this assessment. There is a major difference, in that they have a lot of shrimping in the Gulf,

and it's a large source of mortality on red snapper, the juvenile red snapper, and I think that their scaling of the youngest M has to do largely with trying to account for -- Also account for the mortality from shrimping bycatch, which we don't really have that to deal with in the Atlantic.

DR. BUBLEY: Right. We don't, and I briefly looked at what they used, and it didn't look -- It looked like they were using some sort of closed type areas that they were calculating, and potentially, yes, having some bycatch related to it, because of the -- Because the fish won't stay there, obviously, but I think they were pretty confident that it was looking more like an actual natural mortality and not a Z, instead of just an M, but this is just preliminary stuff, and I'm just kind of curious. Thanks.

DR. SHERTZER: That might be useful to try to fold in, as well as -- This was in the research recommendations for this assessment, but to try to get some more direct estimates for all of the ages for red snapper in the Atlantic.

This sensitivity run was comparing the Dirichlet multinomial and the base, where we used the robust multinomial with iterative reweighting, and, as far as the relative fishing rate, we get a higher -- Over most of the time series, a higher estimate of overfishing if we use the robust multinomial, and then, for the relative stock status, it's lower in the earlier part of the time series, but then they sort of converge from 1990 onward.

Then the hypothetical sensitivity run, where we set the discard, the discards starting in 2010 onward, at 10 percent of what the actual estimates were, and it does -- It does do what you would expect, where we would no longer have a perception of overfishing at the end of the time series, because most of that result of overfishing was coming from the general recreational discards at the end of the time series, and so, if discards are much lower, than overfishing is no longer occurring, and that's really what we were trying to examine with this hypothetical sensitivity run. It wasn't considered a realistic scenario, but it was just sort of the what-if question. What if discards had been much lower starting in 2010, and would that be enough to not have this result of overfishing, and it is.

Then another hypothetical run was this what-if question of how high does M need to be to no longer consider this stock in an overfished condition, and so, in this run, I just iteratively increased M until, in the terminal year, it was no longer overfished, and so it's an M of 0.2 that would achieve this result, and that would imply a maximum age of twenty-eight, given the Then et al. relationship.

Then the last one of the sensitivity explorations was the retrospective analysis, and, in here, we're just chopping out one year at a time, back to 2013 is the terminal year, and rerunning the assessment. The top panel shows the estimate of apical F, and it does not reveal a large pattern in the retrospective Fs. The middle panel shows recruitment, and then the bottom panel shows spawning biomass, and I think the take-home from this is that we don't see a large pattern of retrospective error.

To summarize the assessment results, the stock is not yet rebuilt, based on the proxy of F 30, and, based on the ensemble, the MCBEs, this result appears to be robust. Overfishing has continued through 2019, and, again, based on the MCBE analysis, this result appears to be robust. The overfishing in the terminal years is primarily driven by general recreational discards. If it weren't for the F going towards the general recreational discards, then overfishing would not be occurring

in the terminal years, and, even when we look at the alternative fishing intensity metrics, we get the same result.

The estimated abundance has increased substantially in recent years, and it has been increasing since -- Well, since the original assessment that we did, which was SEDAR 15, and it was increasing even before the moratorium went in place in 2010, but it's certainly much more rapid in the last five years, and since the last assessment of SEDAR 41, to the point where it's now at the highest that we have estimated at the end of the time series, but it's also important to recognize that this result is driven by the high recent recruitments, and, although the age structure has filled out, it's still not to the level that would be expected at the proxy of F 30, and natural mortality still I think remains a key source of uncertainty in this assessment, although at least the qualitative results are robust to the range that was considered plausible in this assessment. This is another break point, if you want to discuss more about the assessment results.

DR. COLLIER: Jie has his hand up.

DR. CAO: Thanks, Chip. Thanks, Kyle. Kyle, can we go back to the slides where you have the size composition fit? I think the model fit, in general, is pretty good, but I'm seeing this pattern of discrepancy in the tails, and I am just wondering -- It suggests, to me, that there might be some misspecification in selectivity, especially for old fish, and so perhaps it's not flat-topped. Any insight on that, Kyle?

DR. SHERTZER: I guess that's possible. It could be selectivity, and there were sensitivity runs on that from SEDAR 41, where this commercial handline selectivity was allowed to be dome-shaped. It could also be something about the growth curve itself, or even the CV of size-at-age, where it's missing these oldest fish.

It could also be that a mismatch in how the largest fish get created, in the sense that, each year, we're applying the distribution of size-at-age, and so, for example, if you choose age-ten, and we apply a normal distribution of size-at-age, but, if the oldest fish are being removed from the population, they're not going to be regenerated in the next year, in reality, as the model might do, and so that could be another possible mismatch between the length comps, how the model predicts lengths, versus how they're in the data, and so, yes, it could be selectivity, and it could also be just a modeling mismatch in size-at-age.

DR. CAO: Yes. Thanks, Kyle.

DR. SHERTZER: Anything else before we go on to forecasts?

DR. COLLIER: Anna had written a question into the question log. Anna, if you want to ask that, I will unmute you.

MS. BECKWITH: I think Steve is going to present the question, just because I'm at a doctor's office in Miami, and so I think he's ready to bring it up, but I just wanted to post it, for folks to be able to read it.

DR. COLLIER: All right. I see Steve has his hand up.

MR. POLAND: Thank you, Chip, and thank you, Anna, for segueing into this. Earlier, I think Fred Serchuk actually raised the point initially, but there was some discussion about the results, the abundance and the productivity of the stock, and the results presented -- All signs point to a stock that is at an all-time-high abundance, and it was noted earlier that the stock appears unusual, in some ways, such that very low age-at-maturity and a long life span produces a very long potential spawning life. There were also some questions about the effect of the early years in the time series on the rebuilding target.

After conferring with some of the other council members, we would like to request that the SSC provide recommendations on alternative metrics that the council could consider to address current conditions in the stock. Basically, there may be other ways that the current SPR approach could be used to evaluate the stock's ability to provide maximum yield. I think Fred mentioned earlier that trying to hit that target in the early time series of abundance just might not be possible, and so we would be interested in hearing the SSC's thoughts on this.

DR. NESSLAGE: So I'm going to jump in here, if you don't mind, Kyle, because that was really directed at the SSC. I have written that down, and I will make sure that we discuss that, but I don't really want to derail Kyle's presentation at the moment, but I would ask that the SSC keep that in mind as we start taking notes and discussing the various issues related to the assessment and its use in management. Is that okay with you, Steve?

MR. POLAND: Yes, Genny, and that's fine, and I didn't bring it up at this point in a means to derail the conversation, but I just -- We felt like we wanted to bring it up while it was fresh, but certainly I know we've got all day long, and fingers crossed that we can get done with red snapper today.

DR. NESSLAGE: Absolutely, and I would -- Just to give folks an idea, I think I would like to have Kyle, if he's willing, push through the end of his presentation, and then we'll take our lunch break and come back and discuss all of these issues. Does that sound good with you, Kyle?

DR. SHERTZER: That sounds very good.

DR. NESSLAGE: All right. Are there any more questions for Kyle before he moves on to -- Or did you have something to follow-up, Kyle?

DR. SHERTZER: Well, I've given a lot of thought to what was just requested, and it's for the SSC, I think, to recommend, but two pieces of information that you might want to keep in mind, and they're, in my mind, sort of conflicting, in terms of which way you might go with alternative rebuilding metrics, but one is that slide that we looked at earlier, where spawning contribution increases with older fish, and so there's that bit that the spawning stock is -- There's a lot of value in the older fish for the spawning stock.

That's one thing to keep in mind, and the other is that we -- Throughout all of the assessments, I have estimated that there is very little relationship between spawning stock and recruitment, and previous assessments have estimated a steepness of one, or 0.99, and this assessment looked at that again, and, again, it found that we couldn't estimate steepness. It went to the upper bound, and so that could just be that it's hard to estimate, and we can't estimate it, given the data we have, but it could also be that there's little relationship between the spawning stock and recruitment, and so

those, I think, two ideas may be important to keep in mind when you later discuss rebuilding metrics. Are you ready to talk about forecast, Genny?

DR. COLLIER: There are two hands up right now. Amy Schueller.

DR. SCHUELLER: I hesitate to bring this up, but can you go back to the retrospective plots? I am focusing on that recruitment plot. Are those points within the MCB ensemble uncertainty distribution? I am asking because -- Well, if they are, then that's good. If they're not, I'm a little concerned. I think there's only one point here that is above the line, and the rest are all pretty systematically below there, and so -- Anyway, I will stop asking.

DR. SHERTZER: I mean, they're all very close to the line, except for two that are quite a bit lower, and so I think I might be a little more concerned if the terminal year of the assessment was estimating a low recruitment value, that that might be an underestimate, but, in this case, it's estimating a high recruitment value. Here's what the uncertainty in recruitment looks like from the MCBs.

DR. SCHUELLER: Thanks, Kyle. I did notice that those sort of last years have an increased envelope of uncertainty surrounding them, and so I would have to flip back and see if the scales - - Where they fall, to see if those points matched up and were inside of that envelope, but I suspect they might be.

DR. SHERTZER: All right. Well, let's see. The low end here is around 750,000, those terminal years, and so I think those two outliers are probably outside of the bound.

DR. SCHUELLER: I mean, I have really mixed emotions about retrospectives and how useful they actually are anyway, and I just know that not everybody else feels the same way, and so I ask this just to think about it a bit further, and I don't -- I assume you didn't calculate any of the metrics related to this type of thing, because we typically don't in the Southeast, but, anyway, thanks, Kyle.

DR. COLLIER: All right. Fred has his hand up.

DR. SERCHUK: Thank you. I want to get back to your summary slide, Kyle, because I thought it was an excellent slide, the summary of assessment results. I think you have given us a good beginning here, because I think this will reconcile observations in the fishery, one of having really abundant numbers of fish, and, in this case, it's because of the good recruitment, and we know that, in terms of abundance, numbers of fish, stock size now is higher than it's ever been, although the age composition is quite different from what it was in the early part of the time series.

The message, I think, that needs to be emphasized is that, generally, the individual fisheries are fishing at very low F s, and your Table 17 in the assessment report shows this, that, if you look at the fully-recruited F s, in each of the individual fisheries in recent years, they are generally less than 0.01, or less than 0.02, or something like that. The primary cause of not being able to obtain the F 30 percent is in the recreational discards, and I think we need to make that somehow visibly apparent, because, looking at -- For example, looking at Table 17, you see that fisheries, in terms of the commercial longline, the F is -- This is in 2019, and the F is 0.19, and the headboat is 0.005, and the next one, which is the recreational fishery, it's 0.067, and then you come down to discards recreationally, and it's 0.388.

It's almost three magnitudes higher than any of the active fisheries, because of the discards, and so, quite frankly, it seems to me that the way that we have to manage this fishery, and I think that the council is doing a good thing, in trying to put the return caught fish to the ocean as alive as possible, but, right now, the active fisheries, in my mind, don't need regulation. What needs to be regulated is the survival of fish that are caught and returned to the ocean.

Until that is mitigated, much more than it has been now, and maybe the descender devices will help, this fishery is going to remain below -- It's going to still be overfished and in an overfishing condition, and somehow we need to make that statement much, much stronger, because the active fisheries are not the problem. It's the recreational dead discards, to me, that are not allowing this fishery to meet the management standards. Thank you.

DR. SHERTZER: Thanks for that, Fred. I think that's very accurate, as far as a good description of what the assessment is showing, and this slide that I'm showing now is just a graphical illustration of what you were just saying, as well as the exploitation rate too, where all of the exploitation in the terminal years is from discards, and almost all of that is the recreational discards.

DR. COLLIER: I am not seeing any other hands, Kyle or Genny.

DR. NESSLAGE: Kyle, do you have the energy to get through this? Do you think we have about a half-hour or so left, with questions, and then we could maybe break for lunch and come back around one-ish, or do you think it's going to take longer to go through this? What's your estimate?

DR. SHERTZER: I think probably half-an-hour is about right for this next section.

DR. NESSLAGE: All right, and you're not going to pass out on us from lack of food?

DR. SHERTZER: No, not yet.

DR. NESSLAGE: All right. Thank you.

DR. SHERTZER: The forecasts had -- There were six scenarios that were identified by the SSC's working group on this topic, and they were the three different F scenarios and then two different recruitment scenarios, and so the F scenarios were fishing at F 30 and then an F rebuild, with a 0.5 probability, and that was based on the probability that was used in the last assessment, and then an F rebuild with a 0.675 probability, and that was based on the current control rule. Then the two different recruitment scenarios were the long-term average recruitment, but then also the recent high recruitment, noticing that these terminal years of recruitment were much higher than average.

The forecasts in the report start with new management in 2023, and so any change in F would take effect in 2023. Since the report was issued, there was a request by the council, last week actually, that the start year be modified to 2021, because they think that they can act quickly, at their June meeting, if needed, and so I think we can accommodate that, and we can modify these projections to start in 2021.

The interim period in the report is 2020, and so after the terminal year up through 2022, and, in that case, it applied the average landings from 2017 through 2019, and so, with this new start year,

that would just be 2020, but it would apply the same method, and then there's a reduction in the discard mortality in the forecast, and that's to try to model the increased use of descender devices, and that would start in 2021.

The way this was applied was as a proportional reduction to the discard F , and it was weighted across the fleets by the discard mortality rate, and so, if you remember the table we looked at previously, it had fleet-specific discard mortality rates, but, in the projections, we just sort of have one discard fleet, and it's a weighted fleet, and so the reduction in discard mortality is weighted to apply to the discard fleet.

When you weight the discard mortality reduction, and this is across the MCBE runs, the reduction has this distribution, and the solid line is the base run, and the dashed line is the median, but the distribution across all of the MCBEs would look like what's shown here, and this reduction acts as a multiplier on F that is applied to the discards, and so we're reducing it to something lower than the full rate of F that would be a value of one here.

This is one thing for the SSC to consider. Because of the change in discard mortality, we would have a different perception of the benchmarks, and so, for the projections to be internally consistent, the forecasts have a different set of benchmarks than what were used in the assessment for gauging stock status, and this accounts for the reduction in discard mortality.

They're not very different, and they're similar, but they are a little bit different, and so the forecasts in the report, in the ones I will show here, are based on these revised benchmarks, and so, when we're looking at stock status, or rebuilding, it would be based on the SSB MSY shown in this table here for the reduced discard mortality, and so it's pretty similar to what was in the assessment benchmarks, but, just for consistency, we're using these revised benchmarks in the projections, but I did want to point out that, since the report was issued, there have been some discussions with the Science Center leadership, and also SERO leadership, about other approaches to doing these projections, and I will go into a little more detail about this later, but part of that discussion is whether or not it's appropriate to revise the benchmarks that are used in the forecasts.

The high-recruitment scenarios are based on noticing these higher than expected recruitment residuals at the terminal six-years of the assessment, and so these high-recruitment scenarios use the geometric mean of recruitment from the last six years rather than the average from the full assessment period, and that's sort of consistent with what the SSC has done with some previous assessments, but, in those cases, there are lower than expected recruitment, and, for setting short-term catch advice, the SSC has used the recent recruitment as an indicator of near-term future recruitment.

This is an example forecast being shown. In this case, this is the F rebuild scenario, with a 0.675 probability of rebuilding and mean recruitment. The top-left panel shows the F across the assessment time period, but then into the projections. Here, the blue-horizontal line is the benchmark, the forecast benchmark, from the base run level, and then there's a dashed-green line that's a median from the MCB forecast benchmarks, and so, here, the rebuilding F is just below F_{30} .

Then the middle panel on the left shows how biomass rebuilds through time, when fishing at that F rebuild, and the bottom-left panel shows the assessment recruitment and then the forecast

recruitment, and you can see, where we shift from the assessment period to the forecast period, that there's a drop in the projected recruitment from the end of the time series to now and back to the long-term average for the forecast. The panel on the right shows the probability of rebuilding, which here is the proportion of MCBE runs where SSB exceeds its own SSB MSY, or the F 30 proxy for that, and so, by design, the F rebuild is computed to be the F that allows rebuilding in this terminal year of the projections, which is 2044.

This is the same scenario, but with high recruitment, and so let me jump down to the bottom-left panel, and you can see there is high variability around the projected recruitment but that the levels stay, on average, where they were at the end of the assessment period, and then biomass rebuilds, and that's the middle panel on the left, and then the top-left panel -- Now here's something that is interesting.

The biomass is rebuilding, but, in this case, the F rebuild exceeds F 30, or the FMSY, the F threshold, and so, normally, this isn't possible, but, because the F 30 is based on the average recruitment, the long-term average recruitment, but here we have recruitment that's much higher than that, even with the overfishing, the stock continues to rebuild, and so this is, I guess, a question for the SSC to consider. Is this overfishing -- Is this something that's acceptable in the short term, when we have a stock that, if recruitment is this high, it would continue to rebuild and increase, even despite the overfishing condition?

That's a description of the forecasts that are in the report, and I mentioned there is some discussions between SEFSC and SERO leadership, since the report came out, and I wanted to sort of fill you in on those discussions and an alternative approach that you might consider, and, mainly, it hinges on this idea of whether the forecast benchmarks should differ from the assessment benchmarks or not, and where the assessment panel landed on that question was yes, so that the forecast scenarios are internally consistent within themselves, but, from another perspective, the answer might be no, because here is a positive management action to reduce discard mortality, and we wouldn't want that to just raise the bar for rebuilding, and it should sort of be a benefit to the stock and the fishery.

An alternative approach to consider, and this isn't in the report, is that we would just reduce discard mortality in the future, and allow those discards to be caught as landings, but not modify the benchmarks, and, like I said, this approach, this alternative approach, and I will give a little more detail on it, does have some support from leadership in the Science Center and the Regional Office.

It's essentially a two-step approach. Step 1 would be to forecast using the prevailing conditions, and so, by prevailing here, I mean the assessment benchmarks, and then use that to compute F rebuild. There would be a second step, a second forecast, where we would project using the F rebuild that we obtained from Step 1, but we would do two things. The first would be to reduce the discard F that would account for the increased use of descender devices, and then still try to achieve rebuilding in the terminal year, but this -- Because the F in the discards had been reduced, we could increase the F applied to the landings, and so we would iteratively increase the landings F to achieve rebuilding in 2044.

I have done some preliminary investigation in trying to code this approach, and it does have this perhaps desired effect of giving similar trajectories to the forecast that we saw in the report in terms of SSB and the total kills, and that is landings plus dead discards, but it does convert what would have been dead discards to higher landings, and, at least in the one case that I examined,

the landings were about 21 percent higher in this alternative approach than they were in the projections in the report.

I am going to need some feedback from the SSC to run some revised forecasts for you to use for management advice, and one revision that we know will happen is this alternative start year of 2021, and so, at a minimum, I will rerun the projections with that start year, but I think other things for you to consider are whether to base the projections, or at least short-term catch advice, on the long-term average recruitment or on the recent high recruitment. If we use the recent high recruitment, what about this idea of F exceeding FMSY, at least in the short term?

Then another consideration would be whether or not to use this two-step approach that was developed after the assessment report was written, in which the F rebuild is based on the prevailing conditions, or the assessment benchmarks, and then ABCs would be based on the second projection, where we projected to F rebuild from Step 1, but reduce the discard F and increase the landings F, and then any other modifications that the SSC might wish to consider for revised projections, and I put “to be continued” here, because I think we’re on the schedule to revisit this in a couple of days, to give me some time to rerun projections and provide a scenario, or a couple of scenarios, for you to look at it in more depth.

DR. COLLIER: Thank you for that, Kyle. Scott Crosson has his hand raised.

DR. CROSSON: I don’t know if it was three or four slides back, Slide 84 or 85, but that scenario that Kyle showed where overfishing was still allowed to occur, and my question is for NOAA General Counsel. Is that legal? I don’t know if General Counsel can answer that now, or after lunch, but that seems to be relevant information.

MR. GRIMES: I can respond now, if you want, Madam Chair.

DR. NESSLAGE: Yes, please do, Shep.

MR. GRIMES: First off, I’m not entirely certain that I understand this, but I would say that we can’t plan to have overfishing. The statute says we’ve got to end overfishing immediately, and we’ve got to prevent overfishing. Prior to the last changes, the 2007 changes, the agency would routinely phase-out overfishing, and I remember working on a Gulf red snapper rebuilding plan, the first one, and it was going to end overfishing over a period of nine years, and the statute was changed to prevent doing that kind of stuff, and we have to end overfishing immediately, and so, similarly, to plan to have overfishing for a brief period definitely seems legally problematic to me. I guess I will just leave it there.

DR. CROSSON: Thanks, Shep.

DR. COLLIER: Fred Serchuk has his hand raised.

DR. SERCHUK: The rebuilding target of 2044, that was based on the stock dynamics presumably at a previous estimate, and I am wondering now -- Given that we have a series of above-average recruitments, could the stock be rebuilt at an earlier time period than 2044, consistent with what we now know about the stock dynamics? Is 2044 so sacrosanct for some reason? I thought we

should try to rebuild a stock within a period of ten years if that's possible, and would that now be possible? That's just a thought, in terms of alternative forecast periods.

DR. SHERTZER: I think the year 2044 was established from a previous assessment, and may have even worked its way into an amendment, but, yes, if recruitment -- Especially if recruitment remains high, then rebuilding would occur very quickly if F -- This is showing F rebuild, but, for the case where F equals F 30, and so not overfishing, and, if recruitment stays high, then the stock is predicted to rebuild fairly quickly, I think within ten years.

DR. SERCHUK: Okay. I just raise that because I think that's a scenario that we ought to consider as an SSC. Thank you.

DR. COLLIER: Fred Scharf has his hand raised.

DR. SCHARF: Kyle, just so I understand it correctly, the forecast option with the two-step process, where you move some of the mortality, the fishing mortality, from discards to landings, it doesn't change the overall removals, and would that be correct, and so you're assuming more descender usage would lower the discard mortality removals, and that would then allow -- Then some increased landings would be allowed of basically an equal amount?

DR. SHERTZER: It's similar. They're not identical, because of the differences in selectivities and standing abundance that's estimated in the forecast, but the total removals are similar between the two methods, but not identical, and the biomass trajectories are similar.

DR. SCHARF: Following up on that, is there -- I guess, just thinking -- It puts the onus, right, on the recreational sector to use descender devices more frequently, or as often as possible, in order to be afforded to have those landings, and how often can the -- I guess how often can the stock assessment be revisited, as part of the normal cycle, and, maybe more acutely than that, can the use -- Can the proportional use of the descender devices be tracked on a finer temporal scale, so we can see if that's actually happening, to validate the increase in the landings?

DR. SHERTZER: Well, I guess how frequently we can assess this stock is sort of a workload question, how many assessments are we going to do across all the different stocks and which stocks get the nod.

DR. SCHARF: I understand. It's a slippery slope, I feel like, right, where we start dancing around these forecast scenarios, where we're assuming that we've got -- Well, we've had five or six years of good recruitment, and so, if we go forward assuming that's going to occur, which may not occur, and the bottom could fall out really quickly, and then we assume an increase in descender usage that allows more landings, and then, if that increase in the descender use doesn't happen, then we have now increased the removals by quite a bit, and so, if we're going to sort of go down that road, we need to be able to have some checkpoints to see if those things are actually occurring, and so I don't know -- I feel like the descender device one -- I mean, through the observer coverage, maybe we can get some handle on that, but it's hard to know where that data comes from exactly.

DR. SHERTZER: Good question, how that would be monitored going forward, and I know the council and council staff has been doing a lot with educational programs and promoting the use of descender devices, and, from what we heard on the assessment webinars, it is catching on, and

usage has been increasing, but you're right that trying to monitor, going forward, whether or not our assumptions are met is something that would need to happen.

DR. COLLIER: Amy Schueller has her hand raised.

DR. SCHUELLER: I was just going to say that I agree with what Fred just discussed. You know, there's risks on both sides, and I guess what I am thinking about for this discussion, as we move forward, is the recruitment part, versus this landings/discards alternative benchmarks and tradeoffs, and like those two things are separate, in my mind, and maybe we would benefit from discussing them separately.

As decision-making points, I feel like they're separate, and so I do have a question, and it's related to the recruitment part of it, and I was just curious, Kyle, if you have a strong feeling about what data are informing those higher recruitments. I mean, there's no recruitment index, right, and so do you think that one or multiple pieces of data are informing those recruitments, and how reliable do you think that information is?

DR. SHERTZER: Typically, we see it in the age comps, and, here, we can see some year classes in the age comps, but I also think there's a large part of it being driven by the SERFS indices that have been just increasing very rapidly, and so, really, recruitment is the only mechanism in the model for abundance to increase. Both of those sources are signals for the recruitment pattern. I think we have some pretty good evidence for the high recruitment, but the big question would be monitoring. If it were the assumption being used in the forecast, is the monitoring to see if that continues.

DR. SCHUELLER: I completely agree with you, Kyle. I'm a bit concerned that, if we're going to chase recruitment, we're basically turning some long-lived species into a recruitment-driven -- I say "fishery" tongue-in-cheek, because I also know that a lot of it is discards, and I get that, but that's not something we should strive for here, in my opinion, and I think that is a really dangerous slope to go down, and it could, in my view, in my mental projections, lead to a lot more heartache in the future, and so I'm sure folks can guess what I'm thinking about the recruitment part of it, based on that statement.

DR. NESSLAGE: Thank you, Amy. Are there other hands raised? If not, I have a question for Kyle.

DR. COLLIER: I am not seeing any other hands.

DR. NESSLAGE: Thanks. So, Kyle, I'm a little frustrated. Is this truly the first time we're seeing this alternative two-step approach, and it would have been last night when we received the PowerPoint at 5:30 p.m., or am I missing something?

DR. SHERTZER: It's really that new. Yes, that's the first time you would have seen it.

DR. NESSLAGE: And we weren't alerted to it when the PowerPoint was shared with us at 5:30 p.m. last night, correct?

DR. SHERTZER: I don't know.

DR. COLLIER: I will take that one for you, Kyle. I did not alert the SSC that this was included in there. I was busy getting the materials ready, and I did not through the entire slides, and so that was my fault, Genny.

DR. NESSLAGE: I don't think it's your fault, Chip. It is not your fault. I am just expressing some severe displeasure with suddenly seeing new forecasting methodology, and it's not that I don't applaud you for brainstorming and thinking of these things, but a heads-up would have been greatly appreciated for a species this important and a decision this important, and so I think the SSC has a lot to think about over lunch. Are there any other burning clarifying questions for Kyle at the moment? We have extensive discussion planned for the afternoon.

DR. SHERTZER: Genny, the methods were actually developed over the weekend, and so it actually is very new on our side too, and so apologies for not including a heads-up along with the slides. It was just sent to Chip yesterday evening, and so my apologies for that, but it's also something that is sort of fresh.

DR. NESSLAGE: Yes and, really, we aren't seeing the trajectories, and you're just summarizing this in this bullet point, right, on Slide 86? We don't have any of that output to look at.

DR. SHERTZER: Well, I mean, I have coded one example, and so, if you wanted to see the one example, I could show that.

DR. NESSLAGE: Well, I would say hold off for the moment. If you could have it in your back pocket, and we may be changing the direction of our discussions this afternoon, based on some of what I have heard, and so hold that thought, if you would, and, again, are there any other clarifying questions for Kyle's excellent and extensive presentation? Thank you for walking us through this very complicated and thorough assessment, Kyle.

DR. COLLIER: Wilson Laney has his hand raised.

DR. NESSLAGE: Go ahead, Wilson.

DR. LANEY: Thank you, Madam Chairman. I was going to save this until after lunch, but I will throw it out there now. So I've been thinking about Fred Serchuk's earlier comment about the fact that he wondered whether or not it was realistic for us to think about rebuilding the stock to the level that it was from 1950 to 1980, given habitat changes that may have occurred in the interim, or I guess, actually, any changes that may have occurred in the interim, fishing practices and so forth and so on.

My question for Fred to think about is I certainly would agree that, for some species, especially species that are diadromous, where access to required freshwater habitats has been greatly reduced, or species that are estuarine dependent, where we have lost so much in the way of intertidal wetland habitats and so forth and so on.

In this case, we're dealing with a species that resides pretty much totally, as far as I know, in a marine environment, where perhaps changes have been less substantive than changes have been in estuarine or inland freshwater habitats, and so maybe it isn't so unrealistic after all to think about

rebuilding red snapper to the same level, and I will just throw that out there, and I don't expect any discussion now, but we can talk about it after lunch.

DR. NESSLAGE: Thank you, Wilson. Fred Serchuk.

DR. SERCHUK: I will wait until after lunch, if we're going to discuss it, Chair. It's already a little bit after 12:30. Thank you.

DR. NESSLAGE: Excellent. Please do save your thoughts, and we will -- I don't want to get into general discussion, and I would like to just have clarifying questions for Kyle before we break for lunch. Fred Scharf, do you have a clarifying question?

DR. SCHARF: I don't. I just have a comment, and it's just quick. I just wanted to thank Kyle for the presentation, and the explanations were really outstanding, and I appreciate the detail.

DR. SHERTZER: Thanks to all of you for all the good questions.

DR. NESSLAGE: I think we all appreciate his very -- All your thorough work. Thank you, Kyle. All right. If there are no other clarifying questions, let's take a break and come back at -- Let's give it half-an-hour, and so 1:05. When you come back, please raise your hand, SSC members and Kyle, if you don't mind, and we will regroup at that point and start our discussions. Thank you, all, for your time this morning, and thank you, Kyle, for your presentation.

(Whereupon, a recess was taken.)

DR. NESSLAGE: First off, I would like to apologize to everyone for my tardiness. Leadership have been having a little bit of a chat here about how to proceed, given what we've seen, and how to prioritize the agenda for the rest of the afternoon, and so I am going to propose a way forward for our remaining time here today, based on some of the questions that council members had asked us earlier and some of what we have seen and discussed already regarding uncertainty in the projections and the reference points.

What I would like to do is start off our discussion and be a little bit more structured, perhaps, than we normally are, and so, if you go to our action items, our first set of action items had to do with are we addressing the TORs and is this best scientific information available and can we determine stock status, and so those are three pretty loaded questions, and they're very big questions, but what I would like to do is start to discuss those and the assessment uncertainties, but focus first on the model itself and separate the discussion on projections and reference points, and so deal with those in two different stages.

So let's talk about all of the good work that the panel has done, the assessment model itself, and has it been configured properly? Are we comfortable with how it's been configured, the assumptions that were made, et cetera, that sort of discussion, and then we will tackle projections and reference points and determine whether there is enough uncertainty for us to even be able to provide an OFL and an ABC at this point.

I would like to open up the floor to comments about the assessment model, and I will note -- I was taking some notes as we going along regarding uncertainties, and I heard folks say that there were

some uncertainties listed, or identified, but whether any of those would preclude our saying that the assessment model itself is not BSIA, and I would like to hear more from the committee, and so there were questions raised about size or age-dependent discard mortality, about maturity-at-age for young females, the starting point for the assessment, whether it should include the pre-1980s, egg viability for young fish, natural mortality uncertainty, and the potential misspecification for catch-at-age.

Those were the things that I picked up on, and so we don't need to rehash things that are already written down as uncertainties, but, if there are other uncertainties regarding the model construction that folks would like to raise, I would like to have that discussion now. Please raise your hand if you have something to add.

DR. COLLIER: I am not seeing any hands raised right now, Genny.

DR. NESSLAGE: Wow. Okay. I will add that I did put, in my notes, some other uncertainties that seemed more directed towards future research recommendations. Can we directly estimate M, and that would be really nice, and Wilson's question about timing of peak spawning and its potential impact on projections, quantifying egg viability, and temporal autocorrelation among indices and incorporating that in modeling. I have all of those written down, and hopefully those who are associated with those sections do too, but let's hear from folks about uncertainties in the model. Scott.

DR. CROSSON: I am still digesting lunch, and you said a lot of things very quickly.

DR. NESSLAGE: Could I just show my screen? Would that -- I have it typed out, and would that be easier, Chip? Is that okay? Then folks can stare at it?

DR. COLLIER: Yes, I can make you a presenter. Hold on one second.

DR. NESSLAGE: Sorry. Or I could have just emailed it to you.

DR. COLLIER: Do you want to just email it to me?

DR. NESSLAGE: You know, I might. That might be safer all around. Let me send that in two seconds here. I have the notes in red here.

DR. COLLIER: We do have some hands coming up, Genny.

DR. NESSLAGE: Okay. Let me just send that. Scott, is it -- Is it a vestigial hand or a real hand?

DR. CROSSON: I just put it back down. I already said my point.

DR. NESSLAGE: Thank you. We'll get those notes back up on the screen really quick here. Fred.

DR. SERCHUK: One uncertainty that we seldom talk about is the uncertainty in the projections. There were projections done in the last assessment, and we now can evaluate, based on the new assessment, whether that assessment was mostly correct, mostly incorrect, or about what we

expected, and I think that is something that we should consider as we go forward, because we're going to be doing projections.

DR. NESSLAGE: So you're talking about like a retrospective projection evaluation.

DR. SERCHUK: That's right. We look at what we projected and then we look at what actually occurred, to give us some confidence in our ability to project correctly.

DR. NESSLAGE: Those were with -- I'm just making sure that I understand what you're saying, and so, if the assumptions, for instance, about M or discards are totally different, that would impact our accuracy, and how do we -- I know where you're going, but how would you suggest that folks deal with that?

DR. SERCHUK: Well, my feeling -- Maybe this is a future recommendation, quite frankly, because I actually think it's important, in any new assessment, to take a retrospective evaluation of how well the previous assessment projection worked out, given that we have a new assessment, and, if it's different, why it might be different, and I think that also will give us some basis to either say that our projections are generally going to be accurate or, if the assumptions are changed in the new assessment, then we'll have to evaluate that retrospectively in the next assessment, but I think that's a source that we can evaluate retrospectively when we have an assessment update from the previous assessment, and I think that's important for our customers, for the council in particular, to have a feel for.

DR. NESSLAGE: Right, and so an evaluation of how we've done. Is it possible, Chip, to put that in the section below I have in red for research recommendations, at least as a placeholder, and the rest of the committee can chime in? Thank you. Was that all, Fred, for the moment?

DR. SERCHUK: For the moment, Chair. Thank you.

DR. NESSLAGE: Excellent. Amy Schueller.

DR. SCHUELLER: I was just going to say, given the list of things that were evaluated in the assessment itself, which were pretty numerous, and the discussion that we had about some other possible avenues of uncertainties, which mostly I felt like were research recommendations, I felt like this assessment did a pretty good job addressing uncertainties, and I was just going to start that conversation off with did the -- Were the TORs addressed appropriately or not, and I felt like they were, and some of the things we discussed this morning are interesting, but we maybe don't have data to address them at this moment, and so that's why I say they become research recommendations. I put my hand up because everybody else was quiet.

DR. NESSLAGE: No, and that's excellent. We need to hear that, and, if anybody disagrees, put your hand up as well. Thank you, Amy. In the meantime, let's hear from Dustin.

MR. ADDIS: I wanted to draw some attention to -- This is in the assessment report, Figure 44, and I don't think this was presented in Kyle's presentation, and this is the comparison of status indicators between SEDAR 41 and SEDAR 73, and the F ratios between the two assessments are pretty drastic, and this might sort of underscore the estimate of the F estimates coming out of these assessments, and so I would take a look at that.

DR. NESSLAGE: Sorry, but which figure were you looking at, Dustin?

MR. ADDIS: Figure 44.

DR. NESSLAGE: Give us all a chance to catch up with you here. Is there any way that we could bring that up on the screen, or am I asking for too much, Chip? You've got a lot that you're juggling there. It's on PDF page 168.

DR. COLLIER: Give me just a minute.

DR. NESSLAGE: Dustin, you're saying the blue line here, for those who can see it already, for F over F 30 -- That the ratio is lower than SEDAR 41 -- Go ahead.

MR. ADDIS: I am just saying that the comparison is very drastic. If you look at the terminal year of SEDAR 41, 2014, if you compare that with 2014 out of SEDAR 73, we're talking about an F ratio of over four, compared to something around two. I just wanted to point this out.

DR. NESSLAGE: So we're talking about -- If I were to summarize your point, you're saying there is significant inter-assessment uncertainty in the stock status, and is that what you're saying?

MR. ADDIS: Correct.

DR. NESSLAGE: Historical stock status, and it's closer now, but, in the past, our understanding of what the stock was doing is very different, and is that right?

MR. ADDIS: Yes. Thank you.

DR. NESSLAGE: All right, and so that's a good thing to mention under the uncertainties. Again, it's almost like looking at the past performance of our assessment models, kind of getting a little bit, in a way, at a corollary to what Fred was saying too, that we have some information based on the past model performance, and it seems to have changed. Kyle, please go ahead.

DR. SHERTZER: I guess I wanted to respond to Dustin and to Fred that -- First, to Dustin, there definitely is some -- There is differences across the different assessments, SEDAR 15, SEDAR 24, SEDAR 41, and SEDAR 73, and those differences are mostly quantitative. In terms of qualitative results, I actually went back and looked at all of the runs that have been done across those assessments and the sensitivity runs, and it turns out that there are exactly 100 sensitivity runs done across the assessments, and the qualitative results across all 100 are the same. They are all in the same quadrant of overfishing and overfished, and so I think there's a lot of uncertainty in the quantitative results, being driven -- In this case, I believe it's the change to the Dirichlet multinomial that's driving the shifts that you're seeing in the overfishing differences, but, in terms of the qualitative results, they are pretty robust across the assessments.

Regarding Fred's comment about going back and looking at projections, to see how well they perform, I think, in general, that's a fantastic idea. I can say, in this particular case, if we looked at the forecast from SEDAR 41, I suspect there's no way that they would have predicted these high-recruitment scenarios of the high recruitment that we've seen in the terminal years of this

assessment, and so the recruitment in those forecasts would have very much underpredicted the recruitment that happened in the last five years.

However, we also to do that appropriately, and we actually have to try to map back the projections that are used in management, and, in this case, the projections I think were ignored for management, and my understanding is that an ad hoc control rule was used for management that was based on the index of abundance and the increase in the index of abundance and using the proportional increase in the index and apply that to landings to get a proportional -- The same proportional increase in the landings. I don't think we can, in this case, map back the management actions to any particular projection scenario. Thank you.

DR. NESSLAGE: Thank you for the clarification and that additional information. Just to make sure we're capturing some of this, Chip, would it be possible to capture Dustin's comment and qualify it? If Dustin is comfortable with this, based on what Kyle just said, that there is quantitative -- Or uncertainty in the quantitative estimates, but note that the qualitative results for management are similar, and, Dustin, would you feel comfortable with something along those lines? The words aren't great, but --

MR. ADDIS: Yes, I believe I'm comfortable with that. I am just saying that you would like to see the same pattern, and there are sort of drastic differences between the two, in terms of ratio, but --

DR. NESSLAGE: Right, and so you're talking about not only the magnitude, but the pattern, and perhaps we could put that in parentheses, and what Kyle is saying is that the ultimate management advice was qualitatively the same though, right, and so it's a fine distinction, but it's also an important one, if you agree.

MR. ADDIS: I agree. Yes. Thank you.

DR. NESSLAGE: Cool. Thank you. Anne Lange.

MS. LANGE: I'm not sure if this is part of it, but wouldn't the fact that we're using the MRIP, instead of the MRFSS, and some of the other updated data have an impact on the actual shape of those data points?

DR. NESSLAGE: You mean it would impact the quantitative estimates coming out of the assessment?

MS. LANGE: Yes, or the figures wouldn't necessarily line up exactly, because they're not using exactly the same data, even if you used the exact same model. There are significant changes between MRFSS and MRIP, or at least that's my belief was the case.

DR. NESSLAGE: Thank you. That's a good point. Kyle, do you mind commenting on that?

DR. SHERTZER: I agree. I mean, there's a number of changes made to the data, and to the assessment, and the change to MRIP was among the more important, and so it might change the pattern in F, but also the scale of the abundance that's being estimated.

DR. NESSLAGE: Chip, it might be worth putting -- I guess I was thinking those two comments would go under the list of uncertainties, unless Dustin or Anne disagree, and so that issue of MRIP and Dustin's concern. They're worth bringing up and highlighting to the council. Anne, is this going to capture your concern or your thoughts?

MS. LANGE: Yes, that's fine. Again, to me, there were some obvious changes that would account for some of the changes that Dustin was noting.

DR. NESSLAGE: Absolutely. Thank you. Amy.

DR. SCHUELLER: I was just going to say that I disagreed with where that statement was in the document, because I think that it could be used to imply that we cannot provide a quantitative estimate of what management should be doing, and I don't think that that's true. I guess what I would also say is that, as a practicing assessment scientist, I wholly dislike continuity runs and comparisons across assessments over time, in particular because the data change.

The inputs that are being changed are difficult to track, unless you're doing them one at a time and see what the repercussions are, and so I guess I don't take a lot of stock in there being big differences between those two runs. I guess I don't see it in the same vein. I think that the current assessment has the best available information in it, and it provides us with estimates based on that, and the past assessment was the best at the time, but, as science always does, it marches forward, and different methods are used, and different estimates for the data pieces go in, and we need to be very, very careful about any wording we use with respect to this topic.

DR. NESSLAGE: Well said, Amy, and my intention was it was going to go under uncertainties and not -- Unless Dustin disagrees and we want to have that discussion, it's pretty common that changes occur between assessments, and, ideally, we're making improvements. The question is have we made improvements? If so, then it's BSIA. If not, then we need to have that discussion. Is that right, Amy? Is that what you're saying?

DR. SCHUELLER: Yes.

DR. NESSLAGE: All right. Fred Serchuk.

DR. SERCHUK: I think we should -- The answer to the first three questions under Review Assessment should be yes. Yes, yes, yes, if we're dealing with that part. The same thing for the next bullet, and the same thing for the next bullet, and, under best scientific information available, I think we can point out what we feel were additional changes that improved the assessment, and there are some of them where the multinomial was used, and some of them where we separated the SERFS data into two components, and so on and so forth, and I think we need to list those, because those are markers that we believe have improved the assessment from the previous assessment, and I think I'm just taken aback about how much work was done in this assessment, and how much thought was given to it, and we ought to list those improvements, Chair.

DR. NESSLAGE: Excellent suggestion, and I think hopefully the breakout group that has this will brainstorm that list for us and we can add, or edit, as appropriate, when we reconvene. I would say that I can almost hear some people thinking, for this third bullet, stock status and fishing level recommendations, I want to just keep -- As I said before, I would like to keep the projections issue

and the issue of whether we need to reevaluate the rebuilding plan separate, and so, if your concern -- If you have concerns with qualifying that last bullet there, where Chip is typing, please keep them in mind, and we will have an extensive period this afternoon to talk about that, but I guess I'm talking about more setting are the abundance estimates the best we can get, are the biomass, et cetera, that sort of thing. Chip, did you have something that you wanted to add?

DR. COLLIER: Yes, and I was just going to talk more about process. The SSC is going to go into breakout groups, where they will be able to take these notes, and what I will do is I send what I have here, and I will send them to all the breakout group leaders for this assessment, and they will be able to move and manipulate all of these discussion points and items that the SSC talks about, and so don't worry about where things are and exactly how it's written. It's going to be improved by the breakout groups, and so this is more just a first blush to get the ideas down, and, that way, they're there and can be reviewed during breakout groups, and then it will come back to the SSC for final review. In between that, there will be public comment as well.

DR. NESSLAGE: Thank you for that. Sorry that I launched back in without giving everyone a plan after lunch, and I was ready to go, and so, yes. If anyone has any concerns with that, please let me know, but hopefully that plan will work for everyone, and so we're in the brainstorming phase here before we go to the breakout groups. Anne.

MS. LANGE: I just wanted to concur with Amy, and then again Fred, that yes on all three of the first points, acknowledging that we're going to have further discussion on how to separate out the projections on the third point, but I think it's an excellent job that Kyle did, and I think we, as a workgroup, can provide reasonable input, and so I think it should go forward.

DR. NESSLAGE: Great, and we thank you all for that. I know you had I don't even know how many webinars, and it was a sizeable amount of work, and for what's technically an update, and so we thank you all. Jie, go ahead.

DR. CAO: I just want to echo Anne and Amy's points on the changes to the data. I think the addition of the MRIP data and the newly-available fisheries-independent data, for example the trap and video dataset that are available in recent years, and particularly there's a big jump in the abundance indices in recent years, and I was thinking that would have an impact on the result as well.

DR. NESSLAGE: Excellent. Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. This is a question to you, and I don't know whether it's an SSC question, because we haven't made any decisions about which of the projection scenarios we will endorse, if any, but I know that we're now proceeding to provide projections from 2022 onward, and do we have any say, or do we have any position, on when the next iteration should be done?

I hate to call it an update, and I hate to call it a benchmark, but, given the fact that we have had this good recruitment, and we are unsure whether it will continue, would we be in a position to think about what type of information might be useful, either in the period between assessments or when we think the next assessment might be done, given that most assessments have an accuracy in terms of generally about three to four years, and any projections that go to fifteen years, or

twenty years, we all realize are very uncertain, but do we normally have any position on either what data might be helpful, in terms of validating some of the assumptions that were made in the projections, either with regard to recruitment or fishing patterns or when the next assessment, or when the next type of assessment, might be done, or is that just a council responsibility? It's a question, Chair.

DR. NESSLAGE: No, and that's a good question, and I believe we've actually been asked that question. If you scroll down just a little bit, there's that question that Chip has highlighted about monitoring, which we should provide some advice on, and, farther down, we are asked to provide guidance on the next assessment and what might need to be done in the meantime, but I would look to staff. Red snapper, I'm assuming it's on the SEDAR schedule, but where it's currently at, relative to what we recommend, and what we would recommend that they use to monitor the stock in the meantime, is definitely up for discussion, but, staff, can you help me out here? Are we on the schedule officially, or not until after we make this recommendation? Sorry, but I don't have a SEDAR schedule in front of me.

DR. COLLIER: I'm pulling it up right now.

DR. NESSLAGE: While Chip is doing that, Fred, that's a really good point. If we're to consider this new recent new recruitment in any format, we probably will want the breakout group and/or the SSC as a whole, to brainstorm some ideas about how one might best monitor that aspect of the fishery. Go ahead, Chip.

DR. COLLIER: This is the latest SEDAR project planning grid. Right now, you can see that red snapper is not on it, but there is a spot it looks like in 2024 or 2025 that might be available.

DR. NESSLAGE: So within five years, possibly, but that's, in essence, the soonest, if it fit into the Southeast Center's schedule and the negotiations that go on there, and is that a correction description?

DR. COLLIER: That's correct, and I see John Walter is on, and he might be able to provide some guidance as well.

DR. NESSLAGE: Anne, I'm going to skip you for one second, and I promise to come back. John, do you mind speaking to that, or whatever else you were going to speak to?

DR. WALTER: Good afternoon. I want to thank you, Madam Chair, for calling on the Center, and so one thing that I will say, from having recently gone through this in the Gulf of Mexico, is that the pretty good red snapper count is probably going to be the single greatest piece of new information that one would want to incorporate into an assessment. That RFP has been awarded, and there's been an additional funding awarded by Congress for an additional \$1.5 million on that, and that project is scheduled to end in 2023.

From the standpoint of providing a lot of new data, that would probably be something that you would want to consider into probably a research track, and probably then an operational assessment on top of that research track, so that you will be able to incorporate it, and so that's probably what I will raise, is the primary new information.

The second path that we've been looking at is some type of interim analysis based on index trends, and that's kind of an assessment lite, and that's something that we've been implementing in some of our other assessments that allows us to use recent trends to adjust ABC and OFL in the interim between assessments, and both of those could be considerations in a SEDAR Steering Committee. Thanks.

DR. NESSLAGE: Thank you, and so, just to be clear, those adjustments could go in either direction, and so, if recruitment, for instance, kept going high, higher and higher, that the ABC could be adjusted up, and, if it suddenly dropped, god forbid, they would be adjusted downwards, and is that how that would work?

DR. WALTER: Yes, and, if the index goes up, the ABC could go up. If the index goes down, the ABC could go down, and so the key is finding the most appropriate indicators, which we prefer to be able to test through some sort of simulation.

DR. NESSLAGE: You said that's being considered -- Is that being considered for other stocks as well, you said?

DR. WALTER: It's become more operational in the Gulf of Mexico, where we've developed the methodology a little bit further, and it's not as operational in the South Atlantic, but it's something that is in the works, and I don't know the timeframe on when we probably would be able to make it fully operational.

DR. NESSLAGE: Okay. Thank you for that, and thank you for alerting us and/or reminding us about the snapper count, and that's good information to have, and it's something we'll want to consider in our recommendations as well. Okay. I promised that I would come back to you, Anne. Go right ahead.

MS. LANGE: I was just going to bring up the sections of our requirements that addressed what Fred was looking at, and you've already done that, how to monitor and provide advice and what guidance for the next assessment, and so that's all I was trying to do.

DR. NESSLAGE: No, that's wonderful. I guess this is going to be really important, I am feeling, and I have my Spidey-sense that's telling me that this is going to be really important, but, before we launch completely into that topic, do folks have other major uncertainties with the assessment that they would like to add to the list at the moment, before the breakout groups happen, which I am aiming at 2:30-ish for the breakout groups, just to keep an eye on the clock, folks, or if you have any concerns with anything that is in red on the board so far, and this would be the time. Wally.

DR. BUBLEY: I just want to point to a couple of the -- Or refer to a couple of the points on here, and I'm not sure how exactly to handle it, and so things like the uncertainty with maturity-at-age. I went back and looked at our data, and I think it's pretty sound. I'm not sure what the Gulf's data looks like, but I don't know how much uncertainty we would actually have in that, based on it's not small numbers of fish or anything like that that's going into it, and it's 500 age-one fish that we have collected histology samples on, and roughly half of them are mature, and there's not really much question about that, and so I think it could just be a difference between the Gulf and here.

Then I guess I'm just speaking related to the things that I'm most aware of, but, in like the SERFS dataset, splitting it into two indices, I think that was mentioned -- Jie mentioned that as an early and late period, and is that right, but, I mean, it's already kind of split into an early and late period anyway, because the chevron trap has been going on since 1990, and it was determined to separate it out due to the increase in some spatial differences as well as some density, more traps being put out there, and so, I mean, in terms of separating it even more, I don't know how much information you actually get out of it, and it just seems to be the trend of that going up. I think that's about all the points that I had in terms of the red. A lot of the other ones -- I mean, yes, they could provide uncertainty, but, as someone mentioned earlier, maybe Fred, we just don't have the data to address some of these, other than to say that it could be an uncertainty.

DR. NESSLAGE: Great. Thank you, and I think I will look to you to help -- I don't remember which breakout group you're in, but, when we are writing this report, I would look to you to add some of that nuance, because you're the expert in those areas, if you don't mind, just taking a real close look at those sections.

DR. BUBLEY: I would be happy to.

DR. NESSLAGE: Thank you. I really appreciate that. Jeff Buckel.

DR. BUCKEL: Thanks. I don't remember who brought it up, but I don't see it on here, and that was the uncertainty in the age structure prior to 1980, when there was a lack of age and length comps, and so thanks for adding that. Then related -- This was Fred Serchuk and Kyle's exchange about the starting the assessment in 1980, and Kyle's response was that they had done it before, and that there wasn't a big difference, but he was going to go back and check on it, I think to see it was the ratio of F to FMSY or what exactly was looked at, and I think that would be important to have ready, because that's a point of concern by folks that were involved in the assessment, the industry folks, that having that ready to provide, that doing it as the 1950 start or 1980 start, and you're still going to end up in the same quadrant, and, if that's the case, that would be good to have that information available. Thanks.

DR. NESSLAGE: I agree completely. I had that on my list of potential asks for Kyle, and so thank you for that. Anne.

MS. LANGE: This is to Wally's comments on the separating the SERFS data, and I believe the separation we're talking about is of the video and the trap indices and not a time period, although there may have been separation of a time period, but there were the selectivity curves that were different, domed and flat, as opposed to using the same presumed flat-top, and that was the change that was made, and is that what we're talking about, Kyle, and not a long time series?

DR. SHERTZER: Yes, and it was separating them into two different time series and allowing for different selectivities.

DR. NESSLAGE: So those are two different things, right, and is that what I'm hearing? So the one is there is uncertainty in the fact that they have been separated into two different indices, but there is also the question of whether there is the two different selectivity periods, and is that what I'm hearing?

MS. LANGE: I'm not aware that we looked at different time periods in those surveys, and my understanding, when we were talking about separating them, was between the two gears, so that we could address the differences in selectivity in the two gears and not time periods of the SERFS data itself, and so I think there's only one. The line you're just putting in there of potentially two different selectivity periods, I don't think that was part of the -- Was it, Kyle?

DR. SHERTZER: No, we didn't consider different periods, and I suspect that Wally's comment had to do with the expansion in SERFS sampling that started around 2010 or 2011. Prior to that, there are chevron trap catches of red snapper, because that survey started in 1990, but there is a very low prevalence of red snapper in the catches, and part of that is that the sampling hadn't expanded to north Florida to the same degree that it did in 2010 and 2011, when SEFIS started, and so there's expansion of sampling into red snapper habitat around the time of 2010 and 2011, and so that change in sampling isn't an issue in this assessment, because we didn't start the index until 2010.

MS. LANGE: Right, and the bullet above the one where the marker just was at, separating the SERFS data into two indices, was relative to selectivity.

DR. NESSLAGE: That was the point that Jie raised, the selectivity issue?

MS. LANGE: I'm not sure, but that was the reason it was separated, because we found that there was a difference in selectivity of the two years, and that's why Kyle went through all the gyrations of trying to figure out how to address the dependence as well as the fact that they had two selectivity things.

DR. NESSLAGE: Right, and so I'm trying to remember what Jie's concern -- Since Jie is next on the list, let's go to him, real quick, and see if he can clarify where that was coming from, and I'm not remembering. Then if you have something else you want to add --

MS. LANGE: It just looks like they're conflating those two bullets.

DR. NESSLAGE: Yes.

MS. LANGE: Because selectivity wasn't part of the second.

DR. CAO: I think the point I was trying to make is I was trying to make a point on the data changes compared with the last assessment, and so not about separating the dataset into two indices. I think it's a good practice, in this case, to account for the selectivity, but I am a little bit worried about the correlation between those two indices, and I think, just by changing the weighting of those two indices, it might not take account for the correlation. I think, for future research, it would be better to somehow estimate the covariance matrix.

DR. NESSLAGE: Yes, and I believe we talked about that during the assessment workshop, and, Kyle, correct me if I'm wrong, but you ran out of time, but just downweighting the likelihoods is kind of a patch, right, and that you were hoping to, in the future, do that more formally, by like, as Jie said, incorporating the covariance structure, and is that something we should add then? If you're still considering doing that, I'm thinking that's a research recommendation. Jie, is that where you're going with this?

DR. CAO: Yes, exactly, as a research recommendation.

DR. NESSLAGE: Okay. Kyle, am I characterizing that correctly?

DR. SHERTZER: Yes, and it's also a research recommendation in the assessment report, and I guess it's partially true that we ran out of time, and I was able to implement it, but it's just that it didn't properly converge, even though it was fitting the data okay, and so we just didn't have time to properly vet the method, especially before using it for a red snapper assessment.

DR. NESSLAGE: Understood. Okay. I want to go quickly back to Anne. If we take out that bullet that Chip has got crossed out, we would be -- We might even be able to take out that separating the SERFS dataset, because, really, that would be accounted for in Jie's comment, which is that it's not -- We think that was the right thing to do, but the likelihood needs to be adjusted. The approach to addressing that in the likelihood is a research recommendation, and would folks -- Jie and Kyle, does that seem like it's a reasonable solution?

MS. LANGE: Yes, it is to me, except that I think the reasoning is because of selectivity, and I think the reason to separate it, and so that should be included in the bullet, I think.

DR. NESSLAGE: As an uncertainty or as an improvement above?

MS. LANGE: As an improvement.

DR. NESSLAGE: I hear you. Okay.

MS. LANGE: The uncertainty is how to, as Jie was asking, how best to accommodate the correlation.

DR. NESSLAGE: Exactly. So we'll put that under research recommendations. Thank you both, or all, all three of you. Alexei.

DR. SHAROV: It looks like we are making a whole laundry list of every possible uncertainty that we didn't talk about. All right. Here is one which may be actually important, and the natural mortality we're considering constant for age here, and constant by the age-specific, and there is a possibility of density-dependent natural mortality, which will change with the increased strength of the year classes and have a potentially substantial effect on estimated fishing mortality, definitely for the young-of-the-year or whatever, the age-one or two, but possibly for an extended range of the three or four age groups that are subject to predation mortality as well.

DR. NESSLAGE: Good point, Alexei. Just to add to our worries, right?

DR. SHAROV: Right. It potentially could be explored, but, in point, the actual possible range of the changes is going to be difficult.

DR. NESSLAGE: Absolutely, yes, but it's something that could thwart the response to management, for instance, or even just the accuracy for projections, and so that's something to

mention to the council, just as a beware that this could be going on or could happen. Thank you. Wally.

DR. BUBLEY: I just wanted to clarify that everything, I guess, has gotten cleared up now at this point, but I misunderstood Jie, and I was thinking because, in the early part of the time series the numbers were lower, and the later part they were higher for the SERFS indices, that that's what he was talking about, and so that was my fault for misunderstanding him in that aspect of it.

I guess one part that does go along with that though is that, while it's not incorporated in the base model, and so it wouldn't account for the uncertainty, there was the sensitivity run that dropped the chevron trap index, or the video index, and it appeared that it no change at all in the run, the deterministic run, itself.

DR. NESSLAGE: You're saying that that's evidence that it's not an uncertainty or -- I'm sorry, but help me.

DR. BUBLEY: At least not anything major, I guess is what I was saying. When he dropped the chevron trap index, or the video index, they appeared to be the same, and the same with the base model, and so, while there is a correlation, it doesn't appear to affect anything, based on the sensitivity run.

DR. NESSLAGE: Right, and so we need to qualify that when we wordsmith this. Absolutely. In the sensitivity runs. Okay. Thank you for that. Anything else, Wally?

DR. BUBLEY: That is it. Thank you.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. One general comment, and then I have a specific question. The first general comment is scientists are generally very well adept at listing uncertainties, but we have been asked, quite frankly, to list uncertainties with regard to status, fishing level recommendations, and future yield predictions. Some of the uncertainties that we have listed here are generic to all assessments, and probably will have very little impact on this or future assessments, because they will require an evaluation, which hasn't yet been undertaken, and I don't want to put so much uncertainty here that people say, wow, you really don't know what you're talking about then, do you, scientists? You've given fifteen points of uncertainty here, and is there anything else you're certain about?

I think we are good at recognizing that we live in an uncertain world, and there are lots of uncertainties, but there's been a lot of work done on this assessment, and I am very confident that the scientists have done the best job, given the available information, and have used the most up-to-date methodologies and ways to evaluate uncertainty, and there's a whole section here on what they've done, in terms of uncertainty analysis and what that means.

I want to be careful, in this section, that we don't just go in and put everything that we feel might be uncertain, because it might have very little impact on how we do our business, now or in the future, and that's all that I'm going to say about that right now.

I have another more pressing question, Chair. We've been presented with a number of projection scenarios, and are we going to be discussing that before we go to the breakout groups, or after the breakout groups, because I think what we might discuss about that might have implications on any work that needs to be done before we make a final determination. Thank you.

DR. NESSLAGE: You're bringing up several excellent points. To your first point, it would be good if we were to list what we feel we're fairly certain about as well as what we've been asked about, which are the uncertainties, right, and I'm not sure where we could fit that, but we can add whatever we want to our report, and so that might be a really nice balance and something that's important for the council to know, that we feel that they can rely on a number of outstanding aspects of this very thorough assessment, in addition to the improvements that you mentioned that we should be providing above.

I think I'm brainstorming, and give me a second to figure how we're going to do that, but let's put a placeholder in for that, the certainties and the things that we feel are strong aspects of this assessment, and they should be listed somewhere in our report as well, or highlighted, I should say.

To your second question, I am thinking -- Well, I have a whole speech drafted out here for you guys with regard to how to move forward, and I'm feeling like perhaps we're almost at that stage to switch the discussion. I'm a little worried though of going down that rabbit hole quite yet, but I would like to get a little bit of discussion -- Well, I guess that's cart before the horse. Perhaps we should just dive in, although, if Fred Scharf has something about uncertainties, I'm going to call on him, and then maybe we'll change the direction of the discussion. Fred, is it regarding uncertainties?

DR. SCHARF: I do have an uncertainty point that I wanted to make, but, coming back to what Fred was just talking about, and then a way to express sort of the level of confidence, and I see that Chip was sort of typing in there to like list data series with certainties, but maybe the best place for that is right up above this section, when we answer those first questions up above and we say yes, yes, yes, right, where we're going to list the improvements, and that's where we could discuss the really strong parts of the assessment, the parts that we feel we're most confident in, but that's just an opinion, where you put it. I agree to put that somewhere to balance out the uncertainties, but maybe up above would be a good place.

The point I wanted to make about one of the uncertainties was just circling back to one of Wally's points about the maturity and the reproductive information, and I think it applies to not only the maturity-at-age, but the batch size-at-age, or spawning frequency at-age, all the aspects of egg production, since that's being used as the proxy for stock biomass. It wasn't really -- I think, from the assessment report, and the working group papers, those relationships are robust, which is why they were updated in this assessment, and so, as Wally indicated, there is lots of data to support those.

I think the uncertainty really lies in how plastic those relationships are and how much they vary related to stock density and related to environmental conditions and not so much that the estimates that we have now aren't robust, but it's just whether they are -- Part of that lies in the fact that it seems like the maturity schedule is a bit misaligned with the longevity of the species, in that a species that lives to be fifty years old you wouldn't necessarily expect to then be mature in the first

year, and so there's just a little bit of disconnect there, and it may just be a reflection of the long history of exploitation on the stock or changes in the environment in the South Atlantic, and it makes them a little bit different than in the Gulf. I think the uncertainty is just more broadly, in terms of their life history strategy and how these pieces all work together, rather than the estimates themselves, which are very robust.

DR. NESSLAGE: Excellent point, Fred. Is the placeholder wording here good enough to get us started on a report?

DR. SCHARF: Yes, absolutely.

DR. NESSLAGE: All right. Cool. Thank you for bringing that up. I don't see any hands raised at the moment, and so I'm going to take this opportunity to say thank you for this brainstorming list of our responses to some of the questions that we've been posed. I think this is a good springboard so far for the breakout groups. However, we have the looming discussion of reference points, projections, and rebuilding plan issues that were raised earlier.

What I would like to spend the next probably twenty minutes to a half-hour discussing is whether the SSC feels that we have -- Whether we're comfortable, given what we've been presented so far, with recommending OFL and ABC recommendations off of the current reference point, based off the current rebuilding plan, and whether we have enough information, based on the projections we've seen and/or the new projections that have been -- The new projection methodology that's been proposed recently and whether we feel that we're in a position, at this moment, to confidently recommend ABCs or whether we would like to request the council, the council staff -- That perhaps we spend some time today brainstorming and discussing what the appropriateness of the current reference point and rebuilding plan and what projections we might need to make our most confident ABC recommendations.

That would involve essentially tabling setting our ABCs today and requesting another meeting of the council, which hopefully John can speak to whether we would be able to do that, and then having the time to adequately discuss the issue of whether F 30 percent is still appropriate, given all the information we've seen and Kyle presented this morning, and whether we want to have a little bit more time to ask questions of Kyle about the new methodology that incorporates discard mortality differently, which seemed like a good idea, but I feel like we were presented with that at the last minute and haven't had a chance to really digest it.

I would love to hear, first from John Carmichael and council folks, if that's possible, and, if it is possible, then I would like to turn to the SSC and see if that is something that you are interested in doing or whether you feel confident that we can set an ABC today, and so, John, and maybe Mel or Steve, would you be willing to, in that order maybe, address my questions and concerns here?

MR. CARMICHAEL: Thanks for this opportunity. I mean, I think the SSC always has the right to not provide the recommendation if they feel that they don't have all the information they need. If it's a case where the information maybe doesn't exist, or wouldn't be available, then, of course, we always ask for you to do the best you can with what you have, but it seems like, on the discussion here today, you have raised a number of legitimate questions about the existing rebuilding plan and the basis for that and how the stock is performing relative to the assumed MSY that is the current MFMT, and you also are trying to grapple with something the council wants,

which is to make sure that you can account for recent regulations, most importantly the descending device usage, in doing your projections for the future.

My thought is, if you guys feel that you need some more information, and you need to evaluate that other alternative projection approach, we can certainly support that and make arrangements to set up another meeting when you have time to go through things in more detail, and perhaps get some guidance for you from the council after the June meeting that may help you in the deliberations, and particularly that question about alternative rebuilding references and such.

DR. NESSLAGE: Thank you, John, and so you're thinking that it would be logistically possible, if we got the right feedback from the council, to meet probably this summer and discuss that, or earlier?

MR. CARMICHAEL: Yes, and that's what we're thinking. You know, it would be nice if you could perhaps meet between the June and the September meetings, and the council could make some more progress at that point.

DR. NESSLAGE: Right. Excellent. Thank you. I don't know if Mel or Steve or Anna or Chris or any of the council members online would like to comment on that. Mel, go ahead.

MR. BELL: Thanks, Genny. Given the discussions you all have had today, and the issues brought up, and, like you said, this kind of fairly late new methodology consideration, I mean, I would certainly support allowing some more time and working through this, and so whatever we have to do to accommodate schedule, or to allow you guys to kind of give this further thought and all, and I'm certainly supportive of that, given the importance of the fishery and all and the decisions we're trying to make, but I really do appreciate the discussions you all have had and the openness about working through some of this, and that's been very productive, but certainly we'll try to do whatever we can, as John said, within the constraints of just the time we have to accommodate more time and the ability for you guys to work through this some more, and so certainly it, as far as I'm concerned, has our support.

DR. NESSLAGE: Thank you, Mel. I appreciate that. Steve.

MR. POLAND: Thank you, Genny. I don't have anything additional to add that wouldn't be redundant on top of what Mel and John have shared, and I just want to say that I appreciate the discussion today, and the council has a lot to discuss about red snapper at their June meeting, and, depending on decisions made today, I can see the council being in full support of a special meeting sometime between the June and September meeting, if it is needed.

DR. NESSLAGE: Great, and so what I'm thinking is that, in place of our -- If the SSC is supportive, and I will ask for discussion on that in a moment, but, if that were to happen, we would spend a little bit of time with our breakout groups, coming up and revising our wording, et cetera, for these sections that we've already brainstormed, but then also spend some time brainstorming what -- Have a really thorough discussion, basically, preparatory discussion, on what sort of things and information we would want to see and what sort of considerations we would want, things we would want to consider, what we would need from Kyle to do that, and have that information upfront, so that we're not surprising him with any requests, and so as well as to just to get the ball

rolling and start to think about what -- List our major concerns and what we would need to address those concerns. I would like to open the floor to the SSC for their thoughts on this. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. One of the things that I think would make us all feel more comfortable is if we had a better idea, or when we would have a better idea, of what the recruitment was in 2020, and that is whether this four or five-year period of above-average recruitment is continued, because I think -- What I am really quite taken aback by is that one of the scenarios, the high-recruitment scenario, said the stock could be rebuilt in four or five years, and I think that was also highlighted in Captain Hull's transmission to the council, based on the information he picked out of the assessment report.

If that is the case, then the fishery then could actually proceed as it hasn't proceeded before in a number of years, and that's a remarkable change. Instead of being rebuilt in 2040, if you can be rebuilt by 2024 or 2025, because of this increased high-level recruitment, I think that would be something that would be most appreciated by everybody, but I can see that people might be reluctant to do that, because, even though we have four or five years of very high recruitment, we don't know what the most recruitment is, and so, from my perspective, that would be something that I would like to have, or would like to see, before I would recommend a high-recruitment scenario.

DR. NESSLAGE: Well said, Fred. Thank you. Chip, would it be possible to start a new list, just to get these ideas on the screen, so we don't forget them and folks can mull them over, and this is just kind of a what would we need to set -- What do we feel we need to set an ABC at this point, is kind of the idea. Thank you.

Also, I would like to put a placeholder in there for seeing the alternative start in 1980 as well, and I know there were concerns about that, but, SSC members, please chime in if you think I'm mischaracterizing that concern, and so it's start in 1980 and then do we have any information on recruitment in 2020, was Fred's comment. Scott Crosson.

DR. CROSSON: Thanks, Genny. I just wanted to state that, at least at this point, I don't see any justification for delaying reaching an ABC on this assessment. The assumptions in the model and the projections are pretty clearly laid out, and we've already discussed a lot of them, about whether we expect recruitment to stay at this high level and whether the descending devices are going to continue to have or are having an effect right now on the discard rate. I mean, if things are going really well, then I think we'll see that in the next interim assessment, and so I would rather wait until that point. The last time this committee delayed setting an ABC for red snapper, it caused a lot of anguish and problems, and I'm kind of loath to go down that path again at the moment, and that's all.

DR. NESSLAGE: That's a good point, and so that's a counter to delaying. There is socioeconomic concerns with delaying, but there might be socioeconomic concerns with setting an ABC based on the current rebuilding plan, which is what I think the council might be concerned about as well, and so we have to balance that out, but it's definitely something we need to discuss. Thank you. Kyle, go ahead.

DR. SHERTZER: Just to reiterate that, if you come up with a set of projections that you want to see that are just a different iteration of the ones that we've talked about already, I am set up to run

those fairly quickly, and we could revisit this probably on Thursday afternoon, if you wanted to move more quickly on looking at those projections. On the other hand, if you come up with a method that hasn't been developed yet, or something that's radically different, that might take more time, but, if it's just a matter of recruitment scenario, start year, the two-step method or not the two-step method, or I guess anything else that we've talked about, or the F that you want to see, then those could be run fairly quickly, and we could look at those results, and I could also give a little bit more information on the two-step method, if you wanted to look at that for review.

That was my first comment, and my second comment was on these different start years for the assessments and just to point you toward old assessment reports, if you care to look at those, and the SEDAR 24, which had a terminal year of 2009, ran a start year of 1976 and a start year of 1986, and this was in -- This is Table 3.15 of the SEDAR 24 report. In those cases, the MSY was a little bit higher than the base case that started earlier, in 1950, and so the base case at an MSY of 1,842, in units of thousand pounds, as compared to 1976, was 2,297, and 1986 was 2,416, and so they're higher if you start later.

On the other hand, SEDAR 41 -- In this report, this is Table 25, and it had a start year of 1978. In that case, the MSY was lower than it was in the base run, and so the base run there had an MSY of 459,000 pounds, versus the 1978 start year was 418,000 pounds, and so similar scales, but, in one case, they were higher, and, in the other case, they were lower, but, in both cases, on the same scale and not radically different for the later start years.

DR. NESSLAGE: Excellent. Thank you, Kyle, and we appreciate your readiness here. I think we are -- Logistically, I'm just worried about balancing our concerns regarding the appropriateness of the F 30 percent as well as the council's concerns with the appropriateness of the current rebuilding plan and investing a lot of time in setting an ABC that we may be asked to revise in June, and so that's kind of where I'm coming from, as just purely chair-wise, but I also appreciate the comments that have been made about the need to set an ABC and your willingness, Kyle, to get us answers by Thursday is outstanding, and we really appreciate that. Wilson, what's your opinion?

DR. LANEY: I don't have an opinion on that, Madam Chair, and I was going to ask the same question which you articulated a few moments ago, which is relative to Fred's question. Do we actually -- Are we able to get the recruitment data for 2020? I mean, I can't remember, and I know that Marcel has addressed it at a previous council meeting, but I can't recall how the pandemic affected at least the sampling of the fishery-independent databases and whether or not we can actually get the recruitment index for 2020, and so maybe some -- I see Marcel's hand is up, and so perhaps he can answer that question.

DR. NESSLAGE: I hope he can too, Wilson. Marcel, can you help us out?

DR. REICHERT: Sure, and I know that Wally can answer that question too, but we were unable to sample any in 2020, and so we do not -- We have about ten sea days that were dedicated to a different project, but we have no data for 2020, unfortunately.

DR. NESSLAGE: So maybe -- Kyle, is there any other information that's typically used in the assessment that we could use as a monitoring -- For any sort of monitoring information on recruitment?

DR. SHERTZER: I would like to say age comps from the landings, but they're not really catching age-ones yet. I can't think of anything.

DR. NESSLAGE: So, even though we would love to have more information on recruitment signals from 2020, we probably don't have that information, is what I'm hearing, and is that correct from both Marcel and Kyle?

DR. SHERTZER: I think that's right.

DR. REICHERT: Yes.

DR. NESSLAGE: Okay. All right. Thank you, both. Other folks who haven't chimed in, what are you thinking? Do you feel that you have enough concerns about whether F 30 percent is making sense, whether the rebuilding plan makes sense, that you question it and you want to start -- Have a little bit more discussion about what you would need to set an ABC, or do you feel like you have enough information here, with a little bit more presentation from Kyle on Thursday, that we could go ahead? What do you think? Amy.

DR. SCHUELLER: Personally, I'm not really sure what information it is that we would have available to us, and so I don't feel like there is anything like hanging out available that we don't know about, given what they just said about SERFS, and they didn't run, and so, basically, we have what we have in hand, and I don't see a reason to change from F 30 percent, unless you were going to like argue some sort of life history reason, but then that would really argue for a higher SPR, which I think is -- We can have that discussion, if that's the way that we want to take this, and so I guess I don't have a problem with moving forward with setting up stuff to set up the ABC.

DR. NESSLAGE: Okay. Thank you, Amy. Jeff.

DR. BUCKEL: I'm in the same boat with Scott and Amy. I think we've got enough info and can move forward, and I think the F 30 -- I'm pretty sure that comes from the council, right, and so we have to go with that, and is that correct?

DR. NESSLAGE: If we set an ABC today, yes. If we're tasked with revising the rebuilding plan and making a recommendation regarding that in June, we would then have to completely revisit everything, basically, but, if you guys feel comfortable setting an ABC today, I'm happy to guide you all through that. That's fine. Does that answer your question, Jeff?

DR. BUCKEL: Yes. Thank you.

DR. NESSLAGE: Okay. All right. Frankly, unless I see -- Who hasn't spoken who has an opinion and would like to speak up? So far, I'm hearing mostly that you would like to set an ABC today, which is, given what you -- Or at least we'll have a list of requests for Kyle that we'll revisit on Thursday and formally set the ABC then. That's kind of where I'm hearing the majority of the committee leaning here. Yan.

DR. LI: Thank you, Genny. I just want to support Amy and Jeff's point that I feel the stock assessment team, and Kyle, already did a very good job, and they used all the information available

to them and did whatever methodology they could to make it work by today, and so I really appreciate that, and I think this is what we have, and I feel that I would support a move forward with what we have.

DR. NESSLAGE: All right. Thank you. Given I am hearing that we're going to move forward, pretty much, if anyone has any objections to that, like major objections to that, I would like to hear that now. Okay. So everyone can live with that. All right. Then that settles that, in which case we've got a list here that hopefully the fishing level recommendations breakout group can flesh out a little bit more, but what I would like to do at this point -- Before we go to the breakout group, I would like Anne, if she is still on and has the energy, I would like you to just, if you could, briefly walk us all the through the working group's recommendation, so that the breakout group can kind of summarize the discussion and questions that come up after she presents and put some strawman language up there on the board when we return, and so would you be willing to do that right now, Anne?

MS. LANGE: Sure. No problem, and there are several members of the working group that can chime in as well.

DR. COLLIER: I am bringing up the document for you, Anne.

MS. LANGE: Thank you, Chip. Our task was to come up with looking at the dimensions of the ABC Control Rule and develop a P* recommendation, and so we just went through and compared what had been done in the past and discussed whether there was any reason to change the previous values, and so, for Dimension 1, the assessment information, we looked at Tier 2. It's a quantitative assessment that provides estimates, but not an MSY benchmark, and it uses proxies, and so that's an automatic minus-2.5. does anybody want to say anything about that or have issues or questions? Okay. That was the same as the previous assessments.

The Dimension 2, relative to uncertainty characterization, the previous assessments had used Tier 3, which is the medium uncertainties. We looked at the new assessment, and there were several things that had changed. The stock has been rebuilding, and there's been increased recruitment, and there were improvements in the BAM model that were designed to address uncertainty, and so the working group recommends moving from Dimension 3 to 2, which is high, and, again, it reflects more uncertainty in the future recruitment, and so that went from a minus-five to a minus-2.5.

The third dimension is stock status, and it remained the same, in Tier 4, because the stock is both overfished and experiencing overfishing, which results in a minus-7.5. The fourth dimension, the PSA score, we maintained as it was before, based on the MRAG value, in Tier 2, moderate risk, which put it at a minus-five, and so the overall P* adjustment was 17.5, resulting in a P* of 32.5 percent, and giving a P rebuild of 67.5 percent, and so that's -- Are there any questions on that part of it or questions about why we chose the values we did? No hands.

Then, from there, we were looking at specifying the projections for the overfishing level and the ABC. For OFL, we were looking at the projections that P*, using an average recruitment from the spawner-recruit curve, and, for ABC, using at projections with F rebuild, and, again, with an average recruitment, and then we also asked that the projections be run both with the original, or the current P rebuild, which was 70 percent, and also with the P rebuild that we had derived, which

was 67.5 percent, and so that's basically where we were at. Are there any questions, or does anyone else want to chime in? Jeff, George, Wally, anybody? Okay. That's where we're at, and Kyle did those projections.

DR. NESSLAGE: We thank Kyle, and he has his hand raised. Kyle.

DR. SHERTZER: Just one comment, that the 70 percent -- I think the intent there was to do what was done in the last assessment, which, after this report came out, we discovered it was actually 50 percent, and so we used 50 percent in the forecasts that are in the report and not 70 percent.

MS. LANGE: Okay. That was we were looking at trying to do -- Replicate what was the current level, and so okay. We'll change it to 50.

DR. NESSLAGE: Excellent. Thank you both. Kyle, was there something else that you needed to clarify?

DR. SHERTZER: No, and that was it.

DR. NESSLAGE: Awesome. Thank you. Are there comments or questions? Fred Serchuk.

DR. SERCHUK: Thank you, Chair. I am looking at one of the graphs that was presented on the BAM base run, the spawner recruits, and it seems to me that the lowest number of recruits have occurred at the highest stock sizes, and the highest number of recruits have generally occurred at the lowest stock sizes, in general, and some of the lowest recruits have also occurred at the lowest stock sizes, but there's a lot of variability, but I don't see a very strong stock-recruitment curve here, where you have a large stock size and you get large recruitment. I'm just -- Yes, that's it right there.

I am wondering about using that for setting OFLs and ABCs. You can see that, after about the middle of the graph, things start to decline, but the highest ones, in the most left-two quadrants there, that's at the lowest stock sizes, and the reason I'm concerned about this is it really makes a difference about what recruitment scenario we use in the projections, and my feeling is, if you don't use a spawner-recruit curve, but you just go with the most recent high recruitment, you're going to get a very different response to the stock.

Even if we discount 2020, if we begin our projections in 2021, the 2019, 2018, and 2017 year classes are going to be the most important year classes in the fishery, and we know they're good ones, and so I would like to have some more discussion about this. Thank you.

DR. NESSLAGE: Thank you. I agree completely, Fred. What do folks think? We have several decisions to make, in response to the working group's suite of projection scenarios that they asked Kyle to run, and, obviously, if we want to -- Basically, the first decision is do we use projections with average recruitment from the stock-recruitment curve or do we go with higher-than-expected recruitment, and does that make sense, is what Fred is asking, given what we've seen out of the assessment? I will open the floor to you all. Alexei.

DR. SHAROV: I didn't see any evidence, or I didn't hear that the SSC has a clear opinion on the existing stock-recruitment relationship. We didn't say that we're convinced that there is a density

dependence and we can use the stock-recruit curve. We did not have any explanation as to why, in recent years, we had a few strong year classes, but we're only able to note the fact, but, because we don't have a proposed mechanism, nor do we have a proof of that mechanism working, and there is no reason for us to predict the near-term recruitment.

Just the simple fact that the recruitment in the adjacent period was high does not necessarily translate into the higher expectation of high probability of the same level of recruitment in upcoming years, and so I don't -- For that reason, I believe that using the average recruitment level from the full time series would be more appropriate. If we want to use a higher level of recruitment, we need to provide -- I would like to hear more reason and more evidence why that would be an appropriate case.

DR. NESSLAGE: Thank you, Alexei. I guess I would turn to Anne. Can you characterize the working group's opinion on that, or was it just that you wanted to see would they be substantially different, and what was your thinking?

MS. LANGE: I'm sorry, but I just missed that. I had to run out and get my granddaughter off the bus, and I'm sorry, but I missed the question.

DR. NESSLAGE: The question is could you elaborate -- You or one of the other working group members, and that's fine, but could you elaborate a little on the request for higher recruitment? Given the -- Do we have any -- I guess how did Alexei say it? Do we have adequate evidence that we should base our projections, our fishing level recommendations, on recent shorter years of high recruitment relative to our stock-recruitment function?

DR. BUCKEL: Anne, I can take that one if you want.

MS. LANGE: Thank you, Jeff.

DR. BUCKEL: Amy mentioned the slippery slope, and maybe we started that with the red grouper and black sea bass, because we didn't go with the average recruitment in those assessments, because recent recruitment was low, and so we went with an average low recruitment instead of average recruitment in those prior projections for those species, and so this working group -- We were just following that past approach that the SSC had used for not going with average recruitment, but going with -- If there was a time series of low recruitment, we went with that, and there was a time series of high recruitment here, and so we went with the projections, what it looked like with that high-recruitment trend.

DR. NESSLAGE: That makes sense, Jeff, and so I guess I'm going to play devil's advocate, a little bit, just so that we have the discussion. With red porgy, and I'm trying to remember red grouper, we used the lower recruitment for the projections, but those occurred over a much longer time period than six years or so that we're seeing at a high recruitment in red snapper, and so there seemed to be concern about a regime change of some sort.

Do we think -- This isn't directed at you in particular, Jeff, and this is more of a you, the SSC, feel that there is strong enough evidence that red snapper recruitment is going to maintain at this record high level here and that we would set ABCs based on that, because that's the question, right, and I don't know if, Jeff, you want to address it or just open it up to the folks who are in line here.

DR. BUCKEL: I think open it up. I think that's a good point about the length of the time series, and we can look back at those, or folks might remember, but let's open it up.

DR. NESSLAGE: Thank you. Okay. Fred, to that point or a different point? What are you thinking?

DR. SERCHUK: To that point, Chair. Can we go back to the recruitment graph? This is the BAM base run recruitment. Let's take a look, and we discount the 2020, and that's just a placeholder, and we have one, two, three, four, five, six, seven, eight, nine points presumably above the average, and we have maybe five points below it. My feeling is two-thirds of the points are above average, quite a bit above average.

We're not talking about four years or five years, but it's nine years of which it's above average, and I think we would be silly, in my mind, to take anything but a recruitment scenario that takes advantage of the fact that, in most of the years, recent years, we've seen above-average recruitment, high recruitment, and, again, I think we've -- That's not three years, or four years, but that's a lot of years in recent years, and I think we should go with the high recruitment, because of that.

We've gone with the low recruitment, as the Chair pointed out, in previous things, because we felt that, well, wait a second, it looks like something is different in recent years. Well, to me, it looks like there is something different in recent years of recruitment, and it's much better than average, and so that would be my recommendation, Chair. Thank you.

DR. NESSLAGE: Thank you. That was a good counterargument. Jie, what do you think?

DR. CAO: Can we go back to the figure, the recruitment figure? I am seeing this perhaps as a regime shift right around 2000, and so, before 2000, you see pretty low and stable recruit. After that, it seems like there is a regime shift that has happened. Personally, I am curious to see a projection scenario where you have random recruitment, instead of a high recruitment scenario, just for comparison, and I think it would be informative to see a random recruitment scenario, given the large variability we have seen in the historic recruitment estimates.

DR. NESSLAGE: That's an excellent suggestion, Jie, and thank you for those comments and the question. Kyle, there is some stochasticity in the projections, isn't there, with regard to recruitment, or it's still locked in around the average? Could you help me out there, Kyle?

DR. SHERTZER: Sure. All of the scenarios that we've looked at have stochastic recruitment, and it's just a matter of what is the mean level. Is it the long-term average, or is it the recent high, as the average, but the annual variability in the forecasts varies in a stochastic way.

DR. NESSLAGE: Thank you, Kyle. Jie, is that kind of what you were asking for, or are you asking for something different and I'm not following you?

DR. CAO: Something different. Like, instead of you have a mean average, perhaps you can draw recruitment from historical recruitment every year and then add some stochasticity to that.

DR. NESSLAGE: Thanks. Kyle, what do you think of that?

DR. SHERTZER: I think it would probably have fairly similar results, if the suggestion is just to draw at random recruitments that we've seen over the past, and so sort of an empirical bootstrap approach. The way it's done now is we use those in those estimates of recruitment to characterize the lognormal distribution of recruitment, and then we draw recruitments from that lognormal distribution, but I think the -- Which of those two approaches we use, I think the results would be somewhat similar.

DR. NESSLAGE: Jie, based on your experience, have you done projections like that and they've come out quite different, or -- I don't want to dismiss your idea, but, if you have experience that indicates that might not be the case, what Kyle is suggesting, we can ask Kyle if he's willing to try that, but what are your thoughts?

DR. CAO: I basically agree with Kyle, and I think that depends on the CV of that lognormal distribution, and I don't know what the CV was used in the projection.

DR. NESSLAGE: Good point. How much are we allowing it to vary, right? Kyle, do you know off the top of your head, or should we keep chatting and you can come back to it?

DR. SHERTZER: It's around 0.5 is the CV in logspace.

DR. NESSLAGE: Jie, is that adequate, do you think, or would you like to see a higher run?

DR. CAO: I think 0.5 is reasonable.

DR. NESSLAGE: Okay. Good questions though. Thank you. Did you have something else, before I move on?

DR. CAO: No, and that's it.

DR. NESSLAGE: All right. Thank you. Wally.

DR. BUBLEY: I just wanted to reiterate what Fred Serchuk was talking about. Not only were those nine years above average, but eight of those nine were the highest on record that we have during this model run, and so it's not even just above average. Those recruitments, the recruitments in those years, are the highest that we've had.

DR. NESSLAGE: So exceptional years. All right. Thank you for that. Fred Scharf.

DR. SCHARF: Just to sort of play devil's advocate a little bit, if you bring the graph back up again on the recruitment plots, while those nine out of those last fourteen years are above average, there is also a period of five years in the middle where they are close to the bottom of what we see in the whole time series, and so there's a lot of stochasticity, right, and, as Jie mentioned, maybe we are in a different regime, environmentally, where we're going to see much wider swings in recruitment, and so there's that.

There's also the issue where the most recent estimates are, again, close to the terminal year of the assessment, which are typically when our assessment output is the most uncertain, and so I don't know, and I can't remember if Kyle may have already alluded to it, and it may be somewhere else, but usually we look at some retrospective analyses, where you're dropping off the terminal years and seeing how some of the estimates change, and I just wonder how stable those recruitment estimates are, particularly like from 2014 to 2019, as you start chopping years off the end of the assessment.

DR. NESSLAGE: Which I think was pointing to Amy's concern about the retrospective, that some of those estimates are outside the MCB envelope, and is that kind of where you're going, Fred?

DR. SCHARF: Yes.

DR. NESSLAGE: Okay, and so that's worth noting as well.

DR. SCHARF: Also, that those couple of cases that were outside the envelope were underestimating recruitment.

DR. NESSLAGE: Interesting. The plot thickens. Alexei.

DR. SHAROV: I had the same arguments and the same comments as Fred just aired, with respect to sort of the frequency of highs and lows. I am not against the exploration of the possible effect of the higher recruitment, and certainly we noted that there was an elevated recruitment in the past ten years or so, but we have no working theory or explanation as to why, and, therefore, we have no model or reasoning to predict or believe that this will continue.

We may say, if this trend continues with this level of elevated recruitment, here is what the projection would give us, but certainly it would be less -- Not so safe approach, as opposed to where you use all of your information on the stock-recruitment relationship, all the available range, to either draw from or model and say, well, this covers the full range of variability of potential recruitment, and, given that variability that the population exhibited in the past, this is where to expect an average. Then, of course, in both cases, we do get an envelope of the projected population abundance, but, still, I think, although the elevated recruitment scenario, I would say it's precautionary -- Not precautionary, but as a cautious scenario.

DR. NESSLAGE: All right, and so I hear Alexei saying the higher-than-expected recruitment runs are not precautionary, and so that's a cause for concern. Amy, what do you think?

DR. SCHUELLER: I am sort of turning over in my head all of these statements, and I guess what I'm settling in on is that, with the other species that we have put in a reduced recruitment value, it's been because there has been multiple years and multiple species that are observing that, and I think that the position of the ABC is that it's set in order to avoid overfishing and getting that stock either into an overfished status, if it isn't, or continuing it to be in an overfished status, if it's already in a rebuilding plan.

To me, there was evidence that there might be some additional cause for concern with those particular species. If you flip it the other way, if you go back to the stock-recruitment curve and

go I think it's a slide down, my expectation is that, even if we don't see a stock-recruitment curve, I would argue that I can squint and see one. As you move across this graph, especially if you just cut off those first couple of years, you are getting increased recruitments with increased spawning stock size, and my suggestion is that I would expect that.

We had a couple of big recruitment classes a few years ago, and those fish should be maturing and starting to contribute to the spawning stock in a way that we would hope to see increased recruitments, and my viewpoint on this is that, to go ahead and just run projections with these increased recruitments is just like cutting this fishery off at its kneecaps, but it's not really getting a chance to benefit from those increased recruitments.

I mean, the hope, with a rebuilding plan, is you get a good recruitment, and they age out, and they mature, and they produce some recruitments, and those recruitments age up and mature, and then you build your stock up, so that you can actually open your fishery again. I'm concerned that if we're like, yes, we got a few good recruitments, we're going to hurry up and open it and then cut it off, and I guess I am -- If this was shrimp, or Gulf menhaden, and they were really short-lived, I would be like, yes, harvest them, because they're not going to be there in ten years, but this isn't a short-lived species. It's a long-lived species, and so you're like deciding whether or not you want to bank your interest or not, or if you just want to take it and some of your principal right now.

I just don't see why we would do that. I don't think there's been any arguments presented that suggest that we should go ahead and take our interest and our principal out, so that we're back at the principal level we were at before, and that's my point of view.

DR. NESSLAGE: Thank you, Amy. I think the thing we're -- If that's the direction we end up going, I think we need to have a very solid explanation in our report, so that I can present to the council and to the stakeholders who are listening as a reasonable scientific explanation then for why, when we're at record-high abundance, which, granted, it's primarily made up of age-ones, and some of highest -- A moderate time series of high recruitment, that we would cut the ACL, because, honestly, all of these scenarios that we're talking about right now would be a drop, but, without accounting for the higher recruitment in the projections -- That's not true.

So the high recruitment is accounted for in the projections, because we're using the entire time series, regardless of which scenario we go with, and whether we give more weight to the recent years is the question, and so we just need to have a solid explanation for that to present to the council and the stakeholders, and so I'm going to look to you all to help me to write that section, if that's the direction we go in, but I am hearing there is folks on both sides of this. There is the precautionary, more traditional approach, and then there's folks who are very confident in this recruitment, and so let's hear from I think one of the confident folks, Fred Serchuk.

DR. SERCHUK: Thank you, Chair. The point is, for me, that the run of recent recruitment, higher recruitment, record-high recruitments, for a stock that -- Those are in the fishery, and they have helped the stock rebuild, and they will continue the stock rebuilding, and that, because they are now part of the increase that we're going to see in spawning stock biomass over the next couple of years. It's a long-lived fish, and so we've seen a run of nine year classes that have been -- Some are still one or two or three years old, and they're still going to contribute.

My point is not the fact that -- My point is the stock could be rebuilt if we take advantage of the fact that future recruitment -- The next couple of years are going to be good as well, and I just can't see keeping this going until 2040. One of the high recruitments says it could be rebuilt in 2024, and, while you might think that's overly optimistic, that's a lot different than 2040 for waiting to get the stock rebuilt and to get some relief to the fishery. I think this is a very important issue. Thank you. But I will go along with whatever the consensus is, Chair. I realize that I'm on one side of the argument.

DR. NESSLAGE: I appreciate your arguments, and I think what you're suggesting would be, if we are asked, and I suspect we will be, to revisit the rebuilding plan, your ideas about alternate target dates for rebuilding, with some monitoring of recruitment triggers in there, is probably a discussion that we are going to have to have in the not-so-distant future. In the meantime, let's hear from Alexei.

DR. SHAROV: Genny, I guess I will repeat what Fred just said. These very strong year classes, nine of them or whatever, are already evaluated as high recruitment, and they are in the model, and they are going to be the principal contributors to the projected stock size for the next following years.

We are not cutting anything, and we're not reducing ABC for any reason, and they are totally accounted for, and so the only thing that we're arguing is about this future recruitment that is coming up in 2021, 2022, 2023, and beyond that, and they will be contributing, or affecting, the rate of further increase of the population between 2025 and 2030 and beyond. That part is what I am saying, is that we have no ability for predicting, and I would love to see a continuing trend of high recruitment, but, based on the plots that we have, I didn't see any reason to expect this, and I would be happy to be wrong.

DR. NESSLAGE: Thank you, Alexei. Shep, I feel like it's a dangerous thing to call on you right now, but I guess go ahead.

MR. GRIMES: Thank you, Madam Chair. I don't intend to wade into the debate, but I did hear one thing from Fred Serchuk that I felt I should say something about. I think, in terms of the rebuilding plan, the council -- As I understand it, we have an approved rebuilding plan, and it's implemented, and there's a timeline associated with that.

We have already built a record at the time that plan was approved for why it was as short as possible, based on the information available at the time it was implemented, and I think, if you end up with a high-recruitment scenario, and there are more fish available, yes, that means -- That could mean that the rebuilding time period could be shortened, but that would be totally be a council decision, and there's always some legal peril with reopening the rebuilding plan and diving back into it, but I think what others may be expecting and what I would tend to expect is that the council would keep the rebuilding target and just raise catches in the interim, or at least that is a legally-viable option for them, and I guess I just wanted to point that out. Thank you.

DR. NESSLAGE: Thank you for muddying the waters, Shep. I appreciate it. That's wonderful. I see there are additional hands raised. We could probably talk about this all four days, and yet we have a lot to discuss, and so I will call on these two folks in a moment, but I would like folks to start thinking about the fact that we have a rebuilding plan, and it is what it is. Until we are asked

to revisit that rebuilding plan, we have to set an OFL and an ABC, because that's what we've been asked to do at this meeting.

The ABC cannot exceed the OFL, and so, depending on what OFL we pick, some of these scenarios are going to fall off the table, and so keep that in mind as well, but I'm going to press the issue on setting the OFL very quickly, because we are running out of time, in the sense that I feel like we're moving mostly in one direction at this point, but let's hear what Wilson has to say and then Fred. Go ahead, Wilson.

DR. LANEY: Thank you, Genny. I had a question, I guess for Marcel and Wally, which may speak to the future recruitment. Are we assured, gentlemen, that we're going to have the surveys, as far as you know at this point, conducted in 2021, 2022, and 2023? Can we say that with some degree of certainty? I mean, that speaks to whether or not we will have data that will tell us whether we are actually seeing this high-recruitment trend continue or whether it drops back to something more in line with the variability that we've seen in the past.

DR. NESSLAGE: Wally, would you like to tackle that?

DR. BUBLEY: Sure. Well, I don't know how much certainty we can say about anything, based on what has happened in the last year, but we have our first cruise scheduled to go out next week, and we are planning on going out, and so, unless something drastic happens, we are planning to have a full cruise season this year, and then, moving forward, there's nothing to say that we won't in future years either.

DR. NESSLAGE: That's good news. Thank you. Wilson, to that? Does that change your opinion?

DR. LANEY: No, and, I mean, I have -- I can see both sides of it, and I guess I would probably fall into the camp, or usually I do, of the precautionary group and say, you know, we can't be assured that this present recent high trend will continue. However, we can run the scenarios, and we can see we still have to make a decision about what we're going to recommend to the council, and, like some of our other SSC members who have pointed it out, I would hate to see us use an overly optimistic scenario and then perhaps take a step backwards toward achieving rebuilding, and so I guess I fall into the more conservative camp, I suppose.

DR. NESSLAGE: All right. Thank you, Wilson. I'm seeing a -- I'm going to pitch a potential compromise, and I'm going to call on Fred after I pitch this potential compromise, because I think he would have some good feedback on this. It seems like most of the SSC is leaning towards the more precautionary approach, which would be to stick with our F 30 percent as our OFL.

That being said, we are also asked what should the council be monitoring and what triggers might there be and would the SSC be comfortable saying this is our recommended ABC, but, if recruitment continues at this new recent average and/or increases based on the survey data, we would like the opportunity to revisit the ABC with alternative projections in X number of years, and that is something that I don't know -- I assume that we can do that, and, if we can't, someone please let me know. While people are thinking about that, let's hear what Fred has to say.

DR. SERCHUK: Thank you, Chair. I guess I will ask a question first, because I will be the last person to go up against legal advice, because they have the final word, but, presumably, when the rebuilding plan was put in place, and the rebuilding period longer than ten years was taken, which, as I remember the law, but it could have changed, the stock should be rebuilt within a period of ten years or less, unless the stock dynamics indicate that that's not possible.

Presumably, if that was the reason to go to a 2040 rebuilding timeframe, it was because, at the time that that decision was made, the stock productivity was such that it didn't feel that it could be rebuilt any sooner than that period. My feeling is that, if we had to put a rebuilding plan in place now, given what we know about recent recruitment and the apparent change in recruitment dynamics, that we would have a much shorter period, and the lawyers would come in and say, wait a second, it looks like the stock can recover within ten years, and so you need to possibly think about either having a ten-year or shorter regime or point out to us why that's not possible.

I can't reconcile those two things right now in my mind, because I wasn't familiar with the resource dynamics and the management decisions that were made when the rebuilding plan was put in place, but a rebuilding time that exceeds ten years is often looked at in saying, well, it's impossible for the stock to rebuild, because the dynamics won't allow it. I see something quite different now in the productivity of this stock. Whether it continues or not, I don't know, and certainly it must be very different from when the rebuilding plan was accepted that it exceeded the national guidelines, in terms of when stocks should be rebuilt. Thank you.

DR. NESSLAGE: Thank you. John Walter, would you like to --

DR. WALTER: Thank you, Chair. This discussion brings me back to I think SEDAR 38, which I actually was the lead analyst for that for king mackerel a number of years ago, where we had three recruitment assumptions about what recent recruitment might be, and we provided a decision table to the council, to the SSC and then to the council, and, Genny, when you brought up your proposal, it reminded me of that, and I do believe that then what happened after that was a number of lines of evidence were brought forward that might have provided some color to the decision about which recruitment to use.

In that case, I think it did provide a path forward, and I believe it was looking at the presence of small fish in the commercial landings, and then the council ultimately decided to use the average recruitment, and so I don't know if people remember that, and this is my fading memory of when I was analyst, and it might be a path forward. Thanks.

DR. NESSLAGE: Thank you. That's good institutional memory, and I guess what you're saying is it lends some credence to this idea that we could have a conditional-based, I guess, ABC, if you will. Anna, please, go ahead.

MS. BECKWITH: I am so glad that you called on him first, because I was the council rep on that king mackerel, and I was going to bring that exact scenario up, which we did have multiple recruitment scenarios, and we, as an SSC and as a council, were able to sort of look at multiple directions and still have the option to change that, via our framework, I believe, and so that path forward was very well received by the council for king mackerel, and so I was going to bring that up as an option, and so you explained it much better than I would have. Thanks.

DR. NESSLAGE: Thank you. I have an idea, but I want to hear what Scott has to say first.

DR. CROSSON: I would rather hear your idea first.

DR. NESSLAGE: No, you go first.

DR. CROSSON: No, and I liked your earlier idea, and so I'm sure that this one is just as good, and so go ahead.

DR. NESSLAGE: This was going to be a logistics thing, where we have already asked Kyle for more information on what it might look like, if we had a start of 1980 and how that affects our understanding of stock status, and we've got questions about the alternative discard projection methodology, and we would like to hear a little bit more about that, and I would like to hear a little more about this alternative way of presenting ABCs, decision tree, whatever John called it, from the previous king mackerel SEDAR, and I don't know who would be the one who could summarize what happened there, but perhaps we could hear a short presentation on how that -- I am just trying to brainstorm a way forward, because I feel like we are stuck in the mud.

Would the group feel comfortable if we heard back from Kyle and whoever might be most appropriate to summarize what happened with mackerel, and we would revisit this and have our breakout groups on Thursday afternoon? That's what I was going to suggest, but, Scott, if you have something to add, go for it.

DR. CROSSON: John was the assessment scientist, and Anna was the council member, and I was one of the SSC members on that assessment, and it was right here in Miami, if I remember correctly, and so I'm fine with coming back to this later in the week. I don't remember exactly how it worked either, and so I would have to go back and look.

DR. NESSLAGE: Did you have something else that you were going to say before I said that I had a plan?

DR. CROSSON: No, and I think, at this point, I'm not going to argue anything, and we're not going to make a decision today, and we're going to come back to it later in the week is acceptable to me.

DR. NESSLAGE: That might give people a chance to solidify a little bit on how they feel about those ideas.

DR. CROSSON: I am definitely in the more conservative camp right here.

DR. NESSLAGE: Okay. John, did you have something to add?

DR. WALTER: I think I probably, unfortunately, stepped into assigning myself something, or you very effectively twisted my arm to do something, or Anna, but it might come to myself, and so we can try to figure out that presentation, and if I could ask the council to help with how the decision process went down, because I didn't follow it after I presented it, and then we could probably get something for, I believe, the next day or so of how the decision tables were produced. Thanks.

DR. NESSLAGE: I think we call it volun-told, where you're volun-told to do something, and I would ask Anna, and do you have any time to work with John on that, just to give the council perspective, or you were on the AP you said, and is that correct? Is she still with us? Well, perhaps, maybe Steve, you can work with John to figure out -- Or staff, to figure out who the best person might be to give us the council perspective, and someone can be volun-told to help us out there.

DR. COLLIER: I will talk to John.

MR. POLAND: I can work with John and staff, and we can come up with that.

DR. NESSLAGE: That would be fabulous. Chip, was that you that had something to add?

DR. COLLIER: Yes, and just what Steve said right there. We're good.

DR. NESSLAGE: Great. Okay. I feel -- Okay. First of all, before we break on this issue and table it, is there anything else that we would like to ask from Kyle or staff or John Walter, whoever, that we think we need to make a final decision on Thursday, because we really do need to do that, and this is the time to brainstorm. Okay. We have something from Amy. Go for it.

DR. SCHUELLER: Can you just -- I don't know, but what is John going to provide to us, exactly?

DR. NESSLAGE: Well, normally, we are asked to set an ABC, and we set an ABC and we give it to the council and that's our recommendation, the end, and the Chair walks away, drops the mic, if you will. In this case, we might be able to provide them with a more -- Not just a single set of annual ABCs, but alternative -- If I understand correctly, alternative approaches to moving forward with regard to what the ABC would be, and so, in essence, this is an example, and this is not -- Do not take this as my suggestion, per se, but one might say, okay, here's our ABC, and it's F 30 percent, with average recruitment, or that's our OFL, and our ABC is F rebuild, with a probability of 50 percent in 2044, and that's what we recommend, assuming that recruitment does not -- Either recruitment declines or stays the same, but, if it continues to increase, you might want to consider -- Then we would have either the chance to revisit or alternative scenarios from what's been presented here, and so it would be kind of a decision tree. That was done with mackerel, it sounds like, in the past, which is what we would be hearing from John about. Does that answer your question, Amy?

DR. SCHUELLER: Sure. It does. I guess I would make the statement that, from the science side of things, basically, it would mean the SSC doesn't have any science to support one option over another, and I think that, if we're going to do that, we better be darned sure that that's what we actually think as a group, because I'm not sure that we think that.

DR. NESSLAGE: No, and I think it would be this is the default, what I'm imagining, and maybe I'm wrong, but it would be this is the default, but, if things change between now and the next assessment, which we might not get for quite some time, from the sounds of it --

DR. SCHUELLER: Okay.

DR. NESSLAGE: We could adjust, and it would be our own decision tree for how we could adjust the ABC, with new scientific information, but only under those circumstances, right, and so that's how --

DR. SCHUELLER: Okay. I understand.

DR. NESSLAGE: I don't know how you feel about that though.

DR. SCHUELLER: I think that that's fine. I think that, if we provide an ABC and then we say this is how it could be adjusted, based on future possible data, but I do think that could lead to two days' worth of discussion, in and of itself, and so okay. I'm just clarifying for myself. Thank you.

DR. NESSLAGE: Believe me, I am trying to shorten this, but it doesn't seem like it's going to work, unless I hear the folks who are very much in favor of the high-recruitment scenarios - If you're willing to back down and we go with the -- Willing to back down sounds terrible. If you are willing to go with a consensus statement that would use the average recruitment, I would like to hear from you, because that would save us a lot of time, but, if folks are -- If we don't think we can come to consensus on that sort of a recommendation, then we need an alternative, because we don't vote, and so this is my only way of figuring this out, but I am open to alternative suggestions as well. John, please, get me out of this.

DR. WALTER: The fundamental thing is we're providing a decision-making process under scientific uncertainty. We don't know what recruitment is going to be in the future, but we're not -- This decision table can put different probabilities in different states of nature and then tell us what the probability of being wrong is, and that's risk, the probability of it happening times the badness of what happens.

In this case, if we want to put probabilities on the two recruitment scenarios, we could say 50/50, 60/40, 90/10, but it would still entertain some probability of either one and then provide that guidance to the council to be able to make that decision under a framework of considering risk, and there is a formal process of doing that, but time is short, and so I can probably provide the papers that cite that. Thanks.

DR. NESSLAGE: Thank you, John. Wilson.

DR. LANEY: If we did something along the lines of what we are going to hear about was done for king mackerel, then, and to Amy's point about not having any science to support one or the other scenarios at this point, which I will note I think we might have had, had it not been for the pandemic and we had an estimate of recruitment for 2020, and, if we move forward, then would the recruitment data that we get from the fishery-independent surveys be the science that would guide us with respect to whether or not we should adjust things in the future? That's my question, and I guess that goes to Wally or Marcel, again.

DR. NESSLAGE: I am not sure they would -- Wally is on the SSC, but that is the data that's being proposed here, and I assume that we'll have some age comps as well, which Kyle had suggested earlier, and I don't know, Wally or Marcel, if you have anything to add to that.

DR. BUBLEY: As far as that's one way that we're looking at recruitment, and I don't know if Kyle is utilizing other streams to use it, but that's something that we plan on having available, are catch data, and, even without the age data, we could just look at the size and get that almost by the end of the season, and so that wouldn't be any issues, getting the catch and size data, and the age data, obviously, will take slightly longer, but that should be able -- We should be able to do that.

DR. NESSLAGE: Right. Marcel, do you have something to add?

DR. REICHERT: It is pretty critical, and so I think even the age data we can get to whoever needs that information relatively quickly, meaning, like we've done before, possibly by the end of the year, but that shouldn't take a year or more to get to, and so just as an FYI. Of course, there's still a lot of uncertainty about COVID and our current sampling year, but, as Wally said, we are very confident, with our SEFIS partners, that we can have a close to normal year, in terms of our basic data, and life history may be a little bit different, but, in terms of our catches and our age comps, I think we can look forward to a relatively normal year.

DR. NESSLAGE: Great. Thank you. Wilson, does that answer your question?

DR. LANEY: Yes, ma'am, I think it does, and so it sounds like we will have some science that would -- That, if we elected to go forward with something similar to what they did for king mackerel, we would at least have some science to tell us whether or not we were close to the mark or way off the mark.

DR. NESSLAGE: Exactly. Thank you. Scott.

DR. CROSSON: I guess I'm more curious to hear if Fred has an answer to your question of a few minutes ago, and I think that's what he is going to answer, and so I will go to Fred.

DR. NESSLAGE: Okay. Great. Thanks. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. I will go along with the consensus of the committee and approach that you've outlined. That would be fine with me.

DR. NESSLAGE: Which approach, because there is the traditional without incorporating high recruitment and then --

DR. SERCHUK: Apparently the higher recruitment one is not one that people are comfortable with, or most of the people on the committee, and I can understand that, and I'm not going to be a bug-bear about it, and so I will defer to whatever the prevailing wisdom is. Thank you.

DR. NESSLAGE: Thank you. Your flexibility is appreciated. So then I thought maybe it was Wally or someone else that had expressed an interest in the high-recruitment scenarios, or it was Fred Scharf, wasn't it? I am trying to remember.

DR. BUBLEY: I had as well, and I'm okay with the approach as well, with the consensus, but it definitely would be nice to be able to -- The concern was that we would be setting these projections and then not have any recourse in future years if it looks like high recruitment is continuing, and

that was my concern, is that we would set ourselves up for that, but, if there are potential recourses to examine it later, then I'm okay with that as well.

DR. NESSLAGE: Just to clarify, I guess the two -- The path we're about -- There is two paths in front of us here, and one is to basically do the traditional thing, set it and forget it, at least until the next assessment, and the other is to have some form of trigger for us to reevaluate the ABC with new scientific data. Wally, sorry to be a jerk, but I just want to make sure I understand what you're saying.

DR. BUBLEY: No, that's fine, and, once again, I will go along with the consensus with this, but I just wanted to put it out there that it would -- It would be nice, and, if I had a preference, it would be to look at it and review it as it's going, but I understand the hesitancy as well with the unknown for the recruitment.

DR. NESSLAGE: Would the folks who are supportive of the more traditional approach then be averse to perhaps, for instance, annually reviewing the survey and age comp port sampling data or sea sampling or whatever we have, the age comp data, or would you -- Are you comfortable setting this ABC, and we'll reevaluate when we get our next assessment? Scott Crosson.

DR. CROSSON: The latter.

DR. NESSLAGE: Which one is the latter, the annual review?

DR. CROSSON: No, not an annual review. I don't want to do an annual review. We have so many other things on our agenda that I don't want to be looking at red snapper every year, unless there is strong new evidence for us to go back and revisit the ABC, which there may well be, and I'm not saying that it's not going to happen, but I don't think there is any cause to put this onto a formal agenda at every meeting.

DR. NESSLAGE: All right. Traditional approach for Scott. Wilson, what do you think?

DR. LANEY: Well, I'm comfortable with doing an annual review. I mean, at one point in time, we did an annual review for striped bass at ASMFC, although that wound up, for reasons of efficiency and workload, getting cut back to less frequent, but, in view of the high significance of this particular fishery, and taking into account the recent high recruitment, I think there is an opportunity here for us to give the council more frequent scientific advice based on getting the science that enables us to do that, and so I don't have a problem with taking the traditional approach or some sort of a modified approach based on the king mackerel example that was provided to us and then giving the council more frequent advice on red snapper, and I'm comfortable with that.

DR. NESSLAGE: Thank you, Wilson. Anne.

MS. LANGE: I think I agree with what has just recently been said. Let's go with the traditional, and follow through as if this additional discussion hadn't occurred, and so, by the end of the week, we can make our recommendations. Then I would like to hear the king mackerel example, and it sounded as though, and I'm not sure if that's what they were saying, but it sounded as though that setup of scenarios -- So, if this happens, then we have the option of saying to the council that this is one of the triggers that we set, and we now have three additional years of increasing -- For

instance, we have three years of increasing, continuing to increase, recruitment, and, at that point, we're comfortable with making a change, based on -- Again, have the scenarios set up, and I'm not sure if that's what John was going to present us or not from what happened with king mackerel.

DR. NESSLAGE: I think it would be something along those lines, or we would be able to adapt it in that fashion. Okay. Thank you. Amy.

DR. SCHUELLER: I don't want to be too much of a stalwart, or someone who doesn't want to compromise, but I am also super concerned that, if we have this annual review, what is that going to comprise, and what does that mean, and so, like Scott, I don't necessarily want to talk about red snapper every single time, because clearly we have lots of other species that deserve attention, but, also, too is so we look at the index, and what does that mean exactly?

The recruitment information seems like it's probably coming from the discard age comps, and what should those discard age comps look like to indicate a high recruitment? I don't know, and I'm a bit uncertain, without sort of looking at the data holistically, how we're going to make that determination, and so, I mean, I have some hesitancy with that, because -- I keep saying this over and over and over again too, is this should not be a recruitment-driven fishery, and so, if we're only looking at something to just see that, oh yeah, we got a good recruitment, and that's not really the same as what is the adult abundance and biomass looking like as we move into the future, given the fishery and the recruitment, and so the inputs and outputs. Those are very different things, and, again, this is a long-lived species, and we need to be careful.

DR. NESSLAGE: Well said, Amy. Thank you. Scott.

DR. CROSSON: Just to Wilson's point, red snapper is a very important fishery, but it's also not an isolated fishery, and so we've seen in this assessment that one of the biggest problems that we've seen with preventing the faster rebuilding of the stock across all different age classes is the discard mortality from the private recreational sector, and this is not the only species that's caught.

I mean, red snapper is not just caught alone, and there is other species that we know of that are caught with it, and there's a lot of recreational species in this fishery that have problems with discard mortality and high recreational discarding, and so this is not an isolated thing, and it's a policy-driven thing at some point, and so this is going to demand more of an policy-oriented -- As I said, the fact is that it's a multi-sector, multispecies fishery that you can't treat as an isolated stock, and so I think that's kind of the bigger driver here, and so that's also part of what was -- I mean, we can look at red snapper more than once, and it's not a problem for me, but it's just that I don't think that's the main issue, and it's not this data issue. It's the question about how the fishery is being prosecuted.

DR. NESSLAGE: That's a good point, and you both raised excellent points that are making me think, logistically, this isn't something that we can solve on Thursday afternoon, if we decide we want to look more carefully at what a trigger might be, and so I'm going to let Fred talk, but then I think I'm going to have a proposed way forward, and so, Fred, go ahead.

DR. SERCHUK: Thank you, Chair. I think we would be foolish not to entertain new scientific data coming in that would shed more insight onto certainly continued high recruitment or change in recruitment in the population. We all know, from the information that's been presented, that

the numbers in the population, currently, are as high or higher than they've been during the entire time series, and that this is being reflected by those involved with the fishery.

To the extent that we have some pieces of information that become available in the future to indicate to us that recruitment is being maintained at the recent high levels, or has perhaps even changed to a lower level, I think it would be our responsibility to at least review that information, and it may not be a full assessment, and it could just be, if we have some indication, either from the size composition of the current fishery or from fishery-independent measures of small animals, that we consider that information. We don't have to make any changes, but I think we should consider it, because science evolves, and we shouldn't be so locked into saying we'll come back to this in five years. I don't think that serves us well. Thank you.

DR. NESSLAGE: Thank you. Okay. Here's what I am hearing, and you all can tell me if you think I'm way off base, but, given what I imagine -- Well, let me take a step back. I think, in order to develop scientific -- If we decide that we want to develop some form of trigger system, where we would evaluate new scientific information, and that would in some way inform the ABC, we would want to see how that's been done in the past, for instance John's mackerel suggestion, case study, if you will, as well as we would want to think very carefully, as Amy suggested, about how that data would be interpreted and exactly what data would inform those decisions, and it's not a simple trend, et cetera.

There has also been raised the issue that Scott raised, which is there is broader socioeconomic issues regarding how the fishery is implemented and how the ABCs for other species in the complex affect red snapper, and it's not a stand-alone, isolated species, and I think these are all way bigger, broader issues than we're going to be able to tackle in an afternoon session this week, given the limited information.

So I'm going to propose that, in our report, we say that we have had this discussion about the importance of monitoring this stock and these other issues and that there may be alternative ways to the traditional approach, but that we would need more time and that we would need to form a working group, and so, if the council would like us to explore that, we would go that route.

There is, I will tell you, a very good possibility that we will simply be asked instead to revisit the rebuilding plan, in which case all of this is a little bit moot at the moment, and so this would -- At least we would set an ABC on Thursday, and we would recommend that this is the direction that we would like to go in, but the council would ultimately then task us what direction they would like to have the scientific information provided to them for how -- What direction they want to go in. How do folks feel about that as a proposed plan for moving forward?

So we would not hear from John about mackerel stuff on Thursday, and we would hear from Kyle about the 1980 run and the alternate -- Because we still have to deal with the discards, how we're going to incorporate discard mortality, in those projections, and then we would set our ABC in our normal fashion for the moment, with the placeholder in the report that we would like to explore alternatives. Chip has a comment.

DR. COLLIER: If you give me thirty seconds, I can provide you what Christina Wiegand has already pulled out for king mackerel.

DR. NESSLAGE: No, I don't want to go there right now.

DR. COLLIER: Okay. Sounds good.

DR. NESSLAGE: I appreciate that though. I really do, but I am not -- Maybe I'm wrong, but I'm not hearing that we have consensus to go in that direction right now, and so I don't want to spin that wheel. SSC members, what do you think about that, logistically? Is anyone horrified by that suggestion? Fred Scharf.

DR. SCHARF: So you can just clarify, again, what you just laid out? I just want to make sure I understand what you are proposing.

DR. NESSLAGE: I'm not sure that I said it very eloquently. Basically, we would hear back from Kyle on Thursday regarding a little bit more information about the model performs if the start date is 1980, and also a little bit more information about his alternative new approach to incorporating discard mortality in the projections, and then we would go about making our traditional ABC recommendation, the way we have in the past.

Then, in our report, we would say that there was significant discussion about this and that there's support for exploring development of the incorporation of additional scientific information into interim ABC advice, and I'm not sure how we would -- I don't want to wordsmith this on the fly, but the idea is that we would ask to form a working group to come up with suggestions, because I don't think we're going to be able to specify all the details of how we would use the new data exactly in the future at this meeting, given that we haven't really reviewed any suggested approaches or really thought about it extensively at this point. Does that clarify it?

DR. SCHARF: So the idea of the working group is it would try to come up with just an established approach for how we would use information intermediate to assessments to maybe update -- Potentially update ABC recommendations, on a shorter sort of time table, when there is some pertinent information that might change stock status or -- That would apply beyond red snapper, right, and we're doing it in the scope of the red snapper SEDAR review, but it would -- If we establish some approaches to do this, it could be applied more broadly, correct?

DR. NESSLAGE: Possibly, or the working group could find that they don't think it's practical, in which case they will suggest we stick with the traditional approach. I think we need more time to really hash that out, and does that make sense?

DR. SCHARF: Yes, I think so.

DR. NESSLAGE: But you're right that it could apply more broadly if we went in that direction, and that's a good point, although the details may be stock specific, and so we might find that we would have to do this individually for other stocks as well.

DR. SCHARF: Right.

DR. NESSLAGE: Kyle, go ahead.

DR. SHERTZER: Just for my clarification, what were you looking for with the start year, the earlier start year, exactly? I could summarize what was done in previous assessments, or I can try to revise the assessment to have a later start year, although I'm not sure if I will have enough time to complete that within the next day or two, but I could attempt that, and I just don't want to make any promises that that could be completed.

DR. NESSLAGE: Right. I guess, before I answer that question, have you -- Regarding your time commitment, do you have -- Have you actually run these -- You have run these alternative discard scenarios, right, and so they're ready to go, and you wouldn't have to do any extra work there, and we're not asking you for additional projections, correct?

DR. SHERTZER: Well, with this two-step approach, I have coded it for one of the six scenarios that was run before, and I would need to code it for any of the others that you wanted to see.

DR. NESSLAGE: So we would need to tell you that today.

DR. SHERTZER: That would be helpful.

DR. NESSLAGE: But we don't really understand what you've done, and so --

DR. SHERTZER: Would it be helpful to run through that now, to try to clarify the method now? There is a slide of this, about it, in my presentation from this morning.

DR. NESSLAGE: Honestly, we are -- I would really like a break and a chance to think about this. We've been at it for an hour-and-forty-five. Can we table that for maybe five minutes, but, before, that we'll hear from Anne. Is that okay, Kyle? Can I get back to you?

DR. SHERTZER: Of course.

DR. NESSLAGE: Thank you. Anne, go ahead.

MS. LANGE: I was just going to say that I like your idea of doing traditional now and then looking into what the options are with setting up a workgroup, and so that's all.

DR. NESSLAGE: Thank you. I appreciate that. Okay. I would really like to take a quick break. If we could take a five-minute break, that would be wonderful, and so that would bring us -- Let's just call it 3:55, and we will reconvene and address Kyle's question. Thank you.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Let's get started again. We have -- What I have heard is that there is not consensus for the higher-than-expected recruitment scenarios, which takes -- If we look at our working group report, that takes several scenarios off the table, and so, if we're talking about what we might ask Kyle for for Thursday, that would be, I think, his Scenarios 2, 4, and 6 would be off the table, right, and is that correct, Kyle?

DR. SHERTZER: I think so. Those are all the high-recruitment scenarios.

DR. NESSLAGE: Okay, and so now we're down to we have to set an OFL and an ABC. The working group recommended -- We had it up there.

DR. COLLIER: Sorry about that. Give me a second. I hit the wrong button.

DR. NESSLAGE: You've got a lot of stuff you're juggling. They recommended, and I will just give you a preview, projections at FMSY, with average recruitment for the OFL and not F 30 percent then, correct, working group folks?

MS. LANGE: Yes. Didn't he correct that to say 50 percent, to make it the old way, the current way?

DR. NESSLAGE: I guess I'm looking at the OFL, and so that would be FMSY, which I thought FMSY -- The proxy is F 30 percent, and so why does that say P^* 50 percent? We're assuming that's P^* of 50 percent, correct?

DR. COLLIER: It was run with a P^* of 50 percent in the past. The MSY value for red snapper, and Kyle can correct me if I'm wrong, but I think it's 98 percent of F 30 percent, and is that correct?

DR. SHERTZER: That was used in the past as the F rebuild.

DR. COLLIER: Okay.

DR. NESSLAGE: Okay. That's different though than the OFL, and so, as I understand it, we need to set an OFL and an ABC. Is there a reason that the OFL would not be F 30 percent? I guess that's what I am asking the working group. I get the ABC.

MS. LANGE: I don't remember why the MSY is there. Kyle, aren't we using 30 percent?

DR. SHERTZER: Yes, and the forecast used F 30 percent as the proxy for FMSY.

DR. NESSLAGE: Okay, and so, if we go with Kyle's projections, it's not what the working group has here, and I just want to make that clear, correct, and so you would have to cross out that --

MS. LANGE: I believe that's an error, and that should be F 30 percent. The proxy for FMSY is what that should be.

DR. NESSLAGE: Which is not necessarily --

MS. LANGE: Jeff or Wally or George, does that sound right to you?

DR. BUCKEL: Yes, that sounds right. My guess is we just copied and pasted some text, and I don't remember, but my reading of that was the proxy for FMSY, which is F 30 here.

DR. BUBLEY: Yes, I agree as well.

DR. NESSLAGE: Excellent. Okay, and so that would be the equivalent of Scenario 1, correct?

DR. SHERTZER: Yes.

DR. NESSLAGE: Okay, and so, if we -- I am just putting this out as the strawman here, because we need to be very clear about what we're asking from Kyle, and so we have a scenario already run with the original older, whatever you want to call it, discard mortality approach that the panel looked at, and that would be Scenario 1, and so that would be our strawman for the OFL, and then the question is to ABC, which we typically then, for rebuilding, would set at F rebuild, and the question is do we go with the working group's recommendation, which would be an F rebuild of 0.675, and it looks like Kyle also ran Scenario 3, which is just the 50 percent.

Is there any objection to the working group recommendation? We'll deal with how discard mortality is handled in a moment, but I just want to get on paper what the OFL and ABC general scenario might look like. I am not seeing any objections, and no one is frantically waving their hands, which is good.

All right, and so, if folks are comfortable with that as our decision, then we have to decide do we want to use the projection approach, discard mortality projection approach, that is in the assessment report, or do we want to entertain this new approach, which Kyle so kindly worked on it sounds like over the weekend, and I'm sorry if I bit your head off earlier, Kyle, but I was just surprised, and so, if we do want to explore that as an alternative, we should take a little bit of time today, before the end of the day here, to hear him out and make sure we completely understand what he is suggesting, because we need to ask -- Either we're happy with what he's done or we need to ask him to run some new scenarios, and do I have that correct, Kyle?

DR. SHERTZER: That is correct. For the probability of rebuilding, was it one of those, the 0.675, or did you need both of those?

DR. NESSLAGE: I don't -- For the ABC, they were looking at F rebuild, which would be 0.675, which is what they recommended, and so, unless I hear other folks saying they want to see 0.5, or they want to make an argument, which is fine, but I would want to hear that now. Does anybody object to the working group's suggestions? Go ahead, Chip.

DR. COLLIER: I will say that the previous assessment did not use the 67.5. It used the 50 percent, and I just wanted to put that out there.

DR. NESSLAGE: Yes, and, again, I believe this is our recommendation, correct, that the council only needs to go to 50 percent, by law, correct, or, if we set the ABC, this is where it's at. In other words, should Kyle -- If he has to rerun anything, should he, as backup, run 50 percent, because the council could override us? I would love some guidance on that.

DR. COLLIER: I mean, I would say the ABC is set by the SSC, and so that is going to be your decision.

DR. NESSLAGE: Okay. Thank you. Shep, do you have any alternative opinion on that?

MR. GRIMES: I was just going to say that I would request the 50 as well. In terms of what probability of rebuilding the council is going to accept, that's a council decision.

DR. NESSLAGE: So we can recommend -- This would be Scenario 5, correct, but you probably will also want to make sure that you have Scenario 3 for the council, and does that characterize the situation? I am looking to the SSC or anyone else, Kyle, who would want to chime in there.

MS. LANGE: Do we have a list of the scenarios you're talking about, because I'm confused by just the numbers of the scenario.

DR. NESSLAGE: Good point. The scenario list is on PDF page 72 of the assessment, and it splits two pages there, and so you've got to kind of straddle. What we're saying is that Scenarios 2, 4, and 6 are off the table. Scenario 1 would be the OFL, and Scenario 5 would be our recommended ABC, but Scenario 3 would be in Kyle's back pocket, because the council will likely want to see that one as well, and they set the final -- They have the final say there, with regard to the probability of rebuilding. Have I said anything wrong here so far, and does anyone on the SSC disagree that that's the characterization of our recommendation at the moment? Okay. No hands. Excellent. Thank you for the visual guidance here, Chip.

Then the next question is do we want to entertain this alternative discard mortality method, and, if so, we should probably have a little discussion about it, and I would appreciate a little bit more -- Another reexplanation, if you would, Kyle, but, if folks are opposed to it, I would like to hear any opposition. Otherwise, that's the direction we'll go right now, if Kyle is game. Okay. That means we would like to hear a little bit more, if you don't mind, Kyle, and if you could just rehash, in a little bit more detail, and slowly, what you're proposing, and we would greatly appreciate that.

DR. SHERTZER: Sure, and I'm definitely game. If you could scroll down to the projection slides, I also wanted to mention that there was this request from the council to adjust the starting year of management, and so whatever you decide about this two-step approach, use it or don't use it, the projections in the report are already obsolete, and I will be rerunning them anyhow, to have a start year of 2021.

This alternative approach, I guess it really hinges on the philosophical issue of whether or not the forecasts should have their own benchmarks or if the benchmark should be based on the assessment period and whether adjusting the benchmarks for the forecast period is sort of changing the goalpost and that it's perhaps penalizing what in this case is a very positive management action of trying to encourage the use of descender devices.

This two-step approach tries to account for the management action being really just sort of gravy, in a sense, and the way it works is that, in the Step 1, it's that we would forecast -- Just as we did before, and so the method here, in Step 1, is no different from what's in the assessment report, except that the benchmarks are based on the assessment benchmarks, and so there's no adjustment for future discard mortality.

The F 30, for example if we forecasted F 30, it would be the F 30 from the assessment report, but here we would forecast at -- We would try to compute F rebuild in the same way, the same methods, that were used in the assessment report, with either a probability of 0.5 or a probability of 0.675, and use that to compute the F rebuild, and so, again, that's the same method as before.

Then Step 2 is where it's a little bit different. Step 2 is a second forecast, where it repeats what was done in Step 1, except it takes that F rebuild that was computed from Step 1 as sort of the

starting point, and it projects at that base level F rebuild, but it reduces the discard mortality according to our estimates of the benefits of the descender devices, and so maybe if you could scroll up a couple of slides.

This is the distribution that is coming out of the MCBE, but, for each of the forecast iterations, there would be a reduction in the discard mortality rate that would be a multiplier from this distribution, and so we would take F rebuild that was computed in Step 1 and multiply it by this value that's coming out of this distribution. For example, if we chose 0.8, this distribution, then it would multiply F rebuild times 0.8 when we're computing the discards, the dead discards.

Then that's sort of taken as a given, and, if we go back to the other slide, that is where we would reduce the discard F by that multiplier, and then what this does is it allows more fish to be in the standing population, and so we can increase the F that's going towards landings, and so, again, it's a multiplier on the F rebuild from Step 1 that would be applied to the landings, and then we increase that -- If we just leave it standing at F rebuild, then the effect is that you -- The stock would rebuild much more quickly with lower discard mortality, and you still might get a little bit of benefit to the landings, because there's more fish in the population, even if you fish at the Step 1 F rebuild.

However, you would rebuild much more quickly, and so, to sort of convert what would have been dead discards, but survived into landings, you can increase the F that goes towards landings, and so it's multiplier on the F rebuild from Step 1, and you can increase that until the rebuilding year, with whatever probability we're using for that run, occurs in the year 2044. That's, effectively, how it works.

I did -- Like I mentioned, I did code this for one scenario, and that was the mean recruitment scenario, I think with 0.675 probability of rebuilding, and that was Scenario 5 in the report, and the results there were that, sort of by design, the spawning biomass and the total kills, dead discards plus landings, are approximately the same, and they're not exactly the same, but approximately the same, as they would have been in the projections that are in the report, but the real benefit is the lower discard mortality that gets converted into the higher landings, and, in that case, the landings were approximately 21 percent higher using this method, but still rebuilding in the same year of 2044. Is that any clearer, or are there questions?

DR. NESSLAGE: We have questions. Chris.

DR. DUMAS: Okay, and so what I'm hearing you saying is that, if anglers use descending devices and are able to decrease dead discards, then you're going to allow them to catch, land, extra fish to keep the rebuilding trajectory the same. Is that right?

DR. SHERTZER: That's how this method works, yes.

DR. DUMAS: Right. I think that's a really cool way of looking at it, and I think it would be really cool to see a graph that would show the discard, the dead discard, rate and how - As the dead discard rate goes down, by how much could landings go up, and kind of see that frontier, or something like that.

Obviously, there could be confidence interval uncertainty bands around that, but to give anglers an idea of what they would get. If they're able to use these descending devices and decrease the

dead discards, what that could mean to them, in terms of increased landings, while still maintaining whatever rebuilding trajectory the SSC and the council chooses. We could pick our rebuilding trajectory and then say, hey, if you can reduce dead discards more, anglers, then you get some increased landings, and here's what that looks like. I think that would be really cool.

DR. SHERTZER: That's a really good point, and so, here, the modification is an estimate of about 25 percent usage, up to about 75 percent usage of descender devices in the forecast, and, with that transition, at least this particular projection was showing the 21 percent higher levels of landings.

DR. DUMAS: But maybe have that graph not in terms of percent use of descender devices, because there might be a lot of uncertainty, in terms of how a percent increase in descender devices causes a percent decrease in dead discards, but, instead, just say, if you're able to reduce dead discards, then what would the -- What increase in landings could be possible and still achieve the targeted rebuilding rate, and we're not really sure what level of descending devices would reduce dead discards by a given amount, and maybe we do, and maybe we have enough science to know that relationship, but if we could just, hey, if you can just use descender devices and decrease dead discards by this amount, and then studies verify that dead discards went down by that amount, then you should be able to increase landings by around this amount, and we would still achieve our target rebuilding rate. I think that could be very motivating to anglers in terms of their desire to use descender devices. Thanks.

DR. NESSLAGE: Thank you, Chris. Alexei.

DR. SHAROV: Following on that, we're discussing the alternative option to run the forecast, and so, if we have to run the forecast, we have to make a decision on what percentage of reduction in the discard mortality will be achieved, and Kyle used an example of 75 percent, I believe, and so I wonder if we have any understanding or expectation of what this level of reduction is likely and how much of a reduction possibly could be achieved if the council goes this way and gets the support of the anglers. We need to pinpoint that number to use in the projection. The rest of the idea of reallocating the saved fish into the actual landings, obviously, everybody would like that.

DR. SHERTZER: That's a good point. The estimates were the ones that came out of the assessment workshop, and so the 75 percent usage was what was believed to be achievable in the future, and it wouldn't be 100 percent usage, but it would be higher than it is now, and then that was converted to what the estimate of discard mortality rate would be, and those numbers are in a table that's earlier in the slides as well, if you want to look at those, but, yes, those were based on the assessment workshop recommendations.

DR. NESSLAGE: So the assumption -- Just to clarify, the assumption would be that they would stay the same. Alexei, does that -- Are you okay with that, or are you suggesting that we need an alternative?

DR. SHAROV: I'm okay with that, but just if we have something to back up the number. For example, the workshop estimate and the recommendation, that's perfect. Obviously, whatever happens in the future will be somewhat different, but at least we have some estimate that is supported by some calculations. In other words, I am asking if the SSC is comfortable with selecting 75 percent for the projection, and, if there is information that supports it, then probably the SSC should support it.

DR. NESSLAGE: Thank you, Alexei. I will continue to go down the list here, but, if there's folks who were on the panel who would like to comment on their opinion on the 75 percent, that would be great, if you could line that up. In the meantime, Amy.

DR. SCHUELLER: I have some of the same questions that Alexei had related to the 75 percent or what percentages should be used and where it came from, and I guess can we go back to the PowerPoint, to that distribution that Kyle went to that was a couple of slides up from this? I guess I'm not sure I understand where this distribution came from. Is this just an input distribution, or is this based on some study? I know that there were -- I think, Kyle, you showed like a table of discard mortality rates under different time periods, and so is this based on one of those time periods?

DR. SHERTZER: Yes, and it's a combination of that and the assessment estimates. If you maybe go back up to that table with the discard mortality rates, that might help with this discussion, and it was earlier on in the data section.

DR. NESSLAGE: It's Slide 16, I think.

DR. SHERTZER: So it's this last block, and the estimates come from the Working Paper 15, and they are fleet-specific discard mortality estimates, and so, for each of the ensemble runs, there is a value that is selected at random from this Block 4, and it's sort of conditional on the previous block from the assessment time period, and, again, it's the upper bound on that draw, but it would have a mean of the value shown and a normal distribution that's truncated to the range that's shown in parentheses, and so that particular run would have its own random value that was drawn, and then the distribution that I showed is the reduction in the discard mortality from Block 3 to Block 4, weighted by the fleet-specific F.

It's fleet-weighted to apply to all discards, but, again, it's really dominated by the general recreational, because that's where most of the discard mortalities are coming from, and so it's sort of a proportional reduction from Block 3 to Block 4, and what is the reduction in discard mortality rate. Does that help clarify it?

DR. SCHUELLER: It does, and I didn't review the Vecchio et al. working paper, and so I don't have a good understanding of where or how these blocks were defined or what the 25 or 75 percent -- What those choices were based on, and so I guess that I should probably look at that. It seems like something we should, if we go this route as a group, look at, and you mentioned that this -- That most of the fishing mortality is coming from that general recreational, and so I was just going to make that statement too, that it sort of assumes that is going to be happening into the future still, which I suspect is probably true, but, again, just a caveat. Thanks, Kyle.

DR. NESSLAGE: Thank you, Amy. Jie.

DR. CAO: I think Amy just had -- I had the same question as Amy, and I think Kyle just explained it pretty well.

DR. NESSLAGE: Thank you, Jie. So, procedurally, I'm a little worried about that, because, if we are going to make that decision, I'm just saying that -- Kyle, help me out here with your

timeline, and we probably won't -- If we're going to revisit that discussion, and we can do that, but it probably won't be tonight, and so how would that fit into your ability to get us projections?

DR. SHERTZER: Well, if we don't use what was done in the assessment workshop, and we had to revisit that, then it would certainly extend the timeline to do those.

DR. NESSLAGE: Which is why I would really love to hear from the panelists, because I feel like that's -- We sent them to this to keep an eye on these things, and so I would appreciate if they would chime in. Chris, in the meantime.

DR. DUMAS: In the meantime, it occurs to me, and it's probably obvious to everybody, that, if we did achieve a reduction in dead discards, then you could give half of that to the anglers and increase landings, but give half of it to the fish, in terms of hastening the rebuilding trajectory, right?

If there's a decrease in dead discards from descending devices, we could give all of that to the anglers in increased landings, or we could give like half of it to the anglers in increased landings, and give the other half -- Let those remain in the fish population, so that our rebuilding trajectory occurs sooner, and so, basically -- Then you get wins for the fishermen and wins for the biology, for the fish. It could be any convex combination of those two. You could give any percentage of the gain to the fishermen in increased landings and a percentage of the gain could increase the rebuilding trajectory. You could split that any way you wanted to, but a good way to look at it would be half-and-half. Thanks.

DR. NESSLAGE: Thank you, Chris. Fred Scharf.

DR. SCHARF: Could you guys put that table up again that you just were showing, the one that - That one, for the different blocks. So I guess, Kyle, the discard mortality rates in the table, are those discrete rates or are they instantaneous rates or just discrete sort of proportions of mortality in -- The 0.23 and the 0.6.

DR. SHERTZER: Those were discard -- Proportions of discards that would be assumed dead.

DR. SCHARF: Okay, and so just a discrete proportion.

DR. SHERTZER: Yes.

DR. SCHARF: Given the changes across the blocks, just looking at the recreational fishery, and I am not familiar with the Vecchio working paper in there, but it seems like the introduction of the circle hooks had a bigger impact, right, going from a 0.37 down to 0.28. Then, when you add descender devices at 25 percent, it just drops to 0.26. Then, if you increase to 75 percent use, it only drops down to 0.23. Would that be an accurate interpretation?

DR. SHERTZER: Yes, because there is still -- The hooking location is still --

DR. SCHARF: It's still the key.

DR. SHERTZER: Yes.

DR. SCHARF: I just wondered if there were more landings coming from the shallower parts of the inner shelf, where the descender devices might be more impactful for species that are occurring a little bit deeper, but I don't know. I can't remember what the paper that Jeff and Brendan -- The Runde and Buckel paper, I can't remember the result of that exactly, and maybe Jeff could speak on it a little bit, and I don't remember if he thinks this -- If he sort of agrees with the changes here.

DR. BUCKEL: That paper is still in review, Fred, but I agree with the Block 4 for the recreational, and I think Brendan is a little on the lower side, but it's not exactly apples to apples for -- He was trying to show like the best-case scenario in that paper, and so it's tough to -- But, yes, it falls within the interval there for Block 4, which is encouraging.

DR. SCHARF: I guess I just worry about sending the -- Making sure the message is clear that like, if you do try to give a message to the fishery, like, hey, use descender devices and you get more fish, and you do, but the change in the proportional mortality from going from 25 to 75 percent is marginal, really, and it's not that big of a change.

DR. SHERTZER: That's a good point. It has an effect, and it's a positive effect, but the more critical issue was pointed out by Fred Serchuk much earlier, that the discard mortality rate from the general recreational is still far too high, and, until that is brought under control, it really doesn't matter what method we use here, and there is still overfishing occurring from the discard mortalities.

DR. SCHARF: Yes, and, ultimately, right. There's got to be a -- You just have to have less hooks in the water, is what it comes down to.

DR. NESSLAGE: Great. Thanks, Fred. Anne, go ahead.

MS. LANGE: Genny, you were asking about people that were on the panel and any input, and I was going to talk to the 75 percent. That was just a projection based on observations recently, and they're looking at there is probably about a 25 percent compliance with the requirement to use descenders, and they're looking at, into the future, post-2020, that the expectation will be, based on improvements in the use of circle hooks and that type of thing, that up to about 75 percent would be using the descender devices, and so that's just a projection, and I'm not sure if that answers anyone's questions or not.

DR. NESSLAGE: So is that why, Jeff Buckel, you were saying that this is an optimistic estimate? Am I understanding what you're saying, Anne, correctly?

MS. LANGE: Yes, I think so. They don't expect the 100 percent -- During this analysis, they did not expect 100 percent compliance in the near future.

DR. NESSLAGE: Sure. That's totally realistic, but is 75 percent too optimistic as well?

DR. BUCKEL: I wasn't saying that. I think that, in the Working Paper 15, you will see that there's a review that Julie did of the literature on the use, the percent use, of venting and descending tools, and so that's where -- There was indication, from the trend, that 75 percent is realistic in the areas that those data came from, Georgia and Florida and the Gulf of Mexico, and so there's

certainly more -- That's a research recommendation, to try to get that continued monitoring throughout the South Atlantic, to see what's going on in North Carolina and South Carolina, in terms of percent usage, and that's certainly still a hole, but there's data to support that that 75 percent for Block 4 would be realistic, based on published studies and some unpublished data that Julie analyzed for that report.

Then you mentioned that I said something about being optimistic, and that was with Brendan's particular study, because it was 100 percent venting, or 100 percent descender, sorry, and it was not looking at this mix that is shown in Block 4.

DR. NESSLAGE: Great. Thank you for clarifying. I appreciate that. Fred Serchuk, unless, Anne, did you have something else that you wanted to add?

MS. LANGE: No, and that's it.

DR. NESSLAGE: Okay. Thank you for commenting on the panel's -- Your experience based on your panel experience. Fred Serchuk.

DR. SERCHUK: My simple reading of Blocks 3 and 4, particularly looking at the ranges, suggest that there's probably little, if any, significant statistical difference between the average values in Blocks 3 and 4, and so I would not -- If that is true, I would not go overboard on this. The ranges are very similar in both cases, and there is only a small difference in the actual percentage in Blocks 3 and 4, and so I think, if that is certainly true, my feeling is that, whatever difference there is, and I certainly support the increased use of descender devices, it would be very difficult to show from a statistical point of view. Thank you.

DR. NESSLAGE: Good point, Fred. Thank you. Amy.

DR. SCHUELLER: I was just going to echo exactly what Fred just said, and I completely agree with him. I don't think that there is much of a difference here, and that it's really contained within this sort of uncertainty envelope that we would be dealing with anyway, and so I just -- I am not sure this is worth all the machinations and discussions about which percentages to pick and what to do, because I think that they're not statistically different.

DR. NESSLAGE: Thank you, Amy. I will just add, personally, I think the only reason I would - - Just from a stock assessment point of view, that I would be concerned is the point that Kyle brought up on Slide 81, and that's not internal consistency, right, and that you have issues with different sets of benchmarks being used. Can you just comment on that again, real quick, Kyle?

DR. SHERTZER: I mean, I guess, by that, I mean, if you, in a forecast, fish at say F 30, then you should, on average, achieve SSB associated with F 30 in the population, and, if you're fishing at F 30 that is estimated from the assessment period, but you're under a completely different set of circumstances in the forecast period, then that might not be true, and the same could be said of the recruitment scenarios, if the assessment benchmarks are based on average recruitment, but then, going forward, recruitment is -- If there's a regime shift and recruitment is much, much higher, then, fishing at F 30, you would get back to something that is much higher than SSB F 30, if the recruitment were higher.

I mean, I think the internal consistency is an important consideration, typically, but then the question comes up, in this case, of whether it's important or not when it's a management action here that should have some benefit, and you wouldn't necessarily want to penalize the fishery for a positive management action.

I also should comment on the ranges that are shown on that table, and we had point estimates, but we didn't have direct estimates of uncertainty from data, and so those ranges, in the later blocks, are borrowed from the earlier blocks, to keep the same width, and so the uncertainty would be the same, and it's just shifted it downward by the same amount that the point estimate shifted downward, but they're not actually estimated from data.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. I just wanted to follow-up on Kyle's comment. That would, to me, be analogous, in terms of benefits, to the average recruitment that must have been assumed in the 2014 assessment going forward, relative to what we know happened in the years in which recruitment was observed to be very much higher, and wouldn't that be the same sort of analog that you have just talked about?

DR. SHERTZER: Yes, a similar situation.

DR. NESSLAGE: Did you have implications then, Fred? Where are you going with that? I just want to clarify.

DR. SERCHUK: The implications are our assumptions, in many cases, need to be evaluated retrospectively, and that's a comment that I made early on today. We knew from the last assessment that we used average recruitment, and we were pleasantly surprised when we had better recruitment, but our projections must have been off, in terms of what actually occurred. That's all. In this case, it was favorable, and the stock sized increased.

DR. SHERTZER: I guess one difference is that's an unpredictable stochastic event, and, in this case, it's a very much predictable change, that discard mortality should go down if descender device usage goes up.

DR. SERCHUK: But it's the amount here. As I said, looking at Blocks 3 and 4, I don't see any statistical difference between a 25 percent device use and a 75 percent device use, and I think we're reading more into it than that. Thank you.

DR. NESSLAGE: Thank you, Fred. John, do you have something to add here?

DR. WALTER: I was going to say that, usually, when there is a management intervention in the future, we rarely recalculate the benchmarks, and that's across many of our assessments, where seasons and other things that are the purview of management go into effect, and we don't usually rerun the assessment, and so we live with a little bit of mismatch between what the realized selectivity of the fishery might be and the projection assumptions. Usually, they're based on some average of the terminal several years of the model.

In this case, we've got a management intervention that has, as Kyle said, predictable impacts, and, under the definition of MSY, it's prevailing ecological, environmental, and fishing technological characteristics, e.g., gear selectivity, as was specifically mentioned, and I think we could probably go both ways, in terms of the prevailing is the last three years of the assessment, and then the management intervention that's going to take effect, or we can assume that the benchmark needs to be based on a future intervention.

I guess, in a lot of our assessments, the prevailing is the average of three years, the three terminal years or something like that, and so that's probably more commonplace to use that than to use the future, because, honestly, we don't actually even know the future, and we don't know what the utilization is going to be, as we've discussed before, and we have to make an assumption, and so thanks.

DR. NESSLAGE: Okay. We are quickly running out of time. I would like the SSC members, with the remaining brain cells you have today, to think really hard about where you land on this issue of how to incorporate discard mortality in the projections, and, in the next few minutes, I would like to take public comment on what we've discussed so far, and then we will return, and we will provide Kyle with guidance on how to move forward for both that and the 1980 scenario, and so think a little bit about that as well. If staff are ready, I would like to take a brief break here and hear what the public has to say. If you have a comment or a question, if you could just raise your hand.

DR. COLLIER: In going through this slide once again, Genny, if you notice, you're going to have this microphone on the top right-hand side, and it's usually on the right-hand side, depending on where you've moved this control panel, but, if it's red, that's indicating that your mic is not on. If it's green, that's indicating that your mic is open.

When you raise your hand, staff will recognize you, and we will unmute you, and you should get a notification through the webinar system that you've been unmuted. Then you can unmute yourself on your side. If you do not feel comfortable providing a verbal comment, you also have the option of entering it here in this question log, or there's always the comment box on the website, and you can provide comments in there, and we will review those in the morning. Those are the three ways. If anybody wants to raise their hand, we will start recognizing people from the public to provide public comment. Kellie Ralston.

MS. RALSTON: My name is Kellie Ralston, and I represent the American Sportfishing Association, and I just wanted to give a little bit of feedback today, and I certainly appreciate the long and thorough deliberations that you all have been going through today, and I appreciate the thoughtful approach that you're taking to this.

I think, from ASA's perspective, we would very much support this idea of trying to incorporate the discard mortality estimates as a way to convert dead discards into harvest. I think not only is it a good conservation policy, but, from a public perception perspective, to be asking the public to use descending devices, but then not offering anything in return, from the management perspective, is a challenge, and so I would certainly encourage the SSC to continue to explore that option as you move forward into Thursday. Thank you.

DR. NESSLAGE: Thank you very much, Kellie. We appreciate that. Are there other hands raised or comments in the box? I don't see any, but maybe I can't see.

DR. COLLIER: I am not seeing any comments.

DR. NESSLAGE: Excellent. Okay. We appreciate that. Thank you. There will be another opportunity to provide public comment on this on Thursday as well. So back to Kyle, you poor thing, and I would like to hear from the SSC, and it sounds like there is, in general, support for this alternative approach, but a few folks have seemed a little tepid on it, and so that's what I'm hearing. If the tepid folks strongly object with going forward with Kyle's new proposed approach, then I would like to hear from you now. Wilson Laney.

DR. LANEY: I guess I would probably be characterized as tepid on it. The question, again, is say we do this, and what science are we going to have to document the percent use of descending devices? Somebody mentioned, earlier in our discussion I think, the possibility that observers could collect those data, and is that something that we would be guaranteed to receive, and/or is there any sort of other use survey that is presently out there that would provide those sorts of data to us, so that we would have some way of assessing whether or not we were on target at all?

DR. NESSLAGE: Good question, Wilson. Kyle, do you have any feedback, or perhaps some of the data folks?

DR. SHERTZER: There might be information that's collected in the MyFishCount. I guess the issue with that is you might get a biased perspective, because the people participating in that may be the ones who are inclined to use descender devices.

DR. NESSLAGE: Chip, to that point?

DR. COLLIER: Yes, and I just want to point out that, in development of best fishing practices, it's not recommended to use a descending device all the time. If a fish is not showing signs of barotrauma, release the fish immediately, because they can swim back down with little interaction with the angler, and, the faster you can get the fish back in the water, it's probably the best thing that you can do for the fish.

As far as monitoring through MyFishCount, that is definitely a tool, and there is information on how many times that they are used, as well as some potential, and I see her hand is raised now, Beverly Sauls, and they might be collecting some information from charter and headboats, with some observer data, and The Nature Conservancy is talking about doing a survey of anglers, to see how many people are using descending devices now, and so I will let -- If you don't mind, Genny, I would let Bev talk about this issue a little bit more, and she's probably more involved than I have been recently.

DR. NESSLAGE: Sure.

MS. SAULS: Thanks for letting me address this. We recently expanded the State Reef Fish Survey over to the Atlantic coast, and I'm sure that we would be open to trying to collect some of that information in that survey. We do a special red snapper survey in-season that we collect that information from, and that's where some of the data from the Julie Vecchio paper came from.

Also, I wanted to note that there is that data workgroup that I sit on, and a number of other people do, that is talking about, I think, how states could be more involved in data collection for reef fish, and so that might be a good topic for that group. Then the last thing I would say is that we do -- We are expanding our at-sea observer coverage, at least in Florida, to charter boats on the Atlantic coast, and we're going to be back out in the field starting next month, and so we would have some data on headboat and charter boats from our observer program.

DR. NESSLAGE: Okay. Thank you, Bev. That would be future information, but we have to make a decision now, and so that's good to now, and hopefully that addressed Wilson's question, but let's hear from Amy next.

DR. SCHUELLER: I guess, based on the discussion, I thought more people were tepid on this than they were for this, and I guess, as Fred mentioned, there doesn't seem to be a strong statistical difference between the different blocks and the discard mortality. It's great to hear that there's more data being collected on this, but, to me, that lends to a research recommendation and not a point in which we're going to now make some decision about what percentage usage we're going to get.

I am a bit concerned that, if this is coming from sort of the MyFishCount app or something, that maybe you're getting a set of anglers who are excited to use the app, and then maybe are more excited to follow the regs and use the descender devices and the suggestions that are put forward, and so there could be some potential biases there. I just don't really feel like I have a good handle on the available data, and so, to me, it's hard to just say, yes, let's go ahead and do this, and I think that this is a research recommendation.

Then John also mentioned the councils make management changes like this all the time, but we don't necessarily go back and run projections based on what they've done, because, a lot of times, again, we don't have the data to really distinguish what the repercussions actually are, and I will stop there.

DR. NESSLAGE: Thank you, Amy. Fred, tepid or not tepid?

DR. SERCHUK: I completely concur with Amy's comments. I think, if we want to be positive about it, we can say something like the use, the increased use, should be encouraged, because, based on the available data, it does look like that this does result in lower mortality for released fish. However, we can't quantify that at this time, but, from a qualitative point of view, we urge that it continue, and I don't think there's anything wrong with that. Thank you.

DR. NESSLAGE: Thank you. Scott.

DR. CROSSON: I'm sure that everybody else understands this except me, but the 75 percent, or whatever percentage we're using, is that of anglers that are catching red snapper or of the biomass that's caught?

DR. SHERTZER: It's that 75 percent of the fish that are released are descended with the devices.

DR. CROSSON: Okay. Thanks.

DR. NESSLAGE: Does that mean you're tepid, or where do you fall on this, Scott?

DR. CROSSON: I don't understand what tepid means here.

DR. NESSLAGE: Sorry. Are you supportive of this new approach or not?

DR. CROSSON: Of using 75 percent?

DR. NESSLAGE: I guess that's another question.

DR. CROSSON: I mean, I am not overly optimistic, and I don't believe that 75 percent of fish that are caught are being released using descender devices. I don't believe that, and so, if that makes me tepid, then that's where I am on that. I'm a shade of beige, if that's the case.

DR. NESSLAGE: I hear you. Thank you. Jeff.

DR. BUCKEL: Thanks, Genny. I was on the assessment panel, and we had discussions about this, and there is more than MyFishCount data, and there are several published papers talking about the use of venting or descending, some type of barotrauma mitigation, on fish that require it, to Chip's point.

Hopefully there is enough outreach out there that, if you're in shallower water and the fish don't show signs of barotrauma, then there's no need for some mitigation, but the published studies out there show pretty high percentages of using barotrauma mitigation for red snapper, and so I'm comfortable with the 75 percent for Block 4, and I really like Kyle's approach, for the reasons that have been mentioned already, that it's showing that you're going to get some benefit from using these tools, and folks have -- Based on those surveys, the published surveys, there are a lot of people using either venting or descending tools to mitigate barotrauma.

I think it's something to keep track of, and so maybe that workgroup that is looking at red snapper, in terms of recruitment and if it stays high or goes back down, can also try to keep track of this using barotrauma mitigation and does that trend continue or is it that people were excited about doing it, but then they revert back to old habits, and so I think it's something to keep an eye on, but the published data support that folks are using it at a high percentage, and not necessarily just descending, but the venting, some type of barotrauma mitigation.

DR. NESSLAGE: Beverly, is it quick to that point?

MS. SAULS: Just a point of clarification, and I had a text from the primary author of that paper, and she reminded me that that 75 percent includes fish that the anglers normally would do some sort of mitigation on, and so the majority of the fish that we observed in shallow depths are just released without venting or any other mitigation, and we assumed that that's what anglers would continue to do after the descending, I guess it's a rule, went into effect.

The 75 percent applies to fish that are right now being vented or otherwise have some impairment, and we assumed that 75 percent of those fish would be descended with more outreach and some

sort of requirement, and so it's a little less of a leap than assuming that 75 percent of all fish will be released with a descender.

DR. NESSLAGE: But is that, Kyle, how it's implemented here, or is it 75 percent at-depth? You don't have the projections by depth here, do you?

DR. SHERTZER: No, and the way it's applied is just the reduction in discard mortality, and so we're not using this value of 75 percent directly, and it's just the values that were in Table 4 would be the discard mortality rates.

MS. SAULS: Yes, and that's how we calculated the rate, was using those assumptions that fish that didn't need to be vented would also not be descended. That's why you don't see a big change, or a real big increase, in the mortality estimates, because most of those fish are still going to be just released.

DR. NESSLAGE: Okay. That really helps. Thank you. I appreciate that. Scott.

DR. CROSSON: Actually, again, thank you, Beverly. That really helps, and what Jeff said actually helps, because my fishing experience is only in south Florida or North Carolina for bottom fish, and I'm also very sensitive to what my fellow economist, Chris Dumas, said about making sure that we don't disincentivize people from using things, and so I'm still a little confused, but that's useful information. Thank you.

DR. NESSLAGE: Thank you, Scott. Anne.

MS. LANGE: Okay, and so, just to summarize what my understanding is, what this alternative two-step proposal is, it's we'll go through the normal forecast and compute the F rebuild, and then, based on that, we'll adjust the ABC upward, based on the presumed reduction in the mortality associated with discards, and so we're adjusting the ABC to allow more fishing, enticing the people to use descenders, or other ways of preventing discard mortality. Is that what we're doing? We're going to be making changes to the actual ABC? Is that the bottom line?

DR. NESSLAGE: If we go to Slide 86, I think, and, Kyle, you only ran one run of this, right, for comparison of what the ABCs would look like, or at least what the catch trajectories would look like, and you would have 21 percent higher landings, and so, yes, I think so, Anne. Is that a correct interpretation, Kyle?

DR. SHERTZER: Yes.

MS. LANGE: But, again, it's the ABC that we would be recommending that would be changed?

DR. NESSLAGE: Yes, because it's going to be the projected landings under certain circumstances, and then the ABC would change. Yes. I believe so, Kyle, right?

DR. SHERTZER: Yes, and that's right, but, again, keep in mind that this also has a substantial reduction in total discards, and so it's not just the effect of descender devices on discard mortality, but the total amount of discarding outside of the mini-seasons would need to be reduced substantially to achieve this.

DR. NESSLAGE: Okay. Thank you. Anne, did that clarify things?

MS. LANGE: Yes and no. We're not sure exactly what the overall discard reduction, mortality reduction, is going to be then. Your last sentence is what confused me, Kyle, when you said that's assuming that all the other methods are used, and so we don't really know for sure if that's going to happen, right?

DR. SHERTZER: Well, I guess what I meant was that the F rebuild that would be calculated in Step 1 would include a reduction in total discards, and so there's the two parts to it. To achieve F rebuild, there would have to be a reduction in the total discards from what we're seeing now, but then, once that happens, then the dead discards -- Some of that could be converted into landings. I think the bigger management question though is how to reduce the overall recreational effort that is leading to discarding outside of the mini-season.

MS. LANGE: I guess that moves me into the tepid side, because it sounds as though we aren't there yet. This is a hopeful change in behavior, or whatever, but we're not sure if it's going to happen.

DR. SHERTZER: But that's true of whatever forecasting method we use, and that's not condition on this two-step approach, and that's also true of other approaches.

MS. LANGE: Touché.

DR. NESSLAGE: Because that's what the SEDAR panel wanted to explore for all the projections, correct, this reduction in discard mortality?

DR. SHERTZER: Well, just outside of the reduction in discard mortality, the F rebuild would come with a large reduction in total discards from what is happening now.

DR. NESSLAGE: Just because of the lower F?

DR. SHERTZER: Right.

DR. NESSLAGE: Got you. Okay. All right. Fred. We're going to wrap-up soon though, folks.

DR. SERCHUK: I have a question related to the reporting of the recreational catches. At one time, and I haven't worked on this for a number of years, but there used to be -- I think it's a Category B1 or B2, where the anglers were asked to not only provide what they caught, but also the number of fish that they released alive, and does that still occur in the databases, at least from the national surveys?

DR. COLLIER: Yes. For MRIP, yes, they do that.

DR. SERCHUK: Okay, and so does that account -- Does that also take into account then the use of descender devices? Are we double-counting? That's just a question. Thank you.

DR. SHERTZER: The live releases from MRIP are -- They're not double-counted, and they are input into the assessment as live releases, but then, when they're fitted, they are decremented by the discard mortality rate to compute the dead discards before fitting. I'm not sure if that answers your question.

DR. SERCHUK: Well, what I'm suggesting is, if someone uses a descender device, and then, in the MRIP surveys, they are interviewed, they will say, okay, yes, I caught this many, but I released this many, and so that is already being accounted for, their use of the descender device is already being accounted for in the statistics, and is that correct, or do I not understand it correctly?

DR. SHERTZER: I think the MRIP estimates would just be the released live.

DR. SERCHUK: Which is what a descender device does, right?

DR. SHERTZER: Right, and, if they were dead, then they would be marked in that way.

DR. SERCHUK: Correct. Okay. Thank you.

DR. NESSLAGE: I am not sure I'm following. Does that mean that we're double-counting?

DR. WALTER: I can answer that.

DR. NESSLAGE: John Walter, go ahead.

DR. WALTER: The B1 that are -- After the B1 are counted, then we kill them off with a discard mortality rate, and so the B1s that are recorded in MRIP are just the B1s. Presumably the descender device is only going to operate on increasing the survival after they have been counted as a B1, and so we are not double-counting them. Is that clear?

DR. NESSLAGE: Sure. Thank you. Okay. We're past 5:00, and a lot of us are pretty drained, and I feel like we're spinning our wheels here. I will take Alexei's comment, and then we need to make a decision, either whether we're comfortable with one direction or another regarding these projections or whether we scrap the idea of getting the final numbers by Thursday, because we are running out of time. Alexei.

DR. SHAROV: Thank you. I have just clarification. B1 is the harvested fish that were not available for inspection, and so, when John just talked about it, I assumed he wanted to say B2. B2s are released alive.

DR. WALTER: Thank you, Alexei. That is correct. It's been a long day, and I get my B1s and B2s sometimes confused.

DR. NESSLAGE: Thank you for the correction there, and, yes, it has been a very long day. I'm a little concerned about us jumping the gun and making this decision tonight, and so, Kyle, I need you to be honest with me. The target was Thursday afternoon, and is that negotiable, or, if we need more time to make a decision about the final runs, is there any way we can push it? I'm going to look to Chip, too. Is there any wiggle room in our very overstuffed agenda?

DR. SHERTZER: I think the goal was to provide you with what you need during this meeting, so that you could make your recommendations in time for the council to act on them at their June meeting. If you wanted to postpone this discussion until one day next week that you're meeting, if that works within the schedule, then that would satisfy that idea too, if you need more time to discuss. If you wanted to revisit this maybe tomorrow and make decisions, and then we could decide whether it could be done by Thursday afternoon or by -- Is it next Monday that you're meeting, or Tuesday?

DR. NESSLAGE: Monday.

DR. COLLIER: Monday, May 3.

DR. SHERTZER: Okay. Maybe provide it by Thursday afternoon or Monday, if that fits in your schedule.

DR. NESSLAGE: Nothing fits in our schedule at this point, to be honest, and so we're going to have to make some hard choices. Scott, do you have a suggestion?

DR. CROSSON: I really just feel like the hour, and the very long day that we've had, and is there any other big item that we need to do on red snapper, and I'm not suggesting that we do it right now, but I'm just saying could we go over this quickly tomorrow morning, within -- I will be optimistic and say half-an-hour to an hour, and would we be able to move on to golden tilefish and still proceed through our schedule?

DR. NESSLAGE: That's where I was thinking, but, Kyle, are you available tomorrow morning?

DR. SHERTZER: Yes, I will be on tomorrow.

DR. NESSLAGE: Can Nikolai stay into the afternoon? That's the other question, because that would push tilefish to the afternoon, guaranteed. Does anyone know?

DR. COLLIER: I am not seeing him on the webinar anymore.

DR. NESSLAGE: That's what worries me about all of this.

DR. SHERTZER: I will message him and see if I get a response.

DR. CROSSON: Just red snapper is not a species to make a decision on when you're fatigued.

DR. NESSLAGE: Nor is it a decision that I really want us to be making over email offline, and so I feel like we need -- Whatever projections we're going to have, we need to review them at this meeting at some point, but that means we need to make a decision about this, and we need to do it very quickly.

If not right now, then tomorrow morning, and so people need to have a very firm opinion tomorrow morning, and so sleep on it, but we will not spend -- I think you're right, Scott, that we can't afford to spend any more than even a half-hour arguing about this. If we can't come to a consensus, then we should go -- My recommendation is we would go with what the panel saw, because that was

the panel's recommendation, and it was our panelists that approved of that, and we make it a research recommendation for the future. That would be what I will suggest tomorrow at thirty minutes into the meeting, if we can't come to consensus.

MS. LANGE: Will Kyle be able to do whatever runs he needs to between now and 9:00 tomorrow morning?

DR. NESSLAGE: No, no, no. He won't be doing that. We will be informing him of what runs we are requesting, and then, depending on what we ask him for, hopefully he will still be able to pull it together for Thursday afternoon. If not, Monday afternoon, I'm guessing. Does that sound right, Kyle?

DR. SHERTZER: Yes. It does, and, again, even if you go with the forecasts that are in the report, I would still need to revise them for a start year of 2021.

DR. NESSLAGE: Right, but, if we decide that we aren't going to tinker with the alternate discard -- If we make this decision, then we are kind of set, right? I guess that's what I'm thinking. This is the last decision that we have to make, and we're not going to cherry-pick once we see the answers, and so the additional discussion will be finalizing our consensus statements after we see the final table and approve it, and does that make any sense?

DR. SHERTZER: Yes, I think so. I mean, there will be some revised projections, and, tomorrow morning, within half-an-hour, you will clarify exactly what those are.

DR. NESSLAGE: That's my hope, or it's not my hope. It's that we have to. It's that or we don't have a decision at this meeting. Fred Serchuk.

DR. SERCHUK: I look forward to you tabling your proposed approach first thing tomorrow morning, Chair. Thank you.

DR. NESSLAGE: Thank you. Do we have any feedback from Nikolai, or we're just going to hope that the extra half-hour works, and we will do our best to get through golden tilefish as quickly as we can, but still give it due diligence? Not hearing anything, I'm going to ask that you all give this very careful consideration overnight and be ready to help me make a quick decision on the morning. Does that sound -- Does anyone have any last-minute comments or objections or accolades? All right. Then we will reconvene at 9:00 a.m. Be ready to rock-and-roll on this issue, and I thank you for your time today. Go get some rest, and thank you very much, Kyle. We greatly appreciate it.

DR. SHERTZER: Thank you.

(Whereupon, the meeting recessed on April 27, 2021.)

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APRIL 28, 2021

WEDNESDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened via webinar on April 28, 2021 and was called to order by Chairman Genny Nessler.

DR. NESSLER: Good morning, everyone, and welcome to day two of our April SSC meeting. We are going to pick up this morning with a continuation, and hopefully a conclusion, on our discussion regarding red snapper projections, and then we will transition into the tilefish assessment review, and then hopefully we'll have a little bit of time at the end of the day to start tackling our ABC Control Rule agenda item.

Just to review where we left off yesterday, we had decided on, in general, which projections we were interested in, but the last little detail that we needed to decide upon was what projection method, with regard to discard mortality, how that would be incorporated into the projections. There had been an alternate method proposed by the Center and SERO, and so we were discussing that, whether that was the appropriate way to go forward or to go with the approach that had been reviewed by the SEDAR panel.

We really do need to move quickly on this, in the sense that, if we're going to review the final projections and come up with our final consensus statements at this meeting, we need to give Kyle some time to do all that work, and he has kindly volunteered to frontload that and get that to us as quickly as possible, and so I'm going to ask for a very focused discussion first thing this morning.

First, I'm going to ask if anyone has thought up any additional questions for Kyle that would help you make up your mind about what direction we should go in, and then I'm going to ask if anyone has changed their mind overnight, or after hearing the answers to those questions. Then we will briefly entertain some back-and-forth regarding pros and cons, but, if we can come to consensus, that is fantastic, and I hope that's where we go. It may require some concessions on one side or the other, but hopefully we can come to consensus. If we cannot, I feel we need to default to the approach that the SEDAR panel saw.

Then, finally, once we've done that, we will review the requests that we have from Kyle, and that should wrap up red snapper for the morning, with the understanding that, hopefully Thursday afternoon, or, if not, Monday at the latest, we will reconvene to review the results of those projections, and we will then go into brief breakout groups.

I am thinking, but I am open to suggestions, but I'm thinking that the breakout group that's assigned to describe uncertainties -- We have kind of done that pretty thoroughly here, and I'm thinking the one thing we haven't done is describe the certainties, the pros, the things we think are strong in the assessment. That came up yesterday, and I'm wondering if you guys would be willing to brainstorm those in your breakout group, and so think about that and shoot me an email if you feel strongly one way or the other, and we will discuss that between now and Thursday.

After the breakout groups, we'll have public comment, and so, folks, if you are able to join us again at that point, you'll have an opportunity to speak, and then we will finalize our consensus statements, and so there will be another shorter red snapper session. Does anyone have any questions about my plan? Scott Crosson.

DR. CROSSON: Not about your plan, no.

DR. NESSLAGE: Okay. What else have you got?

DR. CROSSON: I just want to make sure that I'm understanding it, because I was thinking about this last night, and again this morning, because that's what I do, I guess. Well, one thing is we should stop using the word "tepid" or "lukewarm", or any of these other things, because I got really lost yesterday trying to understand what everybody was implying, but, aside from that, I want to make sure that I understand correctly.

I went back over Kyle's presentation from yesterday and looked at the SEDAR document itself, and so I want to make sure that I understand everything. Looking at the different phases that they assumed the assumption of using circle hooks and then descender devices, am I correct in understanding that the last two years of data for the assessment -- The assumption was that there was 25 percent descender device usage? If that's the case, then that seems to me to be a reasonable assumption to build into the forecasts.

DR. NESSLAGE: Kyle, can you address that?

DR. SHERTZER: That was the assumption at the end of the assessment period, and so that's what the prevailing benchmarks would be based on, and, as Beverly described, that 25 percent wasn't toward all fish, but it was toward the fish that appeared to need help being descended.

DR. CROSSON: Okay. That's good. That seems, to me, to be an acceptable compromise to be doing that, because it's not -- I am, obviously, worried about putting disincentives in for descender device use, and I want to make sure that people recognize that it's being included in the ABC setting, and so I'm willing to move forward at that level right now.

DR. NESSLAGE: Just to be clear, that's move forward with what's in the report as a projection methodology, correct?

DR. CROSSON: That's 25 percent right now?

DR. NESSLAGE: I believe so. The alternative approach that Kyle was describing, that had a higher percentage, correct, Kyle, the 75?

DR. SHERTZER: Well, no. The approach that's in the report uses that fourth block, and so it's the 75 percent, but I guess the primary difference of what's in the report is that the benchmarks used in the forecasts also are based on the 75 percent. The difference with the two-step approach is that the two-step approach uses benchmarks from prevailing conditions, and so the ones that are for the assessment period from Block 3, and so the change in the discard mortality rate going into the forecast -- It uses the Block 4 discard mortality rate, but the benchmarks are based on Block 3.

DR. NESSLAGE: Wow. I thought I understood this, and now I am thoroughly confused. Am I the only one? John.

DR. CROSSON: No, you're not the only one.

DR. NESSLAGE: Oh my goodness. John, clarify it for us. Help us out.

DR. SHERTZER: I have confused everybody. How can I help?

DR. WALTER: Perhaps I will let Kyle clarify that, or help to. I don't want to confuse it, and so, Kyle, I don't know if there's a way that you can clarify that.

DR. SHERTZER: Let me try again. The projections that are in the report use benchmarks and discard mortality based on Block 4 from this table, and so it assumes the change has happened for this post-2020, the forecast that is starting in 2021. In the forecast, it's all Block 4, and that includes the benchmarks, and so that's what's in the report.

DR. CROSSON: I am trying to remember the forecasts, and that was blessed by the review panel?

DR. SHERTZER: Your other review panel. That was what was done by the assessment panel.

DR. NESSLAGE: So, Kyle, keep going, but the alternative is different, in that you're using the benchmark from -- Help me out.

DR. SHERTZER: Okay, and so that's what is in the report. That's what's been done in the past. Then the question is should benchmarks be based on future conditions? For the forecasts, should they be based on future conditions, or should they be based on prevailing conditions, which is the standard approach, and that's normally what's done?

I think the alternative that's not in the report is to base benchmarks on the end of the assessment period, and so that's the Block 3, the current conditions, and that -- You could do that in at least a couple of ways. I mean, you could just have benchmarks based on Block 3 and then use our usual projection methodology and just ignore Block 4, and that would be one idea, and we haven't talked about that at all yet.

The two-step approach that we discussed yesterday was to use benchmarks based on Block 3, the end of the assessment period, and so that's how that F rebuild is computed, and then, in this Step 2, it shifts towards the reduced discard mortality that is not accounted for in the benchmarks at all, because the benchmarks are coming from Block 3, but allow discard mortality to be reduced based on the reduced discard mortality rate from increased descender device usage and then simultaneously increase the F toward landings, to adjust the landings. Does that help?

DR. NESSLAGE: Yes, and then what you raised was a third potential option just now, which would be Block 3, both benchmark and discard mortality the whole way.

DR. SHERTZER: Yes, and so that's essentially just Step 1 and ignore Step 2.

DR. NESSLAGE: Right. Okay. Thank you for clarifying, I think. John, did you want to add to that?

DR. WALTER: Kyle, the benchmarks are not particularly different, correct, when we saw them?

DR. SHERTZER: That's right.

DR. WALTER: So, really, the big difference here are two things. One is what discard mortality rate to assume in the future, which is really based on what fraction of utilization we're assuming, and then that is an uncertainty, and then the other thing that's the important thing that happens is the reallocation of dead discards to some retained catch, and that's the option that allows for some incentivization of utilization of the descender devices, but it's going to kill the same number of fish, but it's just whether they are killed by dumping them over the side or putting them in coolers, and so I think we could partition the decision points there.

Then I have another key point to bring up, because I don't think we need -- We're beating around the bush of a really big issue that is going to face management, and that is that almost any recreational discard fishery right now is overfishing, and so something is going to have to -- Most of the overfishing is happening through a closed season, and that's going to be a really difficult management, and I know it's not the purview of this SSC to consider that, but it's going to very soon be a very challenging issue to address, and that is a big issue, but I think, if we could partition those two decision points here that I don't think are that hard on the discard mortality in the future and reallocation of dead discards to retained, for the projections. Thanks.

DR. NESSLAGE: Thank you. That's helpful and well said. Okay. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. Both Amy and I made a comment yesterday that indicated that we felt that, and perhaps other agree, but at least Amy and I felt that there was little difference between Block 3 and Block 4, in terms of the statistical difference, in terms of the range of values. That being the case, from my perspective, I think we should go with the Block 3 that was at the end of the assessment and not be concerned about trying to fine-tune something that the ranges overlap so much, and that would sort of be consistent, I think, with the way the assessment has been done in the past. Thank you.

DR. NESSLAGE: Thank you, and so we have at least one, or possibly two, in support of continuing Block 3. Anne, where do you land?

MS. LANGE: I agree with what Fred just said, but the reason I raised my hand was to clarify something from Scott's question. There was considerable discussion about whether or not -- Within the panel, whether or not to go to the presumed 75 percent or leaving it at the 25 percent that was already occurring, as far as use of the descender devices.

I think we chose to assume, with all the incentives and everything, that 75 percent would be what would be going forward, but, at this point, I agree with what Fred is saying, that we know it's 25 percent, or at least that's the best estimate currently, and it's probably the appropriate level to use for setting the benchmarks.

DR. NESSLAGE: Thank you, Anne, and I think we can see in our report that, as we get more information on the actual percent descender device use, we can take that into consideration in future projections. Okay. I would like to -- I really like John's suggestion to break it up. Let's talk about discard mortality rate then first. We've got a couple of folks in favor of continuing Block 3. Does anyone disagree? If so, I would love to hear from you.

MS. BECKWITH: Guys, this is Anna Beckwith from the council. Good morning.

DR. NESSLAGE: Hold on. All right. Go ahead.

MS. BECKWITH: I just wanted to speak real quick. The descending device use, I mean, I understand, and I will support any decision that you guys come to, but I just want to reiterate that, for us as council members, acknowledging the use of increasing descending devices was something that we would be able to use very positively, to encourage more use and to sort of show a very direct correlation over -- We have more regulations for you guys, and this is a benefit, and we get to point here and say, even if it is the smallest of interaction towards the end result, it is still something that we can point to, and so I just -- I don't want to discount the importance of that, even though that's not really in your purview, but I just wanted to remind you guys that that was sort of the reason that we had put that additional block in, just positive public relations to support science and policy and regulations, and, if it's a small cost on this side, but the potential benefits are quite large. Anyways, thank you.

DR. NESSLAGE: Okay. I would like to hear from the SSC, please. Eric.

DR. JOHNSON: Thanks. I guess I would go -- If the 75 percent is the best guess, or the best estimate, of what we have, and that's based on the data, I don't see any reason not to go with it, even if it's only slightly better than sort of the Block 3, if that's our best guess at what discard mortality is going to be, and I would think that would be the number we use.

DR. NESSLAGE: Okay. Thank you, Eric. Wilson.

DR. LANEY: Thank you, Madam Chair. I appreciate what Anna had to say, but I think the key word is the one that Eric just used, "guess". It is a guess. We talked about the fact that we may have some sources of data that document the changes in descender use, and hopefully that would increase, but, as you already stated, and noted, we can adjust in the future if need be. For the reasons that Fred and Amy already stated, I'm still in the camp, I think, of Block 3, just because that seems, to me, to be the best available information, and, also, as Fred and Amy pointed out, it doesn't appear to be that much statistically different anyway.

DR. NESSLAGE: Thank you, Wilson. Chris Dumas.

DR. DUMAS: I think I am also coming down on the side of going with Block 3, from the perspective of what if we're wrong about the percentage descending device use, and what would be the surprise that we would face, and how would that affect the different stakeholder groups, and so, if we go with Block 3, that's the 25 percent descending device use, and so probably, in reality, we're going to get at least 25 percent, and so, if we're surprised, it's probably going to be to the up side, right? There will probably be more than 25 percent descending device use.

With that surprise, we would be able to, potentially in the future, increase landings, conditional on that surprise, and that would be well received by stakeholder groups, but, on the other hand, if we go with 75 percent -- If we go with Block 4, that's 75 percent, and there's a chance we could be wrong, and the percentage of descending device use is lower than 75 percent, and, in that case, we would have to come back and maybe reduce landings, or tighten regulations, and, from my perspective, that would be a negative surprise for stakeholder groups, and so, if we go with the 25

percent, if we're wrong and there's a surprise, it will be a surprise to the upside. If we go with the 75 percent, I think, if there's a surprise, it will be a surprise to the downside, because, in reality, I don't know that we're going to get much more than 75 percent descending device use.

Possibly, and, I mean, that's possible, but I just think just random events that happen in an angling trip are going to limit that ability to use descending devices all the time, and so I would -- My vote would be to go with the Block 3 for now, and then, when we get better data on exactly what the percentage of descending device use is, then we can update. Thanks.

DR. NESSLAGE: Thank you, Chris. I know there were some folks who felt evidence for a higher rate was stronger than that, and so I would love to hear from those folks. Yan.

DR. LI: Thank you, Genny. I was going to like support Block 3, because I feel, given the uncertainty, we don't know actually how much percentage for the descending device usage, and, given the uncertainty, I would go for something more conservative, just as Chris just said, and so I vote for Block 3, just being more conservative, given the uncertainty. Also, I am thinking, maybe here, if we eventually decided to go for Block 3, maybe we can add something, like continue to use Block 3 for projections, given the uncertainty in the percentage of usage for the descending devices, something like that, and that's just a suggestion. Thank you.

DR. NESSLAGE: Thank you. Okay. I'm hearing a lot of support for Block 3. Last call, if there's anyone that strongly supports Block 4. That's who I thought might speak up. Jeff Buckel.

DR. BUCKEL: I think I'm not -- I'm going to go with the majority of the group, and, if the support is for Block 3, that's fine with me, and I think the assessment panel -- As Anne Lange mentioned, we went back and forth on this, and, as has been mentioned, the discard mortality difference was a small change. When you go from 25 to 75 percent, you think, well, that's going to be a big change, but it's -- When you work the numbers through, it wasn't a large change in the discard mortality rate, and so I think that's why the assessment panel went with the Block 4, because we knew the trend was of increased use in barotrauma mitigation, and so we wanted to provide that incentive to continue on with that trend.

The 25 percent, that's definitely going to be more conservative, as folks have mentioned, but there is information in the Working Paper 15 from SEDAR 73 that does have higher values of the percent use of barotrauma mitigation, and so there are some data there to support an increased usage of these tools and that the discard mortality will be likely lower as we move forward, but, if folks want to go on that conservative side, that's fine, but I just wanted to give you a sense of where the assessment panel -- How we went with the Block 4.

DR. NESSLAGE: Thank you. Okay. Fred Scharf, go ahead.

DR. SCHARF: Genny, it's not a vote either way, necessarily, but I'm just wondering, going forward, how -- Which data streams, if someone is able to speak to which data streams that we have, or anticipate having, that will allow us to track this usage, and I'm just thinking broadly about what John mentioned a few minutes ago, about how this problem is not going away, and it's only going to get bigger.

We're having the same issue with our state fisheries here too, where you just have a lot of recreational pressure, and a lot of the mortality is happening because of regulatory discards and outside of the open seasons, and so using these kinds of devices, especially for our deepwater fishes, is going to be important, and how are we going to track that going forward? If we're going to make changes like this on projections and revisit them, what data are we going to have to support those decisions?

DR. NESSLAGE: That's a good point, and I think we need to -- I think there's a section in our report where we're asked what information is needed, and I think we need to be very clear about what we would need to adjust those discard mortality assumptions moving forward, and I don't know if we can put a placeholder in there for that language. Thank you. I really want to focus on the SSC, and so, John, do you have something to clarify for us really quick, or --

DR. WALTER: We're sort of talking about what could be management uncertainty that could be considered in the annual catch target that would decrement from the ABC based on implementation or management uncertainty, and so there is means, in NS 1, to deal with what might not happen when management is put into place, and that's my only point of clarification there. Thanks.

DR. NESSLAGE: Thank you. Chris Dumas.

DR. DUMAS: I just wanted to respond to Jeff Buckel's comment a few minutes ago about how discard mortality might not be substantially affected by the percentage descending device usage, and that was my understanding of what he said, and I might be wrong, and, if I am, Jeff, speak up, but, if that's the case, then why are we even worrying about descending devices? Why are we even using them? If they don't have a significant effect on discard mortality, then why is it even an issue?

DR. BUCKEL: Chris, I can respond. They definitely have a significant effect on discard mortality, but it's the -- A lot of the fish aren't -- It's the fish that do have barotrauma that are descended, and so I'm referring to Kyle's table that showed the Block 3 and then the Block 4. If you look at the discard mortality values on those blocks, they are not that different, because of all the other things that are coming into those calculations, but, if you just look at a descended red snapper versus a non-descended red snapper that has barotrauma, it's a large impact on discard mortality, but it's not -- The calculations that are being used to come up with the discard mortalities for Block 3 and Block 4, it's not like you have a hundred fish that have barotrauma and then 100 or 75 percent are descended and 25 percent are descended, and that's not what is happening in those -- That's not what's in the Block 3 and Block 4. If it was, it would be drastically different discard mortality rates.

DR. DUMAS: Okay, and so does that mean there is no real difference between Block 3 and Block 4? If that's the case, then why do we care?

DR. BUCKEL: There is a slight difference, and the reason we care is that the industry -- We want to provide some incentive, and so, if they say that their willingness to use these tools is going to get them some benefit, and, even though it's slight, a slight decrease in discard mortality, then that would provide incentive to continue our increased use of those tools.

DR. DUMAS: Okay. Then another comment that I wanted to make, replying to some of Fred Serchuk's comments about the uncertainty ranges around those blocks -- If you could put back up the slide with the blocks and the uncertainty ranges, and I think it was also said yesterday that those uncertainty ranges are not estimated, right, and those were just the same uncertainty range for a row. Like for a row in that table, the uncertainty range in Block 1 is just carried over to the other blocks, and so those aren't real uncertainty ranges, right?

Those are assumptions about the uncertainty ranges and that the uncertainty ranges are going to stay the same across the blocks for a row, right, and Row 1 -- The difference between 0.38 and 0.58, and so the first cell and the first row -- The difference between 0.38 and 0.58 is 0.2, and that same difference -- On that row, the same difference is in Block 4, the 0.22 and the 0.42, and so there's no change in the uncertainty range across the blocks, and that's an assumption and not estimated change in uncertainty, right? That was my understanding from the presentation yesterday.

DR. SHERTZER: That's correct. We did not have estimates of uncertainty, and so the width of these ranges is an assumption.

DR. DUMAS: I'm not saying that assumption is wrong, but I'm just saying that Fred was making arguments based on those uncertainty ranges, and my point is that those uncertainty ranges are just assumptions.

DR. NESSLAGE: So there could be a bigger difference, and is that your point, Chris, or there could be no difference, and we just don't know?

DR. DUMAS: Right. The uncertainty ranges could get smaller as you progress from one block to the next, or the uncertainty ranges could get larger as we progress from one block to the next, and I don't know. I haven't thought about how they would change, but we just don't know. Here, in this table, they're assumed -- Those uncertainty ranges are assumed to stay the same as we move from left to right across a row and the table.

DR. SHERTZER: It's true that they're assumed, but it's also true that estimates of discard mortality are never precise, and so I believe, even if we had estimates of the uncertainty here, these would still be statistically non-different.

DR. DUMAS: Right, and I'm not trying to criticize what's in the table. I think it's fine, but I just wanted to make sure that everybody was clear on what the table was saying, and that's all. Thanks.

DR. NESSLAGE: Thank you. Speaking of uncertainty, it looks like we have Amy and Fred. Amy first, please.

DR. SCHUELLER: I guess I -- My view on this is we need to make this decision not based on any incentive for the fishery. We need to make this decision based on available data and science, and that's the job of the SSC, is to take the data and science and make an informed science-based decision.

I read the Vecchio working paper this morning, and, based on my read of it, there is data from Florida and Georgia, and those two states had very different usage of descending devices,

depending on -- It was also differences based on the depth where the fish were caught, based on the impairment of the fish, and private boats were basically assumed to be represented by charter boat data, if I understood it correctly, and so I really feel like, at this point, this probably should just be something that's on the radar, that we should have as research recommendations.

I am very interested to see how this will play out in the future in the fisheries, but I don't know that the available data and the amount of time that we've had to review this really can allow us to make some definitive decision to use Block 4 over Block 3, which I'm almost 100 percent sure would not be statistically different from one another, regardless of how the confidence intervals are put together.

DR. NESSLAGE: Thank you, Amy. Fred Serchuk.

DR. SERCHUK: Amy said essentially what I was going to comment on, and so I don't need to comment any further. Thank you.

DR. NESSLAGE: Thank you, Fred. Okay. I am not hearing a lot of support for Block 4 at this point. However, I am hearing a lot of support that we make it very clear that we would like to see new information as it becomes available and that we would encourage the collection of good information on discard -- The use of descending devices, and that should be a priority if the council would like to continue to -- If we would like to consider that in the future projections and continue to incentivize the use of descending devices.

I think we seem to be settling on the first part of the decision, which is Block 3, and the second part of the decision then is do we use this iterative reallocation of the -- Taking the discard F that's reduced by descender devices and reallocating that to the landings, and how do folks feel about that approach? Chip.

DR. COLLIER: Kyle can correct me if I'm wrong, but I thought I heard him say, if Block 3 continues into the projections, that's just a one-stage process. Is that correct, Kyle?

DR. SHERTZER: Yes. If there's no Step 2, then just using Block 3 benchmarks is really just that Step 1 process, just like we would do forecasts under any other circumstance.

DR. NESSLAGE: I see. So, because there is no additional reduction, you don't have to do anything with them.

DR. SHERTZER: Right.

DR. NESSLAGE: Got you. Okay. My apologies for not following along. Okay.

DR. SHERTZER: So I think you've run through Decision Point 1, which was whether to use Block 3 or Block 4 for the benchmarks, and then Decision Point 2 is whether to just do the Step 1, which would be our normal forecast method, the method that's in the report, but just with Block 3 benchmarks and no reduction, or whether to add this Step 2.

DR. NESSLAGE: Well, that's what I was just talking about, and so maybe I'm still confused then.

DR. SHERTZER: I don't think you're confused. Decision Point 2 is whether to do just routine forecasts, which is just Step 1, or whether to add the Step 2 to the forecasts.

DR. NESSLAGE: Did you not just say that if we use Block 3 that we don't do Step 2?

DR. SHERTZER: Sorry, and I didn't mean to say that, if I did. We've already decided on Block 3 benchmarks, and that was part of this two-step approach. Now that there's Block 3 benchmarks, if you just wanted to note account for the change in discard mortality, the change to 75 percent, then we would just stop at Step 1, right, and so we're just doing forecasts based on just the Block 3 benchmarks and that's it. Then, if you wanted to, you could still do forecasts based on Block 3 benchmarks, but then account for the projected change to the 75 percent if we add Step 2.

DR. NESSLAGE: Okay, and so I misunderstood what you just said, and so we do have to make a decision on Step 2 still. Yes. All right. Wilson.

DR. LANEY: Thank you, Madam Chairman. So I thought that I understood things, and now I'm not so sure that I understand things. So, if we do -- If we decide to do the two-step process, then aren't we making the assumption that descender device is going to increase to 75 percent, and a number of us just indicated that we weren't comfortable making that assumption without having some sort of verifying data stream, and so I guess I'm still stuck on Block 3 as being the more conservative approach, but, at the same time, if we have a high level of confidence that descender device use is going to occur, then it would seem appropriate to try and acknowledge that somehow in the projections, and that would then seem to entail the Step 2 process, and so I guess I'm still ambivalent about it, based on our previous discussion, but I will shut up and listen to my colleagues, who hopefully will help to explain which way we should go much better than me.

DR. NESSLAGE: You put a smile on my face for the first time this morning, Wilson. Thank you. Chris Dumas.

DR. DUMAS: If the use of descender devices decreases the discard mortality, then we can either leave those surviving fish in the water, and the fish population will grow faster, and so we recover the fishery sooner, or, those additional fish that survive, due to these descender devices, we could let the fishermen catch them, in which case the fishery recovers at the same rate that we had assumed before, but we have larger catch along the way.

Are those sort of the two different options that we have in this Step 2? If we use Step 2, we have more catch along the way, but the fishery recovers on its original trajectory, whereas -- That's if we use Step 2. If we don't use Step 2, then we do not have more catch along the way, but the fishery recovers faster, because all those fish live to reproduce, and we built up our stock size faster, and so is that the basic choice in Step 2, whether to recover the fishery faster or to have larger catches as the fishery recovers on its original trajectory, and is that right, Kyle?

DR. SHERTZER: I think you may have just proposed an alternative Step 2 approach, which would be to decrement the discard mortality to the 75 percent block, but not increase the landings F , so that those extra fish -- The landings may still increase a little bit, because there's more fish in the water, but most of the fish that were released that then survive would remain in the water.

DR. NESSLAGE: Great. We have three options now. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. Actually, I'm surprised, at my own perspective, that we're talking about increasing landings at a time when the stock is overfished and overfishing is going on, and, also, given the fact that we're twenty years away, at least, from being in a rebuilt situation, given the current structure. To me, we're trying to be very optimistic for a stock that's still quite a ways from being not overfished and overfishing not going on, and so I agree with the former comment that things should be -- That we should try to expedite the recovery of the stock.

Second of all, whatever the descender devices will do or not, the stock is going to only recover if recruitment continues to continue, and we've taken a conservative point of view, and, again, I said I would go along with the consensus, and I do, with respect to using average recruitment over the time series rather than using the most recent period of elevated recruitment, and so we've dampened, in my mind, the recovery of the stock, by using a more conservative assumption, and, here, we're trying to go to a more optimistic assumption of a very small nature.

I am thinking that we just stop with Step 1 and don't do anything else, because I think that is the most appropriate thing for a stock that's overfished and overfishing is going on, and, as we've pointed out, whatever benefit will come from the descending devices will go to the stock. Thank you.

DR. NESSLAGE: Thank you, Fred. Scott.

DR. CROSSON: Well put, Fred. Some of that was what I wanted to cover, and I also just wanted to remind the committee that stocks do suddenly rebuild faster than you would expect, and it's always a nice surprise when it happens, and, at that point, you can start changing regulations. I think it happened with black sea bass five or six years ago, that we suddenly found it rebuilt way ahead of the rebuilding schedule, and so it is possible, and I would rather the committee continue the more conservative approach as well.

DR. NESSLAGE: Thank you, Scott. Anne.

MS. LANGE: I agree with Fred and Scott, and I do have a real quick question. All of this discussion is based on the decision by the Center and the Regional Office, I guess, to look at this second option, and what was the impetus for this? I mean, this just happened over the weekend, and so I'm just curious what suddenly brought this on, if I'm not putting anybody on the spot, and sorry.

DR. NESSLAGE: Kyle, if you're not the appropriate person, I'm happy to call on Erik or John or whoever might be able to answer that question.

DR. SHERTZER: Well, maybe John can chime in.

DR. WALTER: I will put my hand up, if you want.

DR. SHERTZER: Go ahead, John.

DR. WALTER: Anne, thanks for the question. What brought this on, and I think that apologies that it didn't get incorporated earlier, but, primarily, we were trying to find creative solutions that

get us effective management, and, because the projections are so heavily dependent on what management might do, and they are in fact a feedback process, you do have to think about what management might put into place and how it might actually play out, to be able to parameterize projection settings.

That is one of the things that is lesser known about projections, and it's not usually talked about, but anything that management does changes the allocation of fishing mortality and/or selectivity and/or discard mortality, and so, as we come up with options for management, that feedback has to be taken into account, and one of the options would be, and this is how it would play out, is, if there was an additional day of fishing allowed, presumably those fish would be allowed to be kept and not discarded dead, and so it would be that shifting of fish from dead discard over the side to kept in the cooler, which would be the same fishing -- Or the exact same fishing mortality rate, but just a potential different management -- Or it would be how management would play out.

How and why it came about is primarily because the agency is having to look for solutions, management solutions, and, in this case, I think it can't be unsaid that, in this case, we've got a really difficult management ahead of us, and that's not really the Science Center's focus on that, but, eventually, the agency and the council will have to deal with the fact that discard mortality alone is creating overfishing and is above the MFMT, and that has to be addressed, and I do think this SSC should consider some form of guidance to the council on that issue alone, and I don't know that it's been quite clear, and I know that Kyle has said it and shown it, but that definitely needs to be one of the things that is a key message to send along, but thanks for the question, Anne.

MS. LANGE: Okay, and I understand that, and I think everyone here does as well, but I think the timing was not right, and I think those are the types of things that should be included in the terms of reference or, in fact, I think Genny has already brought up earlier that it's a good idea to have maybe a separate workgroup on issues like this, and I think, rather than throwing it in twenty-four hours before the assessment review, and this is no one's fault, but I'm just saying that I think the timing could have been better. Thank you.

DR. NESSLAGE: Thank you, Anne, and thank you, John, for your response. Amy.

DR. SCHUELLER: I was just going to say that I feel like this discussion about the projection, using Block 3 or Block 4, the Block 4 forecast, we just had that discussion about why we're going to Block 3, and, in the forecast, if we were going to do this Step 2, with a Block 4, we would have to have some science or data information to make that determination, and I'm just still stuck on where are the data.

I still just think this is a research recommendation, and I also agree with Anne, and I'm part of the Science Center, but, if this had been plopped down in our laps from somewhere else, we wouldn't even consider it, and so there's some precedent here too about when things need to come to this committee in order to be fully considered, and I get the Center and the Regional Office might have some purview, but maybe that's like a broader discussion that needs to be had, and we talk about this lots of times, right, because things come to us at the last minute quite a bit, and so -- Anyway.

DR. NESSLAGE: Thank you, Amy. Yes, there will be discussions, I promise you, once this meeting is over. We will be discussing this, as in I will be discussing this with folks. Scott.

DR. CROSSON: I would agree with John Walter that we do have to consider the policy implications of anything that we set here, and so my answer to that is that this is a policy issue, because it's a bycatch issue, from a multispecies and multisector fishery, and the council needs to figure out how to deal with all of these species and the bycatch issue holistically, and so, if we want to put that into our providing fishing level recommendations, as a recommendation, I'm okay with that.

DR. NESSLAGE: Thank you, Scott. Can we just put that word "holistic" somewhere on the board, because I feel like that's going to be the key to getting us out of this conundrum. Thank you. Okay. Frankly, we're quickly running out of time here, and this is an important topic, but I'm not hearing a lot of support for Step 2, frankly, and so, unless anyone raises their hand in extreme opposition, I think we are -- We have settled on Block 3 forward traditional projections. Are there any hands raised from the SSC? We will, of course, suggest that more work be done, and this will be part of the research recommendations, that we consider ways to incorporate any new information on both discard mortality and descender device usage in the future. Alexei.

DR. SHAROV: Thank you, Genny. Could you please formulate why -- Just one more time, to be totally clear, why Block 4 is not acceptable for the use of -- That it should not be used for the projection, because, the last thing that I remember is the consideration of the uncertainty range, but that shouldn't be the reason for not using it.

DR. NESSLAGE: I believe there was also concern that the 75 percent is too high, given the information that's presented in that working paper. Correct me if I'm wrong, but I believe it was Amy and maybe -- Who else mentioned that?

DR. SHAROV: Yes, but didn't it come -- The number did come from the working paper, did it not, the estimate itself?

DR. NESSLAGE: The 75 percent?

DR. SHAROV: Yes.

DR. NESSLAGE: I believe so. Again, someone correct me if I'm wrong, but we don't have to accept the working paper. We're the final review body, and I think that's where this is going, but, if you disagree, I would like to hear your arguments.

DR. SHAROV: I am just trying to understand how much more reliable or less reliable this estimate is relative to the earlier estimates, as an estimate itself, with respect to the BAM being statistically not differentiable, and it's not an impediment, from my point of view. In all science, lots of parameters are estimated with wide confidence intervals, and, for example, you may have an estimate of trend of increased population, and you have, for example, five years of increasing numbers, but you consider them with your uncertainty estimates, and they are all statistically insignificant, yet these are estimates of central tendency, and this is an unbiased estimate.

If we have five of them in a row going up, you have a reason to believe that this is a consistent trend of increasing, even though, statistically, that trend is insignificant, and there is a different interpretation here. Anyways, in my mind, the argument of them not being of this range -- Or the range has been applied the same, and so the argument of those estimates not being statistically

different here is not a strong argument, and, yet, the estimated percentage used, 75, is much higher than 25.

The point is that the estimate was derived, and it came from the work, from the study, and it seems that Amy was not sure that the number was reliable, and I'm sorry that I didn't read the working paper, and so I cannot -- I don't have my opinion on that, in that sense, but I just wanted to hear something that would make me feel more confident that the Block 4 should not be used for a certain reason.

DR. NESSLAGE: I hear you, Alexei, but we are at 9:58, and we have a very, very long agenda ahead. I really -- I respect that you're concerned, but, if you haven't read the paper, I am going to have to go with those who have, and I'm sorry, but I think we need to call this, and, at that point - - This is not a fun decision to make, but can the committee live with Block 3 projected going forward, with the acknowledgement that there may be additional information out there that we still need to review more carefully and that alternative methods should be developed in the future to more carefully incorporate this and newer information about descender device use and discard mortality, because I feel like that's where the majority of the committee is going. Alexei, can you live with that?

DR. SHAROV: Yes, absolutely. All I wanted is just to have like a firm formulation from the group as a background for stopping with the Block 3.

DR. NESSLAGE: Yes, and I think what we'll do is have -- I would ask Amy specifically, but maybe a few other folks who can speak to that more eloquently, to help me write that section of the report to justify that decision. Can everyone live with that? John Carmichael, do you have something that is going to completely derail us, or is this something that's going to help me? John, if you're talking, you're muted.

DR. COLLIER: I'm actually not even seeing him on the webinar right now, and so he might have --

MR. CARMICHAEL: Can you hear me? I don't know, but it just suddenly dropped there. Genny, so I just wanted to reiterate the discussion yesterday, where we said, if you weren't able to give an ABC that the group consented to, we could discuss some of these things in more detail at a later meeting.

Obviously, there's a lot of concern about how to carry forward these projections, and we have the new method that everyone has pretty well said that they haven't had time to fully evaluate and review, but it could affect how the management is applied in the future, and I think we have this issue of the descending device effectiveness, which definitely is a big question.

I will point out that the assessment workshop and the assessment did recommend using the 75 percent going forward, and so accounting for the regulations for best practices that went in in July of 2020, and so actually not going along with the AW is making a decision, and it's making a decision to reverse that recommendation, and I think that should be based on a good discussion of the information, potentially even asking the authors of that paper and those who did the research to come in and talk to you more about it and maybe consider the differences in just the scope of the effort between Florida and Georgia, for one example of some of the issues there, but I think

there should be a really good justification, when the SSC does choose to take a different direction than what was recommended by the AW, given the time that we expect they put into these decisions.

I also think that you may get some guidance from the council, after they discuss this in June, and there's been an awful lot of things that have come up here that did veer into the area of policy and risk management and how soon the council wants the stock to rebuild, et cetera, that are really under the purview of the council and they need to weigh within their overall risk tolerance.

I guess the final point is there's been a lot of discussion of little things that have been said of, well, it really doesn't make a difference, but I can assure you, to all of the fishermen and the council members listening to this who have been dealing with red snapper for the last fifteen years, all these little things totally add up, and they mean a lot, and so, while it may not look like but a few pounds here or there, or a little bit of a difference in saying, yes, the descending device regulation did affect the descending device usage, and all of those things totally do add up, and they all are very important. If we need more time, if this committee needs more time, to review these issues, so that the group can reach a consensus, the council will support you in doing that.

DR. NESSLAGE: Amy.

DR. SCHUELLER: I was just going to say that I can help write up stuff, based on my reading of the paper, of the working paper, but, as John pointed out, clearly this is something we're probably interested in discussing in the future, and I don't know whether that impedes our ability to make an ABC, and I would say that it probably doesn't, but then it could come up later, and we could modify from there, if we chose to do that, but I just wanted to say that I would help write things based on what I have read and heard, but --

DR. NESSLAGE: So, when I suggested yesterday that we might not have enough information to make an OFL and ABC decision, folks argued against that, and we pressed ahead, and we went through a very long discussion about what projections we would use to set that ABC, but now we're coming down to the nitty-gritty decisions about those projections, and we seem still a bit uncertain about what the justification for those details might be.

I personally am not a big fan of revisiting things, and I would rather make a decision that's well justified from the start and stick with it until we have new information, but I would like to hear from the committee, and, yes, we are going over 10:00, but I feel like we have been placed in a very difficult position here, and so, Amy, go ahead.

DR. SCHUELLER: I guess I'm -- So I'm trying to look at the assessment report, and people keep saying the assessment workshop recommended projections with the 75 percent, and I keep looking for that in the report, and I'm on Section 4.12, projections, and it just says -- Okay. Going from - - I'm sorry, but I'm just trying to find where it says in the report that they recommend that, and so here's what it says. They recommend it, but there's no justification at all.

I get that the assessment workshop recommended it, but, without any statement in here, I am having a hard time figuring out like why they recommended 75 percent, and I know John said that we're going against what they recommended, but, if what they recommended -- If I can't find a

clear justification in the document, I'm a bit confused as to how that should take sway over data and analyses out of a working paper, I guess. I don't know, but I'm --

DR. NESSLAGE: Thank you, Amy. Jeff Buckel, you were intimately involved in this, and can you help clarify for us?

DR. BUCKEL: I think one way to think about it is so there's a new regulation on the books, right, and it requires descending devices, and so that started in 2020. Moving forward, in Block 4, that regulation is on the books, and so do you say that there's going to be 25 percent compliance or 75 percent, and so I think, based on what was in Julie's review, there were several papers that found greater than 50 percent usage of some type of barotrauma mitigation, and so, for example, the Scyphers et al. study in the Gulf of Mexico -- That was for venting, but they found I think it was 60 to 70 percent usage of venting tools for fish, for red snapper, that had barotrauma.

Then, with the other information that was presented in there, and that there's a new regulation on the books, we felt that there was evidence and data to support that there would be 75 percent compliance with the regulation, so that -- We didn't go to 100 percent, because we knew there would be -- The panel understood that there wouldn't be 100 percent compliance, and so we settled on the 75 percent, so that the -- Taking into account the new regulation that's on the books, and so maybe this is -- As John Walter mentioned before, it's a management uncertainty, given what the compliance will be, and so maybe we provide -- One potential option is to provide projections with 25 percent usage and one with 75 percent, and then the council can -- The management uncertainty is under their purview, and they can work with those two projections.

DR. NESSLAGE: Can you just repeat that one more time, Jeff, the last bit that you just said?

DR. BUCKEL: The management uncertainty, and John Walter mentioned that this is a management uncertainty issue, which that is under the council's purview, dealing with that uncertainty, and so one option would be for the SSC to provide a projection with the 25 percent descender usage and one projection with the 75 percent projection usage, and then that is -- The council can consider both when they're accounting for management uncertainty, which the uncertainty is what's the compliance with the new regulation of descender usage.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. The greatest source of fishing mortality is the mortality in the recreational fishery that is inducing dead discards, and that's, I think, clear in the report. I compliment the council for imposing descender devices and other ways of reducing that mortality, and, by itself, that will help the stock rebuild, but I think that's the only thing that I'm concerned about.

Somehow we want to get a reward back, but the reward is that the stock will be less overfishing will be occurring, and we'll be on target to rebuild the stock, and, again, I find this argument about 75 percent and 25 percent, and the ranges that we have tend to overlap, and the point estimates are not very different, and I find that we're trying to see how many angels fit on the head of a pin, from a scientific point of view, and I just -- Our feeling is, my feeling is, that, yes, the council is to be congratulated for the use of descender devices, and we hope to see in increased stock sizes,

so that the council can then continue on the road to rebuilding the stock and moving away from an overfished and overfishing condition, and I think that's it.

I mean, I'm a little bit frustrated that we -- I thought we had consensus on this, and now we're continuing arguing, where we really don't have, in my mind, very hard data, and so I agree with Amy on this. Sorry to be a little bit agitated, but I thought we were going to be able to get through this in a half-hour this morning, Chair. Thank you.

DR. NESSLAGE: You're not the only one who is agitated, and I'm not surprised that we're still discussing this. I can call this, but, if I call it, it's going to be delaying, because I don't feel like we have consensus, and so that's where we are right now. Scott Crosson.

DR. CROSSON: You've been on this committee long enough to know that we weren't going to deal with this in a half-an-hour, but the -- I thought that we had a consensus as well, and I felt we could move forward with it, and we also agreed with Phase 3 just a few minutes ago, and so I don't -- This proposal of Jeff's, I don't agree with. We have our charge, and it's in the agenda and the overview, and I think we need to finish, and I'm comfortable with setting the ABC, and the committee just needs to do that and move on, and so that's my take on it.

DR. NESSLAGE: Thank you, Scott. Alexei.

DR. SHAROV: Thank you. I personally like what Jeff Buckel suggested. To me, this is a logical way to go. As I see it, neither of the options are -- Essentially, we don't have a reliable estimate of what the percentage of the usage of the descending devices would be.

There are estimates here in the table, and one is conservative, and the other one may seem to be too optimistic, but doing projections with both options would be useful, and that would inform us on the effect of that percent usage and the effect on the expected trajectory of recovery, et cetera, and this is, indeed, a management uncertainty then, and that would be a council decision to use the level of risk, as appropriate, with respect to the level of compliance and the effect of compliance on the population recovery. I think that would be the most honest position.

An alternative is to go more conservative and go with Block 3, and just say that whatever we have underaccounted for will do its own good anyways, and it will contribute to population recovery as a whole, and then it will just simply be reevaluated at a later point.

DR. NESSLAGE: Fred Scharf.

DR. SCHARF: I am going to agree with that, and I glanced too at the Working Paper 15, and it does -- While it certainly indicates an increase in barotrauma mitigation, mostly in the form of venting, a lot of variability in descender use, depending on state and user group, but, that being said, given that the council just implemented this rule to require them on the boats, I think an expectation that that usage is going to go up, moving forward, would argue for providing projections in both directions, like Jeff said, and allow the council to incorporate that uncertainty when they're making those decisions.

I don't have a problem with that approach, and I'm fine with it, and so I'm just trying to kind of step back, at a high level, higher level, on what we know about this stock, and so we have a stock

that's showing signs of recovery and rebuilding, based on recent survey estimates from the video survey and the trap survey, and so we're seeing that, and part of that may be that we're just able to do a better job of counting them, but we're seeing evidence of growth in the stock.

You know, we've got recruitment estimates that are outputs from the assessment model, and we don't have an independent index of recruitment, and so we don't have mechanistic information about what's driving some of this high recruitment that we're seeing in the recent periods, and we've got a lot of uncertainty in the natural mortality relationships with age, and we have that in most stocks, but it's very impactful in this particular stock, in terms of where that curve lies, in terms of our overfished and overfishing status.

What we do know, also, is that we still don't have a fully-recovered age structure, and we're just starting to see some older fish in the survey data, both fishery-independent and fishery-dependent, and so, given that, I mean, coming back to what Fred has said, in terms of we've got a stock that's overfished with overfishing occurring, and I feel like, in doing this for as long as most of us have, I feel like we've seen this movie before, in that, as soon as we start to see any hint of recovery, we want to start skimming off that growth and giving it back to the fishermen, and I understand the social and political and economic pressure that the council is under.

We see that everywhere, but, when we overshoot, in terms of giving back some of the growth -- You know, the stock is not rebuilt yet, and we're still overfishing the stock, and so the projections that include more use of descender devices -- I am in favor of that, but I'm not -- I would not support giving back any decrease in discard mortality as landings at this point, and we don't have a recovered stock yet, and so that's my view.

DR. NESSLAGE: Thank you, Fred. I'm going to take one more hand raised here, Amy, and then I'm going to propose a way forward.

DR. SCHUELLER: I don't -- I agree with what Fred just said, and what I was going to say, and I will wait and let you put your proposal forward, and so I will pass.

DR. NESSLAGE: Okay. We are spinning our wheels. However, I think -- Sorry. I want to make sure I say the right thing, and so I'm trying to gather my thoughts here, and this is not easy. If we provide -- One, I'm not even sure if Kyle can provide us with all of this this week, and I've already said that I am not willing to have us make a decision on an ABC and OFL at this meeting without having final approval, and I'm not doing final approvals over email.

First, I would ask Kyle, is this even possible? If we asked for the OFL Scenario 1, the ABC at our P rebuild, and I know we said that you will probably want to run the 50 percent, but that's not what we're requesting, and that's what the council will probably want, and so I don't need to see that this week, and that's something that you would probably want in your back pocket for the council meeting, and so I would say that's low priority.

Run all of those with the Block 3 forward, and can you do that with -- Can you do both options with -- Our recommendation then would be the 25 percent, but the alternative 75 percent would be there, another back pocket for the council, but the problem is that they can't go above what we've set, people, and so this is the -- This is the problem we have, and we can't just give them two runs

and tell them they can select the higher ABC, and they can't. We have to set an ABC. Chip, help me out here. I don't think this is doable.

DR. COLLIER: That has been, in fact, done in the past, where the SSC sent different scenarios to the council for the ABCs, and, basically, they provided -- The SSC had provided guidance and said, given the scientific information available, we're not able to determine which ABC is most appropriate, and they sent a list of ABCs to the council, and they selected based on that, and that's how -- John Walter had brought that up yesterday, and that's how they worked through the king mackerel.

DR. NESSLAGE: Okay. The alternative is that we go with the more conservative, and, if they would like us to explore the 75 percent option, we would need more time and more information, careful consideration of the new information, which would mean that Kyle would do a bunch of work this week, and then we probably would be asked to revisit over the summer, which seems like a lot of wasted time for Kyle, in my opinion, which is why I've been -- I will leave it at that. Amy.

DR. SCHUELLER: I mean, you sort of put on the table what I was thinking, which was to ask if we could see it each way, but, in the meantime, the other part of it that I was thinking about was that -- I think that going with the 25 percent is more justifiable, at this point, based on the science and data, and I guess I -- I mean, I will put Jeff on the spot here a little bit.

I am looking for the science and data and the justifications for the 75 percent that I am like, yes, okay, I can be comfortable with that, and I'm just not seeing it, and he just brought up another paper that is cited in the Vecchio work, but it is not in any of the figures or tables, as far as I can see on my brief scan, and so clearly Jeff has a more in-depth view of the available information than I do, and I'm just wondering, if we get the runs -- Okay.

If it's doable by Kyle to even do the runs, first, but then, second, would it be possible to have some information from Jeff, perhaps, and sorry to throw you under the bus here, on the science and data related to that 75 percent, and then the other part of it is -- I guess I'm having two hiccups with the 75 percent part. One is should we even use it, and based on what, and then the second one is do we agree with the method, which we haven't really reviewed before, and so --

DR. NESSLAGE: You mean the reallocation idea?

DR. SCHUELLER: Yes.

DR. NESSLAGE: I feel like this all -- I'm really feeling like this is all too much too late.

DR. SCHUELLER: I mean, those are the two sticking points, for me. Like, if we said, yes, we really think this method is reasonable, and we can move forward with it, then -- I'm not saying that I'm not, but I'm just not sure, and then fine, and then the other justification that I'm looking for is why 75 percent, because, in that Vecchio working paper, there's a table, Table 7, and it has depth by percentage of descending devices, and then there's these values in there, and they're just sort of a matrix of possible values, and how do you -- How are you picking one? I don't have a good handle on that still, based on what I have reviewed. Anyway, that's where I am sticking at, is those two points.

DR. NESSLAGE: Thank you, Amy. Scott.

DR. CROSSON: I am not sure what to say at this point, but I agree with Amy. What she just brought up, these are scientific questions, based off of literature, and this is the SSC, and so it's in our purview to review them and use them for making our ABC recommendations, and so, given the uncertainty around them, and given what Amy just indicated, I think that we should be able to put 25 percent in right now, and we still don't have an answer from Kyle, whether or not that's possible for him to be running both scenarios, and so that's something we need to consider, because I think we have information right now and we can make this decision.

DR. NESSLAGE: Thank you. Kyle, could you speak to that? I mean, is it possible to do all the combos?

DR. SHERTZER: I am hearing there is either three scenarios that are being requested or six scenarios, depending on whether you want the 75 percent added in, and so I can certainly do the three scenarios. If you want to look at all six, then I can do that too, but I would request that you look at it next Monday instead of tomorrow.

DR. NESSLAGE: Okay, and so let's just revisit the -- What are you calling the third scenario? I think I understand the first two.

DR. SHERTZER: The three that I have are -- In all cases, the mean recruitment, and one uses F 30 to get the OFL, and then there is the two different probability of rebuilding, the 0.675 for ABC, and also the probability of 0.5 for ABC, and I realize that that's not necessarily something that the SSC needs, but, as long as we're doing it, I think it would be good to have it looked at by the SSC, so that the council has it reviewed by the SSC, if it something that they're going to entertain, and so I can provide all three of those, probably by tomorrow, and, if you wanted to add on all of those, but with the Step 2 added in, then I could do that too, but that would be by Monday.

DR. NESSLAGE: When we say the Step 2, that's with which assumption about --

DR. SHERTZER: That's adding in the 75 percent reduction to discard mortality.

DR. NESSLAGE: Right, and so the default would be 25 percent, and so it would be either four or six runs, whether we see the 50 percent one or not, right?

DR. SHERTZER: If you drop the 50 percent, then -- If you have both probabilities of rebuilding, and then also the F 30, that's three scenarios, and so I think it's -- We will certainly do the ones where there are just standard projections with Block 3 benchmarks. We will definitely do those three. Then, if you wanted to see -- I don't know if you needed each one of those iterations again, but, with the reduction in discard mortality, the 75 percent block, then that would -- Well, maybe each one of those scenarios would need to be redone with that assumption, and so it would be a total of six.

DR. NESSLAGE: Yes, and I think your -- I like your accounting there. My concern is that I don't see the -- The way this discussion is going, I do not see the SSC deciding on 75 percent, unless we have a more thorough presentation of the background information that's used for that number, and

so that would mean not only you presenting on this, but a significant chunk of time set aside in our agenda to have someone go over how those numbers and the Vecchio paper, et cetera, and so I'm going to look to council staff, John and Chip, and any council members present, but this means that other things are going to fall off of our agenda this week, if you want this done this week. If so, what is that going to be, because there's no way that we can do this and complete gag on Monday and whatever else was getting pushed to Monday because we've already chewed up two hours? Erik Williams, please help me out.

DR. WILLIAMS: I am not going to help out. Sorry. I'm going to throw a hand grenade into the whole thing, and just because I have a good history of doing this anyways. I think we are neglecting -- We're getting into second and third decimal place discussions with these projections, when the bigger issue at-hand is Step 1, which is what is management going to do to reduce overall discards, and, by doing what we're doing here, we're actually locking them into only one scenario of reducing overall recreational, or actually reef fish effort, to get F below, and then we're going to deal with sort of descender device savings and allow kept fish.

The problem with that is that Step 1 -- There's a whole bunch of options there available to managers, and, as scientists, what we should be providing them is what is the scope of possibilities for that Step 1, because I think the first thing that doesn't seem to be getting grasped here is that Step 1 is a dramatic management step that's going to be required. It's one that we have avoided every year, in some form or fashion, which is curtailing the total recreational, or even reef fish, effort to get discard levels to a level that's below overfishing.

Until that is done, all of this is just window dressing, and that Step 1 has a whole bunch of options. I mean, in theory, you could reduce the total recreational, or reef fish, effort to a point where every fish could be kept, and you would have no discards, and that would be a pretty -- That's one sort of bookmark end on the range of possibilities, and the other one is every fish continues to be discarded and you have a maximal season, essentially, and you allow as much fishing effort as you can, but you have to throw every red snapper back.

Those are sort of the bookends, and the problem is those bookends still require managers to do some sort of closure, and, until that gets discussed, all of this is sort of inconsequential, in a sense, because the method that might get used to do such a closure is going to have a ton of uncertainty involved in it, and so all of this second and third decimal place discussion is irrelevant when you start to consider the uncertainty that's going to be involved in just trying to zero-in on a management action that's going to get you to the Step 1 reduction that is necessary, and so that's my hand grenade. Sorry to drop it in now.

DR. NESSLAGE: No, it's an excellent hand grenade, and I don't disagree with you at all. However, as Chair, I am looking at an agenda that I was presented by council staff, theoretically coming from the council, and we serve at the pleasure of the council, and we were asked to review an assessment, and we were not provided with a whole bunch of different options or management strategy evaluation, and we were given a standard assessment, and we were asked to provide an ABC.

Mel, you're on, and, Steve, you're on. If we are being relieved of that responsibility right now, and we can have more time to discuss these broader issues that are of great importance to this stock and to the council, then that's fine, but I would like to hear from someone much higher than myself

that our responsibility has been lifted before I say we table this. I think there's a lot to discuss, and we can provide some scientific advice to the council, but, if that's the real question -- Go ahead, Mel.

MR. BELL: Thanks, and I'm sorry for how long this is taking and all, but it is really important, and, as I said yesterday, it is important enough that, me personally, and not speaking for the entire council, but I would be fine with tabling this, or basically allowing more time for you guys to work through this, because you were thrown some curves yesterday that you weren't expecting, relating to other options and things, and so it's just --

As Erik said, that's the first step, and it's a big deal, and this whole fishery is a big deal, and so I am personally fine, and, in terms of the schedule and how we would work this out, I will kind of defer to John or Chip, who are kind of paying attention to what all we're trying to cram into this meeting for you guys, as well as the overall schedule, but I am comfortable with allowing more time for you guys to deliberate through this, myself. We can run it by Steve or John as well, but I am not in a hurry to -- I will use the term rush to something that might end up needing to come back to later, and so, if more time would help, I am fine with that personally, but that's just me.

DR. NESSLAGE: Thank you, Mel. Steve.

MR. POLAND: Thank you, Genny. I mean, I agree with Mel. I mean, there's been a lot of discussion yesterday and today, and it still sounds like there's not a lot of consensus, or there was consensus, and you talked yourselves back out of consensus, and all we're interested in, from the council, is getting the best scientific advice for us to base management decisions on, and, if that takes more time, so be it, and we're in no rush to get an ABC recommendation on the stock, and we already have an ABC for red snapper, and so, if it takes another meeting at a later date, like we said yesterday, I'm in support of it, and I think staff is in support of it, and Mel said he's in support of it.

DR. NESSLAGE: Thank you, Steve, and so that's where I -- I just want to explain to everyone why I'm getting mixed messages, because it was my understanding that there was interest in fast action on an ABC at this meeting, and that's why I have given this so much attention, despite all the uncertainties and our back-and-forth, but, if that is the direction that the council would like us to go in, and we serve at the pleasure of the council, I am going to call this now.

We're past 10:30, and we're going to table this. Kyle, you're off the hook for the moment, but I would ask that Center staff, SERO, the council, and council staff, we all -- And myself, that we all work very closely over the next few weeks to figure out what exactly the council wants and needs and how we provide that information to them, so that the stock can be managed well and with the best scientific advice. With that, I would like to take a five-minute break, and, when we come back, I hope we haven't scared Nikolai off and he's still ready to tackle golden tilefish.

DR. KLIBANSKY: Yes.

DR. NESSLAGE: All right. Thank you. Let's do 10:45, if we could, and I will see you all back then. Thank you.

(Whereupon, a recess was taken.)

DR. NESSLAGE: We're going to move on to our fourth agenda item, which is a review of SEDAR 66, the golden tilefish assessment. Please see Attachment 5, which is the actual assessment report, and then Nikolai's presentation, which is Attachment 6, which was circulated last night. Hopefully you've got that. If not, shoot me an email, and I will send it you. Nikolai, I believe you're going to take questions along the way, the same way that Kyle did. Is that correct?

DR. KLIBANSKY: Yes, and, actually, I was only here for part of Kyle's presentation, and so I'm happy to just take them whenever they pop up, but, otherwise, I will probably stop here and there to ask for questions.

DR. NESSLAGE: While Nikolai is working on that, I would just like to remind folks to look at the breakout room assignments and our rapporteur leaders and make sure that you're familiar with which section that you will be assigned to, so that you can notes appropriately and pay particular attention to your section.

SEDAR 66 TILEFISH ASSESSMENT REVIEW

DR. KLIBANSKY: Thanks, everyone, for being here for the main event for this SSC meeting, my South Atlantic tilefish assessment. I'm going to go through -- This is just a brief table of contents that I have for this presentation that summarizes what's in the presentation, and, also, all of the blue text in the presentation links to either different sections of the document, such as here, and so you can jump around pretty easily, or also it links, in some cases, to online documents, like the assessment reports.

I'm going to go through a brief introduction and talk a little bit about the assessment history and the management history, and we'll go through the data that supplies the assessment, six parameters, and also data that are fit in the assessment. Then we'll get into the assessment model itself, and I'm going to be talking about the methods and results for each of these sections together, and so we'll go through the assessment model, methods and results, and then uncertainty, MCBE analysis methods and results, and then the sensitivities, retrospectives, projections, and then just some brief conclusions.

The first assessment for this stock was in 2004, and these are the dates that the reports came out, and so, in 2004, the benchmark report came out for SEDAR 4. It was redone in 2011, with the SEDAR 25 standard assessment. Then the most recent assessment used for management was the 2016 update to SEDAR 25. Kyle did an update in 2017, updating the model, which was also not used for management, and that brings us to the assessment today, and so the work today is largely based on the 2016 and 2017 update.

As of the last assessment, South Atlantic tilefish was not overfished, but it was undergoing overfishing. This table below summarizes the results for the different assessments over time, and it also presents the values of M and steepness used in those assessments, and so, for all of these assessments, at least at the end of the assessment, the stock was not overfished, but, in a couple of cases, it was found to be undergoing overfishing, including the last assessment, as we mentioned. These footnotes here just note that the characterization of MSST has changed through time, and so it's not directly comparable.

There is a pretty detailed management history, as usual, in the assessment report. This is actually linked right to that section, if you click on it, and this is Section I.2.6, which I did not write, and so I'm not really the expert on this, but I wanted to just kind of briefly go over the management history and try to characterize how we might think about it for reviewing the assessment, and we're just going to look at commercial management history on this slide.

Commercial landings reported for SEDAR 66 go back to 1962, but were just there at really low levels, and so management actually really began in 1994, with the beginning quotas and retention limits. The quota at that point is pretty high, about one-and-a-half million pounds gutted weight, and so it's not being met at that point. The SEDAR 4 report comes out in 2004, showing that the stock is undergoing overfishing, and, in 2006, the commercial quota is reduced to 300,000 pounds, and so a lot lower than where it had been. The quota was met in 2006, and the season closed at the end of October in 2006, and so that sort of enters the second period of golden tilefish.

In subsequent years, the quotas have tended to be met, and it went up after SEDAR 25, which showed the stock not undergoing overfishing, but, at any rate, after that 2006 point, quotas have typically been met, and the seasons have been reduced to only part of the year, and so that's relevant in kind of interpreting some of the landings history later and thinking about the indices, and so there's also these retention limits, and there is no size limits for this stock. That helps to get some detail after thinking about red snapper for so long and transitioning to a completely different stock.

With regard to the recreational management history, landings were reported back to 1981, and management begins in 1994, with retention limits, and the quota goes into place in 2011, and, after the SEDAR 25 report comes out in 2011, the recreational quota is actually increased, and so, in most of the years from 2011 to 2018, the quota has been reached in the recreational sector by somewhere between usually June to August. That's all I have to say about that.

This is just a graphic to note the stock area, and the stock unit is from the Virginia/North Carolina line to the Gulf Council boundary, and the data, where necessary, including Monroe County, Florida.

We've been working on this assessment in earnest from November of last year on, and there was certainly a lot of data work prior to that. We had our assessment data workshop in November, and there were several webinars from December to February, and then we've been working on the report from March to April, just to give you a sense of the assessment schedule.

Now we'll move on and start looking the data that the assessment is being fitted to, and so this is not necessarily all the data that were provided, but these are the data time series used in the ultimate assessment model, the base model, and so we have three series of landings, commercial handline, commercial longline, landings for the entire time series from 1972 to 2018, and the recreational landings from 1981 to 2018. There are two indices, the commercial longline index from 1993 to 2006 and then the MARMAP longline index from 1996 to 2016, but, as you can see, there are intermittent years here.

There are three sets of age compositions, and so we have commercial handline and longline age comps, which are available for intermittent years, and then the MARMAP age compositions that

are associated with the MARMAP index, and then, finally, we just have one set of length comps that we're using for this assessment, which are the recreational combined length comps, primarily to get a selectivity estimate for the recreational fleet.

Here we are looking at plots of those indices of abundance, the commercial longline in red, with light-red error bands, and MARMAP longline is the blue and light-blue error bands. Those error bands are based on the CVs provided by the data providers, and I will note that those error bands are used both in fitting the assessment and also the uncertainty analysis, and you can see pretty clearly that the error around the MARMAP index is a lot larger than the error around the commercial longline index, and so the assessment is going to tend to fit the commercial longline index a lot more closely, and, if you haven't read it by this point, there's working papers for both of these indices, one by Eric Fitzpatrick for the commercial longline index and one by Wally Buble and Tracey Smart for the MARMAP index.

Here, we're starting to look at the different series of removals, and there's two series for commercial, which I talked about before, and this is commercial handline in red and commercial longline in blue, and you can see that commercial longline has made up the lion's share of the landings over time. In this case, the CVs that are used to generate these error bands are actually the same CVs that are used in the assessment model to fit and also the uncertainty analysis, which we'll talk about later, and we often have larger error bands for the uncertainty analysis, but, in this assessment, this is what was provided, and so it's a pretty tight CV for the commercial landings.

Now this is the recreational landings, all combined recreational landings, which, in this case, for this assessment, does not include headboat landings, which were negligible, according to Eric Fitzpatrick, who is a team member on this assessment. Note this pretty high point, this first point in 1981, and then the landings are much lower for the series after that. Despite this high point, recreational landings make up a fairly small component of the overall landings for this stock. In this case, these CVs are just used for the uncertainty analysis, and the landings are fit pretty tightly in the assessment model, or matched, if you want to think of it that way.

I am mentioning discards for completeness, but discards were not used in this assessment. They have not been modeled in previous assessments, previous tilefish assessments in the South Atlantic, due to negligible rates of discarding. We, of course, have examined the sources of discards and determined, after talking to different sources, that commercial discards are negligible, headboat at-sea discards were also pretty small, and then discards from other recreational modes were negligible, and this was reported in this Nuttall and Matter working paper. This isn't really at the end of anything in particular, but is there any questions up to this point? I said I would stop for questions.

DR. COLLIER: I'm not seeing any hands, Nikolai.

DR. LANEY: I did have a quick question, Nikolai. The lack of discards is attributable mostly to the fact that there is no size limit, right? I mean, pretty much everything is retained on the commercial side, and then there just isn't that much recreational fishing for the species, right?

DR. KLIBANSKY: That is my sense, but I'm definitely not the expert on that, but, yes, there is no size limits for the stock. I think, also, they're not catching too many really tiny tilefish out there.

Now we're just going to look at kind of a summary of what was done with age and length compositions. We did have three sets of age compositions and a set of length compositions. For commercial handline and longline, we're fitting to ages one through twenty, with a plus group, and ages one through sixteen for MARMAP longline. We did filter out some of the data, and we only years where there were greater than or equal to five trips and greater than or equal to twenty-five fish, to kind of thin out some of the comps that were just not very informative, and then, also, we excluded 1996, 1997, and 1999 from commercial longline age comps, which was done in the 2016 update.

The length composition data, we're fitting lengths from 350 to 1,000 millimeters, and we excluded those same -- We excluded years for the same reason, if there were too few trips or too few fish, and that actually removed a bunch of years of length comps, and the length comps are just much thinner, which there is not as much information as a lot of the age comps. We considered commercial length comps initially, but early runs showed some conflict between commercial age and length comps, and, in that case, we generally go with the age comps, which tend to be a better source of information and so they are excluded at the moment.

Getting into life history information, these are -- Some of these are typical things that we find in an assessment model, but others are sort of unique to this assessment. We have the conversion between length and whole fish weight here, which is roughly a cubic function. Weight is roughly a cubic function of length. We incorporated the relationship between whole fish weight and gonad weight, which is really included for characterizing spawning potential, because, instead of just using total spawner biomass, or female spawner biomass, we're actually using gonad weight, and so gonad weight of mature females.

If you look at this equation, the exponent is about 1.7, and so it's suggesting that spawning potential is actually like a hyperallometric function of weight, and so heavier females are contributing more to spawning than lighter females, which kind of has a similar effect on the assessment as if we were using fecundity, but it's in gonad weight units instead of egg units. Then, finally, the time at peak spawning is May 31. About 42 percent of the way through the year is when spawning occurs in the model.

We have two growth curves in this model. The population growth curve is both sexes combined, and L_{∞} is about 825 millimeters, and fish are reaching about 75 percent of that by about age-seven, and so most of the growth is happening by about age-seven, according to this growth model. We also have a female growth model, which is used, again, in computing spawning stock biomass and, ultimately, gonad biomass for females. It's a pretty similar relationship to the relationship for males and females, but L_{∞} and K are slightly lower. Interestingly, the females reach about 75 percent of that L_{∞} by age-six, and so they're not getting as big, but most of their growth is occurring just a little bit earlier.

This is the proportion of females that are mature by age in the stock, and our maximum age in the stock is forty years, but we see that 10 percent of females are mature by age-one, and 100 percent are mature by age-four, and then, of course, they're all mature above that.

The natural mortality-at-age vector used in this assessment is drawn here, and it's this solid-black line with the black dots, and that's used in the base model, and blue is -- The blue-shaded area is

showing the uncertainty around M that's incorporated into the MCBE analysis, and I will just note one kind of error that's been pointed out to me, and this value of M equals 0.1038 is the correct value that's been used in this assessment. Wally Bubley was kind enough to point out to me, actually twice, and I failed to completely correct all of my errors in the assessment report, and it's correct now in several places, but there's a couple of places where I think I have a typo in this value, and so just note that this is the correct value.

With regard to how this differs from the previous assessment, the life history information is the same as in the 2016 update, and so all of that that I just went over is the same. I guess I should say with a very sort of minor exception of the range in natural mortality values used in the MCBE, and it's slightly narrower now than it was in the 2016 update, but the life history information for the base model is all the same.

Other differences in data structure from this model to the previous assessment, of course, there are added recent years of data, from 2015 to 2018, and we have a later start year in this assessment. It's now 1972 instead of 1962, which was changed based on observing that there was really limited data between 1962 and 1971, including landings. The MARMAP longline index is now estimated for individual years, as opposed to five-year averages, as it was in the 2016 update, and those details are written up in this working paper.

The commercial longline index is truncated now to end in 2006, due to changes in the regulations that I talked about that reduced the duration of the fishing season, and it changed fleet behavior. We had a lot of really good discussion about this during the November workshop, and we had some really good input from members of the industry about how that affected fishing after those regulations took place.

We excluded, as I mentioned, length composition information for the commercial sector, which conflicted with age composition data, and we used different ranges of ages for fitting commercial age comps and MARMAP age comps, and so it's a pretty comprehensive set of differences between this assessment and the last. Now, moving on to the models -- Are there any questions up to this point?

DR. COLLIER: I am not seeing any hands raised right now.

DR. KLIBANSKY: Okay. Great. For this assessment, we used a model coded in ADMB. It's a catch-at-age model that we use in most of our assessments in the Beaufort Assessment Model. We started with the most updated version of that, and that was the 2017 update that Kyle did, which is just a little different than the 2016 update used for management, and, as I mentioned before, the timeline for this assessment is 1972 to 2018.

Just to briefly describe the configuration of the model, we have this age-structured life history, and these are all sort of bits and pieces that go into that. Life history, we have landings time series that's pretty much matching -- There's a very low CV on there, and so the model can vary a little bit from the observed landings, but just by a very little bit, and we do fit the indices of abundance, and we fit age compositions and length compositions, estimating recruitment deviations, estimating fleet-specific mortality, both average values and a time series of deviations for each of the fleets, and we're estimating Beverton-Holt stock-recruit parameters, selectivity functions

associated with the landings and indices, and then we're calculating biological reference points and stock status estimates.

Just a couple of notes on the initialization of the model, and fishing mortality in 1972, the F init value, is fixed at 0.01, the same value as was used in the 2016 update, and we explored different values in a sensitivity analysis that I will talk about later. Deviations from the equilibrium age structure, at the very beginning of the model, are fixed at zero. We did some early runs where this was not fixed, and those deviations tended not to be different from zero, and so we just basically fixed those and shut that off, and, again, it increases parsimony in the model.

We're using the Beverton-Holt stock-recruit function. Of the parameters in that function, R_0 , the unfished age-one recruitment, is being estimated. Steepness is being fixed, as in the previous assessment, and the σ_{rec} value is also fixed, which is a change from the previous assessment, although, in the past assessment, it was fitted, or was estimated, but with a really informative prior.

We estimated recruitment deviations for as many years of the available data, age data, would support, and the length data didn't tend to provide too much information in recruitment, and so we had age composition data from 1992 to 2018, and most of the commercial ages, which is where a lot of the data is, is age-six to fifteen, and so we ended up estimating recruitment deviations from 1982 to 2011, and there were no additional constraints on recruitment, and so just a note that recruitment was computed directly from the stock-recruitment function outside of those years, and so before and after those deviations are estimated, and that's standard when we do that in our assessments.

DR. COLLIER: Nikolai, it looks like Fred Serchuk had his hand raised.

DR. SERCHUK: Sorry, Nikolai, but I'm a little bit in the slow group. Can you tell us -- I understand you are reviewing the assessment now, and it goes through 2018, I believe, but have there been any sources of data that are either less reliable or have been lost in the past couple of years because of the pandemic, do you know? I know this will affect future assessments, but I'm just wondering.

DR. KLIBANSKY: Are there data sources that will be affected by the pandemic?

DR. SERCHUK: Either lack of sampling or no data whatsoever from a source that was provided in the past.

DR. KLIBANSKY: You know, nothing comes to mind. I mean, I know it's been a big issue with like survey sampling, but we're not relying too heavily on the chevron trap survey -- Not the chevron trap survey, of course, but the longline survey, and I don't actually know how that affected that survey that sort of operated in intermittent years, and I assume that it didn't operate in 2020, but I don't think so, because a lot of our data is coming from -- A lot of our data is coming from the commercial sector, but I guess I can't speak to that, and I'm not sure.

DR. SERCHUK: Okay. I appreciate whatever information -- The information you provided now. Thank you very much.

DR. KLIBANSKY: Erik Williams.

DR. WILLIAMS: I was just going to add, Fred, and that's a good question, and, actually, in this case, we may actually be adding data, and so we, last year, piloted a study for a new deepwater longline survey, and that is going on again this year, and we're hoping to expand it, and so that actually we are hoping that we'll get a new fishery-independent survey that's going to provide information for golden tilefish going forward.

DR. SERCHUK: Wonderful. Thank you, Erik.

DR. KLIBANSKY: Thanks for that, Erik. I mean, one of the bits of information that we have been losing, and not due to COVID, but just because of regulations, is that commercial longline index, which, as I mentioned, ends in 2006, because of changes in regulations, and so that will be critical, and that may be too strong of a word, and I don't know, but to get that new survey information.

I'm going to move on to talking about selectivity, and so we're estimating logistic selectivities, in all cases. We did consider, in the assessment process, and investigate some dome-shaped selectivity for a couple of fleets, but we found that the information in the model just wasn't there to inform the descending limb and those dome-shaped selectivity functions, and so we ended up with logistic selectivities for all of these fleets.

There were two time blocks for commercial handline and commercial longline, which are -- I reiterate that they're not due to any change in size regulations, as we often have size regulations that change selectivity, but, in this case, they're due to changes in 2006, with the decreasing quotas and the changes in seasons and how that affected fleet behavior. We just have the one time block for recreational landings, from 1972 to 2018, and then one selectivity block for the MARMAP longline survey.

Just a couple of points on how this model configuration differs from the previous assessment, and I mentioned the Beverton-Holt rec sigma is now fixed, and the selectivity of the commercial handline and the commercial longline are now in two time blocks, and they were just in one time block before, and the length and age compositions are fit using the Dirichlet multinomial likelihood, in contrast to the robust multinomial likelihood used for the 2016 update, and we're now just modeling out to ages-one to twenty in the population, compared to ages-one to twenty-five in the 2016 update, and, if I didn't mention it before, part of the reason, the main reason, for producing the number of ages that we're using to fit age comps and modeling is just based on the few individuals that we're actually seeing in the data at those older ages.

Now I'll move on to results of the base model. The commercial longline index generally fits the data well. It underestimates these last two years, but, otherwise, it's a pretty good fit, and this is the fit to the MARMAP horizontal longline survey index, and it's not a great fit, but, again, the CVs, which are here, which are drawn as these vertical purple lines, are pretty large, and so the model isn't having, in a way, such a strong incentive to fit those too tightly, and, as I will show later, we did experiment with and investigate sensitivity of the model to this index when we upweighted it, and also downweighted it.

Here are fits to age and length compositions, which are generally pretty good, and this is commercial handline from 1997 to 2015, and this is the rest of those handline ages, and then

commercial longline ages from 1992 to 2008. This is commercial longline ages from 2009 to 2018, and then MARMAP longline ages from 1997 to 2007. This is the last of those survey ages and then the recreational length comps. The recreational length fits are not great, but, again, the sample sizes are not very large. The sample sizes are the number of trips, and they're looking at anywhere from six trips to nineteen trips for any one of those years.

We'll start looking at the estimated selectivities. These are the two commercial handline landings selectivities, and, as usual, the year, put alongside each one of these, is just indicating the first year of that selectivity block, and so blue is the first block, which started in 1972, and the second block starts in 2009, and so that second block is shifted slightly to the right, to older ages, and handline landings, in the handline fleet, the age of first selection is around age-three, with full selection around age-nine.

For commercial longline landings, that second block is shifted about a year to the right, about a year older ages, and fish are first selected around age-five, with full selection around age-eleven, and so a bit older fish in the longline landings. Recreational landings are a bit younger than the commercial landings, which age at first selection is around age-three, but then age at full selection is around age-five. MARMAP longline selectivity is actually pretty similar to the selectivity for the commercial handline, with first selection about age-three and full selection around age-nine.

This is the stock-recruit curve, and you will recall that only the R zero parameter here is being estimated. Now we'll look at the estimated landings, looking at each fleet as a proportion of the total landings, and, again, you can see that commercial longline makes up the bulk of the landings for this stock, and this pink color is the recreational, and it's, again, generally a pretty small proportion. This larger rectangle here is that 1981 point.

We have kind of a major peak in 1982, and smaller peaks in 1993 and then in 2000, and low landings here, and then it increases after about 2003. We can kind of compare that to the F time series, and you see commercial longline being the major source of F. That 1982 peak is relatively low, when you look at it in terms of F, compared to later peaks. The 1993 and 2000 peaks are higher, as the stock declined. That F is relatively low here, from 2007 to about 2011, and recall the SEDAR 25 report comes out in 2011, and it increases the quota, and we see an increase in F from 2012 to 2017, and then a decline in this last year.

This is the spawning stock biomass time series, and so it drops considerably in the 1980s, down to a low in the mid-1990s, and it kind of stays there until the early 2000s, and then it increases to a peak in 2011 and then declines and kind of levels off at the end here.

Looking at numbers-at-age and biomass-at-age, you can see that the proportion of older ages decreased, along with a decline in SSB, or gonad weight, rather, as I showed in the last slide, and then it's been increasing again. The numbers and proportions-at-ages, those older ages, are expanding again after about 2000.

Looking at the recruitment time series, we don't see much of a long-term change in recruitment, increase or decrease, like we do in some stocks, at least based on my eye, and I didn't see anything, but recruitment has really gone up and down a bit over this time period, with peaks in 1987 and again in 1998, and there are these low points in 1983, 1996, and 2007.

It's going up and down, and so no obvious increase or decrease, but you can kind of see a similar thing in the recruitment deviation, and I think it's worth noting where we are now, and the recruitment was not estimated beyond 2011, but these last seven years where they were estimated, 2005 through 2011, were a period of relatively low recruitment, lower than expected recruitment, based on the stock-recruit curve, and so they're going up and down, but there's also autocorrelation, and they're kind of high for a little while and low for a little while and so on.

This is a table from the stock assessment report, which, actually, I think in my version of the presentation, I updated it, and it is now -- If you're looking along on your version, you might have a slightly older version of this table, but this is the exact table from the actual report, Table 18, which, actually, this is hyperlinked to that table, and so, if you want to go to it, you can.

This shows the results from the assessment model and then the median standard error, and then I added the 25th and 75th percentiles from the MCBE analysis, and I added those percentiles because I was kind of looking at some of the plots, and I thought it was just helpful to get a sense of like where that middle 50 percent of the runs is landing, because sometimes, when you look at those 95 percent confidence intervals, as we'll look at in a couple of the later plots, we've got to figure like how much of the data is at those more extreme values. Just to note some of the main results, the MSY is 518,000 pounds gutted weight. The FMSY is at 0.297, and, again, the stock is not overfished and not undergoing overfishing.

I see no hands raised at this point, and I'm going to move on and talk a little bit about the uncertainty analysis, this Monte Carlo Bootstrap Ensemble, and so this is a process where we are randomizing data inputs and fixed parameters that go into the assessment model, not all of them, but just some of the major inputs, and then we rerun the model many times and use those estimates to estimate uncertainty in the model, and so, in this case, we randomized inputs, and we developed 4,200 sets of these randomized inputs and then ran the full assessment model every time, and then we take all of those outputs and combine them and summarize them to characterize uncertainty in the base model and projections. Just to make it clear that the uncertainty from the MCBE goes into the projections, and so that's where that projection uncertainty comes from.

The things that we did vary and then put into the MCBE was we resampled landings from a lognormal distribution with values provided by data providers. As I mentioned earlier, in this case, the only values that were different from the base model that we used for fitting were for the recreational landings, and so there's not additional uncertainty from the commercial landings to the MCBE.

We did the same procedure for indices, resampling from lognormal distribution, and we resampled the actual length and age composition data with replacement, so that it was bootstrapped. Natural mortality is a parameter that we often do Monte Carlo draws from. In this case, we sampled from a uniform distribution from a value of 0.08 to a value of 0.14, and then, in each case, we used that value to rescale the age-varying M , and so this different value gives us the whole different vector of M -at-age.

Steepness was fixed in this assessment, and we resampled steepness from a beta distribution from Shertzer and Conn, and there's a link here, if you want to go and look at that paper, but that's the distribution we often use for those situations, and then we used this truncated normal distribution to resample rec sigma values, since rec sigma was also fixed in this assessment.

I will note, and it's not anywhere on the slide, but I will just note, also, that, following the MCBE process, we often go through a filtering process, and so we don't necessarily use every run, because sometimes some of the runs come out with pretty extreme values that are just not believable, and so, in this case, the filtering criteria were based on what was done in the previous assessment, and so there were -- Of those 4,200 trials, there were 4,050 that were ultimately retained to characterize uncertainty, and the other runs either had a gradient that was too large or unrealistic values, very high values, of F status, and anything over six was filtered out, or large values of rec sigma.

We also did a check on all these runs, to see if any of the parameters were hitting bounds, and, actually, none of the parameters were hitting bounds on any of these runs, and so I thought that was somewhat reassuring.

This is the result of the time series of stock status and F status from the MCBEs. The solid-black line is the values from the base run, and the dashed lines are the medians from the MCBEs. The gray area is showing that 95 percent confidence band around that median MCBE value, and so a fair amount of uncertainty, largely from natural mortality, and steepness is manifesting itself as uncertainty in the results.

This is looking at individual -- Values from all those individual runs, and so these gray, somewhat transparent dots, with the F status value on the X-axis and the SSB status on the Y-axis. This green crosshairs is just showing the estimates from the BAM base run, and the length of those crosshairs is the 5th to 95th percentiles of the MCBE runs, and so we have pretty uncertainty in the terminal status, and this is the value from the base run, but the number of runs saying that the stock is not overfished and not undergoing overfishing, agreeing with the base run, is about the same as the number that are saying it is overfished and undergoing overfishing.

It's about 49 percent, compared to about 42 percent, and so there's definitely more agreeing with the base model, but a lot that are not. I think part of that is that the base run status is pretty close to one in each case, and then also the uncertainty in all those inputs. These are density plots for SSB and F status. I am going to move on to the sensitivity analysis, and I don't see any hands raised at this point.

We investigated several things that we talked about during the assessment process to investigate the effect on the model results, and we looked at runs with high and low estimates of natural mortality, higher and lower values of steepness, and we looked at a couple of higher values of F init, which was already quite low, and so there was no need to go lower than that, but there are two values that were associated with relevant points in the likelihood profiles that we did of F init, and we downweight and upweight the MARMAP longline index by a factor of ten in each case, either going to one-tenth of the weight of that index or ten-times the weight of that index.

Then the final sensitivity run was using an alternative recruitment estimate for years at the end of the assessment, and so I talked about how, in those last years, from 2012 to 2018, where recruitment deviations were not estimated, we usually just go with the estimate from the stock-recruit curve for those years, without it estimating a deviating, but, in this run, we came up with an approach where we used geometric mean recruitment deviation from the last six years where recruitment deviations were estimated and applied that to the stock-recruit curve, and so we had

this average recent recruitment deviation added to the value that you would get from the stock-recruit curve.

Looking at low and high values of natural mortality, it tends to be pretty sensitive to this, which is what we usually expect. A higher M corresponds to higher stock status, and a lower M corresponds to lower stock status. Also, it's fairly sensitive to steepness. The higher steepness corresponds to a higher stock status, and a lower steepness is a lower stock status.

These are the two runs where we looked at higher values of F init, and you do see some notable deviation, divergence, from the base run early on in the time series, but, by the end, they're pretty much -- Despite changing that F init value, they're pretty similar to what we get from the base run.

With regard to downweighting or upweighting the MARMAP longline index, the model is not very sensitive to downweighting it, which you see this red line, but it was fairly sensitive to upweighting it, and so, when you upweight it by a factor of ten, you see a lot more variation in recruitment and a lot more variation in the relationship between F and $FMSY$, the ratio, and, ultimately, lower stock status, and I think that the model is using that recruitment to fit the MARMAP index better, which is why you get a lot of that variation.

Then, when we look at this run with that alternative recruitment, you can see what that alternative recruitment looks like in this bottom-right panel, and it's tending to be much lower than the values from the base run, which are based on the stock-recruit curve, because these recent recruitments are lower, as I mentioned earlier. Then that tends to drive biomass and stock status lower. I don't see any hands raised, and I'm going to move on to talk about retrospective analysis.

These methods are very similar to the sensitive analysis, but, in this case, we're just truncating the data in the model to new terminal years between 2010 and 2017, and then we just rerun the model with the truncated data, and we're looking for patterns in the terminal year values for F status, stock status, and biomass, and then we often do the same thing for recruitment, but, in this case, and in the report, we actually sort of emphasized the last year that recruitment deviations were estimated for the recruitment series, rather than the actual last year, since there were so many years at the end where recruitment wasn't estimated, or recruitment deviations weren't estimated.

What I'm talking about there is all these colored points are the terminal years for these top plots and the bottom-left plot, but the colored points are actually the last year that the recruitment deviations are estimated for these particular runs, and so we don't see any substantial over or underestimation in those terminal year estimates for F or SSB status or biomass.

We do see some underestimation, and I'm actually going to move this next plot, and it's sort of easier to see this, but it's just the zoomed-in view of the end of those retrospective plots. You do see some underestimation, or that the retrospective runs estimate lower recruitment than the base model does, once you get past the terminal years of 2013 to 2010. By that point, there's a fair amount of data that's removed, and so I don't know that that's any concern, but we are taking these retrospectives back a fair bit, and so, by that point, we've peeled off a lot of the recreational length comps, some of the recent years of the MARMAP index and length and age comps, and then a decent amount of the handline age comps, and so, by that point, a fair amount of data is removed.

Then I will move on to projections, and the projections that are completed here are the ones that were specified in the TORs. There were projections made out to 2027, with projected fishing level changes beginning in 2022, and fishing mortality for those years prior to management. 2019 to 2021 were set at F current, and so, for determining an OFL, the two runs that are really very similar are F based on a P^* of 50 percent or F at FMSY, and then, for determining the ABC, F based on P^* of 30 percent or 75 percent of FMSY. This is just, as I mentioned, for all scenarios, F equals current from 2019 to 2021, and then it's changed to these different values from 2022 to 2027.

This is really for your reference, and it's just a legend for the plots in the next few slides. This is for the first run, and F is a P^* of 50. One thing that you might notice is -- Well, I guess I should explain that solid line is the base model values, and the dashed line is the median from the MCBEs, and then the gray area is the 5th to 95th percentiles associated with MCBE. The blue line is MSY-related quantities, and the dashed-green lines are associated with the median from the projections.

One thing you will notice is that the median from the MCBE does sort of diverge from that value from the base run, and it kind of decreases over time, and I think that might be that one element of these projections is that, because there are so many years at the end of the assessment where we're not estimating recruitment deviations in the projections that you actually add variability to the age structure at the beginning, and the projections do account for that constrained recruitment, and so I think maybe that that divergence has something to do with that, and I'm not totally sure. I see that Fred Serchuk has his hand raised.

DR. SERCHUK: I had a question, because, obviously, you have to assume four years of assumed fishing mortality, or three years, from 2019 to 2021, and do we have any indication, from speaking with people in the industry, that, because of COVID, that fishing activity was reduced in a significant way, because of that, particularly last year, and perhaps the beginning of this year?

DR. KLIBANSKY: I haven't heard that. Somebody else hopefully can answer that, but my sense was that COVID restrictions didn't tend to impact some of those commercial boats as much as the headboats and charter boats, but I don't know if someone else knows. I don't know who we have.

DR. SERCHUK: I am just trying to see whether the assumption was -- If the average fishing mortality applied for those years was realistic or may be too optimistic or too conservative, but, if you feel that there was really no significant change in the operation of the fishery, then your assumption was probably realistic. Thank you.

DR. KLIBANSKY: Thanks. That's a good point, but I see Walter B. has his hand raised.

DR. BUBLEY: Fred, in 2020, the way the tilefish fishery is going, at least commercial, they have reached their quotas well before -- In 2020, it was well before, really, March in that year, and so it probably wasn't affected at that point, and then, this year, I think they reached their quota pretty quickly again, and so, at least in terms of the commercial longline fishery, I don't think it had much of an effect.

DR. SERCHUK: Thank you for that.

DR. KLIBANSKY: Thanks, Wally. I didn't realize that Walter B. was you. Okay, and so we looked at the results for F at a P^* of 50, and it's very similar when F is set at FMSY, and this is

the F at P* of 30, which is very similar to 75 percent FMSY, and so, as expected, when you cut fishing mortality more, the spawning stock grows more quickly, and then these tables I put in here are kind of for reference, and I don't think we need to look into much detail in here, but these are also the same tables from the report, Table 20, 21, 22, and 23.

I just have one slide of conclusions, and just to recall that the assessment is indicating that the stock is not overfished and not experiencing overfishing. The probability that SSB is greater than MSST exceeds 50 percent in all years of all the projections. We do see a fair amount of uncertainty in stock and fishing status at the end of the assessment, and so there is some reason for caution there. Also, I will just point out, as I mentioned before, that recruitment is low at the end of the assessment, and it could be problematic if the trend continues, although we certainly have no indication of that at this point.

It's also always kind of problematic that it's hard to estimate recruitment very close to the end of the assessment, and so those deviations that were low are also going back still to 2011, and so we just don't know too much about recruitment past that, and one point that challenges us for the next assessment would be the limited abundance index information beyond 2006, and that was a challenge for this assessment, and that's not going to change, at least in the data sources we have, though, as Erik Williams was mentioning, it sounds like we may get some reprieve from a new survey coming online, and so that's my last slide, and I will take any more questions. Thank you.

DR. NESSLAGE: Thank you very much, Nikolai. Excellent presentation. Are there questions for Nikolai? Are there questions about the South Atlantic tilefish stock assessment for Nikolai? We will narrow the scope. Fred Serchuk.

DR. SERCHUK: I have another question. Given the survey that Erik indicated was taking place, would it be appropriate for forestall the next assessment until there were, perhaps, three or four or five years' worth of data from that survey, which could really shed some very interesting light on the status of the resource? That's just a question. Thank you.

DR. KLIBANSKY: I don't know exactly how to answer that, and I think it's an interesting thought, and I certainly think it would be worth thinking about where we'll be with regard to data in the next four years, just with the given abundance indices that we have, because I don't know that we're getting any more data from the MARMAP longline, and I don't think that we would be able to use the commercial longline index for the next bunch of years, and so I feel like answering that is sort of above my paygrade.

DR. NESSLAGE: Could you just repeat -- When do we anticipate having the first year of data from that survey?

DR. KLIBANSKY: I don't know, and I think Erik was saying pretty soon, Erik Williams.

DR. NESSLAGE: Sorry, Erik. Go ahead, if you could answer that.

DR. WILLIAMS: I think, if everything goes well, I think this year could be the first year of data, full year of data, that we have, and Fred is right that it's one of the many factors that go into scheduling these assessments, is consideration for new data sources that might be coming online,

and I think John Walter mentioned yesterday about red snapper, and we're going to have the lesser red snapper count, or whatever we're calling it.

The South Atlantic red snapper count data will probably be coming online, I'm sure, and, as soon as that's available, the next logical step would be to schedule another red snapper stock assessment as well, and so, yes, I think the answer to Fred's question is, yes, there is some strategy to be employed here, in terms of scheduling the next assessment and how this data shakes out that's coming online.

DR. NESSLAGE: Excellent. Thank you. Alexei has a question.

DR. SHAROV: I have a few, but I was holding them up. Anyway, I will try some. As I recall, there was no size limit for both the commercial and recreational fisheries, and is that correct?

DR. KLIBANSKY: Yes, that's correct.

DR. SHAROV: But the age at full selectivity, in the commercial and recreational, differs quite a bit, by three years, I believe, but do you know why that is?

DR. KLIBANSKY: You know, I'm not entirely sure, because, actually, we did have some discussion, and my thought would be that it is based on where they're fishing, and so like this is a recreational selectivity, and then, if you look at the commercial longline, it's much older fish. My sense, from talking to members from the industry, I think at the workshop, where the recreational fishermen have access to a lot of the same waters as commercial, but maybe that was primarily in Florida, where the shelf is really narrow, and so the quick answer is I'm not sure why it would differ that much, other than to hypothesize about the difference in where they're fishing.

DR. SHAROV: So there is no -- I wonder if somebody had suggested an explanation of the commercial guys, because they are professionals, they are selecting -- Based on their knowledge, they are selecting areas where they do know that they will get a larger fish, probably of a higher commercial value, or, and I apologize for suggesting such an explanation, but there could be discarding or highgrading, and that's purely theoretical, in a sense, and so what can create that difference, but I was wondering what are the actual explanations from the field, from people that know the biology and the fishery.

DR. KLIBANSKY: I don't know, and I can say that, with regard to commercial discarding, and I know that it was looked into in fair detail, and it's not that nothing was reported, but what is reported is very minimal, and so I don't know that there is -- I haven't heard any suggestion that the discards are being underreported by the commercial sector.

DR. SHAROV: Okay.

DR. KLIBANSKY: Of course, that would be hard to know, but --

DR. SHAROV: All right. A few more, quickly, and you can choose to just ignore them or give a quick answer. The recruitment deviations were not estimated past like 2011 and 2012, and why is that? Is it because the -- Well, the fish have not been seen enough, in terms of their age structure, in the index?

DR. KLIBANSKY: Right. It's that not enough fish from those age classes are in the age composition data to really be able to say what -- To get a recruitment signal for those age classes, because they are recruiting to --

DR. SHAROV: Then, for your MCB runs, were you doing the resampling from distributions from a number of parameters, and all of those, obviously, were assumed to be independent, right?

DR. KLIBANSKY: That's right, and so we don't have the same covariants between steepness and natural mortality, for instance, but we do filter out extreme runs, which hopefully compensates for just a really bizarre combination of parameters.

DR. SHAROV: Right. Lastly, and I hope that it will be useful to everybody, but what does the ensemble in here actually constitute in this approach?

DR. KLIBANSKY: Well, I mean, it's an ensemble, in that we actually are taking -- In this case, it's 4,050 runs, and we're combining those results to get those -- To get the median and percentile, and so we're using all of those runs. It's basically an ensemble of 4,050 runs, which, in a sense, they're fully weighted to estimate these different quantities, and so the term "ensemble" is used variously, and, in some cases, you're only varying parameter inputs, and, in some cases, you might be varying the actual structure of the model. In this case, it's an ensemble of runs, where it's just the inputs that are changing.

DR. SHAROV: Okay. All right. Thank you.

DR. KLIBANSKY: Thank you.

DR. NESSLAGE: Thank you. Are there other questions for Nikolai? Jeff.

DR. BUCKEL: Hi, Nikolai, and that was a nice presentation. I'm on a breakout group that's going to be talking about monitoring, and I have a question on the new survey. Will that survey potentially get a signal of recruitment, so you don't have this issue with waiting? Given the age of the fish, when they enter the fishery, you have to wait -- Or you can't use recent years of data, right, and you can't get recruitment on recent years, because you don't have the signal yet, and so is there a potential, and is that something we need to recommend, to get a signal of recruitment earlier that would be beneficial for the assessment model, in terms of younger fish being caught in the survey?

DR. KLIBANSKY: I would bet that it won't, because I think it's a longline survey, but maybe Erik could answer that, unless they're trawling, which I'm pretty sure they're not doing.

DR. WILLIAMS: It's a longline survey that's going to use primarily gear that more or less mimics the commercial fishery, I think with some smaller hook sizes, but it's hard to say whether they will get many smaller tilefish at this point, or younger ones, and my guess is probably not.

DR. BUCKEL: Okay. Thank you.

DR. KLIBANSKY: The only place I have ever seen really small tilefish is like in the Northeast survey, and they get some pretty small tilefish in that trawl. I am not suggesting trawling, by the way, but I'm just noting that.

DR. NESSLAGE: Thanks, Nikolai. Wally.

DR. BUBLEY: I mean, I'm involved with that, and so I can answer a couple of those questions, too. The hook size is slightly smaller than the commercial fishery, at least for golden tilefish, because the fishery is hopefully designed to target more than just golden tilefish, and there's also a relatively shallow-water component that is looking at blueline tilefish and snowy grouper, potentially, and so a smaller hook size might -- Selectivity might shift a little bit, and you're still not going to, probably, regularly get the age-one and age-two fish, but it could shift a little more towards younger, but we really won't have a great idea until a couple more years in.

DR. NESSLAGE: Thank you, Wally. Wilson.

DR. LANEY: Thank you, Madam Chair. Do we get anything at all in the SEAMAP trawl survey in the way of juvenile golden tiles?

DR. KLIBANSKY: I will answer just to say that I don't have an answer for that. I don't know if anyone knows from the SEAMAP survey.

DR. NESSLAGE: Marcel.

DR. REICHERT: Thank you. The answer is no. We don't get any golden tilefish, to my knowledge, in the trawl survey. It's too close to shore.

DR. LANEY: Thanks, Marcel.

DR. KLIBANSKY: I guess I can add that, just from SEDAR 50 for blueline tilefish, we spent a fair amount of time trying to think about where we might -- Data sources that might have information on small blueline tilefish, and so, in some cases, we are looking for sources that had information on very small golden tilefish, and we didn't see anything south of Hatteras. The only places we could find information on really small golden tilefish, or even larval, was north of Hatteras.

DR. NESSLAGE: Nikolai, I just want to go back to a question that Alexei asked earlier. My understanding is that these animals are coming up from such depth that high-grading would be kind of a ridiculous idea, and am I way off-base there? I don't think it's a concern, pretty much, and that's one of the reasons that there is no minimum size either, and I am way off-base in my understanding there?

DR. KLIBANSKY: You mean that you wouldn't expect them to survive?

DR. NESSLAGE: No, and that there's really no issue of high-grading and what's landed is landed. What's caught is landed, and I just wanted to put that idea to rest, because I don't think that's an issue for tilefish, is my understanding.

DR. KLIBANSKY: I guess I thought the suggestion was maybe that they were -- If fish weren't being officially landed.

DR. NESSLAGE: Which would be high-grading, right, or dead discards?

DR. KLIBANSKY: I agree, and I don't -- Like Kevin McCarthy produced some tables that are pretty detailed showing what the reported discards are over time, and like I know it's hard to judge data that are not there, but there just wasn't -- I didn't sense that there was any large missing information there.

DR. NESSLAGE: I think you're spot on. Wally.

DR. BUBLEY: Just to that point, in my conversations with these fishermen a lot over the last three or four years, and it sounds like they're pretty good at targeting the size that they want, and so I don't think there would be too much of an issue with high-grading going on.

DR. NESSLAGE: Thank you. That was my understanding as well. I appreciate that. Then just a thing that I would add is there's some work in progress right now, and John Weideman has an MSE that he has preliminary results from that was built around the northern stock of the golden tilefish, and he presented that to the Mid-Atlantic SSC at their last meeting.

At least for that stock, it indicated, largely, that having a recruitment survey wouldn't really greatly increase your ability to assess the stock, and it's a slightly different stock, but, if that's something that the group would want to invest in in the future, before suggesting a survey, it might be worth a little bit of simulation modeling, to see if it's even worth improving the assessment in that fashion, before thinking about figuring out a juvenile survey for tilefish, and I will just throw that one out there as a thought to the breakout group that's working on that. Eric and Church are on that project as well, and so, if they want to chime in or add anything or disagree with me, they are welcome to. Are there other questions for Nikolai? You have rendered us speechless. That is very impressive.

DR. KLIBANSKY: Can I make one comment? I just was going to make one comment, just to kind of reiterate what Kyle had said yesterday for red snapper, and I don't know what the next -- If there will be requests for additional projections, but I was just going to kind of reiterate what I believe Kyle was saying for red snapper, which is just, basically, any projections that involve changing inputs to the projection code, like changing P^* value or percentages of FMSY or the duration of projections, don't really take very long. Anything much more creative than that, it's hard to say how long it would take, but I just thought I would put that out, since that's probably the next round of what will happen, is figuring out maybe additional projections.

DR. NESSLAGE: Absolutely. My understanding is we have you until 12:30, and then back at 2:00, and is that correct?

DR. KLIBANSKY: Yes. Sorry. It's just scheduling.

DR. NESSLAGE: No, and I totally understand, and we are off schedule, and that's my fault entirely, and so what -- I'm not seeing any other hands raised, and this is not to cut off discussion,

if there is more to be had, but it looks like we might be wrapping up clarifying questions for the moment.

I think this -- Unless I see any other hands pop up in the next minute or so, I think this might be a good break point, and then, if the SSC would be willing to reconvene like around 1:00, we can start to have our general discussion, and, if there's any questions that come up that those of us on the panel or who know anything about tilefish can't answer, we will write those down and bug you with those when you return, so that we can just keep on schedule here, and then we'll go to our breakout groups, and then we'll give you any requests we have for projections, and there will be opportunity in there for public comment as well. Does anyone object to that plan, reconvening at 1:00, with Nikolai returning to us at 2:00? I am not seeing any, and I hope that everyone has an excellent lunchbreak. Thank you so much, Nikolai. We greatly appreciate your presentation, and we will see you all back here promptly at 1:00. Thank you.

DR. KLIBANSKY: Thank you. See you at 2:00.

DR. NESSLAGE: Right. Thanks.

(Whereupon, a recess was taken.)

DR. COLLIER: Genny, it looks like most of the SSC members are back, and I have pulled up the overview, if that's where you would like to start, or I can go back to the tilefish presentation, if that's where you would like to be.

DR. NESSLAGE: Unless folks have a ton of questions, which hopefully they don't, because we don't have Nikolai with us, but I was thinking that we would start brainstorming and have a little discussion before we go to breakout groups. I did just send you, Chip, just two little things, via email, to add to the list that I heard as potential notes under the -- You're along the same lines.

DR. COLLIER: Okay. I didn't see the other one.

DR. NESSLAGE: Up under uncertainties, I think there were questions about the -- At least concern about the index ending in 2006 and the need for -- Uncertainty about recruitment at the end of the time series, estimating recruitment and/or trends at the end of the time series. Thanks. That's the commercial longline index, and those are just the notes I had, but it's a springboard.

SSC folks, I would like to have a little discussion before we go to breakout groups, just general discussion of our action items, to get the juices flowing and see what people are thinking. Let's, if we could, start -- I should also mention, if there are folks from the public who are online, we will take public comment after you've had a chance to listen to our discussion, both here and the in breakout groups and then you see what the strawman language is coming back, and then we will hear your public comment, and then we'll make our final consensus statements, and so that's the plan for the afternoon here.

Going back to action items, again, the kind of discussion about how comfortable are we with the way the TORs were addressed, and do we believe this is BSIA, and do we feel comfortable setting -- Recommending fishing level recommendations off of this assessment, and I'm sure that there are uncertainties that will pop up, and questions that people will have, and we'll list them, but we

need to kind of discuss whether we think this is the best available science, and so I would love to hear from the committee, and what are folks' thoughts on the matter? Anne Lange, please.

MS. LANGE: I would say yes to all three, that it does address the terms of reference, that it is the best scientific information available, and that it provides an adequate basis for stock status determination.

DR. NESSLAGE: Thank you, Anne. I agree with you, but I was on the panel, and so I had a preview. Does anyone else have any comments or anything to add to that or any disagreement? Wilson Laney.

DR. LANEY: My question is, when you look at the graphic that shows the quadrants and the cloud of uncertainty, if that's the appropriate terminology for me to use, should we be bothered at all by the fact that the points that -- The number of points, the percentage of points, I guess, that fall into the not overfished and not overfishing quadrant are equal to the ones that fall into the other quadrant?

I guess, most of the time, and I have probably less stock assessment experience than anybody else on the whole SSC, but I am not -- I guess I'm not used to seeing a figure that looks like this one, where those percentages are so close to being equal, and so is that something that we should note as an uncertainty? Is that something we should be bothered by?

DR. NESSLAGE: Wilson, I think you're absolutely on to something there, and we should definitely address that. Church. Let's see what he has to say.

DR. GRIMES: I agree with Wilson's point, and I had noticed the same thing, the uncertainty in the stock status projections and the sensitivity runs, that the status results are pretty uncertain, and there's just about as many, and especially for the overfishing status, and there were just as many in overfished as not overfished, and the median value, in fact, indicates overfishing, if you look at that analysis, but, anyway, that's something that ought to be listed, I think, as an uncertainty. Thanks.

DR. NESSLAGE: Thank you, and so you're looking at -- The terminal year median from the MCB looks like it's -- But we used the average of the last three years? I see what you're saying. Gotcha. Okay. Can we capture this? Is that Chip driving?

DR. COLLIER: I'm trying to drive. Hopefully I won't crash you guys. That is partially -- That is a condition in the stock status tier, but we can make sure that we get it added in here as well.

DR. NESSLAGE: While Chip is typing, Chris, go ahead.

DR. DUMAS: I still am unclear about how the lower recruitment towards the end of the time series -- How that affects the projections, and so my understanding is that recruitment is estimated by the model, and is that right, and so we don't have any direct data on that, and it's estimated by the model, and so the model is estimating that recruitment is sort of low in the last few years, but it was also said that it's difficult to estimate recruitment in the last few years and that there are not enough low data points on recruitment to be sure that it's a trend, and so I'm not sure how to put that all together to assess how the uncertainty in the recruitment is affecting the model projections,

and could somebody else help me with that? I'm less familiar with how recruitment affects things. Thanks.

DR. NESSLAGE: So, without Nikolai here, I might look to Erik, if he's on. Is he back? If we have to table that, we will, and that's fine. There is certainly uncertainty in our estimation of recruitment, which is something we'll want to chat about, I'm sure, but how that projects forward or gets propagated forward in the projections. Erik, can you address that? Did you hear the question, Erik?

DR. WILLIAMS: I think so. It was mostly about how stochastic recruitment is projected forward, and am I correct?

DR. NESSLAGE: Yes, especially given that it's kind of averaged at the end of the time series there.

DR. DUMAS: It's sort of consistently low recruitment in the last few years of the time series, and is that something for us to be concerned about or worried about?

DR. WILLIAMS: This all stems back to -- I will refresh your discussions about red snapper and other species, and so what we do is project forward a mean and a variance in recruitment, and so we can adjust that mean based on recent recruitment or not, and then the uncertainty is based usually on the overall uncertainty in the historical recruitment pattern.

I believe, in this case, we're not accounting for any low or high recent values, and we're actually just taking the mean and then the total variance and using stochastically-drawn recruitments from that mean and variance, and usually it's a lognormal distribution of recruitment, and that's different from say red grouper or black sea bass and red porgy, where we actually adjusted the mean that we drew from, because of recent low recruitment in those cases, and then, of course, I will draw your attention back to your red snapper discussion about the recent high recruitments in red snapper, but, in this case, it's just the mean of the whole time series.

DR. NESSLAGE: Thank you, Erik. Chris, does that answer your question?

DR. DUMAS: For recruitment, basically, we've got the long run mean and variance, and we're taking draws from that, and we just happened to get four or five low draws in recruitment in the last four years of the projections?

DR. NESSLAGE: These aren't the projections that are being shown here.

DR. WILLIAMS: I think the confusion here is that, because there is this delay of entry of the fish into the fishery at-age. The age of recruitment that we're actually modeling here, effectively, is age-five or six, and I can't remember, but, anyway, there is a period at the end of the assessment that is really projected recruitment, because we don't have actual estimates for it, and we have no data to support an estimate for it, and so that's why you see that flat line in the recruitment estimates, is that's the projected recruitment in the base run model.

Now, when we do it stochastically, we're actually allowing that to be random, and that's the MCB process, and so that plot that was just shown, that showed the recruitment pattern and the

deviations, that flattening at the end is for the base run only, but then, in the MCB process, those ones that are on the line, that are flattened, are actually stochastic in the MCB process.

DR. DUMAS: Okay. Thanks.

DR. NESSLAGE: For folks who are interested, Nikolai did do some work on sensitivities to some of those recruitment assumptions, if you look at Slide 56. I don't know if that helps or hurts, Erik, but it's something to think about. Amy.

DR. SCHUELLER: I was just going to tag on to what Wilson and Church both talked about, which was the sort of plot with all the different MCBE runs, where it shows forty-some percent in one sector and 40 percent in another and 9, or whatever, percent in one, and that one -- When I got to it in the report, it also gave me pause, but then I sit back and I think to myself, well, if we're managing to MSY, or some proxy, and we are basically decrementing from that some amount --

Usually, in my opinion, it's not a huge amount for an ABC, and then what they're catching exactly equals the ABC, and, eventually, wouldn't we expect the base run to sort of come into the middle of that figure, and then, given our uncertainty, have some sort of distribution around that, above and below, and so I guess what I started puzzling about is how concerned we should be about that and whether or not we're sort of circling in on sort of a point where management is doing what they need to be doing, and we're doing what we need to be doing, and we're just sort of in that zone, and I don't know if that makes sense, or if I'm off my rocker in some way, but that's what I was starting to wonder about. We're trying to harvest just below that, and so I guess my expectation is that we would have this type of an appearance, even if it is concerning.

DR. NESSLAGE: Amy, you're getting my brain fired up here too, and what's -- I see what you're seeing here, and thinking, and what is a disconnect in my mind though is that this stock we've been managing at one of the lowest P^* s, right, that we have for almost any stock, and so there's some sort of disconnect there, and that may be what we're achieving, and that would be fine. That's kind of sort of the goal, but how are we -- If we were doing that at a super low P^* -- My brain hurts. Do you see what I'm saying?

DR. SCHUELLER: I guess, but I just -- I don't have necessarily a good idea, in my brain, about what the actual impact of a P^* would be on this type of an output, because we put in some percentages, right, and then we run it based on the uncertainty we've included in the model, and then maybe we include a different uncertainty in the future, and I don't know. I don't think the P^* link is exactly straightforward, and I guess you could say, well, maybe that amount between one and where we're at, on the F part of it, for the base run, is that P^* , and that's going to have uncertainty around it, right, and so I don't know.

DR. NESSLAGE: It's a good point. We're going to have to mull that over, I think. Fred Serchuk.

DR. SERCHUK: I looked to the executive summary, and the words that I find there I think were helpful to me. With respect to the estimate of SSB relative to SSB MSY, it says the results from the MCBE suggest that the estimate of SSB relative to SSB MSY and the status relative to MSST is highly uncertain, and those were the words of the assessment report, and I think we need to capture that, because I think that's an apt description, and then, in the following paragraph, it says that, at the end of the assessment, tilefish was not undergoing overfishing. However, results from

the MCBE show that there is a lot of uncertainty in the status of the fishery, and only 48.8 percent of the MCBE runs agree with the fishing status result from the model and that that median value from the MCBE suggests overfishing. I think that we need to capture “highly uncertain” and “lot of uncertainty”, because I think that provides a bit more -- A better description than just looking at the graph.

DR. NESSLAGE: Thank you. That’s an excellent contribution, and I would just add to that, as a placeholder, under providing fishing level recommendations, that there’s a sub-bullet, below all the P* red there, that says was past management successful in reducing F or ending overfishing, and so the literal answer appears to be yes, but -- There’s a “but”, right? Comment on potential reasons for change in stock status, and I think we need to address this here as well, that, yes, technically, we are not overfishing with this assessment, but there is this high uncertainty, however you phrased it, that was in the executive summary, Fred. Amy.

DR. SCHUELLER: I was just going to say I think that your comment, Fred, was super useful for me, and I agree. I was thinking too that there is a lot of uncertainty in this, because like the indices are not great, and so there’s some data limitations with this assessment. The indices are sort of patchy, with high amounts of variability and rather flat, and so it just adds to our sort of statements of high uncertainty.

DR. NESSLAGE: If I might add to that, Amy, the fact that, despite our attempts to characterize, or generate, an abundance index from MARMAP, it’s pretty rare event in that survey, and so we’re relying on CPUE from what I have heard described as a derby fishery, at least in the most recent years, which is why it was terminated in 2006, and there’s not really any hope -- Unless management changes, there’s not hope of generating a new CPUE index, I don’t believe, from that, from that data that’s collected from the longline fishery, and so I guess that --

I think we just need to make sure we communicate to the council that management has resulted in a loss of information that we can use for this assessment, and it’s not that that’s good or bad management, but it may be just what’s needed, but that’s a consequence to the assessment, and, thus, the uncertainty of the assessment, and does that make any sense, I hope, and Chip is frantically writing something here, but I will do my best to flesh that wording out a little bit better. Are there other thoughts? Fred Serchuk.

DR. SERCHUK: The assessment only goes through 2018, and so here we are at 2021, and, obviously, given all the uncertainty with the status in 2018, we simply don’t -- One would assume that we have even more uncertainty, because we have no information on the intervening years, and it’s not as if we only have one year, and it’s quite a ways back now.

DR. NESSLAGE: Exactly. Good point. I’m sorry. Did I cut you off? Did you want to say something else?

DR. SERCHUK: No, and I think you grasped my point. Thank you.

DR. NESSLAGE: Thank you. Alexei.

DR. SHAROV: On the uncertainty, I generally agree with the points made, but I just wanted to forewarn you that this large uncertainty, in part -- Well, it’s certainly been driven by the data, and

our ranges and assumptions that were made to provide a description of uncertainty for a number of variables, but the -- Essentially, the more you include, the wider would be your uncertainty range for certain parameters, for example for natural mortality, and the wider and wider tails you will be generating.

Your resultant probabilities of being not overfished and not overfishing will be rather close to, or similar to, the overfished and overfishing, and that's, in part, the reason I asked about the model independence to those parameters which variability was exclusively modeled, and all I'm saying is that you can easily make more uncertain any assessment by incorporating more elements to it, and it's the estimate of a point here is important in itself as well, the position of the estimated SSB relative to the SSB MSY and relative to the FMSY or its proxy, and that puts us into the not overfished and not overfishing. Again, I guess I am trying to warn you not to focus too much on an existing level of uncertainty in the assessment, per se, if that make sense, if I have made my point, or probably not.

DR. NESSLAGE: No, but I think -- Well, I don't know if you have made your point clear, and I will try to summarize. What you're saying is that plot, the banana plot, if you will, reflects the amount of uncertainty that is used in the MCBE analysis, which I don't know -- Once you're done typing, Chip, if you could pull up Slide 47.

This is something that came up in the last assessment, how much uncertainty is being incorporated in here relative to other species. We talked a lot about that during the SEDAR, and we talked about -- I think other panelists -- Erik, help me out, because I've got a lot of different assessments floating in my mind right now, but I know I brought up the issue of natural mortality, and I believe we changed that, and I'm trying to remember exactly what we did, and that was one thing that changed, and I'm trying to think of what else was narrowed with regard to the amount of uncertainty, because it had come up in the past, right, Alexei, that we perhaps were incorporating more uncertainty in MCBs for this stock than others, and that was a concern, and so we did discuss that, but I admit that I am forgetting the gory details. Can anyone come to my rescue?

DR. SHAROV: Right, and so this banana of the points, or 5,500 ensemble results, could be moving up and down and left and right and stretching or compressing, and the distribution of those points relative to the cross, the point estimate of the SSB, will vary a lot depending on how we choose the model and different elements of uncertainty, and that's what I am trying to say, and our choices were made, in this particular case, which probably are reasonable, but they, all together, as an ensemble, resulted in these long tails of distribution that ended up in the positive result being only 49.8 percent and the negative result of being 41.7 percent, et cetera.

DR. NESSLAGE: I hear you, and I am hoping that --

DR. SHAROV: The model is uncertain in itself, and --

DR. NESSLAGE: Go ahead. Sorry. I didn't mean to cut you off. Erik, can you help address some of those questions?

DR. WILLIAMS: Sure. I mean, I agree with everything that Alexei said, and he's absolutely spot-on that our choices about what to include in uncertainty and how we include that uncertainty is what really contributes to the final uncertainty package, so to speak, or the final uncertainty

results. What I will say is we do have a standard method of what we include uncertainty in, and we did not deviate from that, particularly, with this assessment, and so, in terms of the first part of it, which is what things we included in uncertainty, it's pretty much similar to all of our other assessments, and we include the same sources.

Specifically to Genny's point and why this one is a little broader, is it does mostly come down, I would say -- Just pulling a number off the top of my head, I would say 80 percent of that uncertainty, or that increased uncertainty, is driven by the range in natural mortality, and a lot of discussion did go into that, and I think, and I hope, the assessment panel landed on a good sort of balance of not putting too much uncertainty in natural mortality, because we can always claim that that is virtually almost unknown, but at least being a little pragmatic, but also do recognize that it is a little more uncertain for this particular species compared to some of our other species, and so I would say that this increased uncertainty is largely a reflection of our increased uncertainty in natural mortality.

DR. NESSLAGE: Thank you for that, Erik, and I thought we decided not -- We were considering changing the distribution, right, and then we ultimately decided this was a -- What are we on? Is this a standard? I forget what we're calling these things now, and so we decided not to go there and to keep it uniform for the moment, and was that -- Am I recalling, or is that --

DR. WILLIAMS: No, you're correct, and what we did though is we made the range a little less broad, and so we had it really broad in I think the previous assessment, and we sort of tightened that up a little.

DR. NESSLAGE: I am looking for the figure on that, and maybe that's something that Nikolai can show the group when he gets back. In the meantime, I will try to dig it up, just so you guys can see, and I remember that he had a plot showing the two different natural mortality assumptions, and so thank you for that. Fred.

DR. SERCHUK: I think another source of concern, for me, and maybe, if I'm misinterpreting this, then I stand to be corrected, but the report talks about that the recruitment in the last few years has been below average, and you can see that if you go to the figures. There has been a run of below-average year classes, but my concern is that these below-average year classes have not been taken into account in terms of whether poor recruitment is going to continue in the future. Rather, some sort of average has been used that's been significantly higher than the year classes that we've seen in the past four or five years, and I wonder whether that should be -- If that's also a concern relative to maybe having the projections be too optimistic. Again, I will stand corrected if I misinterpreted the information in the report.

DR. NESSLAGE: Thank you, Fred. I don't think you've misinterpreted. I will go out on a limb, as someone who does a bit of work on tilefish, and say -- I will just admit that I am not too worried about the low recruitments, and is it possible that we could put up the trend in recruitment? It's Slide 44.

DR. SERCHUK: It's these points here that I'm worried about.

DR. NESSLAGE: Yes, and I don't blame you.

DR. SERCHUK: The report talks about we've had these ups and downs, with sort of the expectation that we should expect low periods, and they're going to be compensated by high periods, because it looks like it's a cyclical nature, but, in terms of our projections, if that doesn't occur in the next four or five years, then we've sort of perhaps overestimated the stability of the stock.

DR. NESSLAGE: That's a good point, especially given we're already three years out.

DR. SERCHUK: Exactly.

DR. NESSLAGE: We probably don't have a lot of data for 2020, I'm imaging, and this is mostly a commercial fishery, almost entirely a commercial fishery, and I think that should definitely -- I think we should have some placeholder in there regarding how that informs when the next assessment, or at least an update, is done, because, if we don't see the normal cycles in recruitment, that would be a concern. Erik, is it to that point, or it's totally different and I'll go to Jeff first?

DR. WILLIAMS: It's a little to that point, and it's also sort of to the -- Sorry, and I don't mean to sound preachy to the SSC on this, but it's a conversation that has come up repeatedly on multiple assessments, and that is this notion of being able to eyeball a time series and infer things about it that we can actually measure, and let's call it a pet peeve of mine, and it rightfully has come up recently, because we have seen these periods of what look like periods of low and high recruitment for some species, and some of them have been drawn out, but I would just recommend that maybe -- I don't know if the SSC can make recommendations about this, but there's a sort of overarching issue that needs to be discussed, and that is what to do about these things and how to detect the patterns and how to detect the autocorrelation and how to incorporate that autocorrelation, if it's significant, and all these things can be done.

I mean, it's not like time series analysis is a new piece of statistics, and it's been around for many, many years, and we should be applying some of that, rather than eyeballing time series and suggesting properties that we can actually measure, and probably should be measuring, and so that's just sort of an overall topic that sort of threads through all of our assessments recently, is how should we be dealing with what appears to be time series properties in our recruitment time series.

DR. NESSLAGE: Yes, and -- Well, I'll leave it at that. Jeff, go ahead.

DR. BUCKEL: Fred captured what I was going to bring up, that, in this list of risks and uncertainties, that we didn't have the low recruitment, and if folks -- Nikolai did -- One of the sensitivities was using that low recruitment in the 2012 to 2018 period, instead of the average, and that's on Slide 56, and so that had a -- The model was sensitive to that, as you would expect, and so I would say, in terms of the sensitivities, natural mortality was a big one, but also this recruitment was a bit one, and so we should definitely highlight that, and Fred covered the other points. One other area that this would impact, with Genny and Amy and your discussion on where things were on the phase plot and where you would expect to be and the six years of low recruitment, that probably impacted that as well.

DR. NESSLAGE: Thank you, Jeff. Wilson.

DR. LANEY: I have a question, Madam Chair, and, if it more appropriately belongs in the breakout group discussion, tell me, but I was wondering, given our previous discussions about -- Well, specifically, Amy is pointing out the concerns with the time series available to us, and our discussion about the difficulty of getting any sort of independent data that would give us some insight into recruitment, and what sort of recommendation would we make for any sort of future monitoring or surveying?

It seems like you can't -- Well, maybe you can catch the things with trawls, but I guess Marcel was saying that SEAMAP is too far inshore, since we're dealing with a deeper-water species, and then, if you were sampling them at the larval stage, I guess that would be -- There is so much potential variability between the egg or larval stage and when they actually recruit to the fishery, around age-four to five or six, somewhere in that neck of the woods, and then exactly what sort of gear or technique could be used to give us a better time series for assessing recruitment? Again, I will defer that to the breakout groups, if you think that's more appropriate.

DR. NESSLAGE: Well, I think the breakout groups should definitely brainstorm, but I'm not sure that anyone has a great answer to that. I have talked to numerous people in the South Atlantic about -- No one seems to be able to catch them, and so that may be a research recommendation, but the likelihood of that actually panning out is probably pretty low, if the top brains in the area haven't figure it out yet.

DR. LANEY: Okay. Thanks.

DR. NESSLAGE: Hence my suggestion that we look at the impact of -- Do a simulation study to try and figure out how best to incorporate recruitment into our tilefish projections, because, personally, I don't think we're going to have great information, empirical information, on recruitment, but, please, someone speak up if you disagree with me. I am happy to be wrong on this one, and I don't know if Wally has an opinion, or George, or someone, and I'm calling you out, but people who know more about on-the-water tilefish information. I'm just a modeling nerd. Thank you, Wally.

DR. BUBLEY: You say that, yet I think you as a modeling nerd got this, because I don't know of any real good way to get these really small fish. I mean, you might be able to pick some up at two or three years old, but I don't think -- Based on what's going on out there, I don't think there's any reasonable way to get at that.

DR. NESSLAGE: Thanks, Wally. George, do you have something to add to that?

DR. SEDBERRY: Not really. I mean, Wally said it. Back in the early days, MARMAP did a lot of ichthyoplankton surveys out there, and tilefish are -- The whole family is exceedingly rare in ichthyoplankton samples. For all the surveys that SEAMAP does, it's inshore, and it uses shrimp nets, which are just not going to work for that kind of groundfish survey. The juveniles are just really rare in fishery-independent samples, and I don't -- You never see them at the dock.

DR. NESSLAGE: Yes, exactly. They are a mystery. John Walter, go ahead.

DR. WALTER: Tilefish are a weird one, and they -- Really, where are they when they're small is a good question, but I do want to just bring up the South Atlantic deepwater longline survey that

is probably, we hope, the path forward for providing a continuity of the ability to survey this species, and one of the issues we face is that there's just not that much funding for the surveys for one particular species, and so these cooperative projects are probably the way to go, where the industry is helping us with this, and it was pretty successful when it did get out last year.

There's going to be a presentation of it by Todd Kellison at the council meeting coming up, and so I would just refer everybody to pay attention to that. It got a lot of tilefish, and it got 166 tilefish last year, and it was the number-one species, and so it seems like it could work well, and it won't get a recruitment index, but it might very well get a decent index. Thanks.

DR. NESSLAGE: That's fantastic news. We like to hear that. Thank you. Are there other thoughts, particularly on some of the questions we haven't addressed yet? Are there other research recommendations or metrics for monitoring? We've talked a little bit -- We're dancing around all of this, but if there's any other thoughts before we go to breakout. Wilson.

DR. LANEY: In view of what John just said, and, again, this is maybe an ignorant question, but, if you catch enough of them in the bottom longline survey, could you not -- I mean, would you not have a sufficient sample size of different ages that you could sort of back-calculate, if that's the right term, the size of the -- I mean, basically, do a backwards projection to determine what the recruitment was that led to the observed age structure from the bottom longline survey, and can you do that?

DR. NESSLAGE: I suppose you could, but, if you go backwards from there, you probably have catch information, or am I misunderstanding your question? John, do you understand his question better?

DR. WALTER: Absolutely you could, because you would have all those ages, and that would tell you about historical recruitment, and I think what we are wanting to inform is those recruits that are coming into the fishery that the model had to simply revert to not estimating, and I don't know that we're going to get a good answer or a solution for that in the near term for those like last five years of recruitment, but, again, I think the simulation that Genny alludes to about recruitment not being as important probably speaks to the fact that this fishery is primarily on older fish and not really that driven by those one to five-year-olds that we don't really have any information, and so, by looking at that retrospective, what recruitment was ten years ago, that's telling us what our fishery is largely operating on this year now, I think. Thanks.

DR. NESSLAGE: Thank you. Does that help, Wilson?

DR. LANEY: Yes, ma'am, it does, and thank you, John. I guess knowing the historical recruitment pattern is -- It sounds like it's not that useful to us, in terms of trying to project forward in time, I guess, unless we could come up with some sort of a model that predicted recruitment based on environmental factors. If we saw a really strong relationship from the historical recruitment pattern, would that be useful? Again, we would have to incorporate some sort of environmental variability into the model, I guess, and so, anyway, thanks. That helps.

DR. NESSLAGE: Wilson, I will say one of the tricks here is we don't really have on-the-ground, or in-the-water, I guess, empirical information on recruits. One thing we did, as part of our fate

project, was try to predict the estimated recruitment coming out of the previous version of this model, based on environmental covariates, for lack of actual data, survey data, really to do that.

We have a paper that's coming out in *Fisheries Oceanography* looking at our ability to predict environmental effects on the catch and the CPUE, but we ultimately decided that we felt it was a little bit inappropriate to be predicting the estimated -- The impact of environmental covariates on the estimated recruitment, and it was a little circular, and so, until we get independent data on recruitment, I'm not sure we'll be able to do that.

However, based on our paper that's coming out, and it's press right now, and this is with Erik and Church and Paul Nitschke from the Northeast Center, and John Wiedemann from Rutgers, and so I think that might, in the future, help us to understand the impact, for instance, of the Florida Current on our CPUE and on the landings in general, and so it's something that I would love to see in the research recommendations, is maybe just consideration of that in interpreting future assessment results and keep an eye on those environmental conditions, because they do appear to impact the catch and the CPUE, but that's for the future, because, obviously, Nikolai did not have that information available, and the panel didn't see that in this assessment. If I am speaking out of turn, Church or Erik, just please chime in, but hopefully that answers your -- I would say we played around with that with the available estimates, but, ultimately, we didn't feel comfortable with that model.

DR. LANEY: That does help, and I will look forward to reading the paper.

DR. NESSLAGE: Great. All right. I am not seeing any other hands at the moment, and I think this might be a good time for us to go to breakout. Staff, are you guys ready? I think we were planning on taking a five-minute break, so that folks can run to the bathroom and get these webinars, these side webinars, going, and so everybody is going to need to leave the -- Anyone who wants to go to a breakout session needs to leave the main webinar and go to your appropriate, or, if you're a member of the public, whatever breakout group you're interested in.

Remember that what I'm asking you to do is to try and draft -- They don't have to be worded prettily, but draft some consensus statements that are strawman that the group can then evaluate and the public can comment on and we can finalize. We're not looking for you to brainstorm new stuff, unless it happens to come up, and what we really need is some solid statements under each one of the bullets that you've been assigned to, and does that make sense? Are there any questions about that? I am thinking if we can do a half-hour, and so, if folks meet by around -- Get on your new webinars for around 1:55, and then we'll reconvene around 2:25, and that will give us a chance to -- A few minutes there for staff to collate all the notes, and so, rapporteurs, when you're done, if you could send your notes to Chip. Is that right, Chip?

DR. COLLIER: Yes.

DR. NESSLAGE: Cool. That would be great. Anything you want to add, from a logistics point of view?

DR. COLLIER: I am going to copy and paste the links into the chat, just in case somebody can't get them, and I guess that's not going to work. I am going to try to get these in there, and so if people can hit the links. Can you hit the link at all, Genny, to see if it will --

DR. SHAROV: No, it's not working.

DR. COLLIER: Okay. All right. I'm going to put it in the chat, but you guys have all gotten this, through Genny's email, and so be sure to go there, as SSC members, and I will work on getting this in the chat for the public.

DR. NESSLAGE: Thank you. Thank you, all. See you back around 2:25. Good luck.

(Whereupon, the SSC went into breakout groups.)

DR. NESSLAGE: It looks like we have everybody back that we're expecting, including Nikolai. Okay. Perhaps we can come back to my slide when we get to that section. Does that make sense, and we'll just go through the combined file at the moment, to give folks a chance to look at what the breakout groups came up with?

What I might do is ask each of the rapporteurs to just briefly summarize what you've got here. Once we've done that, I will ask for public comment, so that we can hear from folks what they think about what they see on the screen and from our discussions today, and then we will go to finalizing our consensus statements here, and so who is rapporteur of the first group?

DR. COLLIER: Fred Serchuk was the rapporteur for this group, the identify, summarize, and discuss assessment uncertainties.

DR. NESSLAGE: That was for red snapper. Isn't it Chris Dumas for this one?

DR. COLLIER: Sorry. My bad. Chris. That's correct.

DR. DUMAS: We identified several items that went to risks and to potential consequences for assessment uncertainties, and we listed, first, natural mortality uncertainty. There's a high percentage of increased uncertainty that seems to be driven by the natural mortality uncertainty. A sensitivity analysis indicated that natural mortality had a large impact on stock status, and it was also mentioned, by someone during our session, that tilefish has a greater uncertainty in natural mortality compared to other species.

Our second item was the low recruitment at the end of the time series, and there is concern that lower recruitment in later years of the assessment is not reflected in the projections, and, if it's not balanced by higher recruitment in the future, then current projections don't reflect the effects of the current lower recruitment. Our third item was concern that the MCBE runs have nearly as many runs in the overfished and overfishing quadrants as in the sustainable quadrants, which indicates that the terminal status of the stock is highly uncertain.

Erik had put in an item that there is a standard package to account for uncertainty, and we were uncertain about this item, about the standard package, and so we left it in, and we're not sure what the point of that is.

Our next item was that steepness could not be estimated reliably, and the sensitivity runs indicated that there was a significant effect of steepness on stock status, and so that could be important. Our

next item was the weight placed on the MARMAP index, and sensitivity runs showed that increasing the weight on this index substantially could affect the stock status. Our next item was a concern about loss of the commercial longline index after 2006 and that this resulted in a loss of information for management and for the assessment, due to the short season for the longline fishery.

Our next item was the indices, in general, are somewhat patchy, with high variability and little trend, and we thought we might want to expand on that a little bit, but we were out of time. The terminal year of the assessment was 2018, and there have been additional years since then, and so the large uncertainty in 2018 may be even higher now, after several years have passed, and then, to the question of whether the methods of addressing uncertainty are consistent with SSC expectations and the available information, we thought that, yes, the methods of addressing uncertainty are consistent with expectations and the available information.

DR. NESSLAGE: Thank you. Outstanding. I think I can address that one up top about the package, and I think Erik was just saying that the parameters for which uncertainty is accounted for in the MCBs is standard across almost all their species, and so it wasn't that we were including uncertainty in any additional sources of uncertainty, and it was pretty standard, and the difference was in how much leeway M was given to vary in previous assessments versus this one, and so I think that's where that goes, and so I don't know that we necessarily need to consider that a source of uncertainty, but I would open that up to the group. Yan.

DR. LI: Thank you, Genny. I would like to take this out, and I feel this -- If we have to put this in this document, it may fit better under the question of whether the methods of addressing uncertainty are consistent with SSC expectations.

DR. NESSLAGE: Yes, that's a great suggestion. Can we move it down?

DR. COLLIER: Where did you want it moved? Sorry, but I missed that.

DR. NESSLAGE: Right below the "are methods of addressing uncertainty", and then we say yes, and then add that, and we can flesh it out, the wording, but Yan is right that that's where that belongs, I think, and I agree with her, and I don't know. If someone disagrees, speak up.

DR. LI: Yes, that was what I was trying to say. Thank you, Genny. Genny, another thing. Chris, when we had the breakout group discussion, we talked about, under this category, the first bullet and the second bullet, they're very similar. Chris has a better suggestion that merged these two bullets together.

DR. NESSLAGE: The list?

DR. LI: If you just go up, like under the big bullet of identify and summarize, and, yes, these two bullets sound very similar to us, within our small breakout group, and Chris suggested a better way to merge them together.

DR. COLLIER: Okay. I will get those from Chris, and we'll have those in the next review, and, I mean, this is an evolving list of questions, and so, any comments that you guys have on those, just send them to me, and I will get those incorporated for the next time.

DR. DUMAS: We don't necessarily need to merge those together, but our group did not understand the distinction between the two bullets, in terms of the question they were asking, and they seem very similar to us, and so we just answered them all under the second bullet. Thanks.

DR. NESSLAGE: I think we can structure the report that way, and that should work, unless, Chip, you had something in mind that we're not addressing. If we're not addressing something important, let us know. In the meantime, Fred.

DR. SERCHUK: I mean, I have seen this section many times in the past, and I think the group has done a great job in listing the uncertainties, but I think where we're -- Generally, where we haven't done a good job, and this is just my personal opinion, is in the latter portion of the request, with regard to status, fishing level recommendations, and future yield.

It's not clear, to somebody that's not familiar with it, how these factors impact status, fishing level recommendations, and future yield predictions and in what manner, and I'm not trying to reinvent the wheel here, but I think we have -- The group has done a good job, and we've always done a good job of listing the uncertainties, but we don't really link it very well to status, fishing level recommendations, and future yield. Does that mean that they're going to be too high or too low, or are they going to be more uncertain? Those are the sort of things that I think maybe we should think about. If we can't do it in this iteration, maybe the next time we run through this exercise. Does that make sense?

DR. NESSLAGE: Yes, Fred. I think, some of these, we might know the direction. For some of them, we wouldn't know without simulation studies, for instance, or alternative sensitivities, and so, where we know, or we think we know, the direction or the magnitude of the impact, we should probably flesh that out, and I would ask folks to add to the report as you see it, but definitely we can try and pay more attention to that in the future as well. Good suggestion. Okay. Let's keep rolling, if we could. I want to get through this, so we can have some public comment as well. Wally, is it to the previous one or the next coming up?

DR. BUBLEY: It's the previous one, and I just wanted to make a point. I know it's kind of always referred to as the MARMAP survey for the longline, but SEAMAP funding, in the later years, is really responsible for continuing it, and so I just wanted to make sure that's added in there, MARMAP and SEAMAP, just to make a point that they're included in there, because they were really instrumental in continuing it. Along with that index as well, something that's come up before is it's relatively limited spatially too, and that was another uncertainty that kind of goes along with that index, and that's been brought up in multiple assessments.

DR. NESSLAGE: Good point. Thank you for both of those comments. Nikolai.

DR. KLIBANSKY: I just wanted to -- It's kind of a minor point, but I don't know that I would agree that there's more uncertainty in the M for golden tilefish, or for tilefish, than other species. I'm not sure where that comes from, but just to note that the uncertainty range that's used in this assessment now is actually just based on using higher and lower Tmax values and plugging that into the Hoenig equation.

In the past, like in SEDAR 25, there was more uncertainty incorporated in the M, because there were something like twelve estimates from a lot of different methods that were used, and then I think it was basically that range, or sort of a version of that range, that was put into the uncertainty analysis, but we have kind of revised that here, to say that -- Because some of those methods are things we wouldn't use now, and so I'm not sure where that comes from, but I just wanted to note that.

DR. NESSLAGE: Thank you for catching that. You're right. I think that was part of the discussion of, previously, we had used a wider range of M than for other species, and so I think maybe we can take that out, because we addressed that down below, but, folks from that group, yell at me if you don't -- Just the last sentence.

DR. KLIBANSKY: It was definitely true in SEDAR 25, if you compare what was done for black sea bass versus what was done for tilefish, but I don't think it's true now.

DR. NESSLAGE: Agreed. Excellent. Thank you for catching that. I didn't notice. Okay. Let's keep scrolling. Anne.

MS. LANGE: We just went through the P* values, and I don't think that I need to read the entire description of each of the tiers that we selected, but, basically, for the assessment tier, we looked at Tier 1, which is the same level that it was before, and it's a quantitative assessment that provides estimates of exploitation and biomass. The uncertainty tier was Tier 2, which is a 2.5, which is a high -- Uncertainty is highly characterized, and it reflects more than just the uncertainty in future recruitment.

The next level, the stock status, was Tier 2. In the previous assessment, it was considered a Tier 3, but we're looking at Tier 2 now, because the stock is neither overfished nor overfishing, although it's a 2 instead of a 1 because the stock may be in close proximity to the benchmark values. Then the PSA score was Tier 3, the same as the previous, which is 10 percent, and that's based on the MRAG values. The total adjustment was 15, and so the P* is 35 percent.

The next thing was whether management, past management, was successful in reducing F, and we felt that it was, but there is still a high degree of uncertainty in the status determination, and, again, we mentioned also the range in M that used the MCBEs, and it was a wide range, and so it may contribute to the uncertainty in the stock status, and I don't know if what Nikolai just said sort of cancels that or not.

DR. NESSLAGE: I meant used in the past, and so we should probably clarify that, and I have a slide to elaborate on that, if you're interested in going there right now, but, Chip, did you have something to this?

DR. COLLIER: I had a question on the assessment, and I thought I remembered Nikolai indicating that they were using some steepness proxies. I feel like, in the past, that was given a Tier 2 score for assessments, but I just wanted to point that out and have the SSC discuss it.

DR. NESSLAGE: Thank you. Nikolai, can you just clarify, really quickly, what was done?

DR. KLIBANSKY: We fixed steepness based on the values from the Shertzer and Conn meta-analysis, and then, in the MCBE, we used that distribution, truncated normal distribution, to put in uncertainty around steepness, but we didn't use -- We used the fixed steepness.

DR. NESSLAGE: We discussed this with regard to red porgy, didn't we, Chip? Is that where you're going?

DR. COLLIER: Yes, you guys did discuss it relative to red porgy, and I think other species in the past as well.

DR. NESSLAGE: We gave it a two then, instead of a one?

DR. COLLIER: Yes.

DR. NESSLAGE: That's right. We were supposed to revisit that with the ABC Control Rule recommendations. Note to self for later in our discussions. Well, if we would like to be consistent, then we would need to change it to a two.

MS. LANGE: I have no concerns about that, except how is it different than the previous assessment, where we gave it a one? Is this less quantitative than the previous assessment, or are we just changing our interpretation of this?

DR. NESSLAGE: I think we're changing our interpretation, and I believe that Fred had talked extensively about this with regard to red porgy and fixing steepness, and so I guess that was the direction that the SSC has been going in, but, if folks feel differently, it's open for discussion.

MS. LANGE: No, and I was just looking at which level of consistency we're -- With the previous assessment or with our new interpretation from other species, and so that's fine.

DR. NESSLAGE: I think we're shifting over time. You're right though that, assessment to assessment, for the same species, versus how we're interpreting the control rule over time. Amy, go ahead.

DR. SCHUELLER: I was just going to say that Chip's recollection is the same as mine, is that, when we've had steepness fixed, we're basically saying what that proxy is, by default, given some of the research that's been done on steepness and fixing steepness, and I don't remember the last tilefish assessment and how we picked what we picked, but, I mean, there have been cases where we have moved assessments from estimation to fixed values for steepness too, and so I don't know if that's the case here or not, but I would prefer to be consistent with how we've been handling fixed steepness in the recent time period.

DR. KLIBANSKY: If I can just jump in, just to be clear, the steepness is fixed and was updated in 2016, too.

DR. NESSLAGE: Yes.

DR. KLIBANSKY: It's the same value of 0.84.

DR. NESSLAGE: Thank you. Okay. I'm not hearing much argument that we should go back to the old tilefish way and that we should be consistent with our -- That was back in 2016, and so I think we've refined our understanding since then, and, Chip, you can change that 50 minus 15 to 50 minus 17.5. Thank you. Then can we just pull up that slide, real quick? With regard to the -- Wait. Sorry. I'm jumping ahead. Had you gotten there yet, Anne?

MS. LANGE: Sorry. No, and let's see where -- This was the buffer, and so the stock status was looked at as a Tier 3 adjustment, and it's down to 2.5. Then the assessment included a -- We did this already, right, this one?

DR. NESSLAGE: Yes.

MS. LANGE: Then I guess the next one was whether there was difficulty applying the control rule, and if it was straightforward, aside from our tinkering with the -- The discussion we just had relative to consistency within a species or within our adjustments, and then that was it, right?

DR. NESSLAGE: Yes. The one thing I wanted to add, if I could, is I think what that question about the buffer is getting at might be addressed by that slide that I sent to Chip, and so I was having a hard time interpreting it, and so, Nikolai, correct me if I'm wrong, but, in the upper-left there, that's your MCB distribution around the -- Well, I guess it's SSB over MSST and F over FMSY, and then the bottom-right is from the 2016 assessment. The thing I would point out is it seems like we have a much tighter distribution for F now than we did the last assessment, and am I interpreting that correctly, Nikolai? It's more peaked.

DR. KLIBANSKY: Sometimes it's tricky to interpret based on the difference in the dimensions of the plot, and I can't actually see the labels on my plots here.

DR. NESSLAGE: Yours go up to a peak of 0.6, and my old ones go up to 0.4, and so mine is more flat, and yours is more peaked, and I'm wondering if -- I guess where I'm going with this is I'm wondering if -- Before, we said there was more uncertainty in the overfishing status, for instance, than now, and can we say something like that? Is that informative to answering that question, or should I just ignore this?

DR. KLIBANSKY: Sorry, but are you asking the group, or are you asking me?

DR. NESSLAGE: I'm asking anyone who is willing to answer. I think this -- Whoever posed the question, I guess, and, Chip, maybe you can help me, but I think this is getting at the buffer. It's getting at how much uncertainty is there in our overfishing, our OFL, right, and so we go to this distribution to help inform that, and it's looking, to me, like our old estimate of the distribution was much wider than it is now, and so, in theory --

DR. KLIBANSKY: If we could pull up the benchmark tables from the two assessments, because they will have the standard error in them.

DR. NESSLAGE: Good point.

DR. COLLIER: Do you happen to have those together, Nikolai? If not, I can try to --

DR. KLIBANSKY: I was just opening it up. It doesn't look like the standard error is in this table, in the 2016 update, and so this doesn't work.

DR. NESSLAGE: I can try and dig it up later, but -- Well, maybe it's a moot point, but I just thought it might be informative, but maybe not. Okay. Well, let's not hang-up on this too much. I will go digging and let you all know if I find something interesting that might help answer that question, but, in the meantime, who is our rapporteur for the third group?

DR. COLLIER: That is Alexei.

DR. SHAROV: Thank you. All right, and so this needs to be edited a little bit, because the same information is repeated several times, but it just reflects our deliberations, and so the group discussed what indicators and metrics should be used to monitor the stock until the next assessment, and so what we talked about is that there is a limited amount of information that is being collected with respect to the status of the stock.

The first thing that we wanted to say, or suggest that the SSC supports, is the review of the information on landings, obviously, to make sure that they stay within the ABCs. Then the relative index of abundance, and there is only the MARMAP/SEAMAP index that potentially is available, and the new survey, the pilot survey, that is coming in, we assume that it will be collecting -- The information will be summarized as an index of abundance, and so the new time series will start, and that should be monitored as well.

Then data on size and age composition, and we understand that this sort of information is going to be collected annually, but we were not sure whether they are summarized and available for review also on an annual basis, but the sub-group believed that it would be useful to have some interim review of all those indicators in between the assessments. Just as an example, if the new assessment is going to happen within five or six years, then, somewhere around three years from this point, it would be useful to review the metrics. I think that's pretty much the recommendations, and I don't think that I missed anything.

DR. NESSLAGE: Thank you, Alexei. That was pretty straightforward. I am not seeing any hands raised, and so let's keep rolling. Amy, do you mind walking us through your section?

DR. SCHUELLER: Sure. We had research recommendations and guidance on the next assessment, and so the research recommendations that are currently in the report -- There is two sets in that section, one from the assessment prior to this one, a holdover, and then another set, and so we basically said research recommendations 2a and 2b in the assessment report would be the most important, or basically the highest priority. 2a, in particular, will help reduce uncertainty in the spread of the -- I am missing a word, maybe. That is related to natural mortality and the MCBE runs. Then 2b would provide index data to indicate population trajectory and inform past recruitments.

In addition to that, we were very much interested in 2d as a high priority, related to information on -- Basically, it's having better and more information on the age data and increasing the continuity in the age composition data over time, and so that was basically collect more age composition data, and so those three, and, in addition to that, we said that all of the other research recommendations are important to improving the assessment in the future, but the ones that we've

highlighted above we considered to be the highest priority, and so natural mortality, indices, and better age composition data.

For the additional research recommendations, and so we tried to include things that we heard during the discussion, and then we had a couple here that had some questions, and so one was investigate the relationship between recruitment and environmental variability, and the thought behind this being that we could better be able to predict or project recruitment with currently-available data, and so, if we had some sort of environmental piece that we could then use to project recruitment, that would help us address the lag created by basically only sampling the fishery, as we're currently doing.

The second one here is collect information on age-zero abundance, and I know we had discussion about how that might be difficult, and so we wrote that we recognize that this may be difficult, given the lack of information on where age-zero fish are located and what gear could be used to collect them, and then we had this discussion about whether or not juvenile tilefish burrow, and, if so, could we consider using ROVs to assess the size and density of burrows, and there was an example there of some work done on ghost crabs that could be used as an example, and I see Church's hand went up, and so maybe he can answer that question for us.

DR. NESSLAGE: Please, Church.

DR. GRIMES: You mean the question about whether they burrow?

DR. SCHUELLER: Yes.

DR. GRIMES: They didn't burrow in the southern New England and Mid-Atlantic area, or at least I never saw them in burrows. In fact, they were up on shelf, in shallower water that adults were, and you never saw them hanging around the big burrows, and probably for good reason. It would become part of a diet, but, anyway, I put my hand up for another question actually, about the north/south split there, and I didn't know what exactly you meant. Is that Cape Hatteras or --

DR. SCHUELLER: One of the research recommendations that's in the report is to collect information on the north/south split, and I assume that means the split that's currently in the assessment and whether or not that's appropriate, and so, right now we're splitting at the Virginia/North Carolina border, and whether or not that's appropriate, and our group basically discussed this. I mean, clearly, this was something that was brought up with blueline, and so the question is, is this also a concern with golden, and we put to collect genetic data on this, because -- Well, I have a question over there, Chip, that says we are uncertain if these data are already available or have been collected, and, if not, then we can recommend collecting those data, in order to address that question.

DR. GRIMES: Actually, it's a funny thing, but, a few nights ago, I was having a conversation with John Gold, and he's a retired geneticist from A&M, and John was saying that they did have tissue samples, or genetic samples, from throughout the Gulf and all the way up through the South Atlantic and into the Mid-Atlantic and southern New England area, and so maybe sometime soon.

DR. NESSLAGE: Amy, I would add that there is a researcher at VIMS, whose name is escaping me right now, that may have already done this work. I am vaguely remembering -- Maybe George was going to talk to that. George, do you want to go?

DR. SEDBERRY: No, and I was actually going to talk about the surveying burrows with sonar, in addition to ROVs, because, with high-resolution sonar, you can do it faster and maybe get the same kind of information.

DR. NESSLAGE: Good addition. Yes. I will look up her name, but I had heard, through the grapevine, at an AFS presentation, that there was some preliminary information on this presented, but I have never followed up, and so it would be worth -- I will get the name. Sorry. I'm blanking right now, but we should definitely make sure that we reach out to her for the next go-round for both tilefishes.

DR. SCHUELLER: Sure, and so it sounds like maybe this data are available, but maybe not, and so, I mean, I still think it's worth including here. Then the next piece that we had was diet information for golden tilefish, and this was brought up within the context of some of the EwE work that we've been reviewing and is ongoing and whether or not we would need additional information in order to help provide overlap, et cetera, et cetera, for the diet.

We recognize that this particular statement, or request, that we're putting this under has to do with improving future stock assessments for tilefish, but then we also had a discussion that, as we're moving forward into the future, this EwE work can have an impact, and, while tilefish is more of a targeted species, a lot of the other species that we discuss in this context, lots of the snappers and groupers and other ones we've discussed during this meeting, are part of multispecies fisheries, and so there should be some interest in multispecies management, potentially, in the future, and so we're just sort of maybe trying to put our cart before our horse, but that's okay.

Then the one other piece is -- It said to provide guidance on the next assessment and timing, and so we put that the next operational assessment should occur in three to five years, and some folks had discussed this next sentence, and so we thought it was important to include. The next assessment should include the pilot survey work that is currently being conducted, or at least consider it, with the thought that three to five years' worth of data would help to provide an index. Anyway, that's where our group ended up.

DR. NESSLAGE: That's great, Amy. Thank you. Let's see. Nikolai, go ahead.

DR. KLIBANSKY: Just a quick comment about the collecting genetic data, which, while I think it's a good idea, I just wanted you to recall the experience with blueline tilefish, which was that we ended up doing all this work to look at the connectivity, or potential connectivity, between the Gulf stock and the South Atlantic, and we had all this genetic data that showed that there was no clear genetic difference between the areas, but then we still assessed them separately, and so that's just a thought about what the potential use might end up being for these different things as we kind of triage it in terms of promoting different types of research.

DR. NESSLAGE: Excellent. Thank you, Nikolai. Just, before I forget, Jeff Buckel just reminded me that the researcher's name is Jan McDowell at VIMS, if we want to reach out to her at the some point. Church.

DR. GRIMES: I was just going to add that there is an old diet study for golden tilefish, and it's not from the South Atlantic though, and it's Steve Turner and somebody else from the Mid-Atlantic.

DR. NESSLAGE: Great. Thank you. Okay. At this point, unless there is other SSC member hands raised, or concerns that Nikolai has, I think we might -- If staff are ready, it would be nice if we could take some public comment at this point, now that folks have had a chance to see what we're thinking. Take it away, Chip, or whoever is running the show right now.

DR. COLLIER: I'm doing my best to run the show. For anyone that would like to make a public comment I have a slide up here that hopefully provides some guidance, and I think I've gone over it a couple of times, but I will go over it one more. When you want to indicate that you would like to make a comment, click on this button here, and that will raise your hand. This little arrow is currently green in the image that's being shown, and it should turn to red, and that's indicating that your hand is raised.

When your hand is raised, staff will recognize you, and we'll click on the "unmute" button, and you will get a notification that you've been unmuted by the organizer, and then you will need to click on this button to turn it green. When it's green, that's showing that you're unmuted. If you would like to provide a public comment, you can type it into the question box as well, and it's described here by this one, and, also, if you have any questions, enter those into the box, and so the first person I see up here is Rusty Hudson. Rusty, you are unmuted.

MR. HUDSON: Thank you, Chip. Your demonstration might work with the computers, but, with my iPad, it's just a blank and not a red, and then it turns blue. That being said, I thought oral comment, we had worked over the last several years with the SSC, should have been at the end of the presentation and before all of the breakout groups, et cetera, and I kind of missed some of my opportunities with red snapper, it seemed, today and yesterday, and, of course, this virtual meeting stuff means that, if something happens around the house, you can wind up, in thirty seconds, not even knowing that you had an opportunity.

I have three little pages of notes that I've been taking, just dealing with golden tile, and I just had to get that other stuff off my chest, because I have some concerns about red snapper too, but now is not the time anymore.

Peewees, Ben Hartig brought this up to the SSC and to the council, and he's down there off of Jupiter Inlet, and he's south of the original expanded Oculina zone, and that expansion, in 2000, went out to 660 foot up on the north end, and I can't tell you about the south end, but there is a narrowing of the silt down to the south, to where Ben Hartig is.

The two-pound peewees are very small-mouthed animals. In general, they're -- Golden tilefish have a tendency to get bigger, nice and large, thirty-five or forty pounds, but most of that's going to be found outside of 600 foot. For all these years, that area off of 660, off of Port Canaveral, into the mud, and not the Oculina, has just made law enforcement happy there, but we were able to work out a scenario for the north expansion of the Oculina, and it stopped at 330, in most places, and starts around 240.

That being said, the blueline tile stuff, Wally brought it up, the things with the overlap that might occur off of South Carolina, and I used to fish up there, and it's not the same down here where our Gulf Stream is, which just really has prohibited a lot of the MARMAP work in our backyard, from Ponce Inlet down through Fort Pierce.

Moving on, it was brought up, I think by Fred, and, yes, we got to fish last year the golden tile, and this year, and we're considered essential workers under the pandemic, and our 75 percent allocation of golden tile for the longline is generally caught by February and March. This year, they closed us down early, and they had to open us back up to catch almost all, but not all, and I think we've got 4 percent still left on the table, but Roy Crabtree's past protocol was, if you hit 95, you're done for the year, and so we're in a small area.

I used to fish a lot of mud bottom, and you've got to be in mud bottom. The blueline tile is not in mud bottom, in general, for where we're fishing down this way and on up the line. Recreational, their spatial distance is a lot shorter off of south Florida, and the for-hire charter boats and all of them, and this MRIP -- The tiny bit of intercepts they may or may not have got last year and this year, that whole database is suspect, because we have a lot of problems with the recalibration scenarios.

Moving on, high-grading, why do we want to high-grade? Most of our animals are all market-sized, the normal things we catch, based on the hook size that we're targeting them, and most of those are four and five-year-olds, and they're not the two-year-olds and stuff like that, and, of course, the males are bigger than the females, but they don't switch sex like some of the snowy grouper and others.

SEAMAP, they don't get down even off the beach much below Ponce Inlet, except in the thirty foot or less, and that's been -- Then you get on down Port Canaveral, and you've got other problems, and SEAMAP ain't going to be out there in 660 foot, or anywhere near the Oculina and trying to drag a trawl, like they do up in the Northeast.

Then, shifting to your breakout group stuff, in 2018, your terminal year, well, with these MRIP issues, you're not going to have a 2019 and a 2020. It's going to be another problem for you down the road, and remember that monofilament does not cut the water the same way that a bandit reel does, and 25 percent of our allocation is guys that are fishing bandit reels, and mostly some type of stainless line going down off a spool and then catching what they catch, and they have been catching their quota too since we established it, even though they only had 10 percent of the allocation, based on actual landings going back to the early 1980s, but we gave them 25 percent.

Uncertainty on low recruitment, I just explained a lot of the reasons. The Monte Carlo Bootstrap stuff, it's not overfished, and overfishing is not occurring, but, because you have a lot of assumptions going in and a lot of unknowns thrown in, it's just going to create the problems that they create.

Let me see. The P* analysis, we handled that, and sometimes I think that's a little heavy-handed at times, with the P* stuff, and the burrows, and I loved hearing the stuff about the young-of-the-year, or two-year-olds or whatever being on shelves and not in burrows, but don't forget that a lot of those burrows, up and down the whole eastern coast and wherever else these tilefish are, are subject to predation from hammerhead sharks, and they are good at it.

There's footage of it, and, yes, Amy, I loved the notion of the genetics and checking between the north and the south, but I believe that whatever kind of stuff is going on with our breeding stock down here may actually be benefitting that one-million-pound limited access, and seven boats, predominantly, are dominating it off of New York, the allocation, and here we have twenty-two boats that longline now, and that's so wrong. The diet study, thank you for bringing that up, and that's it. Thank you. I wish that I could say something about red snapper, but we're off the subject now. Thank you.

DR. NESSLAGE: Rusty, I apologize. This has been a crazy webinar so far, and I am not trying to quiet you, but will you be around when we do the final public comment on the last day, or will you be completely checked out by then, and I wouldn't blame you.

MR. HUDSON: Are you talking tomorrow or Friday or Monday?

DR. NESSLAGE: This thing will never end, and I'm calling it a webathon, or maybe a webageddon, but I was thinking the final public comment, the wrap-up, would be Monday afternoon, but we can reconsider that too, to give folks a chance to talk about red snapper, although we're off the subject now.

MR. HUDSON: Yes, but, after each presentation, the protocol that we worked when Marcel was the Chair, et cetera, was that, when we actually had physical meetings, and I know it's a little hard, and it gets discombobulated, when we've got everybody working out of their houses, and I had a big 200-pound dog run in the yard, and I was afraid that I was going to miss this comment. I'm out in the country and just trying to deal with operating off of a microphone for the last year-and-some-odd, but thank you, and I'm hoping that there's other people that were listening, I think, and maybe Chip can tell, but I appreciate it.

DR. NESSLAGE: I hear you, and I had thought along the ways of I wanted people to hear everything before they provided comment, so that you wouldn't feel left out if you saw something in the breakout groups, but you're right that it would be good if we had a brief public comment after the presentations as well, and so I will see if we can squeeze that in, and I apologize.

MR. HUDSON: That would be cool, because, honestly, my little brain has a hard time keeping up. Thank you.

DR. NESSLAGE: Your brain is not small, and I will be very impressed with anybody who is keeping up with us this week. Is there any other public comment? Thank you, Rusty. Is there any other public comment?

DR. COLLIER: I am not seeing any other hands raised.

DR. NESSLAGE: All right. Thank you. Church, your hand is probably hurting by now, because it's been in the air so long, and is there something that you wanted to comment, or is that leftover from before?

DR. GRIMES: I think it must be leftover, or I forgot what it was.

DR. NESSLAGE: We're losing our brain cells, all of us, at this point. Thank you. Okay. Let's go back, if we could, to our consensus statements. While Chip is doing that, Erik, are you still -- Nikolai, you're still on the line, right?

DR. KLIBANSKY: I'm here.

DR. NESSLAGE: I remember, early in this SEDAR for this, the process, we had a -- It was like the -- I forget, and I was just looking through my file, but there was a slide that you showed of the data by latitude, and we talked extensively about how the data availability changes by latitude, and Rusty reminded me of that issue, that you get very different -- Because of the depth closest to shore, et cetera, et cetera, that, just because we're sampling in every state, it doesn't mean that we're getting the same kind of data, and Eric made a number of important, and I thought good, points on that webinar. Do you still -- I hate to put you on the spot, but do you have that? I guess I just wanted -- Because we're talking about uncertainties and research recommendations and things, and it might be really nice to show folks that, but, if you can't dig it up quickly, that's fine, too.

DR. KLIBANSKY: I think that was Eric Fitzpatrick that had some plots, and they would kind of be bubble plots that were just like black-and-white bubble plots that were showing -- Eric Fitzpatrick had that, and I know he's not on the call at the moment, and I don't believe that I ever had that.

DR. NESSLAGE: Okay. That would be something -- Can we -- I don't want force the SSC into putting something in the report that they haven't seen, but, when we review the final consensus statements on Monday, it might be something -- If we could find those files, and just to show folks and to maybe -- If you could scroll down, Chip, under uncertainties, but just that there's spatial variability in the data that is not necessarily -- Sorry. Up above, under uncertainties.

DR. COLLIER: Okay.

DR. NESSLAGE: I can try and wordsmith it a little, but, basically, the amount of data is not consistent spatially along the South Atlantic coast, and that could present some model misspecification, or I guess not model misspecification, but the data may not be completely representative of the entire stock, which I think is part of what Rusty was trying to get at, or maybe I'm wrong, and I shouldn't put words in his mouth, but -- Then what I can try and do is have -- Nikolai, can you ask Eric, or should I ask Eric? What's the best way to --

DR. KLIBANSKY: I am actually just messaging him now.

DR. NESSLAGE: Fabulous. Yes. If he could send that to Chip or me, and then we can show it, and then, if the group doesn't agree with me, after seeing that, that's fine, and we can take it out, but I think it's an important thing to consider. Are there any other comments before we take a close look and then kind of approve these as our -- Or do the final edits for our consensus statements?

DR. COLLIER: Genny, it looks like there's one more public comment.

DR. NESSLAGE: Great. Okay.

DR. COLLIER: Mike Merrifield. Mike, it looks like you're unmuted, but we're not hearing anything yet. Mike, given that we're not hearing you, if you want to type something into the question box, I can ask the question for you or provide the comment for you. I'm not certain how long it is. Mike, I'm not certain if -- I guess lower your hand and raise it. There you go. I see the question has been entered. He indicated that he just wanted to -- He's going to send in a comment, but he wanted to reiterate Rusty's comment, that there are no discards in the commercial longline fishery. Therefore, the high-grading question that was brought up is not an issue for this fishery.

DR. NESSLAGE: Thank you. I appreciate that, because I didn't think that was the case either, and so hearing from folks who are on the water is really important. Good. We appreciate that, Mike. Do we see any other hands? I don't want to miss anyone.

DR. COLLIER: I am not seeing any right now.

DR. NESSLAGE: All right. Let me know if anyone pops up, but I feel like -- I don't know about you guys, but I really need a five-minute break. Do you think we could do that and then come back and finalize these?

DR. CROSSON: It sounds good to me.

DR. NESSLAGE: Good. Okay. It's 3:30.

DR. COLLIER: So, Genny, 3:35, or 3:37?

DR. NESSLAGE: We'll give them five. Thanks.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Nikolai just sent me -- He reminded me that it's in Eric Fitzpatrick's -- The graphs are in the PDF from Working Paper 3 from our SEDAR 66. Chip, you just sent it to your email as well, and would you mind pulling that up, real quick, and then folks can judge for themselves whether they agree with my concern, and it would start on page 12, I think. No. Page 11.

DR. COLLIER: That should be coming into view.

DR. KLIBANSKY: It's PDF page 11.

DR. NESSLAGE: Eric says it's Figures 6 and 7. The bubble plots -- Can we unmute Eric, if he's willing to just very quickly walk us through these graphs?

MR. FITZPATRICK: I'm here.

DR. NESSLAGE: We appreciate that. It just reminded me of our early conversations, early in this process, about the spatial distribution of the data, and we talked a lot about how that's a challenge for the assessment, and I was wondering if you could just briefly show us what was going on with these graphs, and sorry to put you on the spot so suddenly.

MR. FITZPATRICK: Right here is just the relative -- So this is the -- Number 6 is just the number of trips by latitude, and the size of the bubble represents the sample size, and, if you scroll through, it's the same process, and so the next plot would be the number of fish, and then the final figure is the relative catch per unit effort by year and latitude, and so you can see that the predominant -- The driving force of this index -- You see the shift from a relative distribution in the Carolinas, in South Carolina, and you see this narrowing of the fleet in the fishery in the more recent years, and so that was a big concern in guiding the decision to truncate that index in 2006, along with the seasonal closures. I tried to do a pretty good job, in the working paper, of describing all of those issues, and talking with the commercial stakeholders was very informative, and so I laid it out pretty good in the working paper, but, if you have any more specific questions, I'm available until 4:00.

DR. NESSLAGE: That's fantastic. Thank you so much, Eric. Go ahead, Chip.

DR. COLLIER: I just wanted to let people know exactly where they could find this paper, because it's not in our briefing book documents, but it's on the sedar.org website. If you click on those hot links to the right, SEDAR 66, and this will be one of the working papers, and it's Working Paper Number 3.

DR. NESSLAGE: Thank you, Chip. Just for the rest of the SSC's indications, this is what I was talking about. As Eric mentioned, some of this was accounted for in part of the decision-making process to truncate the commercial longline CPUE, but this does -- Obviously, we get samples, age samples, from the fishery as well, and so this might reflect some -- It's hard to say, but it is an uncertainty, but I don't want to be too prescriptive, and so, if anyone on the SSC is concerned about making this statement, I am happy to rescind it.

MR. FITZPATRICK: Genny, I wanted to make one other quick comment. It's an anticipated question, but I got this question about the assessment webinars, but those red Xs represent confidential data, and so I went through, and it's safe to assume that those are pretty low values, and so the predominant -- What you're seeing here is the pattern, and so I wouldn't get caught up with those red Xs.

DR. NESSLAGE: Gotcha. Thank you for that clarification. Does anybody on the SSC have an issue with the point that I raised? I'm fine if you do, and this would be the time to express concern. George, go ahead.

DR. SEDBERRY: Could you just -- Now that we've looked at this, could you just quickly reiterate the point you made?

DR. NESSLAGE: Yes, and could we maybe go back to -- Yes. You're reading my mind now, Chip. Right, and so there's been, I guess you could say, a spatial constriction of the fleet, and thus the available samples to inform the assessment, and that could impact our understanding of the status of the entire stock, I guess is how I would say it, but --

DR. SEDBERRY: Okay. When I look at those figures, to me, they reflect where golden tilefish are found. They're not found everywhere, and they have a very restricted habitat, and say, off of Georgetown, South Carolina, at those 600-foot depths, it's hard bottom, and so you don't find a

lot of golden tilefish there, but, off of Georgia and Charleston, at those depths, where the Gulf Stream is deflected offshore and get more sedimentation, because there is less current, you get that green clay bottom that tilefish like at 600-foot depths, and so there is more catch there than at similar depths off of northern South Carolina, just because the habitats are different, and so, to me, it's constricted, yes, but I think it actually reflects where you find tilefish and not that there is missing samples or missing data, but it's just that tilefish aren't found everywhere, and they have really narrow habitat preferences, and they just don't occur along the slope all the way from north to south in the South Atlantic Bight, and so I don't have any problem with this, myself.

DR. NESSLAGE: I agree with you completely, with regard to the narrowness of the habitat and where they're found. What I'm looking at is the X-axis, and so, yes, there is an increasing number of samples as the catches have gone up in recent years, and, if you look, there used to be -- Unless I am reading too much into this graph, there used to be a bit more up towards the Georgia region, and now it looks like it's coming back a little bit, but maybe not so much, and it's not that there's been a shrinkage latitudinally, but there's been a change over -- Well, it's hard to say.

Do you see what I'm saying? The X-axis has -- The bubbles have gotten bigger in the Port Canaveral area, and perhaps I'm reading too much into it, but I know we talked about this quite extensively, but I'm happy to -- That's just my reaction, and I will shut up. Fred, please go ahead. Fred, you might be muted. In the meantime, should we go to Wilson, and hopefully we'll get Fred back online soon?

DR. COLLIER: Sounds good.

DR. LANEY: Madam Chairman, I was just going to say that George's comments about the fact that golden tilefish are so tightly tied to a particular habitat type, to me, just once again reinforces the desirability of us understanding exactly what is out there, in terms of habitat, and this council has been supremely wonderful in terms of placing an emphasis on mapping those habitats and working with our partners at NOAA to do exactly that, and so, at some point in time, in the not-too-distant future, we will have really good detailed habitat maps of what is out there, and then tilefish might be the optimal candidate to begin to understand habitat production relationships, given that they are so tightly tied to a particular habitat, and so I will just weigh-in with that observation.

How exactly that fits in with the data distribution that we're looking at on this graphs, I'm not sure, but I take your point, Madam Chairman, that it does appear that effort, certainly effort in the fishery, has shifted over time, and, somehow, what would be ideal, maybe, would be to put a grad student on this and do some GIS mapping of effort and habitat, and then we would really understand a whole lot more about where this fishery is and how it's prosecuted, maybe. Thank you.

DR. NESSLAGE: Thank you. Fred, are you back on?

DR. COLLIER: I'm not certain if he's back on, but I will read his question. He indicated that he thought the Xs were confidential data, and that's what I remember from Eric, when he was discussing it as well, that those Xs are confidential, and that, if there's a blank, that means there's no data in that spot.

DR. SERCHUK: Can you hear me now?

DR. COLLIER: Yes, we can.

DR. SERCHUK: Okay. I got back on. I just wanted to make sure that the Xs mean that there is information available there, but, because it is either less than three vessels, or whatever the confidentiality limit is, they're not shown, and so it's misleading to see large circles in areas and say there is nothing up north, when, quite frankly, there is not a sufficient number of individual operators to make those data transparent, and so I think we've got to be careful about it. Obviously, the places where there are no Xs mean there's been no activity whatsoever, but I just want to make sure that I understood that the Xs are confidential data, and so there's no information on CPUE that is divulged from that information, and is that correct?

DR. NESSLAGE: That is correct, but Eric did say that they wouldn't be very large bubbles, and let's just put it that way, if that's a --

MR. FITZPATRICK: Genny, during the assessment process, I ran this plot, and I can turn that on and off, but it's just, because this is a working paper, it's something that I just can't provide, and so I don't have that right offhand, but I did examine it, and there's no hidden pattern that would lead to a different conclusion. Those values are so small, and the pattern that's emerging here is the pattern that exists when you run it without the confidential Xs.

DR. NESSLAGE: Thank you, Eric. Does that answer your question, Fred? Obviously, we have to take Eric's word for it, but I will vouch for him. He's very trustworthy.

DR. SERCHUK: Okay. Thank you for that clarification.

DR. NESSLAGE: Okay. George.

DR. SEDBERRY: That answered my question, too.

DR. NESSLAGE: Great. Okay. We need to have Eric on more often. Anne.

MS. LANGE: Sorry, but I was going to comment on what Eric had said. I was going to remind everyone that Eric had already said the Xs had been examined, and they really were small, and so sorry.

DR. NESSLAGE: No. Thank you, but I feel like I argued too much with George. George, if you feel this is pretty representative of where you would expect to find tilefish, I will back off completely, and you are the senior expert on this one.

DR. SEDBERRY: Well, that's kind of the way I see it, is that the right type of bottom occurs -- Particularly if you look at the number of trips, and, well, I guess it doesn't matter which one you look at, and it has certainly changed over time, but the right type of bottom just doesn't occur everywhere, and where I see the large catches is where you find the right kind of habitat, and so, if there's concern about missing data, then I don't think there is missing data, but it's just the data is coming from where the fish are found.

It also helped me with Eric's clarification that the Xs -- That he has actually looked at the data in there, because the catch per unit effort in those Xs could be very high, but it's three or fewer boats, and so it doesn't show up, but he says he's looked at those. He just can't report them, but he's looked at the data, and they are very small, and so that helps me quite a bit, too.

DR. NESSLAGE: Okay, and, well, sorry to take us down a rabbit hole, folks. We can take that out.

DR. COLLIER: Just in case you guys want to keep it in, all I'm going to do is strike through it, and I'm not going to delete it.

DR. NESSLAGE: I am just hemming and hawing because I feel like whatever fishery-independent index we get -- If the fish are concentrated off of Port Canaveral, and whatever Todd's survey is going to be like is in a different place, we could end up with even more problems in the future, and maybe I'm just a worrywart, but I don't know. Wilson.

DR. LANEY: Well, I was just going to say that -- I mean, I still think that your concern is somewhat warranted. If those red Xs, and Eric has assured us that they do, represent data, the distribution is somewhat broader than if they didn't represent data, but still that tells us that there are -- I mean, if there's an X there, that means there was a tilefish landed at that latitude, correct, and so it's still skewed, a skewed distribution. Now, does it reflect a skew in the distribution of effort? George tells us, and I certainly respect his opinion, that it is more reflective of where the habitat, optimal habitat, desirable habitat, whatever adjective you want to us, occurs, but, if it's a combination of both effort and habitat, then I think your concern is more valid than not.

DR. NESSLAGE: Thank you, Wilson. Fred.

DR. SERCHUK: Thank you, Chair. It seems to me that, if you were going to do a survey, you would probably stratify your sampling by habitat, and that is you would put more samples in those habitats that are known to be prime habitats than you would in other habitats that contain some animals, but are suboptimal, in terms of the preferred habitat for the animals that you are surveying, and so the spatial -- All animals have a spatial distribution, and all animals have a preferred habitat, but they also occur in marginal habitats as well, and the idea for a good survey is to make sure that you spend most of your survey effort in the prime habitats, because they will encompass most of the abundance of the stock. To that extent, we would hope that the data that are forthcoming from the surveys, or the fisheries, reflect those areas that produce most of the catch, that it presumably reflects the prime habitats, and is that correct?

DR. NESSLAGE: I think you're on the right spot, and I guess I don't really know much about this new survey. Is Erik Williams or Nikolai or someone who could speak to that?

DR. KLIBANSKY: I'm here, but I don't know.

DR. NESSLAGE: Okay. Thank you.

DR. WILLIAMS: I can briefly touch on that, and so what Fred describes is correct if you're focusing say on a single species, but this is a deepwater survey that is meant to cover multiple species, and so the sampling design gets a little more complicated, or actually not complicated. It

actually gets simpler, and, in the sense of what the -- My understanding of the deepwater survey that they're implementing, it's just stratified basically by depth zone and then broken into some latitude zones, and they're going basically with a proportional allocation for sampling, and that's just -- Maybe, over time, we could refine that survey, as more information is gained, but that's kind of all we have to go with, and we can't afford to do anything like a Neyman Allocation or any other more advanced allocation and stratification for a survey that -- You know, one of the things that we suffer from in the South Atlantic is an incomplete mapping or understanding of all the habitat, and that's going to haunt us for a while, until we get more percent coverage of habitat mapping.

DR. NESSLAGE: Thank you, Erik. While you're unmuted, this was a big -- I remember you making a big deal out of this, and so I would love to hear your comments on the concerns about the change over time, but maybe you have changed your mind.

DR. WILLIAMS: No, and one of the -- The other thing to sort of keep in mind that matters to these species is the degree that movement is occurring and the potential for localized depletion, and so, for something like tilefish, where the sort of predominant thinking is that they tend to settle out as adults into a habitat, and probably don't then migrate very much outside of where they have settled, then that's where this becomes an issue, is if what the CPUE we're getting is a reflection of local conditions and not necessarily conditions up and down the coast. That is where you start to worry with these fishery-dependent indices.

DR. NESSLAGE: I would agree, and would you not extend that to the catch-at-age as well, because this is an -- If you have higher effort in the area where you're getting most of your age samples, and then, if that's getting fished down, then you might see a higher -- You might end up with a higher F than you might actually be experiencing stock-wide, which is my whole point.

DR. WILLIAMS: Well, again, then the trick there is, is the selection process such that say bigger fish are being caught first, and so then that has to play in as well, and so imagine in this case, and I don't know the answer to this, and this is a hypothetical, but these fish are not really being recruited to the fishery until age-five or six, and so is the hook selection going on -- When you put a hook on an area, are you capturing those oldest fish first, and then you're serially working your way down to say the age-six or seven fish, or is what is being caught on the hook reflective of what's there, age-wise?

Again, don't conflate catch per unit effort as the abundance on a site, and the selection process is sort of that serial depleting of the age structure, and I don't know how that trades off with tilefish exactly, and I know we have a study for snowy grouper that suggests that they actually are susceptible to this idea of, if the bigger fish are there, they're more likely to be caught first, and then you can see the serial depletion, and there's a good study by Sherry Epperly and Dodrill, where they actually follow the sort of fishing-down effect on a particular site that had snowy grouper on it, and what you see is exactly what I just described, where not only did the catch per unit effort go down over time, but even the size of the fish then went down over time. I don't know if that's necessarily the case for tilefish.

DR. NESSLAGE: Agreed. Thank you. I appreciate that. Fred Serchuk.

DR. SERCHUK: My hand should be down.

DR. NESSLAGE: Apologies. John Walter.

DR. WALTER: Thanks. This brings back a lot of memories for me of when I worked on tilefish in the Gulf, and one of the things that -- There has been a long history of research on tilefish, and I was just going to point out a depletion experiment that was done in the Gulf of Mexico by Jerry Matlock that was published a bunch of years ago, which worked quite well, and you actually could deplete the population and get a population estimate for a particular area.

Then I will also comment that, in terms of some of these sampling issues, they could get addressed through some of the new next-generation sampling techniques that I didn't quite see on the set of research recommendations, but particularly acoustics that could get at -- You could count the burrows, and then visual techniques and cameras that could actually be run over the areas to count them, and those are things that probably should be in the next -- Particularly, those were some of the main engines that were used to count red snapper in the Gulf of Mexico, and so my thought is, as we embark on the pretty good red snapper count, we may learn some things that might work cross-species, particularly if we could get them in other habitats, and maybe even deeper water, and that could be done, but I think there's a lot of potential there. Thanks.

DR. NESSLAGE: Thank you very much. Wally.

DR. BUBLEY: I just wanted to touch on the newer deepwater survey that's going on, and Erik covered most of the topics that I was going to mention, but, I mean, one thing is that survey range is going from the North Carolina/Virginia border through the Keys, and so it's a pretty wide range, and, as of right now -- As he mentioned, in the future, we can potentially reallocate some of the effort, but, right now, this year, the plan is to actually triple or quadruple the effort that went on last year in each strata, and so hopefully we'll have a better idea of where we can go in the future, in terms of allocating effort, if we need to, from there.

DR. NESSLAGE: Thank you. John.

MR. CARMICHAEL: I wanted to ask for some perhaps clarification to be added on the bullet addressing the low recruitment at the end of the time series, and it's because of the nature of this stock, and, as Erik has mentioned a couple of times, the high age of recruitment into the fishery, and so you don't have a lot of information on those youngest age classes in any of the assessments in the terminal year, and so, if you were to say look at Figure 11, depending on how well you understand that and what that figures shows, you could look at that bullet and then see the last seven years or so, where recruitment is right in line with the expected values, and go, what do you mean low?

Then you look at the residuals, and you can see that, clearly, there's really no information to inform them, and so they're just pretty well fitting based on the average, and you see a little bit of blip coming in there, with probably, as Erik mentioned, the fives, sixes, and sevens start to recruit to the fishery, but it's probably not until eight or nine where you really get a good -- That enough year classes have recruited to understand how good year class strength was, but, on the other hand, if you do look at the recruitment from 2002 to 2008, it was on a pretty good downward slide, and it seems to have maybe stabilized, and perhaps starting to kick up a little bit, depending on how

much stock you put in 2011 and 2012, with those still, for this fishery, pretty young fish, and I just feel like that needs some potential clarification of what is meant by the end of the time series.

DR. NESSLAGE: Good point, because we have -- Is it eight years where we're not really estimating it, and do I remember that correctly, too?

MR. CARMICHAEL: Yes, and you look at the residuals, the deviations, and you see all those circles right on that dotted line, and that means they're not deviating from the expected, because they don't have a lot of data, and so I would really love to have the surveys and more information on the younger fish, and it's been this way for tilefish since the very first assessment, and it's just an issue, and I think it contributes to the overall uncertainty, and it certainly makes it harder to manage.

DR. NESSLAGE: Absolutely. When we go back through our language, we'll take a particularly close look at that. Thank you. Fred Serchuk.

DR. SERCHUK: I thought the -- My concern was that the recruitment that was used in the projections is almost at the 300,000, or 3e to the 05, where most of the observed points have been below that for the period that we have in the last nine or ten years, and so that was my concern, quite frankly. That's why I thought that the projections were optimistic, but maybe I'm wrong. Maybe I misinterpreted the figure.

DR. NESSLAGE: No, I think you're -- Since we're here, and, at this point, we're just going to transition into finalizing these, and so let's do it. Fred, help me with the wording then here, and let's see how people feel about it. We don't have to wordsmith too much, but I want to make sure the content is right. You know what I'm saying? First of all, I think we have to do what John suggested, that low recruitment at the end of the time series is a little -- The last nine years of estimated recruitment, from 2003 to 2011, are below RMSY.

DR. SERCHUK: Right, and those are good data points, and everything after that is estimated, and so my feeling is that, if you were going to take an average of the data points from -- For me, the 2003 to 2011, to basically say we have a period of what we see as low recruitment, and we don't know whether that's going to prove or not, but you certainly wouldn't -- You would get an average recruitment that would be lower than I think the recruitment that's been used in the projections, which I think is around three-something, or maybe 297. We can look at the projections, and I'm just thinking that's the reason why I think they perhaps could be overly optimistic.

DR. NESSLAGE: Yes, and perhaps we could add that phrase, right after "projections" there, below your cursor. Therefore, the projections may be overly optimistic. As long as we say "may be", we don't know, right, but it's a concern. Does that capture what you're saying, Fred?

DR. SERCHUK: Yes. Exactly.

DR. NESSLAGE: Is everyone okay with that, or, rather, should I say is anyone not okay with that?

DR. SERCHUK: I mean, if you start looking at the document itself, Table 20, where they looked at projections, you see we have 294, 297, 297, and they're close to 300, and I think that the recent

average of the empirical observed values would be much lower than that, but I think you've got my point. Thank you.

DR. NESSLAGE: Maybe we're missing something, and I see Erik's name. Erik, go ahead.

DR. WILLIAMS: I know, with other cases, when we have a pattern of low recruitment and we're considering that that pattern may continue onward, beyond where we're able to estimate it, that usually only affects the projections. In this case, this would affect the actual base run as well, because you basically -- I mean, we are projecting stochastic recruitment in those years that are on that line, so to speak, but, if the SSC does really think that the low recruitment in those years where we have freely-estimated recruitment values should have been continued on, then the overall assessment is optimistic and not just the projections, and so you just might want to mention that as well, and it's not just the projections, in this case, because we're talking so many years of recruitment that are assumed in the assessment model itself, the base run.

DR. NESSLAGE: Good point, Erik. Nikolai, would you like to add to that?

DR. KLIBANSKY: Just that that last sensitivity run incorporates lower recruitment at the end of the assessment, and I think that's sort of where Erik is going with that, that if we had assumed -- Instead of using that stock-recruit curve for those last seven years, if we used something like average recruitment for those previous like eight years that were low, then the assessment would look different.

DR. NESSLAGE: It looks like it would be overfishing for sure, and possibly overfished, at least in the last year, and so, yes, that contributes. Thank you. Amy.

DR. SERCHUK: Again, Chair, if I may, I didn't want to make a big thing out of this, because, when we discussed not using the high recruitments for the red snapper, and we decided to go someplace else, and so this is the opposite of that, and so I don't know what our standards are here, but we used a different approach in not taking account of the continuation of the high recruitment that we saw for red snapper in the past five or six years, whatever it was, into the projections. Thank you.

DR. NESSLAGE: Good point. Amy.

DR. SCHUELLER: I was looking through the assessment report, to look at the MCBE runs, to see what figures were provided for those, and I was wondering, Nikolai, if there is a figure for the recruitment for that, and what I'm wondering is -- Erik keeps saying that recruitment is stochastic in those last nine years in the MCBE runs, and so I was wondering what the envelope or distribution around those recruitments looked like. It might help us at least say something about the uncertainties that are addressed related to this, given the MCBE runs.

DR. KLIBANSKY: Yes, and so you want to see like the -- I have a plot that I'm looking at that looks like a lot of our other MCBE plots, with the base run recruitment time series and then the median and 95 percent confidence intervals around recruitment.

DR. SCHUELLER: Exactly. I mean, we have them for everything, right?

DR. KLIBANSKY: Yes.

DR. COLLIER: Nikolai, can you tell me what slide that is, and I will pull that up?

DR. KLIBANSKY: I don't know that it's in there. I don't know if it's actually in the report or not. I could just send it to you.

DR. COLLIER: Okay.

DR. NESSLAGE: Great. While he's doing that, let's hear from John.

DR. WALTER: Thanks. So, as somebody who might have to explain the decisions here, I want to make sure that I'm clear on the logic, and so, in particular, the Bullet Point 3 that the MCBE runs have a lot of uncertainty, is actually capturing -- The model is doing exactly what we expect it to do when we have scientific uncertainty, and if you look at like, for instance, the Slide 48, where you look at the ensemble, and you look at the F over $FMSY$, and it's got a really wide distribution in the terminal years, because the model is accounting for that uncertainty, in that there's no information for recruitment, and it's just use rec devs of zero and accounting for that.

That is actually what you want your model to do, and that's going to create a wider distribution around the overfishing limit, so that, when you apply a P^* , it's going to be a bigger buffer, because you've got a wider distribution, and that's actually the process of accounting for the scientific uncertainty within the model, and so it seems to me that the model is doing what the concerns, the scientific uncertainty concerns, are.

The next point, and so, in that case, you wouldn't need to decrement further for that, because it's already part of the incorporated scientific uncertainty, and the P^* is to account for scientific uncertainty not addressed within the model.

The next point is that it seems like -- Fred brought it up, about the logic on dealing with and explicitly pointing out the low recruitments, but not necessarily pointing out the same concerns about the high recruitment, and that's going to be something that I have a feeling that whoever presents this to the council -- That they're going to have to explain, and I know that I will probably get asked that, and so I just want to make sure that the logic is clear. Thanks.

DR. NESSLAGE: I don't know who is going to have to explain that to the council.

DR. WALTER: I don't know either.

DR. NESSLAGE: I feel like that's me. Oh, believe me, we're going to be talking about -- We'll see how that goes, but we haven't made a decision on snapper, and so I don't want to go there again today, but I thought we gave -- In the decision tree, I thought we gave them the max credit for uncertainty, other than they didn't incorporate environmental whatever whatever, and so I'm not sure where you're coming from, John, that we're somehow --

DR. WALTER: The bullet point that says that the MCBEs -- It might be the concerns over -- I don't know that that was explicitly incorporated in the P^* calculations.

DR. NESSLAGE: No, and so don't worry about.

DR. WALTER: Okay, and so it's just a bullet point that is additional, but it doesn't -- I don't know why that -- I'm thinking that it's not really helpful, in the sense that -- Do we think that it's not incorporated in the actual model outputs?

DR. NESSLAGE: No, and I think all we're -- Maybe I'm wrong, but I think all we're trying to say here is that this isn't a stock where all the MCB runs were in one quadrant and the answer was clear as day. The answer about stock status depended on a lot of different conditions in the stock, as indicated by the MCB runs, and, therefore, it's not a slam dunk and everybody in one quadrant, and that's all we're saying here. John Carmichael.

MR. CARMICHAEL: Thank you, Genny, and I just wanted to -- I was going to comment there when John was mentioning the uncertainty bounds that are there and how they get reflected through the P* and to point out that this stock has stood out, for a number of years, for having the largest percentage buffer, in terms of pounds, of any of the assessments that we do, and it's often been attributed to exactly the things that John was mentioning, this uncertainty and this lag in actually getting a good handle on recruitment from time to time, and we've had to explain it to the council in a number of cases in the past.

The reason that it seems so odd is that the things that we normally cite to contribute to uncertainty don't exist in this fishery, and it's a relatively short-duration fishery, and it's predominantly commercial, and it's well sampled, and it's free of all the recreational reporting issues and the uncertainties there, and it doesn't have the discards, and so all the things that you normally look to in a fishery to say, yes, that one should be a strong assessment and very well sampled and low uncertainty just don't sort of work out here.

Sort of what John was saying, that, theoretically, they should create a high buffer, is exactly what has happened in this stock, year after year after year, and so I do feel that these concerns about recruitment and these issues with the MCB -- When you look at it, they do get reflected in that difference between OFL and ABC, and they do create a pretty big separation and buffer in this particular stock.

DR. NESSLAGE: Perhaps we can elaborate on that below, in the question about the buffer. Did we want to go back to Amy's question, now that we have those -- Do we have those teed-up? Go ahead, Amy. Do you mind reiterating?

DR. SCHUELLER: This is the distribution of recruitment from the MCBE runs that's been used into the projections as well, right, and so, if you look at those last nine years, or however many we decided, the distribution around those is gigantic, and it includes an area below the recruitment values that we're talking about as being low, and so I guess I feel like we could -- I mean, I don't think this was in the report, and this could probably be -- Maybe we can add this to the SSC report and then explain what we're doing here and why, and I think this just supports that, and it supports, I think, what John was also just discussing, which is there is scientific uncertainty here, but we're accounting for it in those MCBE runs, and it shows it here visually.

DR. NESSLAGE: Right, and then that bleeds into the buffer. Yes. Could we put a note to include this and discussion of this under the recruitment, and then also below, with regard to the buffer?

DR. COLLIER: You said in the buffer? I'm sorry, but my eyes are getting clouded over now.

DR. NESSLAGE: No, I don't blame you. If you could scroll down to the question about why the buffer is so big, and if you could just add a placeholder for some language about the fact that there is high uncertainty in recruitment and that's incorporated into the -- We'll come up with better wording, but that ends up being part of the contributor to the higher buffer, and we'll reference that figure, too. I'm not sure if we were correct in the statement above, and maybe "should" is not the right word there, and maybe say "may", or we'll see.

Let's go back up to the top, and let's go through this one final time, or not final, and we have one more chance at the end of the day on Monday, but I think, by then, everybody is going to be really -- Their brains are going to be toast, and so please pay attention at least to the content of these and make sure we're not missing anything that needs to be included in the report. We all agree that the assessment is ready for use, and then we have raised several -- We are reviewing and summarizing the potential assessment uncertainties, and we've got natural mortality, and we've got recruitment.

DR. COLLIER: I will scroll as you talk.

DR. NESSLAGE: Yes, and we've got the issue of not all of the MCBE runs are in the same quadrant. Steepness cannot be estimated reliably, and there is an effect of assuming steepness, and we've got weight on the MARMAP/SEAMAP index can affect stock status and is limited spatially. There is concern about the longline index being truncated in 2006, and the indices are patchy, and there's high variability and little trend. Then the terminal year is 2018, and so now we've got quite a few years without actual information, but, yes, the methods of addressing uncertainty are consistent, and we thought standard practices. Well done, Nikolai. Anything we need to add or change here with regard to the content?

DR. COLLIER: I am not seeing any hands. Amy has her hand raised.

DR. NESSLAGE: Amy, go ahead.

DR. SCHUELLER: I was just going to say that we need to sort of finesse that recruitment bullet still, and I can be -- I don't know, and maybe a couple of us could be assigned to work on that or something, because I think it needs a little bit more thought.

DR. NESSLAGE: Can you scroll up, real quick, Chip?

DR. SCHUELLER: Because, I guess, my concern is it says concern that lower recruitment in later years of assessment not reflected in projections, but that's not exactly true, given the plot that we're going to add.

DR. NESSLAGE: I see where you're going. Fred, have --

DR. SCHUELLER: I just don't want to get down the line and we're confused, because there's like two things in there that are opposite of each other.

DR. NESSLAGE: Absolutely. Fred, having seen that plot, you're okay with taking that sentence out and refining this more along the lines of what Amy is talking about?

DR. SERCHUK: I will accept any emendations that Amy wants to put in there. That's fine.

DR. NESSLAGE: That's collegiality, and I love it. So you can strike that through, unless, Alexei, you have something?

DR. SHAROV: I hate to continue this, and we need to wrap it up, and we're getting it pretty much, but I don't understand why we think that the low recruitment for the past nine years is not reflected in the projections. These are the estimated recruitment numbers for the last nine years in the assessment, and they lead us to the terminal year numbers-at-age, which then -- Up to this point, that's the estimated recruitment within the model.

From that point, and they are low, primarily, or likely to be low, because those cohorts have not participated fully in the fishery yet. Once, in the future years, more catch-at-age information will be accumulated, those will be adjusted, and the numbers will be more variable, and some might be higher and some might be lower, and we will see later, and, from that point, the projections -- The question is what we use, what level of recruitment we use, for the projections. That is exactly the same logic as in the case of the red snapper, and so, in my mind, the low level of recruitment isn't counted in the assessment, I mean in the projections, because those low levels of recruitment result in the lower starting point of the projection, and then the projection goes forward with whatever level of recruitment the analysts assume, and so thank you.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Of course, Alexei is correct that whatever recruitment has been substantiated will go into the future as lowered numbers-at-age, and that was not the meaning of the sentence. The sentence was that the pattern of recruitment that we've seen in the last nine years of lower than average recruitment, or a much lower level of recruitment, that pattern, as far as I was concerned, was not captured as a lowered level of anticipated recruitment in the projections, and maybe Amy has said, well, look at the level of variability, and, if that's the case, I will accept it, but, typically, there are a number of ways you could think about how we should project recruitment in the future.

One, you can take it off of a stock-recruitment curve, or, one, you could use a recent average, and there are a number of others. All I was trying to say was that, as far as I could read it, the annual recruitment that went into the projections was higher than what we have seen empirically for the years in which we were able to estimate recruitment and not that those low recruitments were not going to go into the population in the future, and they certainly were, and that's all that I was trying to highlight there, and maybe that sentence doesn't capture it.

DR. NESSLAGE: I think I agree with Amy that a group needs to work on this, because I am not sure that I am completely following where you're both going, separately or together. Is it possible that someone could volunteer to flesh this paragraph out a little bit more and run it past the other two or three of you, and then can review it on Monday, in our final review? I hate to do that, but we also need to wrap up and give Nikolai our final projections, or can you guys quickly --

DR. SCHUELLER: I was going to say that I can volunteer to work on the language and then pass it by whoever wants to see it, and I assume Fred.

DR. SERCHUK: I will accept whatever you do, Amy, quite frankly. I saw that large confidence limits around it, and, if you're going to address that, that would be fine.

DR. NESSLAGE: Thank you, Fred, but I'm worried that maybe Alexei disagrees. I am not following this argument completely, and so --

DR. SHAROV: I am totally fine with this, and I think that Amy would just strike a balance, and I'm pretty confident in that, and so, since she volunteered, that's wonderful.

DR. SCHUELLER: That's a lot of responsibility, guys.

DR. NESSLAGE: You are so highly respected, Amy. Do you mind? That would be fantastic.

DR. SCHUELLER: I will work on the language, but, if folks read it and they go, what, or they disagree, please speak up. I want to make sure that it makes sense and that it captures everyone's thoughts on this topic.

DR. NESSLAGE: Thank you. Big, big thank you. Okay. Moving along then, we will come back to this, I promise, and anything else on these top sections before we go to fishing level recommendations? All right. Fishing level recommendations. The working group presented this as our P* and our justification for that P*, and this is really important, and does anyone have any concerns about our recommendation, because our OFL will be 50 percent, and our ABC will be based on 32.5, right? Nikolai, do you have any questions about that?

DR. KLIBANSKY: I am just looking through it now.

DR. NESSLAGE: Do we need to be explicit there, Chip, just for the record, for OFL and ABC?

DR. COLLIER: I will send them the standard language, in order to get this done.

DR. NESSLAGE: Okay. Outstanding. So, if you have any questions, Nikolai, please ask them before the end of the day on Monday, because clarifying these things over email with the SSC is always a bear. Okay. Was past management successful at reducing F or ending overfishing? Yes, but there's a high degree of uncertainty in status determination, and that's that what quadrant are we in question, and why is there a potential change in stock status, and there's the issue of the range in the Ms used in the MCBEs. I also wonder about -- Was it the impact of the index as well, and I'm trying to remember, for the recruitment assumptions? Are we missing stuff to include here, folks?

DR. COLLIER: The section that I have highlighted, is this the section that you're referring to right now, Genny?

DR. NESSLAGE: Yes.

DR. COLLIER: I am not seeing any hands, and so maybe we just go on to the next one.

DR. NESSLAGE: Sorry. I was looking something up. Okay. Then the buffer question. We've done an adjustment, now that we're not overfished or overfishing, and so the buffer should change a little bit, or not, because we ended up moving down the Tier 1, right, and so we probably have to take that out. I am not seeing any hands raised. We will flesh this out. Nikolai.

DR. KLIBANSKY: I just thought that I would note that I sent you an email, and I don't know if you want to look at it, but I replotted the distributions we were trying to compare between this assessment and the last assessment, and I replotted them both on the same axes and everything, if anyone wants to look at that before the end of the day.

DR. NESSLAGE: Sure. I just sent them to Chip.

DR. COLLIER: Were they sent to me? I'm not seeing anything.

DR. NESSLAGE: They must be in the ether.

DR. COLLIER: Here they come.

DR. NESSLAGE: Nikolai, do you want to just walk us through this really quick, and so this is the distribution of the --

DR. KLIBANSKY: This is just the distribution for the terminal status, and this is the one for the SEDAR 25 2016 update, and so it's the exact same axis and scale and everything. If you flip to the next one, this is for SEDAR 66. There was the discussion about how much more uncertainty or less uncertainty there was in the terminal status estimates, and so it's a little bit more of a squat, stocky distribution, if you will, with a shorter tail.

DR. NESSLAGE: Then the OFL is below.

DR. KLIBANSKY: Yes. It shows SEDAR 66, and the top plot is from the 2016.

DR. NESSLAGE: So it's a tighter distribution now.

DR. COLLIER: Thank you for doing that. I will get these added to the SSC's discussion as well.

DR. NESSLAGE: Thank you, and we can incorporate that into that discussion, and it will help once we have the table and the final projections. We can massage that in there, just to help explain some of the changes that folks might see. Thank you, Nikolai. Are there questions or comments? Fred Serchuk.

DR. SERCHUK: Is the true value the areas under each portion of those curves and just not the shape? I am asking a question.

DR. KLIBANSKY: I'm not sure -- What are you asking?

DR. SERCHUK: The shape of the curves differ, but there's a density to the left of each of the lines, and then there's a density to the right of each of the lines, and isn't the -- Doesn't the area beneath those portions of the curve mean anything?

DR. KLIBANSKY: You mean beyond where it's truncated?

DR. SERCHUK: In other words, if we have a large area, or a high area, that suggests that the F is less than FMSY, to the left of those two lines, isn't that correct? That's a probability distribution, correct?

DR. KLIBANSKY: Right. Yes.

DR. SERCHUK: Then everything to the right is also a probability distribution that it exceeds FMSY, and is that also correct?

DR. KLIBANSKY: Yes.

DR. SERCHUK: Okay, and so one way of looking at it would be --

DR. KLIBANSKY: It would be in terms of greater than one.

DR. SERCHUK: Right, and so anything greater than F at one means that it's higher than -- F is higher than FMSY, and isn't that correct, and so wouldn't it be the area under each of those respective portions of the total curve? I am just asking a question.

DR. KLIBANSKY: I'm sorry, but wouldn't what be the portion of the area under the curve?

DR. SERCHUK: The probability that you're either overfishing or not overfishing.

DR. KLIBANSKY: Yes. I'm sorry. It should come down, if you look at those phase plots.

DR. SERCHUK: Right, and so I'm just suggesting it's not only the height, but it's an area-based evaluation as well, in terms of how the probability distribution is distributed, and maybe I'm making a mountain out of a molehill here, but there's a lot of probability, at the very tip, that it's going to be as high as six, but that expands out into a very large range from one to six, and I don't know whether that probability is any greater than the summations of probability from zero to one. Is that a way to understand this distribution, or am I completely off my --

DR. KLIBANSKY: No, I don't think so, and I'm just thinking back to those phase plots and the phase plots provides the actual percentage of runs that ended up in each of the quadrants.

DR. SERCHUK: Right, and some of them were about half-and-half, is the way I understood it.

DR. KLIBANSKY: Right, and so I do think, in terms of those phase plots, that, if you look back to the phase plots from the 2016 update, and I think you had something more like three-times as many in the quadrant, and I would have to pull it up again, but in the quadrant with the base model than you did in another quadrant, and I'm just looking at it myself.

DR. SERCHUK: Okay. I just wanted to make sure that I understood it correctly, and I don't mean to prolong this discussion. Thank you for providing the plots.

DR. KLIBANSKY: Sure.

DR. NESSLAGE: John, do you have something? Go ahead, Nikolai.

DR. KLIBANSKY: I was just looking at that phase plot from 2016, and it looks like actually there was only like about 19 percent that were in the same quadrant as the base run, whereas there was about 34 percent that were saying not overfished and not overfishing, and about almost 50 percent that were saying overfished or overfishing and overfished. Anyway, in some ways, in the current assessment, there were runs in the same quadrant as the base run and in the previous assessment.

DR. NESSLAGE: Okay. Thank you. John, to that, I assume?

DR. WALTER: Given the lateness of this, I will try to get this clarified a little bit better for everybody. That solid line is the median, and is that correct, Nikolai?

DR. KLIBANSKY: The solid run is the base run, and the dashed line is the median from the MCBEs.

DR. WALTER: Okay, and so the dashed line is the median from the MCBEs, and so 50 percent of them are above and below the dashed line, and, without having to integrate by eye, that tells us that in fact 50 percent of the density is above and below, and so Fred is correct in his interpretation of that. Thanks.

DR. NESSLAGE: Thank you. Okay. Let's go back to the last few points. We are almost there, folks. Hang with me. We had no difficulties with the ABC Control Rule. Okay. Then monitoring. Any modifications or suggestions to any of these monitoring recommendations? Why do we have landings there, again? Is that just to --

DR. SHAROV: I am responsible for this mess. The information and the idea is repeated several times, and this needs to be shortened to really like two bullet points, and no more than that, overall.

DR. NESSLAGE: Okay. Is there any way that you would be willing to clean that up a little bit? I think there's nothing in here that --

DR. SHAROV: Yes, and it's substantially -- I mean, in terms of substance, if people don't have any corrections, I certainly am willing to edit this to remove unnecessary stuff.

DR. NESSLAGE: If you could do that, then we can just take a quick peek on the last day, just to make sure everybody is still cool, but I anticipate they will be. Thank you so much. Then our last bit is research recommendations. Are we going to be able to do Bullet Number 1? This would be hindcasting then, is what you're talking about, basically. Amy, was this your group? Wilson.

DR. LANEY: Yes, it was our group, and I think that, based on our discussion that we had earlier, that was the idea, and how feasible it is I don't know, but I think it's worth looking into.

DR. NESSLAGE: I guess that's what I was trying to say earlier, is I don't -- Well, I don't know. My read on it was this would be really hard to do without new data, but I am happy to be corrected.

DR. LANEY: Well, I thought, and John Walter can speak for himself, but I thought he indicated that it would be possible, using the age structure data that we already have, to go back and look at what recruitment you would have had to have to generate that present age structure, and then you would be able to look at environmental variability during that timeframe to see if there was any obvious relationship between environmental factors that you thought might enter into recruitment and the historical recruitment time series that you had documented by looking at the age structure data. Yes, I agree that it doesn't sound like a real simple thing to do, but I still think, if it is feasible at all, then it might be worth doing.

DR. NESSLAGE: Okay. Any other comments?

DR. COLLIER: I am not seeing any hands raised.

DR. NESSLAGE: Can you scroll down to the timing of the next assessment? Any final comments or questions or edits or concerns? As this gets fleshed out in the final report, I may ping some of you breakout groups, because we'll just need to clarify the language here a little bit. Alexei.

DR. SHAROV: I am sorry for asking this, and I understand that we generally -- We do want to have diet information, for a number of reasons, but, with respect to estimating the status of the stock and the relevant ABC advice, is it really needed? I wanted to understand why it's here.

DR. NESSLAGE: Someone from that group?

DR. SCHUELLER: I'm sorry, but I missed it, Alexei. Can you say it again, please?

DR. SHAROV: I was just asking why is the diet information needed to improve our ability to define the status of the stock and calculate the ABCs.

DR. SCHUELLER: The diet information?

DR. LANEY: I don't think we felt that it was useful for that purpose, Alexei, but we were just sticking it in as a future research recommendation, with a view toward the fact that we are moving, slowly but surely, toward ecosystem-based management, and, at some point, it would be desirable to have current diet information. Church indicated that there is an existing historical diet study, but it was from the Mid-Atlantic and not from the South Atlantic, and so I don't know whether we have diet data from the South Atlantic or not. Lauren Gentry or Marcel can answer that question, but I guess they are not on the call at the moment, and so we just put it in there for the future, and I agree with you that it doesn't have any particular relevance relative to assessing the stock.

DR. NESSLAGE: So we can either strike it out or we can say to inform the EwE model and make it low priority, and how do folks feel? Wally.

DR. BUBLEY: I think that's a good suggestion that you just offered up there, to maybe add it in as for the EwE model, just to explain why it's in there. In regard to Wilson's question about diet data, we don't tend to get a lot of it, just because of the deepwater nature of these species, and they

tend to have inverted stomachs when they come up, and so I don't think we have much information down here.

DR. NESSLAGE: I think, when Jill did her survey, the only thing that came up were those brittle stars, and didn't she have like a ton of brittle stars? It was either an empty stomach, inverted stomach, or it was all brittle stars, and so we know they eat things other than that.

DR. LANEY: I like your suggestion, Genny. That works for me.

DR. NESSLAGE: Cool. Thank you. All right. Fred Serchuk.

DR. SERCHUK: Now that we're into a DNA world, where we actually don't need the animals, but you could just know that their DNA is within the system of an animal, by the fact that they've eaten it, there may be ways of getting at diet data without actually looking at the actual animals that are in the stomachs when you bring them up, because those DNA will actually be incorporated within the animals themselves, and so the world is changing, in terms of how we evaluate presence and absence of animals, and a lot of work is being put into DNA signatures of different animals, and so it still could be possible. Thank you.

DR. NESSLAGE: Sure, and maybe, Chip, if you could just write diet comp/DNA information, something along those lines, just to remind me when I flesh that out, and then, Fred and folks, you can just help me out when the report comes around your desk. Wilson.

DR. LANEY: Fred is exactly correct. I just had a discussion about that on Saturday at the spring meeting of the North Carolina Herp Society, and researchers are now collecting feces, and you can analyze the DNA in the feces to generate a list of the prey that the predator consumed, and so we need to put little diapers on the golden tilefish, and, if we can catch their feces, we can use eDNA to determine what they're eating, and so Fred is exactly correct.

DR. NESSLAGE: Wow. With that, I think we might be wrapping up the day, unless someone has better ideas than diapers on golden tilefish. If folks have any other comments or questions regarding these consensus statements, we'll have one last chance on Monday to modify this, and so keep that in mind.

Unless I hear any screams of protest, I think this is a good time to end for the day. We will reconvene at 9:00 tomorrow, and we'll start with the ABC Control Rule, Agenda Item 5, and we'll hopefully get through that in the morning. Any questions or comments or concerns? Seeing no hands raised, I will thank you all for another -- Rusty, go ahead.

MR. HUDSON: Public comment after presentation and before overview, it's a lot easier on us if you can do it like that, because that's what you are debating, when you get into all of your various questions, whether it's the Comprehensive ABC Control Rule and whatever, but, tomorrow, at the end of golden tile, I believe, is that taking place, or are we at the end of golden tile now?

DR. NESSLAGE: This is the end of golden tile.

MR. HUDSON: Well, I hope not. Anyway, let me state something for the public comment. I have fished golden tilefish since the 1970s, all the way into the 1990s, and then, of course, I had

to be like a cockroach and stay out of the sun after that. Going back in time, I have fished golden tile off of Port Canaveral and Ponce Inlet and down there east-southeast of Key West and all the way up to South Carolina. Of course, South Carolina was the furthest you had to go offshore, in order to get to that, quote, mud bottom, and I tried to type that into the question box when you all were talking about that.

We have hard bottom, sometimes between different depths of this mud bottom, and all you're lucky to catch is like scorpionfish and whatever, you know stuff that ain't got nothing to do with burrows and golden tilefish, and they're offshore down our way of the blueline tilefish, but our snowy occasionally are in the golden tile region, on what we call the snowy wrecks, something that would attract them, and all of that was way offshore of the younger and medium-aged snowy that were in the Oculina and back into the 220-foot range and out to the 330-foot range.

Getting back to golden tile, 450 foot was some of the shallowest that I ever caught, and they were too small, and then I get into 550 foot and on out to 700 foot, but some of these people work out to 900 foot and 1,000 foot of good mud bottom, but you've got to know where it's at, and I gave these numbers to NMFS, and I gave them to the South Atlantic Council, and I gave them to MARMAP and SEFIS and all of them. They've got it, but they just have to have the ability to research it, but that may take ten or twenty years, it seems like, even though I gave them all this stuff five or ten years ago. The same with the red snapper. Thank you.

DR. NESSLAGE: Okay. Thank you, Rusty. Thank you, all, for hanging with us today. We will reconvene again at 9:00 tomorrow. Have a good night. Thank you, staff. Thank you, Nikolai. Great job, and we'll chat with you tomorrow.

(Whereupon, the meeting recessed on April 28, 2021.)

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APRIL 29, 2021

THURSDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened via webinar on April 29, 2021 and was called to order by Chairman Genny Nessler.

DR. NESSLAGE: I'm sure that everyone has noticed by now that we're a little behind in our agenda, and so we want to try and make up time today to get through the very important items that we have today, the first being our ABC Control Rule and issues that we'll be looking at, in particular the Category 4 stocks and completing our carryover discussions. That, I'm anticipating, will take up the morning.

In the afternoon, I'm anticipating that we will tackle dolphin wahoo and the geometric mean discussion, the geometric mean use in monitoring the ACL, and then the SEP report and the allocation decision tree discussion. That would mean that Monday morning, as previously scheduled, we will tackle the gag review.

In the afternoon, once we've completed gag, I would like to briefly return to the red snapper discussion and finalize the consensus statements that we have up through, but obviously tabling the OFL and ABC decisions, so that I can report back to the council what our statements are and what our thoughts are regarding the assessment itself, and so we'll have another discussion on red snapper at that point, and then we'll go to Other Business and wrap up.

If we're going to actually achieve all of this, we're going to have to be very focused and very streamlined in the next two meeting days, today and Monday, and so I am going to be a little bit more heavy-handed than I have been in the past, and I apologize, and I don't like to do that, but I'm going to prioritize SSC discussion, and so imagine if we were in Charleston, and folks who are sitting at the table are going to get priority to speak here.

I will make sure that we have opportunity for public comment, and we're going to go back to our old method, which seemed preferred, which would be after presentations, so that folks know exactly when it's coming, and so, after the presentations for each of our agenda items, I will -- Once the SSC has a chance to do clarifying questions, I will open up to public comment on that agenda item, and then there will be a final moment, at the end of the day on Monday, for any wrap-up public comment, but that will be the extent of public comment, and so please be prepared after each presentation with your public comment. Are there any questions from the SSC about how this is going to work, or any of the changes to the agenda? I am not seeing any hands. All right. Let's get started.

Our first agenda item is Agenda Item 5, the Comprehensive ABC Control Rule Amendment, and so the council, as you know, is hoping to wrap up development of this comprehensive amendment to revise the ABC Control Rule. At our fall meeting, the SSC reviewed some of our previous comments that we had provided, and then, when we got to the ABC Control Rule for Category 4 stocks and the use of ORCS, for instance, or ad hoc control rule options, we realized that we were a bit out-of-date and that we wanted to take a break there and take a moment to review the recent literature on methods for determining ABCs for stocks that do not have an accepted SEDAR stock assessment.

We formed a workgroup, and we asked them to recommend an alternative language for the ABC Control Rule for Category 4 stocks, and I will be presenting that in a little bit. Mike Schmidtko will be providing an overview, as well as guiding us through the second part of this agenda item, which is reconvening our discussion on any comments or recommendations we might have regarding the alternatives in the amendment for carryover provisions, and so that's what is on the docket this morning.

There is going to be a bit of back-and-forth, and Mike and I are going to juggle this here, and we're going to start with Mike presenting an overview of what's going on, and then we'll switch over to my presentation on the workgroup report, at which point I hope the working group will help back me up, and Mike is going to walk us through some of that as well, with regard to some of the attachments, and so let me point you in the right direction. There is quite a few attachments.

Mike's overall presentation is Attachment 11, and he's going to start with that. The ABC Working Group, their final report and the presentation, is 7a and 7b, and there are two Excel spreadsheet attachments that you'll want to take a look at as well that go along with that, and that's Attachments

8a and 8b. If you have any questions about the overall amendment itself, that's Attachment 9, and NMFS guidance on phase-ins and carryovers for the second-half of our discussion, you can take a look at Attachment 10. I think that's all we need for intro. Mike, are you ready to kick us off here and get us started?

DR. SCHMIDTKE: Yes, I am.

DR. NESSLAGE: Before you do that, I would just remind folks who are on each of the breakout groups. For the Category 4 discussion, I believe our rapporteur is Jeff, and we have Jie and Jared and Anne and Yan and George in that group. The ABC Control Rule alternatives, Dustin is going to lead that up. Wally is in the group and Chris and Wilson and Amy. Then, for carryover, Scott is going to lead the charge there with Church, Eric Johnson, and Fred Serchuk and Alexei. If Fred Scharf, if you're back, you can pick whichever group you want to go in, and so any questions before we get started? If not, then, Mike, please, take it away.

COMPREHENSIVE ABC CONTROL RULE AMENDMENT

DR. SCHMIDTKE: Thank you, Genny. Good morning, everybody. After some riveting red snapper and tilefish discussions, hopefully this will be a softball for the ABC Control Rule Amendment. We've been working at this process for quite some time now, and it got started back in 2018, and then put on hold, and then restarted towards the middle to end of last year, and you all took a look at some of your previous recommendations, and we wanted to have the SSC review the recommendations previously made on this, just because we've had some turnover in the personnel of the SSC, and there's been some time passed and some NMFS guidance provided, and so there have been a lot of changes since this was started, and we wanted to make sure that the SSC is still supportive of their previous recommendations.

You all go through several of the actions for this amendment in the last meeting, and we're hoping to kind of wrap those up today, and then the next step after this is that the council would review your feedback and the actions as they're updated and drafted by the interdisciplinary planning team, the IPT, and then we'll kind of proceed through the process from there.

As a reminder, and kind of an update really, the ABC Control Rule Amendment process is considering three general actions, and this is changed from five. The council gave direction, at their last meeting, to kind of blend the three actions that were previously 1, 2, and 3 into that single one, to make sure that the alternatives being considered were complementary to each other, and so the control rule modifications, Action 1, they now include council specification and application of the control rule to rebuilding stocks, or the council specification of risk that is, and application of the control rule to rebuilding stocks, and so that kind of changes the numbering.

Phase-ins were addressed at the last meeting, and so I put it in the discussion document, simply to remind you that that's a part of this, but we're not going to be discussing that today, and then we will talk about carryover of unharvested catch.

One other notable change is in the FMPs that are affected by this amendment. Coral and Sargassum were taken out since the last time you all looked at it, because these fisheries have

minimal harvest, and so the council removed those, and so this would only impact the FMPs for Dolphin Wahoo, Golden Crab, and Snapper Grouper.

The goals for today's meeting are, first of all, to kind of present to you some redrafted Action 1 alternatives and recommendations. One thing that I want to stress is that the IPT was going to be kind of developing the final language, or the language that will go to the council at least, and they have not met to look at this redrafted language yet, and it has been kind of passed around internally a little bit, but it has not gone to the IPT yet, and they will meet after the SSC meeting, because they wanted to incorporate SSC feedback, and so what we're looking for, in relation to really all of this information today, is the idea and the concept that you all want conveyed in this amendment.

We're not looking to have perfect wording coming out of this, because the IPT is going to basically edit all the wording when we get to it, and I think it's in a couple of weeks, and so that's something to just keep in mind, or, actually, it's next week. Sorry. I'm getting my dates mixed up, but just keep that in mind, that the IPT will edit the action and alternative language, and so let's get big concepts settled down, and we'll kind of get direction that the IPT can work with from there.

The second goal for today is to look at the conclusions of the SSC working group and consider how that information can be incorporated into the Action 1 alternatives and then, finally, review you all's previous recommendations on carryovers and take a look at the alternatives, as they stand right now, and see if those recommendations -- If you all still support them or if you want to make any changes, edits, deletions, things of that nature.

Getting a bit more into the amendment material, one thing that we're kind of keeping as a reminder throughout this process is this distinction between risk and uncertainty, and one of the things that we want to try to stress within this amendment is that risk is denoting management risk, and that is the purview of the council. Uncertainty is denoting scientific uncertainty, and that is the purview of the SSC. The ABC Control Rule is kind of that process where we incorporate both of these factors in some way or fashion, but we want to make sure that there is that level of distinction as well.

As a reminder, for the current ABC Control Rule, and, if you're looking in your discussion document, that's Tables 1 and 2, and that is organized based on assessment category. There are different levels, and there are tiers within Level 1, and you all are probably pretty familiar with that, as you just went through this process and applying it to golden tilefish yesterday, but the first level has to do with stocks that have been assessed using age, length, or biomass-based models.

Then, for unassessed stocks, there is this sequence where, if it hits -- If it fulfills Level 2, it goes into Level 2. If not, it goes down the list, all the way into -- For the snapper grouper fishery, there is an ORCS category, only reliable catch stocks, and there is a method that's applied there, specifically for that FMP right now, and then, finally, there is a decision tree at the bottom portion for stocks that don't have a reliable catch series.

One thing that was noted about this control rule at the beginning of this process is how inflexible it is, and, really, over the last ten years or so, there's been kind of a big surge of data-limited methods that have come out and been considered in different capacities, really throughout the country for a lot of different fisheries, and this method was very prescriptive, and it didn't allow

consideration of the variety of data-limited methods that are now available to us, and so that was one note related to the current rule of why a change should be considered.

Action 1 would modify the Acceptable Biological Catch Control Rule. The status quo alternative would leave the current control rules for these various fisheries, and, in these alternatives, I'm going to kind of note two portions that are the incorporation of previous Actions 2 and 3 into Action 1, and, like I talked about, we kind of put complementary alternatives together into a single alternative, but I still want to note that these are components of each of these.

Under Alternative 1 for the risk tolerance, the P^* is adjusted by the SSC's ABC Control Rule criteria, and, for overfished stocks, the application of the control rule to overfished stocks is not specified in an FMP or amendment, and the current control rule, as far as I have seen, came out of the Comprehensive ACL Amendment, except for Snapper Grouper, when ORCS was incorporated, but both of those don't specify what happens with overfished stocks, and it's more kind of an applied practice than specified in the amendment.

Alternative 2 would categorize assessed stocks based on information used to evaluate and characterize assessment uncertainty. For the risk tolerance category, the P^* would be specified by the council, using the biomass and the stock risk rating, and Table 4 kind of shows that tradeoff table of different levels of biomass and different stock risk ratings. There are additional options, Options 2a through 2c, that may be considered. Again, these alternatives are all material that you all have seen before, and so we're not really looking as much to delve into that, but just reference the discussion document if you need to see those options. Then, for overfished stocks, the Alternative 2 would specify that the rebuilding plan takes precedence over application of the control rule for those.

Then, finally, Alternative 3 would be the current control rule plus the application of that ORCS level that right now is only for some snapper grouper stocks, and that would be applied for all of the FMPs involved, and there would be a change to Level 1, with Tiers 3 and 4, that evaluate stock status and the PSA, and those would be replaced by a risk tolerance that is set by the council. The risk tolerance could go from zero to 20 percent, and so it would really just replace the 20 percent that's accounted for by those two tiers, and this would then be added to the SSC's adjustments coming from Tiers 1 and 2.

Again, for Alternative 3, there would be the specification that the rebuilding plan -- That the landings allowed by the rebuilding plan would take precedence over application of the ABC Control Rule for overfished stocks.

Just kind of in summary, Alternatives 2 and 3 both remove stock status and PSA from the control rule, and they do it in kind of different ways, but that's what is accomplished, and they incorporate a risk component that is set by the council. Alternative 2 does this by setting P^* considering biomass and stock risk rating, and the council would use that information. They have default levels, and, according to some of the options, whichever options are selected, they may have a little bit of wiggle room to kind of deviate from those, if they desire to, but, also, they would be constrained to make sure that their accepted risk of overfishing does not exceed 50 percent. Alternative 3 would incorporate the council's setting of risk as a P^* adjustment and then, of course, added to the SSC assessment and uncertainly characterization adjustments.

At the last SSC meeting, or at the fall SSC meeting of last year, you all formed a working group to address Category 4, and Category 4 is in reference to the control rule proposed by Alternative 2, but it really kind of is more expansive, kind of into that unassessed or ORCS stocks category, and so that working group developed a report, and, at this point, I'm going to pass it over to Genny, so that she can present that report, and, after that is presented, then you all will have the opportunity to ask questions and discuss whether or how to incorporate this information into the Action 1 alternatives. Genny, I am going to -- I have your slides pulled up, and, if you're ready, we can go ahead and start into that.

DR. NESSLAGE: That sounds great. Thank you. The working group did quite a bit of work that I would like to report on. We had a great group of folks, and I was the reluctant chair, and this is not me trying to take over the world, I promise you, but it was just folks were pretty overloaded, and so I tried to take some stuff off their plate, but everybody participated and provided great feedback and contributed to this, and it was a really good working group, and so I thank Chris, Eric, Wilson, Amy, Alexei, and our wonderful staff, the Mikes and Chip, for all the work that everybody did. It was a good group.

If we go to the next slide, I just want to give folks a little bit of background on this issue, and so, as Mike mentioned, the Category 4 stocks are those for -- How it's currently defined is there is no acceptable stock assessment available, although that's something we would want to consider, and so put a pin in that one, and we'll come back to it. Just to remind you, the South Atlantic Council manages thirty-four Category 4 stocks, and they are organized into eight complexes, and the SSC's ABC Control Rule includes, at this moment, a decision tree for Category 4 stocks, and that decision tree allows for the use of ORCS or other ad-hoc methods for ABC setting. For instance, we have often used the third-highest catch, or some configuration of that, as well.

However, in October, at our October meeting, as Mike mentioned, the SSC discussed the fact that there's been a lot of new research on the performance of these ORCS and other ad hoc methods that are used to set ABCs for data-limited stocks, and we wanted to review those, and so we formed a working group, and our goal was to recommend alternative approaches to setting ABCs for these Category 4 stocks.

The group met, I think two or three times for the last few months, since January, and we reviewed the majority of the recent literature as a group, and so everyone took a few papers, and we presented them to each other and discussed them. Those papers included new methods that have come out since we last took a look at our decision tree and the control rule, and they included papers that suggest revisions to ORCS, or ad hoc methods that we have used in the past, as well as papers that reviewed the performance of these approaches and evaluated them relative to each other, and so our first conclusion was there's a lot of new information out there.

We felt that there wasn't a one-size-fits-all approach that could be applied to all of our Category 4 stocks. In particular, there are several papers out there that indicate that the best-performing -- Basically, ABCs would come from stock or complex-specific methods, and so the one-size-fits-all approach just doesn't seem to work well, given there is, especially in the South Atlantic, a wide variety of life histories among our different species, and the data quality and quantity varies, and the way the fisheries are prosecuted varies dramatically from stock to stock.

Mike Errigo had summarized the available data, which you can look in our attachment, and it's the first Excel spreadsheet, to kind of give you an idea, and Mike Schmidtke is going to go through this in a moment, to give us an idea of what sort of data might be out there that we haven't considered yet in our past deliberations, and we found there is quite a bit of information out there.

We did not get to doing the work of vetting that data, as in is it enough, and is it high quality, but Mike had gone through and summarized what he thought was all of the available data, although, if we go down this route, we will definitely have that data availability table reviewed by local experts, regional experts. Then Mike Schmidtke had kindly generated a tool for mapping that Table 1, the data availability, to the potential methods that we might use, all of the methods that are in the data-limited toolkit as well as some of -- Well, that's what he has done for the moment, but we would expand that to some of the other methods that are available out there in the literature as well, but this was kind of a draft first attempt to see what it might look like if we were to go this route.

Then, ultimately, what we did was recommend a new process that would be included in our ABC Control Rule, and so we're not recommending specific methods, because we think it needs to be very closely evaluated and stock or complex-specific, but that the ABC Control Rule could be made more flexible, so that the process itself would allow us the ability to look at all of the available data and use the most appropriate and the best-performing tool, according to the literature.

I think, at this point, Mike is going to guide us through those example draft tables. Again, keep in mind that this is just a first, first draft. It's a very rough draft of what sort of data is available and what sort of tools might be considered, and the idea being this is more of a -- These were generated to give you an idea of those this might work, rather than -- We aren't really looking for specific details on I know there's more detail on bar jack, for instance, or, no, I would never use that approach for dolphin, but the idea being this is the sort of process we might go through, and so go ahead, Mike.

DR. SCHMIDTKE: Thanks, Genny. As Genny noted, this is the data availability spreadsheet, and this includes unassessed species that would be kind of addressed through the ABC Control Rule Amendment and through this data-limited approach. As you can see from the bottom of the screen here, there are a lot of tabs, and there was a lot of work that went into this, and so big thanks to Mike Errigo for putting this together, and this was something that really kind of got the working group moving in the direction that we eventually ended up in.

One thing you will see, at the bottom here, is that there are tabs for each species or complex that show landings info through 2018, and we have total, rec, commercial landings, and any ABC or ACL that was in place for those years, and so you can kind of take a look at that, when you have a chance, and go through it.

We have a couple of tabs that I want to spend a little bit of time on, just summarizing at least, and not a whole lot, but so, for sample size, the sample size tab, we have information here, and you can filter by your sector, commercial or recreational, and you can also filter by the type of information you're looking for, and so, if you're looking for trip information, lengths, otoliths, weights, and all of this sampling information, as well as the presence of landings information, then

gets summarized and is summarized by this matrix, and this is kind of the deliverable from this spreadsheet.

What we see here is a list of our applicable stocks, and we have the types of information that are available, at least in some capacity, for these. Looking across the top, you see landings, discards, length, weight, so on and so forth, with the X marks indicating presence of some level of data. A couple of notes for this, and so we have -- Under the length, weight, and age categories, we have some sample size information. When reading this sample size information, the parentheses would show, first of all, the number of years that have samples, and so, for example, for Atlantic spadefish, there are thirty-nine years that we have length samples for. This number shows the average number of samples per year, and so, in this sense, for the recreational fishery, thirty-nine years' worth of data and an average of eighty-one lengths per year across that time span.

There are a couple of additional notes that it's important to look at for these when considering the catch per unit effort. One of the notes for this category is that this indicates that there is the potential information to develop an index and not necessarily that one has been developed, and so this is -- Just keep that in mind as you're looking at this information.

Another note is that this table indicates the presence or absence of data and sample size, where you see it, and it does not speak to the extent, as far as like the composition, the makeup, the quality of that data, and that's important to keep in mind as we move into the next spreadsheet, where we start thinking about some of the applicable methods, because, if you have a bunch of lengths, but the lengths are all within a fairly narrow size range, it can be difficult to characterize the population based on that information, and so you may have, numerically, samples that can support a model, but you may not have, from a qualitative standpoint, the samples that would support that type of model.

I am going to move, next, over to kind of the combination of the data availability and the methods, and so I just copied over the data availability table, and this is the same thing as what we just saw in that other spreadsheet, and what you can see from this one is that there are a bunch of tabs to go through here. As you go out, you see different species and the types of methods that are applicable to them.

One tool that the SSC has at least some familiarity with, and I at least know it because it came up during the last blueline tilefish assessment, and that is the Data Limited Toolkit. The toolkit, as a reminder, is an R program that contains over eighty data-limited assessment or management methods.

Some of these methods are quite simple, such as various catch averaging techniques, and they expand all the way up to some more relatively data-moderate approaches that are currently considered in the ABC Control Rule, like DBSRA or DCAC, along with several variants in between for a lot of these included models, and Genny will get to the working group's full recommendations later, but, for the purposes of this spreadsheet, we saw the DLM Toolkit as a good starting point to evaluate a large number of approaches at once with a single data input.

Within this spreadsheet, and I will go through a couple of these tabs, just to summarize and highlight, trying not to go too far in depth, because we do have time considerations here, but, under the data description, you can see definitions for the various DLM Toolkit data abbreviations, and

see those abbreviations, a tier, a description there, and then a Category column. Under that Category column, I categorized pieces of these data to the information that is depicted by the data availability matrix. For example, vbLinf is the L infinity parameter of the von Bertalanffy growth equation, and so, if we have, according to our data availability matrix -- If we have life history growth information, then we would be presumed to have -- Either have the L infinity parameter or the ability to estimate the L infinity parameter, and so we would have that as a piece of information at our disposal when evaluating which methods we can use.

Under the MP tab, MP, in the DLM Toolkit, stands for Management Procedures, and these are all the different management procedures from the date that I queried the information from that program, along with some description and several other pieces of information. There are a couple of things that are of note for our purposes, and so, first of all, the Recs category, and “Recs” being short for recommendations, which indicates the type of output that comes from each MP.

Most of these are TAC, which stands for total allowable catch, but some of these models are effort-based, and you can see, right here, we have a couple of TAEs, total allowable effort, and some of these models produce information that is retention-based. For our purposes, for setting an ABC, we would primarily look to those methods that have TAC, total allowable catch, outputs. That would kind of eliminate some of these from the consideration off the bat.

Then the second category that I wanted to highlight is the data list, and this shows the required data for each of these MPs, and, as you can see, just from this initial look, it can vary quite a bit. You have some where you have your catch, and you have your year information, and that’s about all you need, and then you have some of these other ones that incorporate growth information and that incorporate factors such as steepness and natural mortality, and so it can vary quite a bit, and we’re looking through a lot of information within this spreadsheet.

As we move out to some of these other tabs, for each species, we have a tab that indicates the presence or absence of data required by each MP, as informed by the data availability matrix, and this feeds into the possible MPs tab. This shows us the number of potentially usable methods for each stock. As you can see, this table is quite overwhelming, and so, for presentation purposes, to make it a bit more digestible, I have an abbreviated version here that just pulled a couple of pieces of information, and I see we have a hand up, and so, Fred, do you have a question for right now?

DR. SERCHUK: Just a nomenclature question, but, if you want to wait until you’re done with your presentation, I would be happy to wait.

DR. SCHMIDTKE: All right. Thanks. Looking at these potentially usable methods, one thing to note with this is, by potentially usable, I mean that the data based on the categories included in our data availability matrix -- That we have those that are required for a given method, and some MP requirements go beyond the data that is included in our availability matrix, and evaluations of those methods would need to consider whether we have the full extent of required information.

Given that we have life history and growth in our data matrix, if a method requires the von Bertalanffy parameters, and we don’t have them, then that MP will show as not usable. However, if an MP requires a ratio of FMSY to M, and we don’t have that, that’s not really captured by our data availability matrix, and so that MP may still show as available, if we have all of the other required parts, because that ratio is not in there, and so that’s just a note to keep in mind when

looking at these methods, is this is kind of an initial filter, and then it would require a second look to look a bit more closely at which methods we would want to apply.

The DLM Toolkit has a function that operates very similar to this, in the sense of providing the possible MPs based on data input. Kind of the utility of this spreadsheet is that it includes the information for all of our unassessed species, whereas the DLM Toolkit runs it on -- You run it for a single stock at once, and this includes multiple stocks, and the other aspect that we saw with this, going forward, is that we can add more methods that are not included in the DLM Toolkit to this spreadsheet. All we would need to know is we would need to make up an abbreviation for that method, and we would need to put in the data requirements, and then it would just be kind of another column within this list.

The plan for these spreadsheets is, again, it would be used to give an initial filter for methods to develop ABCs for these unassessed species, and we would also potentially -- When we get to kind of those final recommendations, we would potentially hope to use it to prioritize the order in which we would go through species to evaluate and develop ABCs, based on the information that they have that could go beyond only historical catches, which is what a lot of these species current ABCs are based on right now.

Before I kind of wrap-up, I do want to, again, remind you that these tables are drafts that show some of the functionality that we're going for, and these would be really living documents that would be updated as we go further in time and we gather more data and we go through the process of developing these ABCs for these various stocks, and so that's all I have to kind of present on these, and, Genny, do you want me to take questions on this now?

DR. NESSLAGE: Yes, and I think this is a good pause point, before we go into the actual recommendations of the group, just to make sure that folks understand what you've done, and thank you for that very good presentation. Fred, go ahead.

DR. SERCHUK: Thank you. I am just overwhelmed how much information you've been able to provide in the tables, and it's a herculean task, and I thank you, because it seems to be very complete at this point in time, and clearly it's going to be very helpful, but I have a semantics term that I am bug-bear about, and it's the using catch when we only have landings data.

Typically, the catch data we have for many of the unassessed stocks, if we have any, is landings, and we don't have any information on the discards, in many cases, and I'm just wondering whether, in those cases where we only have landings data, that we refer to it as landings, rather than catch, because we've had some cases where discards make up a large component of the catch, or we have no idea what component of the total catch is discarded, because there is no sampling of that, and would it be appropriate to think about, where we only have landings data, to put landings, or put another column in that says that we have any discard information, to be more complete? Thank you.

DR. SCHMIDTKE: Thanks, Fred. Just kind of coming back here, as far as the data availability table, we do separate out landings and discards, and these -- I may have inadvertently said catch within kind of my ramblings, but we do have the separation of landings and discards here, and, eventually, we would get to the ABC, and that's kind of a term from on-high, and so I don't know

-- We could certainly characterize the landings and discards component, if we have that information, within the ABC.

DR. SERCHUK: Thank you for that explanation.

DR. NESSLAGE: If I may add, I think, Fred, that's a great point, and it's something that, as we go along, we need to highlight. If there is a sizable, or we anticipate there's a sizable, discard component, that it needs to be very clear if we have that information or not and whether what we're considering the landings, or the total catch, actually captures all of what we think is going on, and so, yes, I'm making a note here to make sure that we're very careful about our language for each species. Thank you.

DR. SERCHUK: Thank you. When we go to ABC Control Rules, in many cases, they will be ACL control rules, I think, but I understand. Thank you.

DR. NESSLAGE: No, that's an excellent point. Does anyone else have questions so far? No hands. Outstanding. Mike, that was a great summary. Thank you.

DR. SCHMIDTKE: No problem.

DR. NESSLAGE: I thank both Mike Errigo and Mike Schmidtke for all the hard work they've put into these tables. This is not the working group that did this. This is staff, and so we greatly appreciate the time that they put into that. We have great staff. Don't let your head get too big though, Mike.

DR. SCHMIDTKE: Are you ready for me to pull up the rest of the presentation?

DR. NESSLAGE: I think so. We do appreciate it. Thank you. Before I launch into the description of the wording that we're going to recommend that you review as our recommended control rule for Category 4 stocks, I want to just kind of describe what we felt were the qualities of the process that we would like to recommend that make a little bit different than what may have been done in the past, and so we felt that it was really important that whatever process we recommend for these stocks be flexible and that the wording should be generic, or general enough, or broad enough, to allow the methods that we would apply to any given stock, or stock complex, that it could be updated as new data, better data, or better-performing approaches, become available, so that we're not stuck in old methods that we may have identified don't perform well, or maybe there's new data that we should be considering.

We would -- Ideally, we would have wording that would not require revision to the control rule if we were to apply a new method, and so that's kind of the idea here, is to be as flexible as we can, so that we can apply the best available science and data to these stocks.

The second characteristic is that it should be customizable, and so at least the approach that we take. As I mentioned before, recent studies appear to be very clear that the one-size-fits-all approach to setting ABCs for data-limited stocks does not provide robust advice, and you can look at some of those papers, and I can send them to the group, if you would like, and, in fact, I might send the whole SSC a link to all the papers that -- The pile of papers that we looked at, if you're curious about some of this background information. Then we felt that stock-specific methods

should be developed and updated as new data and methods become available, so that these stocks are not lagging too far behind.

We also felt that the wording should be responsive to council risk concerns, and so the ABC-setting approach derived from an OFL estimate should incorporate the council's stock-specific risk tolerance, and that is something that would be consistent with what is also in the broader amendment.

We also felt that the approach should be adaptable, and so there's going to be inevitable changes in the fishery, as they develop over time, and there's going to be new data available, or some data that might have been available in the past, and may no longer be available, and there will be changes in quality, and hopefully improvements, but there is always unforeseen circumstances, and that happens. We need to have a process that goes along with these ABCs that allows us to adapt, rather than just blindly following old advice.

What we're doing here is recommending that, along with these ABCs, that we develop and provide what are called either empirical harvest strategies, and EHS is the little abbreviation, or harvest control rules that would accompany each of these ABCs.

The empirical harvest strategies, if you're not familiar with that jargon, that's generally what is used in the literature to describe basically a process for managing that ABC for a stock that only has monitoring data, basically, and so maybe landings only, or effort only, or whatever the -- Or a survey only, where there's not an ability to come up with an OFL, for instance, or estimates of stock size.

Harvest control rules, that's typically the jargon that is used to describe the process that one would use or the setup that one would use to manage stocks that have data-limited models, or even complicated models, but, in this case, we would be limited, and those models have been applied to estimate either stock biomass or exploitation or both, so that you can have some form of rule that you can follow as the stock biomass goes up or down.

Both empirical harvest strategies and harvest control rules we felt should include provisions for deviations from the rule, because we know that that happens all the time, and we're seeing it with numerous stocks. There is episodic events that happen, and we've seen, extensively, many examples where catch estimates, or landing estimates, and we have outliers, either anomalously high or low, that we need to deal with, and then there is always new developments in the fishery, and there is all sorts of things that pop up. There needs to be a way for dealing with that so that we are prepared.

The wording that we're suggesting is not a decision tree, per se. It's a little bit more descriptive of a process, and so, basically, what we're asking is that -- What we're suggesting is that the ABC for Category 4 stocks and complexes would be set based on expert judgment of the SSC, and that was in the old control rule, but we would be using all available fishery-dependent and independent data. The exact method recommended by the SSC for determining an ABC would be stock or complex-specific, and it would depend on the quality and quantity of the available data.

Then we basically would develop a list of potential ABC-setting methods for stocks, depending on the type and quantity of reliable data that's available, and that table would be reviewed and

updated regularly by the SSC as various stock-specific data changes and there are new innovations and data-limited methodologies become available.

For some stocks, we are suggesting that we might want to consider adopting a multi-model ensemble or super-ensemble approach, which seems to be the direction that a lot of the literature is suggesting that we go in that provides the most robust management advice for determining an OFL or ABC, when we can, and so that's the wording for that portion.

The next portion says basically that, if a stock has adequate information to adopt a data-limited method, and we can actually generate an estimate of the OFL, then the ABC would be set using the council's Comprehensive ABC Control Rule Amendment, which is what is pending right now, and that would explicitly incorporate the council's risk tolerance for the stock, and so, if we can estimate an OFL, that would include the council's risk tolerance.

If an OFL can't be estimated, the ABC would be set directly using a data-limited approach that uses monitoring data only, and that's nothing new, but we're saying it explicitly here. If the available data are adequate, methods that estimate an OFL are preferred over methods that only provide an ABC, and so that's our recommendation there, and so, in other words, if we can estimate MSY, or our risk of overfishing, and actually set an OFL, that we would -- Unless we have a really good reason to deviate from that, that that would be preferred over just setting a catch-only ABC, or a landings-only ABC, right? I will be very sensitive to the wording now, Fred.

We also recommend the Category 4 stock ABC recommendations should be accompanied by an empirical harvest strategy or harvest control rule, depending on what we are able to provide, that would be considered by the council, and, obviously, these are all recommendations to the council. Then all methods and assumptions should be well documented and clearly justified, so that everyone understands exactly how we came to those decisions.

The last bit of wording here is that all current ABC recommendations for Category 4 stocks would stand, and so, basically, what's in place would stand until we can get to providing new ABC recommendations to the council for each stock or complex. This is from kind of the old ABC control rule as well, this next section. If a species is bycatch in another fishery, the SSC may recommend that the council adjust management of a directed fishery as well, as a means to reduce interactions or mortality, if necessary, and that's old wording.

The SSC can recommend to the council that a stock be made an ecosystem species and will recommend an ABC, using this control rule, until such time as the relevant FMP is amended accordingly, and so the idea here is this used to be -- There used to be a part in our decision tree where we could say recommend it as an ecosystem species, and so we're just being explicit here that we can still -- We should still recommend that to the council, if we believe that's appropriate, but, until that time, we would still be required to provide an ABC, and it's just making that very clear.

This is kind of a big change, and so this is how we anticipated the process might work. The SSC, today, would review this workgroup report and revise and edit as you see fit and then finalize those recommendations for the council, to be presented at their June meeting coming up. The working group report and the SSC response would then be presented to them in June.

If the council adopts our recommendations, then we would start by soliciting regional feedback on that data availability table, because Mike Errigo did a great job, and we provided some comments, but, really, the data providers in the region need to take a close look and see if they have anything else, as well as academics, and the SSC may have ideas, and we need to make sure that we've got all of the information available to us.

The SSC, in consultation with the SEP, would recommend prioritization of stocks or complexes to the council. The council would then approve that prioritization, and the working group would be formed and would start developing new recommended ABCs in the prioritized order of the stocks. The SSC would regularly review and update those Tables 1 and 2, as new information becomes available, so we're on top of things, and the SEP, and we would ask if they have the availability and interest, would comment on all of the empirical harvest -- Well, all of it, but, in particular, the harvest strategy or control rule recommendations, and then, finally, as each of these stocks or complexes -- The new ABCs and associated harvest strategies or control rules would be developed, and the working group would bring those back to the SSC, who would review them and then provide those recommendations to the council.

That's kind of how we imagined that it would work, and so, in conclusion, on the next slide, we anticipate implementation of this process for these Category 4 stocks will require an investment of time, but we believe this will result in, we hope, more responsive and robust management advice that is really tailored to meet the needs and the challenges of these Category 4 stocks that the working group felt really could use some TLC, frankly.

That was the end of my presentation, but I anticipate there will be lots of questions and lots of discussion, and I think, Mike, we had talked about handling this section first and then going to carryovers later. We're still on the same page there?

DR. SCHMIDTKE: Yes.

DR. NESSLAGE: Okay, and so then I think what I would like to do is entertain clarifying questions from the SSC.

DR. SCHMIDTKE: Genny, I just had one timing note. With kind of the emergence of red snapper and the anticipated considerable discussion that the council will need to have with that, items had to get kind of shuffled around, and so staff's anticipation right now is that the ABC Control Rule would be planned for September to go to the council, rather than in June.

DR. NESSLAGE: Okay. Well, I don't anticipate -- That's good to know. Thank you, but I don't anticipate that we will have this on our agenda again before September, and so I think our group needs to finalize our response today, and would you agree?

DR. SCHMIDTKE: Yes, and the SSC would still have the same plan for today for finalizing the response, but it would just kind of get sat on for a quarter and then brought to the council a little bit later.

DR. NESSLAGE: Understood. Okay. Thank you for that. Fred Scharf, go ahead.

DR. SCHARF: Thanks, Genny, and I really appreciate all the work that you guys put into this, and I think the framework really makes a lot of sense. Just a question, going forward. So you anticipate having a standing working group that is going to regularly meet to recommend ABCs for these stocks, and then those would come back to the full SSC for discussion and approval, before going to the council, and so just a workload question. How many stocks do we have, roughly, right now that would fall into this, and what do you anticipate the workload being for this standing working group on an ongoing basis?

DR. NESSLAGE: That's a great question. Just to answer the first part of your question, there is thirty-four stocks, but there is eight complexes, and we talked a little bit about that, and we anticipate many of them will -- Because they will have very similar life histories and/or data, that we could probably, as a group, tackle multiple ones at once, but we would go in that priority order that would be provided at the recommendation of the SSC and approval of the council, and so, basically, this would be a chip away at it as we can, and I am really excited about this, but I don't anticipate it will happen fast. I think this will be a slow-but-steady-wins-the-race kind of a thing.

I don't know exactly how the workload would be, and I would imagine that we would tackle -- I don't know, and I'm just spit-balling here, but we would go down the list and tackle a small group each year, for instance, and it might take us a while, but I feel -- Maybe, once we get the hang of it, and we've got a really good handle on what the available data are, it might go a little faster, but I don't think we're going to blaze through the entire list right away. I don't know that I can give you many more specifics than that, but does that give you some sort of idea?

DR. SCHARF: Yes, and I appreciate it. Thank you.

DR. NESSLAGE: Thank you. Scott Crosson.

DR. CROSSON: Very nice work by council staff and the working group, and this is really impressive. When I got to this in the briefing book, I wasn't expecting so many points and complete, and so this is really nice. My question is, in terms of the section in your presentation mentioning that the methods will be updated regularly, and so who does that? Is that like a working group too, or is that a sub-committee of the SSC that looks at this? I mean, this is not my scientific discipline, and so I don't keep tabs on this literature, and so I'm not sure how that new literature for setting ABC or some kind of stock recommendation for the unassessed stocks develops.

DR. NESSLAGE: I'm not sure that I had thought that through, or we had thought that through, entirely, but I would imagine that the working group chair would keep an eye on new literature as it comes up and would make it available to the entire SSC and the workgroup's consideration and alert the SSC Chair that new methods might need to be evaluated and added to the potential list. I don't know, and I am making this up as we go along, but I would imagine the working group chair would be kind of the one responsible, but, if anyone sees a new paper, I would hope that we would share it with each other, but does that answer your question?

DR. CROSSON: Sort of, and it's not an automatic process, and so I know that science is not a predictable thing, or the advance of science is not a predictable thing, and so I just wasn't sure how you keep tabs on that.

DR. NESSLAGE: I think you're right, and I'm making a note. Someone would need to be kind of responsible for keeping an eye on the literature as it comes out, and it make sense to me that it would be the working group chair, but perhaps we can revisit that, but I'm making a note that we need to be explicit about that.

DR. CROSSON: Then who vets it? Does the whole SSC have to vet it every time that there's a new method that is going to be proposed?

DR. NESSLAGE: I would think that the working group would take a look first and then make a recommendation to the SSC, and they would have an opportunity to either add it to the potential list or not. Does that seem reasonable?

DR. CROSSON: Yes, that's fine.

DR. NESSLAGE: Okay. I'm making a note here. Thank you. Yan.

DR. LI: Thank you, Genny. First, this is gorgeous, and I think this should be published, so that we can make it available to all the people. This is very, very great. It's very, very super impressive with the quality of the work and the amount of work that the whole workgroup and the SSC staff put into this gorgeous piece of work, and really you need to consider to publish it.

My question, my first question, is the same question that was being asked about who is going to do all the jobs, and it looks like it's going to be a lot of ongoing work associated with this new framework, and so I think you already explained much of it, and then the next question is the SSC's responsibility is to recommend OFL and ABC, based on the methodology that is determined by the SSC, and so the council will only receive the recommended OFL or ABC, or the council will need to review the recommended OFL and ABC and plus the methodology?

DR. NESSLAGE: So you're asking would the council review the SSC-recommended methods, right, and so like, right now, we explicitly have in there ORCS and something else, right?

DR. LI: Yes.

DR. NESSLAGE: I believe -- That's a good question, and I will just start by saying that. I believe the process we had outlined, and, working group, chime in, if you think I'm way off-base here, but my understanding of what we discussed was that the working group would recommend the list of potential methods, and the SSC would review and edit and approve those methods, and the ABC Control Rule language, if the council approved it, would be flexible enough that we would have the ability to decide on the methods.

I suppose, and maybe staff needs to help me out here, because, if the council didn't approve the approach, or had concerns with the approach, I assume they would remand it back to us with their concerns, and is there someone on staff who can help me with how that might work out, or maybe we don't know, because we can't stay flexible and malleable enough to incorporate new methods without constantly changing and updating the ABC Control Rule Amendment and still stay up-to-date. Mike Schmidtke, you had your hand up.

DR. SCHMIDTKE: I can try things, but I may need assistance from higher-up staff. I mean, at least initially, this process -- The process is what would be approved by the council. The council would be considering approval of the process, and part of that process is giving a certain amount of flexibility to the SSC in developing the methods on that stock-specific type of basis, and so there would be a level of justification required when those things get recommended.

The place where I'm a little bit stuck, and I may need some help from somebody else, is I don't know kind of on what basis the council would be able to evaluate -- Like to the extent of saying these methods aren't applicable for this stock that we have very little information on and like what alternative information would they be looking at, when we don't have very much to begin with, for these stocks.

DR. NESSLAGE: Good point. I see that Shep Grimes has his hand raised, and he might have some -- He might be able to shed some light on this, procedurally. Shep, do you mind commenting?

MR. GRIMES: Thank you, Madam Chair. I just wanted to point out that, ultimately, the ABC Control Rule is a creature of policy, and it's a council decision, and it lives in the FMP, and I think that you recognized that the council would approve it. I think one of the issues that we may have with this is you want to put enough specificity in the control rule that you're providing the public notice as to how this process is going to occur. We'll have some flexibility with -- There is that open-ended provision, where, if the SSC wants to vary on a case-by-case basis, they can, and so I think we'll have to put a lot of thought into the bounds of the flexibility that we can and should put into the control rule.

Just to touch on something that Mike Schmidtke had mentioned, the council -- A lot of these things are council decisions, but, as I have discussed with this committee before, everything we do is based on the record before us, and so, if we have a recommendation from an SSC that is very scientific or technical in nature, then that carries a lot of weight, and you will have built a record that the council will have to address, should it want to go in a different direction. Thank you.

DR. NESSLAGE: Thank you, and I think we're on the same page, and that helps. Fred Serchuk.

DR. LI: Excuse me, Genny.

DR. NESSLAGE: Yan, go ahead.

DR. LI: Do you mind if -- I have other questions on my list, or I can wait until later.

DR. NESSLAGE: No, sorry, and I didn't mean to cut you off. Go ahead and finish your list of questions.

DR. LI: The reason I asked that question is I wanted to know where the line is between like the flexibility with the SSC. I mean, like, if the SSC only needs to recommend the OFL, the final outcomes of the models, and the council only needs to review the recommended OFL or ABC, and this is one case, but, if the SSC also needs to like recommend the OFL along with what kind of models the SSC used to come up with those OFLs or ABCs to the council, and then there is other

complications. Like, from the council's perspective, they need to make decisions not just on the OFL or the ABC, but also on the methodology itself.

Then I am thinking when the models -- For example, for one species, if the applicable model is only one model available there, then it's kind of easier, but, if there are multiple models available and applicable for this species and for this stock, and then how to weight those different models when we use like model averaging, for example, and how to decide those weights, and who is going to decide that weighting?

Then, if we don't weight those models, and then if the council will make the decision on which model to use, and then the SSC's job will -- The SSC will have to recommend and provide not just the OFL outcome, but also each available model and the OFL along with that model, and then there is a lot of information and responsibility for the SSC to provide to the council to help the council make the decision of which model and then which OFL comes with that model, and so I feel, again, that's a lot of responsibility and a lot of work there.

Then, also, for multiple models, you want to establish which one is best, and sensitivity runs and simulation runs might help to decide which model may be used and may be the best, and so there is other work associated with this process, and that's just a little of my concern. That's all. Thank you.

DR. NESSLAGE: It will be a lot of work, and I admit that, and I'm willing to contribute, and maybe I'm the only one, and we'll see, but I think it's important enough, and these stocks have not gotten the attention they need, and it will take a long time, because it will be a lot of work, but, to your previous concern, I don't think the council, and someone correct me if I'm wrong, would be deciding on the methods.

The working group would recommend all of those things that you just described, what best approach, and kind of like we're sometimes presented with a statistical catch-at-age and an age-structured production model, et cetera, all in the same SEDAR report, and then we have -- There would be a recommendation from the assessment panel, but then the SSC will approve the recommendation or say, no, we think the ABC should be set from a different model, and the same kind of thing would happen at that level.

It's just that it wouldn't be a SEDAR panel providing those models and those initial recommendations to the SSC, and it would be an SSC working group doing that, and so, yes, we would be taking on a lot of our own work, and then the broader SSC would be providing recommendations based on that, but, short of -- It's just, without that, we're using ad hoc methods that the working group felt and/or old versions of ORCS that the working group felt are very out-of-date and probably not appropriate for most of the stocks that we have on that list, and so that's kind of our conundrum here, and I hope that addresses your questions or concerns.

DR. LI: Yes.

DR. NESSLAGE: I don't know if you feel any better, but --

DR. LI: I feel much better, much better, and I totally agree that the old method is outdated, and we need to move on to the future, a better future, and so, although this takes a lot of work, but it will be worth it. It will be worth our time and effort to move forward.

DR. NESSLAGE: Thank you for that. Did you have anything else on your list?

DR. LI: No. Thank you.

DR. NESSLAGE: Thank you, Yan. Fred Serchuk, go ahead.

DR. SERCHUK: First, I want to echo everyone's comments and applaud the working group for the fantastic job that it has done, in cooperation with work done by the staff, and it really is a truly amazing piece of effort that everyone put in. A couple of comments. Do you envision, or does the working group envision, developing sort of a standard terms of reference that the group will address as it goes through its process for these stocks, similar to the sort of general things that we have for the assessed stocks, indicating sort of how the work should proceed, or do you think it will just be more ad hoc, based on the data requirements for each of the thirty-two stocks or the eight complexes? That is my first question.

The second issue is I think it would be important, even if there isn't a standard terms of reference in addressing the Category 4 stocks, that the working group provide -- At least provide some recommendations, research recommendations, relative to how either more information is needed, and of what type, to either improve the Category 4 work or perhaps move these things from Category 4 into a different category, and I think this is really important, because the research recommendations can often be read as issues that people will seek funding for, particularly if it's of a type that is very specific and could be done in a one-off manner. I would urge that research recommendations related to collection of information that would assist the group in doing Category 4 work or perhaps move the stocks from Category 4 to a higher category. Thank you.

DR. NESSLAGE: Those are two excellent suggestions, and so I will say, regarding your previous question about TORs, it's my understanding, and, staff, correct me if I'm wrong, all working groups have statements of work, which are essentially TORs for a working group, that are developed and approved by the council before the working group is blessed and sent out to start their work, and so we could develop a standard set and then tweak them as necessary, if there's something specific that pops up that the SSC or the council would need looked at beyond the standard group, but I think that's an excellent suggestion, and we should add that to our recommendation, if the rest of the SSC agrees.

Then there is also -- You have made a suggestion about whether the working group would provide recommendations on how and where more information is needed to improve the Category 4 ABC setting or move it to an assessed stock through the SEDAR process, and I think that's another thing that we would want to put in that statement of work, and I hope -- Does that characterize what you were saying, Fred?

DR. SERCHUK: Exactly, Chairman. Thank you.

DR. NESSLAGE: All right. I think we would probably -- Unless folks disagree, we should probably add that, because I think that's a really good addition, but we've got two working group

members here lined up to comment, and maybe they can say that or something else. Wilson, go ahead.

DR. LANEY: Thank you, Madam Chairman. You had asked us to chime in, although I'm challenged now to remember exactly what it was that I was going to chime in about, and I will state a great thank you to all of the other workgroup members who have the expertise that I lack. I volunteered for this one primarily so I could learn, and my brain is exploding with all the information that I learned, and so thanks to all of the other workgroup members, and thanks to you, especially, as the chairperson who guided us through this process and provided us with all the tremendous literature that we reviewed, and thanks, Yan, for using the word "gorgeous". I like that. That's wonderful, and I will leave it up to Genny and the rest of the workgroup members as to whether they think we could get a publication out of it.

In response to Yan's question, I think, Genny, you characterized it the way I feel it should go, and I think that, ultimately, the council would prioritize the list of unassessed stocks, based on recommendation that the SSC would develop, and, once the council has prioritized that, I don't really know that the council would be excited about reviewing any recommendation that we would have with respect to the model that would be most appropriate for each stock, and I would anticipate that that flexibility be built into the language, and hopefully Shep could help us walk through that process and make sure that we had flexibility built in that was legally defensible, but also would meet the requirements of the regulations that govern the process.

Then I thought that Fred's recommendations were spot-on, and your response to his recommendations was spot-on, and so I enjoyed being a member of the workgroup, and I'm not sure that I contributed a whole heck of a lot to it, but I did enjoy participation and enjoyed reading all of those papers, and thanks so much to Dr. Errigo and Dr. Schmidtke for the tremendous amount of work, which has already been noted, that was done to put together those two tables and review all of that information. I think it's fantastic, and I hope that the SSC will support moving forward with this approach. Thank you.

DR. NESSLAGE: Thank you, Wilson, and I also agree that I think the IPT will have revisions, and I think Shep will have recommendations for us, and I think the council will have revisions, but hopefully folks will like the general approach, and there will be tweaks, I anticipate, and we have not thought of everything here, but hopefully the overall approach will be favorable. I am going to take comment from Chris, and then I want to pause and take some public comment on this. Chris, go right ahead.

DR. DUMAS: Thank you. I wanted to echo Wilson's comments about the work done by the working group, and especially the other working group members. I, myself, also, as a member of the working group, had a lot of unexpected responsibilities come up at the same time, and so, as you hear from each working group member, by a process of elimination, you can tell which working group members did the vast bulk of the work, and I was not among them, and so I thank all the other working group members.

I had two comments. The first was, with regard to the issue of the identification and vetting and selection of new methods, it seems to me that the working group and the SSC could do that, and then, if we identified a preferred method as best available science, or BSIA, I think that would potentially carry a lot of weight with the council and help, perhaps, the council feel more

comfortable in the method that the working group and the SSC finally land on for a particular stock.

Then the second comment was that identifying new methods in real time, coming out of the literature, would be a very time-consuming process, and so maybe we could sort of have a policy, or maybe as part of the process, that we do an update to the available methods let's say every five years, or every so often, or maybe every three years, and we could pick a time period. Then, at that time, we could kind of do a literature review of the new methods and identify new methods, or new methods that have been submitted by working group members or other folks, and sort of update our list of methods every three years or every five years, to avoid the time it would take to update methods in real time, which I think could be a very, very time-consuming process. Thanks.

DR. NESSLAGE: Great suggestion. I am writing that down. Outstanding. Thank you, Chris. Wilson. I'm going to take Wilson, but then we will go to public comment, if staff are willing to do that.

DR. LANEY: Thanks, Genny. Chris's comment reminded me that the thing that I was going to chime in about was the literature and the need to update the literature and suggest that, possibly, Dr. Serchuk already does that anyway, by virtue of the fact that he sends us so many papers so frequently during the course of every week, and so I certainly appreciate Fred doing that, and I wanted to thank him publicly for all of the updating that he does for the entire SSC, and that's a wonderful service that he provides.

I concur with Chris. I think, if we -- Again, going back to the workgroup charge that you referred to, which is equivalent to TORs for assessments, putting one in there that would recommend a certain time period for doing literature updates, or for focusing on literature updates, I think we can have a two-step strategy here, the first one being that all the SSC members keep an eye out for pertinent new literature on methodology for unassessed stocks, but then the second would be that TOR that says, well, at certain intervals, three to five years is what Chris noted, we focus on that and we do some comprehensive literature searches, and I think that would meet the needs.

DR. NESSLAGE: Excellent suggestions, Wilson. I think Fred has been volun-told there, using our phrasing from yesterday. I'm sure we'll find a volunteer who can help keep us on top of that, but, obviously, everyone, keep your eyes out for new papers, and that's all good stuff. Okay. We've had a presentation, and we're starting to move into discussions and recommendations, and so I want to take and pause here, and, if we could, if staff can swing it, I would love to take some public comment, and I see Rusty Hudson up first. Go ahead, Rusty.

MR. HUDSON: Anything in the toolbox that you're adding and moving forward with, and we've had a bit of experience in that for the last eleven or twelve years with the South Atlantic Council, is a good thing. Action 3, you all didn't get to discuss that, and that's dealing with the unharvested catch carryover, and my only problem with that is that, with commercial, you have a real-time census that goes on with these fish, and we have a lot of different kinds of fish, but how do we go about dealing with carryover of unharvested catch with the recreational, which is an estimate of an estimate, that takes a year-and-a-half or more to really understand what they didn't catch that year or two before?

DR. NESSLAGE: Rusty, wait. If you're going to talk about carryovers, I will provide another opportunity after that presentation. Then we might actually know what you're talking about, and so I don't want to cut you off there.

MR. HUDSON: Because I had a concern, and I just wanted to air it, and I will do it then, but, right now, any time you all increase your toolbox, that's a good thing. Thank you.

DR. NESSLAGE: Outstanding. Thank you for that, and I promise you -- If you're going to be around, we'll have some public comment after the next presentation as well, and I just wanted to take -- These are so different, and I just kind of wanted to take them one at a time, if that's cool with everyone. Okay. Are there other public comments? Is there anyone else on the webinar who would like to comment on this presentation so far? I promise that we'll come back to carryover. Okay. No hands. All right. Thank you. Sorry to cut you off there, Rusty, and thank you for your support of our work on this.

Back to the SSC. I am wondering if we could -- Since we're starting to develop a few edits and whatnot to the report, or things that we want to highlight in our report, I'm wondering if we can switch over to the overview document, unless folks had specific questions about something they say in the PowerPoint or the tables. I want to capture what we're getting at.

DR. SCHMIDTKE: What's on the screen now is the discussion document, but, if Chip wants to record in the overview, and he's grabbing that right now.

DR. NESSLAGE: Okay. Sorry, but I got confused there for a moment. So many documents floating around.

DR. COLLIER: All right. You should be seeing my document with the actions for the Category 4 workgroup.

DR. NESSLAGE: Outstanding. What I had so far to characterize the suggestions that I have heard from the SSC was, first, be careful how we use landings versus catch terminology, to make sure we're being accurate. If I mischaracterize folks, please raise your hand and set me straight.

The second thing was that we should schedule a regular review of the literature, perhaps three to five years, and maybe folks can give me a -- We could settle on some recommendation for that, and then have that reviewed by the working group, the SSC, and then, obviously, the council would see that recommendation. We would send it on up the chain, so that, if we needed to add to or revise our toolbox, as Rusty was calling it, then we would do so on a regular interval, but not every meeting, because that would get kind of crazy. I think that was Chris's suggestion.

Then we need to develop standard SOWs for this working group, and that would, obviously, be approved by the council, and that would include providing research recommendations on how to improve ABC setting for Category 4 stocks or move them to an assessed stock category that would go through the whole SEDAR process, whatever the group feels is most appropriate. There would be other things in the statement of work, more specific, and we need to work on that, but we want to make sure that it includes providing research recommendations. Go ahead, Chip.

DR. COLLIER: I am just making sure that I'm capturing everything.

DR. NESSLAGE: I think so. What did I forget? I was frantically taking notes, but, folks who have spoken up so far, does this capture -- Does it capture your thinking? Yan, go ahead.

DR. LI: Thank you, Genny. I think you captured everything, and there is one little thing on my notes that you may consider or not, but I remember -- For the discards, and I think Fred Serchuk mentioned the discards, like for -- Genny mentioned it too, but, for a stock that has a sizeable discard component, you mentioned that maybe you wanted to flag that stock and make sure that the discard data will be a key component for that species or stock. It's just something in my notes.

DR. NESSLAGE: Yes, that is a good note. Chip, if you could add something along the lines of like identify stocks with large discard components, known or unknown, or well characterized or poorly characterized, something along those lines, so that it's clear to everyone who is reviewing that ABC recommendation as to what the challenges are for that stock. Does that capture your ideas, Yan and Fred?

DR. SERCHUK: It does. Thank you.

DR. LI: Yes. Perfect.

DR. NESSLAGE: Excellent. Chris Dumas.

DR. DUMAS: I am not sure if this would be appropriate, but do we want to sort of ask the council for approval of the working group and SSC sort of reviewing and vetting new methods that come out and selecting the method, or the ensemble of methods, that is best available science? It's like sort of getting preapproval for the working group and the SSC to sort of do that new method identification and vetting process, so that, if we presented the council an OFL or ABC, that we can say this has been developed using the best available science method that was determined by the process that has been approved by the council, the process of the working group and SSC identifying and vetting the method, and so maybe if we can just get the council to kind of approve the working group and the SSC doing that work to identify and vet, and then we could just sort of put that general statement on any OFL or ABC that's put forward. We can just add that statement that this has been developed -- This is the best available science developed according to the pre-approved process, and we can just sort of reference the time when the council preapproved the process, or something like that.

DR. NESSLAGE: The process, the overall process, would be in the ABC Control Rule wording, which we have provided here, which I anticipate will be edited, but that something along those lines would be approved, and that would be the kind of high-level stuff, but then I think you're talking about the two tables, right, the available data and the methods that might be used, including -- We would need to provide more information to the council on this idea of either an ensemble approach or whatnot that we might apply, and that would -- Before we started work on any of the stocks, we would want to brief them on that and get that approval to start working and applying the best available method to whatever the priority stocks are, and is that kind of what you're thinking? So I think we need to be a little bit more explicit in our plan of action?

DR. DUMAS: Right, and I just think, from the council's perspective, if there are fifty or a hundred methods, and they probably want to delegate to the working group and the SSC the task of

reviewing all of those and selecting which ones are the best available science and kind of putting that forward, without having to get down into all the weeds. I mean, unless they want to, but getting down into the weeds of all of that.

If we were able to get a statement from them, saying that we have the authority do that, the working group and the SSC has the authority to go through all these new methods that come out and identify the best ones, the best available science, and develop OFLs or ABCs from those and put those forward, and then, when we submit something to the council, we wouldn't have to submit a huge document with all the details of all the process we went through and all the different methods. We could just say we did that, and this has been identified as the best available -- These OFLs, or ABCs, are based on the best available science method that was identified by the working group SSC process for Category 4 stocks.

DR. NESSLAGE: I'm not sure if I'm understanding you correctly, but I think the wording that we're going to provide here as our recommendation for the actual ABC Control Rule would set up a process whereby they would essentially give us the blessing to go figure out what the best available science would be, and then there would be a working group report, which would be very detailed, which folks can read or simply listen to the Chair's presentation that is a little bit less detailed on whatever the final ABC is and the justification for that. I think that's kind of the way that would proceed. I think that's what you're suggesting, and so I'm not sure that -- I guess I am stumbling around what aspect of the report you're suggesting we need to revise to make that more clear.

DR. DUMAS: Based on what you just said, I think we're saying the same thing. Thanks.

DR. NESSLAGE: Yes. I love that. Okay. Mike Schmidtke, did you want to clarify, or am I way off-base on anything?

DR. SCHMIDTKE: No, I don't think you're off-base. I guess my thought, following from what Chris brought up and kind of how the discussion along the lines of new methods has come about -- The council doesn't -- I mean, the council will review an assessment that uses an age-based stock assessment method, something like that, but the council doesn't typically review new methods as they come out.

They more or less review assessments as those new methods are applied, and so I guess I would kind of put that thought out there, that, even as new methods are developed and published into the literature, it's certainly good to track them and be aware of what's available, but not every new method will be applied immediately or in any soon nature to any of these stocks, and it would really depend on what the data requirements of that method are and what the data availability of the stocks that are being evaluated at that time are, and so I just -- I want to put that thought out there, so as to -- If you all want to not be -- To not evaluate a whole bunch of different methods that may or may not get actually applied to stocks.

DR. NESSLAGE: That's a good point, Mike, and I would also say that I would anticipate the working group will be -- Just because something is hot off the press, it doesn't mean that it's been thoroughly evaluated, and they may wait to add something to the list, to see -- Once a performance evaluation has been done, and we don't want to use it just because it's new, necessarily, but it would need to be well vetted, and does that add to your comment or no?

DR. SCHMIDTKE: Yes, I think so.

DR. NESSLAGE: Okay. Thank you. Anne.

MS. LANGE: This is to Chris's point, and I think that's what the statement of work -- It's included in the statement of work. I mean, as you had said, Genny, the council has given direction, and, if something needs to be provided in a little more detail, this is what the working group is going to do to provide this advice to the -- To be reviewed by the SSC. Anyway, I think that's already been included by having it in the statement of work. Exactly what methods are used, that's up to the SSC, based on what the statement of work for the council was, I believe.

DR. NESSLAGE: Thank you. Yes, that's a good clarification. Excellent. Fred Serchuk.

DR. SERCHUK: I think the SSC already has the authority to make statements about whether an evaluation for the development of an ABC is predicated on best scientific information available. In fact, some councils have a statement in their report such that this work represents the best scientific information available, and I think that's under the purview of the SSC.

I don't think, and maybe I'm wrong, and maybe there is some legalese that I'm not aware of, but I know that other councils preface any of the information that they provide to the council with a statement that, in the view of the SSC, this represents the best scientific information available, and, based on that practice in other SSCs, I don't think we need to get any special authority to do that, and maybe I'm wrong, but that's my experience in viewing several of the other SSCs on the Atlantic coast. Thank you.

DR. NESSLAGE: Thank you, and that's my understanding as well, but I'm sure, as we go along, as this goes up the chain, we will learn if that is not the case, and we will respond and adjust accordingly, if that's so. Given that I am not seeing any hands right now, I would like to go down to the next little bullet, although, if Shep has something to add to that point -- Go ahead, Shep.

MR. GRIMES: Thank you, Madam Chair. The only thing that I wanted to add is that the SSC can certainly make that statement, and, as Fred said, it's in the opinion of the SSC, but, ultimately, as to whether any particular action is based on the best available scientific information is technically a policy decision that's made relative to approval or disapproval of any kind of proposed management measure. Thank you.

DR. NESSLAGE: Thank you for that. In the interest of time, I'm going to keep us moving here, and it looks like -- I will let the breakout group add some wording here to these other bullets, but I want to draw your attention to the dark bullet there, combined ABC control rule alternatives, and do you want to revise or remove any of the previously-provided recommendations for Action 1, and, basically, we've seen this before, and we've gone through this before. Mike, very quickly, ran us through some of those things, but this is kind of -- I am anticipating this will be our last chance to see this, and so, if anyone has anything, and I do have something, and so I wanted to throw it out to you all.

Mike Schmidtke pointed out to me that there was a question, and I believe from the council, but he can correct me if I'm wrong, about what we're calling a Category 4 stock and how it's defined

in Tables 3 and 5. There could be some confusion, moving forward, given what we're providing as recommendations for Category 4 stocks, and so it might be worth recommending that a Category 4 stock is a stock for which no externally peer-reviewed assessment is available, i.e., a SEDAR process or a peer-reviewed stock assessment, or like wreckfish, and maybe there's a stock assessment that we've considered that would be in some way coming external from the SSC. If the Center did a stock assessment, and it went through SEDAR, that would not be a Category 4 stock.

Even though we might be applying a data-limited method, like DBSRA, et cetera, or ORCS or whatever it might be, to an unassessed stock, that would provide an -- Some might call that an assessment, right, but what we're calling a Category 4 stock, just to clarify, would be one for which there is no externally peer-reviewed stock assessment. That would be included in Tables 3 and 5. That's my recommendation to the group, just to make sure that folks don't get wrapped around the axle on jargon, but, if anyone sees any problems with that, or has alternatives or concerns, please speak up, and if you have anything else regarding Action 1, and this is the time. Amy.

DR. SCHUELLER: My only thought is for which there is no externally peer-reviewed stock assessment. I am being a -- I'm sort of harping on the language on that a bit, maybe, and I don't have a recommendation, but I'm a bit concerned that -- I mean, sometimes we're the peer review body, right, for an assessment.

DR. NESSLAGE: But usually they have undergone a research track assessment first and it's an update or a standard, right, and so, if it's already gone through a research track, then it's been externally peer reviewed, in which case it would never be a Category 4, or help me if you think there's a way that you get stuck here.

DR. SCHUELLER: What you're saying is if it's ever been reviewed in any form, really, prior to coming to the SSC. I'm fine with that, and I just think that the language could be interpreted differently than we intended it to be, but I don't necessarily have a good recommendation, without trying to think about it a bit more.

DR. NESSLAGE: I did think about whether it should say a SEDAR process assessment, something along those lines, and I see we might get some help here. Chip, do you want to go first?

DR. COLLIER: I did want to point out that you guys were the review body, or the SSC was the review body, for the wreckfish assessment, and that was done externally to SEDAR, and it was brought to you all for review, and you do have a review process set up for something that is being done outside of SEDAR, and I know you're trying to balance between a paper that is published describing a stock assessment versus a stock assessment that's going to be used for management, and it's a tricky way to describe that, and I don't know if I have a clear idea, but what we can do is just give an indication here in the text and not have to wordsmith this in great detail.

DR. NESSLAGE: I suppose we could, and we could ask the IPT to just be aware of that issue, and we need to resolve that in some fashion, and I think we all understand what we're talking about, but what the wording should look like to make it clear isn't super obvious to me, but maybe it's obvious to Shep.

MR. GRIMES: Thank you, Madam Chair. Sorry to keep raising my hand, but so, with this one, I don't like "external", because I think I'm on the same page as others who have spoken, but the SSC serves as a peer review for some assessments, or it can serve, and that's in the National Standard 2 Guidelines, and it sort of begs the question of external to what, or to who, right, and so, if it's a peer-reviewed stock assessment, and it seems like, to me, you could just leave it there. Thank you.

DR. NESSLAGE: Excellent suggestion. What does Alexei think?

DR. SHAROV: I think, the way I understand it, we shouldn't be focusing -- Or at least I don't understand why we need to focus on the fact of whether it was externally peer reviewed. I think what is potentially important here is to say that a Category 4 stock is a stock for which there was no formal stock assessment completed, and that's the way I see it, rather than peer reviewed.

DR. NESSLAGE: So the distinction is that these data-limited methods might be used to set an ABC, but we're not doing a complete stock assessment, right, is what you're saying?

DR. SHAROV: Yes.

DR. NESSLAGE: Does this wording capture your thoughts there?

DR. SHAROV: Mine, yes, but I don't know if the SSC will agree with it, but that was my comment. Thank you.

DR. NESSLAGE: I appreciate that. Does anyone have concerns or alternative suggestions?

MR. GRIMES: Again, I'm very sorry to keep speaking, but what if you have a stock assessment, you have a formal stock assessment that is completed, but it's rejected, and it's not considered best available scientific information, and you want to fall back to a lower tier? Thank you.

DR. NESSLAGE: See, this is why we need legal counsel. There we go. Thank you. It looks like Fred Serchuk has some thoughts. Go ahead.

DR. SERCHUK: Hasn't the SSC, on occasion, gotten SEDAR-reviewed assessments and decided that they didn't represent the best available science and not proceeded with those assessments, not accepted them, because of our peer review responsibilities?

DR. NESSLAGE: I believe -- Well, I haven't been on the SSC that long to recall one, but -- Where we changed the review decision? Is that what you're suggesting, Fred?

DR. SERCHUK: No, and we didn't accept the assessment that came to us, for one reason or another.

DR. NESSLAGE: Well, I'm sure that has happened.

DR. SERCHUK: Okay, and so we used our peer review responsibilities to say that there was an assessment that went through a formal assessment process, but we didn't use the results of that assessment, or there was something in our review of the assessment that indicated that we weren't

going to use it as the basis for our advice. I think I seem to recall this a number of times, but maybe I am -- I am looking to others that have been around.

DR. CROSSON: Just as a quick interjection, we did that with triggerfish.

DR. SERCHUK: Okay, and so my recollection is not incorrect, and so it's not only that it -- I think we have to start to look for some different language here. That's all I'm saying. Thank you.

DR. NESSLAGE: Well, what's your recommendation then? Where are you getting hung up on, because, if it's not accepted, then it could go back to Category 4 options.

MR. GRIMES: Maybe accepted as suitable for providing management advice?

DR. SERCHUK: That would be fine. Thank you.

DR. NESSLAGE: Okay. While Chip is doing that, Eric.

DR. JOHNSON: I was just going to chime in and just say the triggerfish assessment, and I think there's been at least a couple where we agreed with the CIE reviews that rejected the assessment as well, and I can't think of any, offhand, where we went against them, but I'm sure that's happened, too.

DR. NESSLAGE: Thank you. All right. We can think about this wording a little bit, and we'll have another chance to look at all of our -- We'll have the breakout groups, et cetera, but I just wanted to get this on people's radar screens. It is almost 11:00, and we have not taken a break. I would like to take a five-minute break and come back at 11:00, and then we'll pick up with carryovers, Mike, if you're ready and willing.

DR. SCHMIDTKE: Yes, we can do that.

DR. NESSLAGE: All right. Thank you, all. I appreciate it.

(Whereupon, a recess was taken.)

DR. NESSLAGE: It looks like folks are -- Almost everyone is back. Mike, are you going to give the -- Chip, go ahead.

DR. COLLIER: I was just going to say that I think we can switch back to Mike now.

DR. NESSLAGE: Great. Thank you. Church, go ahead.

DR. GRIMES: Genny, just, before you completely get off of the previous thing there, you might -- I mean, that was such a huge amount of work, and such a good job, you might want to consider sharing it with other SSCs, and it seems like the Gulf Council -- It might be really useful and save them a lot of work, and I don't know.

DR. NESSLAGE: The approach?

DR. GRIMES: Yes.

DR. NESSLAGE: I know they've done -- They have applied the DLM Toolkit to a number of stocks, and it didn't go over very well, but that's something we could talk about in the future, because I think we're thinking of expanding beyond that, if possible, and so, yes, I might reach out to Joe and see. Thank you.

DR. GRIMES: Sure.

DR. NESSLAGE: Mike, take it away.

DR. SCHMIDTKE: All right. Thanks, Genny. We're coming back around to carryover, and I apologize that I have not updated the text within the PowerPoint, and it is updated within the discussion document, but the IPT did have a discussion on this, and it kind of goes to the nomenclature discussion that we had a little bit earlier, but, within the document, the IPT settled on the unharvested portion of the ACL, and so unharvested catch is not what is being used, moving forward, and it's unharvested portion of the ACL, which we feel characterizes that a bit more accurately of what we're talking about.

Looking at the information here, Sub-Action 3.1 would look at when carryover would potentially be allowed, and so Alternative 1 for this would be that it's not allowed right now, and there is no specified allowance within these FMPs for carryover, and so the default is that it would not be allowed.

Alternatives 2 through 5 would allow carryover under certain conditions, and, first of all, based on the status of a stock, so that the stock is neither overfished nor experiencing overfishing, and Alternative 3 would evaluate carryover based on the status and the biomass relative to the BMSY and MSST midpoint. Alternative 4 would tie carryover eligibility to regulatory closures, rather than stock status or relative biomass, and then Alternative 5 would have carryover eligibility based on the total landings relative to the ABC, but that carryover, notably, would be conducted by sector, and it also would not be allowed during -- If there is a phase-in being conducted at the same time, then the carryover would not be allowed.

Sub-Action 3.2 looks at how much of the ACL can be carried over, and Alternative 1 would be, again, that status quo, where it's not allowed, and Alternative 2 would be a carryover amount up to the buffer between the total ACL and the ABC, and this is something that has been discussed, and potentially could be removed, because, right now, this can be accomplished by simply changing the ACL, provided that it stays equal to or below the ABC.

Alternative 3 would be an approach that would revise the ABC, and the ABC would be able to be revised up to the OFL. In the case that the OFL is unknown, the ABC increase could be limited, according to the options that are listed in 1 through 4, and these options would limit the revised ABC to 105 percent, 110 percent, or 120 percent of the original ABC, or an additional option is that, if there is no known OFL, then carryover would not be allowed for that stock. Alternative 4 would also revise the ABC, but it would cap the allowable carryover amount at 25 percent of the sector ACL.

This slide, one thing that I need to note is that, in this slide, this information is in the discussion document, but it is not provided in the slides that were uploaded for the briefing book, and so I will send this updated presentation to Chip following the meeting today, but this Sub-Action 3.3 addresses how carryovers should be kind of carried out, in the cases where they are allowed, and so Alternative 1 would not have any carryover.

Alternative 2 would use the existing framework approaches that are in the given FMPs, and this process takes about a year, and so that means that, if this were the process by which carryovers would be put into a fishery, there would likely be some level of lag as to when the underharvest happens, so to speak, and when that amount is applied to the fishery.

Alternative 3 would be a more expedited approach, and this is something that the IPT will need to discuss and flesh out kind of what exactly it looks like, but the general idea is to have a process where we get preliminary landings at the end of the fishing year, and we see an amount that is able to be carried over from the uncaught ACL, or the unlanded ACL, and we bring that information to the council, and then they would recommend carryover to the Regional Administrator, with justification that the criteria of Actions 1 and 2 are satisfied. This would be a potential faster process that would allow that carryover to be applied in hopefully the immediate next year, if that all goes -- If that all gets approved by the various bodies.

The SSC has provided recommendations on this item previously, and this is really a check-in to see if you all still support these recommendations, in light of the time passed, new composition, and NMFS guidance that has been given last year, and so the previous recommendations include supporting if only applied to stocks that are neither overfished nor overfishing and have catch close to the ACL. You all recommended to consider the species biology and the consequences of carryover for short-lived versus long-lived stocks. You all noted that we should request updated stock projections to evaluate the carryover and to provide a basis for the ABC recommendations in the years after carryover occurs.

There was a recommendation to consider the precision of catch estimates when allowing carryover of a percentage of the ACL, and that's something that there is a specific discussion question related to that, and it kind of speaks to what Rusty talked about a bit when he started to give that initial public comment.

There was another recommendation to add a term of reference to future assessment reviews and ABC recommendations addressing whether carryover should be allowed for a stock, and then a recommendation to consider the BMSY-MSST midpoint as a threshold for carryover and not allow carryover if biomass is below, or estimated to fall below within the projection period, that midpoint.

These are the recommendations that were provided previously, and we would be asking if there are any edits or additions to these, and then kind of the additional questions is there was that recommendation to consider how -- To consider precision when thinking about carrying over catch estimates, and just kind of asking a little bit further if you all have any recommended methods for how the precision of catch estimates should be considered, if there is some level of threshold of uncertainty beyond which carryover should not be allowed, how the uncertainty should be considered in determining the amount that is allowed to be carried over, and any other considerations of that uncertainty of the catch, or uncertainty of the landings, that would be

considered in that frame. That's all I have, Genny, and I would open it up to questions and discussion.

DR. NESSLAGE: Outstanding. Thank you very much, Mike. Are there clarifying questions for Mike? Fred Serchuk.

DR. SERCHUK: The protocols assume that we have sort of real-time information on what's going on in the stock. For example, we have an assessment before us that ended in 2018, and now we're providing advice for catches beginning either in 2021 or 2022. We're making some assumptions that the catches in the interim years between the end of the assessment and the beginning of the specification period are going to be within whatever previous catch levels were set in our projections.

They may or may not have been that way, but we had to make an assumption for those interim years, and I'm just wondering if there is any -- This sort of procedure sort of gives an idea that we actually know the stock status in the particular year in which the catches have not been exceeded or has been under-caught, and the fact is, in many cases, we don't, because we use recruitment projections, and we assume that the catches would be in those years for which we -- Those intervening years, we had to assume that the catches were going to be no higher than what had been recommended in the past, and is that a source of uncertainty that we need to take account of when we discuss carryover? I just pose the question. Thank you.

DR. NESSLAGE: It sounds like that was an open-ended question to the SSC and not to Mike, and so I won't put Mike on the spot, and so, folks, mull that over, but perhaps, in the meantime, Scott, do you have a -- Is it to that or something else?

DR. CROSSON: It's to something else, and I am kind of digesting all of this and going back and looking at the NMFS technical guidance that was published on this, which I was a co-author on, and still everything doesn't immediately come back to mind. The guidance that came out -- So there were a number of things that were in that technical guidance, the tech memo that came out, and, in there -- I just want to make sure that I understand this correctly, and this is definitely a question for Mike.

If we have a stock, and there is no buffer between the ACL and ABC, and then there is an underage, or whatever you want to call it, and not all of it is caught in year-one, but, in year-two, you want to allow the potential for a carryover, and a new ABC is going to have to be given by the SSC, right, because the guidance that is there requires that any carryover not exceed the ABC in any given year, and so is that going to happen? Is there going to have to be a -- Will the ABC have to be revised each time by the SSC after we do new projections, based off of the last stock assessment about what's going to happen?

DR. SCHMIDTKE: In the case described, yes, the ABC would need to be revised, but, under this policy, that would be a -- I guess the wording may need to be improved to reflect it, but, as I understand it, it would be a temporary revised ABC that would be applicable to the year that that underharvested amount is being carried over to, and so there would be kind of a one-year revised ABC, and then, the following year, the ABC would go back to where it was before.

DR. CROSSON: Okay, and that's going to be done through an SSC meeting for a particular stock for that one year, and there's going to be projections given before the SSC signs off on it, or is this something that is built in automatically into the control rule? That's where I'm getting a little lost.

DR. SCHMIDTKE: I guess I may need some assistance on this, but the way that I understand and envision it is that it would probably need to be an SSC thing and that the council would need to say that this is a carryover -- You know, an amount that's eligible for it and send it to the SSC, and, as far as the projections, I'm not sure. I'm not sure at this stage.

DR. CROSSON: That's where I'm getting lost in it. I understand the utility of it, but, because there's no buffer between the ACL and the ABC, and that's true for a number of stocks under the South Atlantic Council's jurisdiction, I am trying to imagine how the SSC is going to be able to respond to this.

The council receives notification that not all of the previous year's ACL was caught, and so they want to add that to the current year, and, at that point, the ABC needs to be revised, because there's no buffer, and then the SSC needs to put in a temporary one to account for that, and, to do that, the SSC needs to have an idea what that's going to do to the stock, I think, based off of the guidance that's given in the technical memo, and these are recommendations anyway from NMFS, and so I'm just trying to imagine how that process -- Because that can be very time consuming. If the SSC is only meeting once or twice a year, or twice a year, are we going to be having to look at this on a regular basis, because there are a number of stocks that not all of it is caught.

This is different -- By the way, this is different from a situation in which one sector is not catching it, and that's different, because, to my mind, if there is one sector that's not catching its portion of the ACL, and the other one is, that carryover is still within the ACL, because, as far as -- From our perspective, it doesn't matter, right, and the whole ACL is what the council can regulate, and so they can choose to do that carryover without involving the SSC, because the ABC does not need to be revised. I'm just trying to imagine that, if an ABC actually need to be revised, on a temporary basis, how that's going to proceed, logistically.

DR. NESSLAGE: Scott, maybe that's our recommendation, is that they need to work out the logistics very specifically in this, because they can't exceed the ABC, correct?

DR. CROSSON: That's my understanding, and maybe NOAA General Counsel can give input on this, but that was my understanding, is that, in year-two, you cannot exceed the ABC there, even if there was an underage the year before.

DR. NESSLAGE: I see NOAA General Counsel has their hand raised. Shep, can you shed some light on this?

MR. GRIMES: Thank you, Madam Chair. I was just going to jump in to help Mike, and so I have raised this in the past, in discussions with council staff, and even the council, but we have to figure this out, and I think Scott is exactly right, that, ultimately, either the SSC is going to review and make every ABC recommendation it makes with some eye towards carryover, and then you could make a recommendation that any unharvested ACL that fit within the bounds of when carryover is allowed, that it could happen, and they would sort of, in advance, say you could have up to this

much carryover, and then, if that situation arose at the end of year, the agency would go through the process, and we would allow the carryover.

Otherwise, I think Scott is exactly right that you're going to have -- It's going to be that, each year, oops, well, we've gotten to this point, and we know we're going to have the potential for carryover next year, and we have an ABC recommendation, but we have no specific record to support potential carryover, and so we would have to go back to the SSC and get that advice and then move forward, and I see that as being extremely burdensome, time-wise. Thank you.

DR. NESSLAGE: Thank you, Shep. I agree that this seems like the simpler way would be to actually have a buffer between the ABC and the ACL and, when we make those recommendations, that the council would seriously consider them, and then we wouldn't have to go through this revision to the ABC that seems onerous. I don't -- Perhaps I'm missing something, but that could be part of our recommendation here, and it might be taken or left, but, Scott, am I off-base there? Is that --

DR. CROSSON: No, you're totally -- This has been bugging me for a while, and this is the proper context, I guess, for me to be bringing it up, because I was part of the group that developed the technical guidance, and so, when I think about applying it to our particular situation, that keeps popping up in my mind.

MR. GRIMES: Sorry to interject here again, but I think keep in mind that there is a difference between -- If you have the buffer between ACL and ABC, then it's not really carryover, and, I mean, you could carry it over, but it's not an issue, because you have that buffer there, and you have more ABC available, right, and this is all around not achieving the -- Given the council's history and policy of setting ACL right with ABC, this is really a different thing, in my mind.

DR. CROSSON: The easier thing for the council would be -- Logistically, that it didn't have to involve the SSC, would be that -- I know this happens frequently, enough that I would comment on it anyway, is that you have one sector but not the other hit its part of the ACL, and so the council could choose to take that unused portion and apply it next year, as long as it doesn't exceed the ABC, and so that's -- I guess that's going to be difficult. I don't know how to respond, and now I'm thinking, but, again, you wouldn't be able to come up with a new ACL that would be higher, because, again, it would exceed the ABC.

DR. NESSLAGE: But what you're saying, Scott, if I'm capturing it correctly, is that the other option is they could -- If it's possible, in some situations, they could just reallocate among the sectors without our involvement, correct?

DR. CROSSON: Yes, they could. It's going to require reallocation for that year, and so, if you have year-one, and Sector A doesn't hit its portion of the ACL, and Sector B does, and you're thinking, okay, and so I want to take that unused quota from Sector A and put it over towards Sector B in the following year, you can't do that, because, the next year, if you want to add it to the ACL, it's, again, going to -- The ABC is equal to the ACL, and you're going to go back over the ABC again. It's going to be difficult to do this. Am I logically thinking this through correctly? Do you follow me?

DR. NESSLAGE: I follow you, but let's see if anyone else is following you as well, or not following you, and this is a serious consideration here. Are there other SSC member comments and questions on this? If folks are mulling this very difficult problem over, I might go to public comment soon, and so, folks, get ready. Fred Serchuk.

DR. SERCHUK: Just a question, and I know that Rusty mentioned this before, but when would we have the data available during the year to make such decisions? That is, when would we have the previous year's information? Certainly it wouldn't be -- Would it be in the middle of the year, because the recreational data is going to lag, and we know that, and so that's a consideration, quite frankly, from my perspective. Thank you.

DR. NESSLAGE: Thank you. I made a note of that, that the timing needs to be considered, and maybe Chip can shed some light on that.

DR. COLLIER: As far as recreational data, it's generally available two months after the year ends. As far as commercial data, it can vary, depending on the fishery. If there is a significant state component, it could be delayed up until June or July, but we have preliminary estimates throughout the year, and they monitor these currently, and so it just depends on what you're trying to do, if you're trying to do in-season adjustments or if you're trying to post-season adjustments, and those would all change things.

DR. NESSLAGE: So the adjustments though, just to clarify, these carryovers would be between fishing seasons, and they wouldn't be in-season, correct?

DR. COLLIER: That's correct.

DR. NESSLAGE: Okay, and so if they're talking about the council doing their own in-season reallocation, that is their own business, and they will have the data, hopefully, to do that, but what we're focusing on here is between-season carryovers. Chip, did you have something else?

DR. COLLIER: No, and that's it.

DR. NESSLAGE: All right. I think we're starting to get into discussion here, unless the SSC has more clarifying questions, and I might go to public comment, given that we're at the end of the presentation for the moment, I think. Is that right, Mike?

DR. SCHMIDTKE: Yes, we are.

DR. NESSLAGE: Okay. Staff, do we think we can do that, really quick here, switch over?

DR. COLLIER: Sure.

DR. NESSLAGE: Thank you for holding your comment, Rusty, until now. I think it would be more appropriate for folks to hear it after hearing all this discussion and presentation, and so go ahead, Rusty.

MR. HUDSON: Thank you. Of course, when I think -- As I tried to express earlier, the difference between a census and an estimate, and our commercial fleet has been very frequent with their

reporting, under a lot of the electronic guidelines and stuff like that, and getting away from paper, and so, in essence, we're already -- Like it was brought up, we're doing an in-season thing with our king mackerel, and that's all easy and nice and new, but, back to doing something with an estimate, which is those two-month waves for the private recreational and some component of the for-hire fleet, I guess the charter fleet, and it takes forty-five days after the first two-month wave.

Then, by the time I always get to these stock assessments, I'm told it's going to be the month of June when we have some reliability with the recreational, and, again, it was brought up -- Shep was talking about ABC, and we have an OFL. We have some stocks that have a big OFL between that and the ABC, and then the ABC and ACL, and we have mechanisms to even do an ACT, but, again, unless you have like the for-hire fleet, as a for instance in the recreational, and doing some kind of census, and I think there's a little bit of an example of that in South Carolina and a little bit of an example with Florida recently, having brought over their Gulf Reef Fish Survey onto our Atlantic side, which it's going to be -- That's a catch-type census, and it gives you a little bit more stuff to deal with.

Again, there is so much precaution built into a lot of assessments, and the fact that it includes stocks where it's not overfished and overfishing is not occurring, and so the council is going to have to come up with how to deal with the estimate versus the census, and that's all I can say about it, because that's the reality of how we live with a year-and-a-half difference with the recreational, and it was brought up that the terminal year is affected on the stock assessments, and sometimes we're already three to four years out-of-date before we implement the new guidelines, and so thank you.

DR. NESSLAGE: Thank you, Rusty. That's a good point. I'm glad you've raised it. Are there other public comments? No, and so let's go back to the SSC discussion. A couple of questions have been raised, and I am not sure that we have quite formulated recommendations yet, and, Scott, do you want to go ahead?

DR. CROSSON: Well, I guess, in terms of recommendations, going back to the scenarios that I outlined, it would be -- A far simpler process would be that, if you had a buffer between the ABC and the ACL, and, in year-one, you have an underage, and, in year-two, the council could raise the ACL all the way up to the ABC and to go through the SSC process. At that point, that would be a way of increasing the quota overall without running afoul of the complications that Shep outlined, and so that would be the easier process.

Otherwise, it's going to get very technically difficult, because you're going to have to have relatively complete landings data, which isn't going to arrive until partway into year-two, and the council is then going to have to meet and decide, I guess, that they want to ask for a carryover, and then the SSC will have to meet and revise an ABC, which will probably involve getting some projections of the effects of that from the Science Center, and, once they do that, then the council could react and produce a new higher ACL, if there's no buffer between the ABC and the ACL, and that would be a very long process, and it may well drag well into year-two, and so that's the issues that I see coming up. Again, it's not that it's not possible, and it's that it's logically very difficult for everybody to be getting this done on time.

DR. NESSLAGE: That's a good point, Scott. Would it be good to recommend that, if they don't go with the simpler process of adding the buffer, for reasons I think we can all understand, that an

expedited process be developed, because, otherwise -- What I hear you saying is the ladders will get the data June or July, and there would have to be some frantic modeling done between the council meeting in September and saying, hey, we want to consider carryover, and then at the SSC's October meeting, and then they would decide on it in December, and that's already too late, isn't it?

DR. CROSSON: That's what I would be thinking, based off of the timeline of our meeting schedule and the council's meeting schedule, and it's not that it's not possible to have interim meetings, on either our side or theirs, but I also know that has to go through the Federal Register, and it has to be set up so that it syncs up with everybody's work schedule. I mean, we know how difficult it is with us, and we know when an SSC meeting is coming six months from now, and it's easier than trying to say, well, we need to have this in the next month, and the Federal Register isn't announced -- The same thing happens I guess on the council side, and I don't know, and so it's a lot, and we have to think about whether the Sustainable Fisheries Division for the Science Center is able to produce the new projections, based off I guess the stock assessment scientist who was in charge of it last time.

DR. NESSLAGE: Absolutely. Okay. Thank you. Fred Serchuk, your thoughts?

DR. SERCHUK: Thank you, Chair. I can think of at least two other instances in which carryover might be problematic, and one is the stock assessment is wrong. We've overestimated the abundance in the ocean, and, therefore, the allocations by sector are not going to be met, because the fish aren't there, and that could happen, and it may have happened, and, therefore, we would be exacerbating the situation in trying to increase catch, where, quite frankly, there is no room to increase it, and, in fact, it should be decreased, because whatever assumptions we've made haven't come to pass.

The other thing could be that there could be changes in the localized abundance of fish compared to previous years, and so, again, the fishermen and the fishers know more about this, particularly for those stocks that are not residential. Either offshore migration or inshore migrations, and something has happened in the environment in which the areas in which they typically fish do not have the abundance, which may have been the norm in the previous years, and so they were unable to catch it.

By increasing the carryover in those grounds, it may not even work out, because the fish have changed their distribution patterns, and we know that's happening, quite frankly, in the environment, because the physical environment is changing with respect to temperature, salinity patterns, and current patterns. There are lots of reasons why, even with the best intentions, things are not going to happen the way we have predicted them to happen, and those are just some other thoughts that I had, Chair. Thank you.

DR. NESSLAGE: Good points, Fred. Thank you. Any other thoughts or questions? All right. We are at 11:40. Anne has something. Go for it, Anne.

MS. LANGE: This may be a little off-base, but I'm just wondering -- If we suggest making larger buffers between ABC and ACL, are we exacerbating the problem, because they're going to wind up with less available to be caught, and I'm not sure, but it just seems -- Some of this seems a little

counterintuitive about, again, expanding a buffer, as opposed to allowing the fish to be caught to begin with. I'm not sure how that relates, and it just seems a little difficult.

DR. NESSLAGE: Agreed. I think that was something that Rusty raised as well. Other thoughts? Jeff.

DR. BUCKEL: I want to make sure that I understand the point that Scott and Shep were talking about, and sorry about not getting that, and I looked at the NMFS -- The NS 1 technical guidance, and that Figure 1b, and that gives an example where the ABC equals ACL, and it says the NS 1 Guidelines allow the ABC to be increased in year-two, and was that example something that could happen, but then, later in the document, it says that you can't do that? I didn't read the whole thing in detail.

DR. CROSSON: Are you asking me?

DR. BUCKEL: Yes, because it sounded like you and Shep were saying that you can't do that, but then the figure shows an example of that, I think what you were saying in that.

DR. CROSSON: So I'm looking at the graphic, and it's called Figure 1, and it's called --

DR. COLLIER: Give me just a minute, and I will pull it up.

DR. CROSSON: Okay.

DR. COLLIER: You said Figure 1?

DR. BUCKEL: Yes, and the second part of it, the b.

DR. SCHMIDTKE: It's PDF page 14.

DR. BUCKEL: It's page 4 of the document, but PDF 14.

MS. BYRD: As a heads-up, and I'm not sure why it's not showing up on the screen, but Shep has his hand raised as well.

DR. COLLIER: I have the screen paused.

DR. BUCKEL: Yes, that's the one.

DR. NESSLAGE: Can you just repeat what you were saying there, Jeff, real quick?

DR. BUCKEL: It says that the NS 1 Guidelines allow for this to happen, which this is an example that we have in our council, where the ABC equals ACL, and so, if there is catch that's not made in year-one, that's allowed to carry over, and then add -- It's added to the ABC for year-two, and so you have a new ABC for year-two that is higher.

DR. CROSSON: Right. You have a new ABC, but that ABC still has to be created by the same process that we use.

DR. BUCKEL: I guess that's the part that I didn't understand, and that that would be allowed to happen and you wouldn't have to go through the ABC Control Rule or SSC again.

DR. CROSSON: My recollection, and also my re-reading of the document, is that you have two different ABCs here. You have an ABC for year-one and an ABC for year-two, and, both times, the ACL equals that ABC, but, both times, those were ones that had to be created through the same process that creates ABC right now.

DR. NESSLAGE: Okay, and so, just to clarify then, Scott, that process would include updated projections with the actual estimated catch?

DR. CROSSON: Give me a second. There is guidance further down in the document, and I'm scrolling down. Give me just a second.

DR. NESSLAGE: While you're scrolling, Shep, maybe you can clarify?

MR. GRIMES: Thank you, Madam Chair. I guess my comments were, in the first instance, where you set a buffer between ABC and ACL, and you get to the ACL -- You underharvest your ACL, and you want to carry over some the next year, and you can carry over up to the ABC, and you don't need a new ABC, because the binding constraint here is that the catch level can't exceed the ABC recommendation from the SSC, and so, if you have one like the graphic that was shown there, where you have an ABC recommendation, and the ACL is set right at the ABC, and you want to have carryover the next year that's going to put the second-year catch level above the ABC, then you need a record to support that second-year ABC, and, if the SSC, in year-one, had made a lower ABC recommendation, you don't have that record.

In building the record, the question is does the SSC, when it sets that first-year ABC, envision the potential for carryover and explicitly allow for it in that year-one recommendation, so that no -- The SSC doesn't need to reconsider it before it's implemented, or are you going to wait and have the SSC revisit it once you know there has been an underage, or you want to do the carryover, and have it revisited then, and you can use that as a vehicle to build the record to support the second-year ABC. Thank you.

DR. NESSLAGE: Okay. Scott, your comments on that?

DR. CROSSON: I mean, this is what we produced in the document, in terms of guidance, and so you can scroll down, but this was the summary of the carryover provisions that we put in there.

DR. NESSLAGE: But this is the NMFS guidance and not -- When you say "our", it's not the SSC's, and I'm just being clear here.

DR. CROSSON: No. I'm sorry. Being clear, this is the NMFS guidance.

DR. NESSLAGE: So, really, we could grab like Bullets 3 through -- I mean, pretty much, we could -- How does the SSC feel about this table? I mean, we can be pretty succinct and say -- I am hearing a lot of the same things coming from the SSC that are already in here. Does anyone object to anything they're seeing in here, because that might be the quick way to summarize our

recommendations. No hands. Okay. Unless, Scott, because you kind of -- I left you hanging there. Do you have final words? I want to wrap this up pretty soon.

DR. CROSSON: I don't want to dominate the discussion anymore, because I did so much of this stuff, but it's been like a year, and it would be better of the other members of the committee to --

DR. NESSLAGE: I see a few hands. Let's hear from Fred Serchuk.

DR. SERCHUK: I think the system would work best if we had real-time stock assessment information, and we don't have that, Chair. Again, we have interval between stock assessments that can be anywhere from three to five years, and I think it puts a big onus on the understanding of what the current abundance, or current stock status, is, for which we really don't have a real-time ability to evaluate that, and so I'm thinking the scientific process is going to be very much involved in this, at time scales which we haven't been before, and I hope that's not the case, but my experience here suggests that the timelines in which we evaluate stock status is in multiple years, not within a year, and certainly not every couple of years, and so I think this is a big challenge for the science. Thank you.

DR. NESSLAGE: I think we could add a comment there, perhaps, to Fred's thing that the timeliness of the stock assessment advice might not be adequate for providing rapid advice, something along those lines, and you can help me with the wording later. Wilson.

DR. LANEY: Thank you, Madam Chairman. I have never been a big fan of carryovers, but I understand the sector's desire that they be considered, but I think it's -- As Fred has already noted, and I agree with everything he said, and it's extremely problematic for us to be assured that we are giving sound advice, because of the uncertainties of knowing the stock status in a timely manner. If we have to add things in here, I'm comfortable with your suggestion that we use the guidance document and just pull from that to try and specify the sort of things that we would consider if we decide that we're going to do this.

DR. NESSLAGE: Thank you, Wilson. Okay. I'm looking at the time here, and I think we've got a lot already on the board. What I would like to propose we do is go to breakout groups, and so take five minutes or so to regather and get those going. Wrap up by 12:30, at the latest, and then everyone can go to lunch, and, in the meantime, if rapporteurs could send their comments to Chip, and he can collate those, so that, when we return from lunch, we can take a quick look and edit, as necessary, for our final consensus statements.

We have a lot still to cover, and so, if folks can tolerate it, I would really like to come back around 1:00, and so, the quicker you can wrap-up your breakout group discussions, the quicker you can just be going to lunch, and so consider that incentive, but still give it the time it needs to be thorough, and the breakout groups are there. Remember, public, that you are more than welcome to join a breakout group. Please remain muted, and you'll have a chance to see the results of all that when we reconvene at 1:00. Any questions or concerns from the SSC? Thank you all very much, and thank you, Mike, for your excellent presentation. Chip, unless there's anything else, we'll just break and be back at 1:00. Sound good?

DR. COLLIER: Sounds good, and you can see the assignments up here right now. I did want to let people know, in the Category 4 workgroup, that Kathleen is not going to be there, and it's going

to be covered by Kelly, but we do have access to her account, and so you can just log in there, and I am going to try to post again today, and hopefully this works. There should be links in the chat message for anyone from the public that would like to join in. Give us just five minutes to get all of these set up, and we should be over there. I appreciate it.

DR. NESSLAGE: Thank you, Chip.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Thank you, all, for your participation in the breakout groups and for your willingness to take a quick lunch so we can stay on track. Speaking of which, what I would like to do is to take a quick look at the results of the breakout groups, the strawman consensus statements, and, if there are any concerns among the SSC members, edits that folks would like to make to this -- Again, we're looking at content and not wordsmithing, and you'll have a chance to wordsmith when we edit the report.

What I would like to do is call on each rapporteur to just briefly go over exactly what you brainstormed there, and your reasoning, and we'll try to wrap this up as quickly as we can and still do it some good justice. Jeff, it looks like you're back. Would you mind walking us through your group's recommendations?

DR. BUCKEL: I would be happy to. This was -- It helped that the SSC had already provided some bullets here, and we moved -- Several of those were -- We felt they better fit under the last bullet, and we'll get to that. The one bullet that we felt was left out, there were a lot of people that made the comment of how the SSC was very impressed with this workgroup's efforts, and so that's the first bullet that we have added under review the findings of the workgroup.

Then the second open bullet there is are these findings suitable for consideration, and the breakout group agreed that they were suitable for consideration in the control rule amendment, especially with the addition of a standard scope of work that is described, and now that recommendation is below, and so, Chip, if you could change the "recommendation above" to "recommendation below". Thank you.

Then any needed edits or clarifications, that third open bullet, these are -- The first several are familiar to you, because those are ones that the full SSC came up with, and then the next two bullets that we added were attention should be paid to unassessed data-limited stocks that -- We felt that there should be a break between the directed, targeted, fisheries or species or groups of dolphin and wahoo, for example, where there is targeted fisheries for those, versus the non-directed species or complexes, and one question to consider is are some of these data-limited approaches not applicable for species that are culled as bycatch, and so, for example, it may never have been depleted, and so some of the depletion-based approaches might not be appropriate.

I guess just, if it's not in the language, to keep that in mind, that some of the approaches may not be applicable, and I know that's something that the group considered, but just to point that out. Then identification of several of these species -- For example, the porgies are an issue, and they get misidentified in the landings, and so the use of complexes rather than individual species can address that issue, and that's what we had in our breakout group.

DR. NESSLAGE: Outstanding. Thank you. Let's just go through them all, and then we'll take questions and comments from the SSC. Dustin, if you would.

MR. ADDIS: Thank you. I was the rapporteur for the combined ABC Control Rule alternatives, and we just had this one bullet of does the SSC want to add to, revise, or remove any of the previously provided recommendations for Action 1, and you may already recognize the first bullet there. A Category 4 stock is a stock for which there is no formal stock assessment accepted to provide OFL and ABC recommendations.

Most of our discussion revolved around the second bullet here, Action 1, Alternative 2, and specifically Table 4 underneath that. We recommended keeping the ability to have the PSA scores in the control rule and the separation of values of scientific risk versus management risk, and, obviously, the SSC would like to keep purview of the scientific risk. In Table 4, the language describing risk is a little ambiguous, and it just says low, medium, or high overfishing risk. We had a few questions. Is this the council using PSA for that, or is it something else? We believe that the text could use some clarifying. Our final bullet is we just wanted to remind the SSC that we intend to review preliminary stock risk ratings in the fall meeting this year, and that's it.

DR. NESSLAGE: Okay. I have questions and whatnot, but maybe we should go through them all, and then we will come back, and so I believe that our last section was Scott and carryovers.

DR. CROSSON: A lot of this is redundant from what we discussed in the full committee, but we started off with that it would be much easier to have a buffer between ABC and ACL, so that the SSC did not have to be involved. If the SSC did have to be involved, it would require increasing the ABC on a temporary basis, and we outlined all of the steps that we would have to go through, depending on everybody's availability to do this and the workload.

It was brought up, and I think Fred brought it up, or maybe it was Alexei, about we already have projections that are based off of uncertainty, and, if you change the ABC in the middle of the time series, it's going to increase all of the uncertainty in those projections, and it's also going to potentially impact all the other species that are co-caught along with this species, and so it gets exponentially more complex.

Species distribution, there's always these questions about species distribution and what Anne brought up about expanding a buffer may be problematic, because it would increase the probability of exceeding the ABC, and so that's kind of the tradeoff, and maybe that should be brought up under the first bullet point, now that I look at it. I mean, it's basically this is the tradeoff between the two things that you have to look at. If you have a buffer -- If you do add a buffer, then you're going to increase the possibility of something getting triggered.

Then the second set of questions about the precision of low catch estimates and the PSEs and everything else, this is all things that -- This is not something that we can answer generally, and so this is stock-by-stock stuff that would have to be analyzed.

DR. NESSLAGE: Thank you very much, Scott. I appreciate it. Let's entertain questions and discussion from the SSC. I would like to start off, personally, by going back to the second group, and I am very -- I didn't know that we intended to review preliminary stock risk ratings at the fall meeting, and so I would love to learn a little bit more about that. That one surprised me, and then,

the second bullet, I know we've discussed in the past that we weren't comfortable with the MRAG report, et cetera, and I am curious why the group wanted to go back to that, and so can you elaborate a little bit more? First of all, can someone -- I assume that was coming from staff, the third bullet, and then, maybe Dustin or whoever in that group, could elaborate on the second bullet, please.

MR. ADDIS: It looks like Amy wants to speak, and so maybe she --

DR. NESSLAGE: Can she answer that? Amy, go ahead.

DR. SCHUELLER: I guess I will -- The third bullet is a reminder that the SSC intends to review -- That sentence after the star is literally in the amendment document underneath Table 4, and so this group discussed putting it back in the notes here, because clearly we need to remind ourselves when we were telling ourselves to do something.

DR. NESSLAGE: Indeed.

DR. SCHUELLER: I think the context for that is like basically what is in Bullet Number 2, which is I don't think that we have a full idea of how that table would be implemented in a practical way, and so we had some discussions about, if we took our stocks that we have now and put them through that table, where would they end up, and it was confusing, based on what was written, how the low, medium, and high risk would be chosen, and it seems like it's based on the council's choice, and we didn't understand like how that would be done, and so there's really no specifics, and so I think we wrote something about the text is ambiguous, and it needs clarification, because there are statements in there that are just -- They're vague statements that we're not sure if they're going to use the PSA. Then we got into this discussion about PSA and whether or not that is like a scientific or a management purview or a mix of both, and does that help clarify what we've written?

DR. NESSLAGE: I think it clarifies what you have written, and thank you for pointing out the footnote to Table 4. I guess I thought we've gone over this at previous meetings, the examples that Mike Errigo had walked us through regarding the risk ratings, and there's a lot that goes into that, and it's not just coming from the PSA scores, and so I'm thoroughly confused. Mike Schmidtke, get me out of this hole that I've dug.

DR. SCHMIDTKE: I think -- I guess the process, as far as I understand the process for assigning risk, the low, moderate, and high, we went through the example last meeting of how to do it, and I think that there was discussion, and I need to go back and look at the notes, as far as there was some discussion about the default levels that were set there, and that had some impact for the various attributes that were evaluated, but I will look at that and try to remind myself of it, but it was kind of a note coming out of, I guess, the last iteration, that there would be some preliminary evaluation of the stock risk ratings, and, when I looked at the document, it was scheduled for this meeting, and we were not going to be able to cover that in this meeting, and it doesn't need to be covered in this meeting.

That is something that we would hope to have the SSC look at before this document is finalized, but, that stock risk rating process, there was an example gone through at the October 2020 meeting that the SSC discussed, and I guess, as far as like the purview portion of that, that would go to --

The SSC would make recommendations, and it would go to the council, based on -- The council would then decide the risk rating. Does that make sense?

DR. NESSLAGE: Yes, and I'm just looking back at our old recommendations that say the SSC supports varying risk tolerance by biomass levels, which we've got in there, and considering the PSA risk categories for assigning stock risk ratings.

DR. SCHUELLER: Genny, I think it's unclear, based on what's written in Action 1, Alternative 2, near Table 4, whether or not the PSA risk ratings will be used by the council in order to choose low, medium, or high risk.

DR. NESSLAGE: So whether it would be them or us is what you're saying?

DR. SCHUELLER: Well, even if it is them, I'm not sure they're -- It doesn't say "PSA" in there anywhere.

DR. NESSLAGE: In Table 4 it doesn't, but it does earlier in our recommendations.

DR. SCHUELLER: In our recommendations, yes.

DR. NESSLAGE: So we can reiterate that recommendation, and are we comfortable still with that -- Would that help clarify things, or would it just muddy the waters? It's on PDF page 12, and does that help at all, or am I in a different section? That's for Table 5. I'm sorry. This document is really hard to follow.

DR. SCHUELLER: I think you're right on PDF page 12. No, it's 10.

DR. NESSLAGE: The comment on using PSA is on --

DR. SCHUELLER: Page 12 of our recommendations, yes.

DR. COLLIER: Genny, those scores that were developed by staff previously were requested by the council and the SSC, because they did not feel comfortable with the PSA scores. For one, the PSA scores were developed in 2007, and significant changes have occurred since 2007, and they wanted to really think about the metrics that were included as well as the availability of data, and so a new system was developed with how to account for some of these different things, and so those PSA scores that were from MRAG are based on the SSC, and you guys wanted different values, and those were provided to you at the last meeting, and we can make sure that we clarify exactly what we're calling those, but those MRAG scores we thought were no longer going to be used.

DR. NESSLAGE: Yes, and there was a huge table that Mike walked us through, and it had all sorts of detailed information about the biology of the animal, right? I mean, I thought we had abandoned this, and so I guess -- I'm sorry that I missed --

DR. COLLIER: It might be called PSA still, but it was different attributes that were included.

DR. NESSLAGE: So the recommendation we need to make is to clarify the wording and replace PSA with biological risk scoring or information, right, is essentially what this group is suggesting, and that we have an opportunity to review those risk ratings, and we'll just say in the near future, and let's not put a date on it. Would that address what you guys were talking about, Amy?

DR. SCHUELLER: Wilson has his hand up, and he was in the group as well. I think so, and so, yes, I am remembering now that we did that, but -- I mean, it's a problem if we did it and we can't remember it, and it's not written down in the document, and so it should go into the document, and I know that they said that they were going to work on the language in this document anyway, but this is an additional thing they need to address, so that it's clear.

DR. NESSLAGE: Thank you. Wilson.

DR. LANEY: Thank you, Madam Chairman. One other thing that I was going to add was that, with respect to Table 4, we had some discussion relative to -- What we were trying to do was to keep in our heads, in the breakout group, the SSC risk responsibilities relative to uncertainty versus the council's responsibilities relative to management risk, and one question we had, and I will just go ahead and ask it, in the hope that staff or other SSC members can clarify it, is whether or not, in Table 4, if you look at the columns relative to the biomass status of each stock, whether that sort of captures the SSC's scientific uncertainty assessment, and then the rows, on the other hand, capture the council's management risk assessment, and is that the way it works? I was confused about that, and I think some of my colleagues were as well.

DR. NESSLAGE: My memory is that there was a huge table that had biological and socioeconomic factors that went into the risk rating that the council was asking us to provide a biological opinion on, and then that would be used to set the rows, and then the assessment would be used to set the columns. Does that answer your question, or now I'm way off base?

DR. LANEY: Well, that helps. That helps, and so, basically, as far as the use of that table goes, the council is setting the rows, and the SSC would have the input into the columns, based on our review of that other table, if that's what I am hearing you say.

DR. NESSLAGE: Technically, yes, but the council has asked us, as I recall, to comment on the biological, and the SEP on the sociological and economic, aspects of the risk ratings, and so they have the ultimate authority on that, but they have asked our opinion, and we had seen a preliminary version of those tables, but we wanted to look at them more carefully, as they weren't finalized, and hence the footnote. I don't know if I'm clarifying it here, but, staff, if I'm getting this wrong -- It's all coming back to me now.

We have purview over the ABC and the OFL, and that's the scientific uncertainty. The risk is the council's purview, and, if they are considering biological and socioeconomic aspects in the risk rating, that's great, and that's what they're supposed to be doing, but they have asked our opinion of their risk rating. Mike, correct me if I'm wrong.

DR. SCHMIDTKE: No, you have it right. The biomass information would come from the assessment, and then the risk rating would come from that table that we walked through, and that does include -- It has categories of biological, human dimension, and environmental attributes, with kind of sub-categories underneath each of those, where there are scores.

DR. NESSLAGE: To add to that, in the past, the whole idea is that -- The reason why I am balking a little at that second bullet is that we have purview over the ABC and the OFL, and we do not have purview over the risk rating, although we have been asked to comment on it, and so I don't think, the way this amendment is going, that we can say what we were saying there, and we recommend keeping the ability to have the PSAs in the control rule, and that's a totally different - - That is blowing up what's in here, basically, and is that what you guys are intending? That's why I'm worried.

The scientific risk and the management risk are -- Again, we're confusing risk and uncertainty here, and so the scientific uncertainty we have complete control over in the OFL and the ABC. Mike Schmidtke, correct me I'm wrong. Management risk is this stock risk rating, which includes biological considerations, which we've been asked to provide information on, and our opinion on, but we do not have control over whether it would be low, medium, or high, ultimately, and is that correct, Mike?

DR. SCHMIDTKE: Yes.

DR. NESSLAGE: So we only provide our recommendations. Fred Scharf.

DR. SCHARF: Thanks, Genny. In looking at the document, this is Attachment 9, right, the ABC Control Rule discussion document, and, in that, and so that Table 4 that you guys have been talking about is in there, on page 12, I think, and Table 2 in there lists this biological catch control rule, and it shows a Level 1 for assessed stocks, and, as part of the adjustments for the P* adjustments, there is four tiers, and one of the tiers at the bottom is a productivity and susceptibility analysis, low risk, medium risk, high risk, that we have always ascertained as to what that is, based on what we know about the productivity of the stock and its susceptibility to overexploitation.

Is that still retained if we go to this Action 1, Alternative 2, and so that is already embedded in the P*, and then Table 4 gets implemented, where the columns define the stock status, based on high, medium, or low biomass, and then you have these rows of low, medium, and high risk that you just mentioned are based on socioeconomic considerations, but also biological risk, and the council makes that decision. They ask for our input, but they make that decision of low, medium, or high, and I think that's where the confusion for us set in. Is that original sort of PSA adjustment still in there or not?

DR. NESSLAGE: My understanding is it's in there, but not as the MRAG-based PSA that we used to use, which is what Chip was trying to clarify earlier. It would be used in that big -- The biological considerations that we would consider risk would be in there, but biological risk, like is it a long-lived species, does it have low fecundity, whatever those types of things are that we tend to fuss about, and those would be considered in that big spreadsheet that would go into the stock risk rating, but it would not be in our ABC -- In the setting of the ABC anymore, our control rule, and am I wrong, Mike?

DR. SCHMIDTKE: No, and that sounds right. I was, I guess, thinking of it in a slightly different way, and there are components that would have gone into the PSA that are used in the stock risk rating and evaluating it, but there are more components than that, and they're not used in the same format.

DR. NESSLAGE: Well said. Fred, does that clarify -- Did that answer your question? I'm not sure.

DR. SCHARF: I don't know. I mean, I think that we felt like, just from -- You know, at a broad level, that we felt like that input, whether that input is -- If that input was quantitative input, in terms of assessing a biological risk to a stock, that this breakout group felt like we should retain that and that we should still have some ability to adjust based on that risk, right, and that's removed from socioeconomic risk, right, which the council -- That's their purview, but the biological risk would be for us to input, and it sounds like the way it would work is that now that would just be a recommendation, to say, well, this is a potentially-risky stock, and so you should be careful, and I think that concerned us a little bit, that, if we had really strong information about productivity and vulnerability of a stock, that that should be more than just a recommendation and that we should be using that to set the ABC.

DR. NESSLAGE: Thank you. Mike, is it worthwhile reviewing how we would set the P^* at this point, if we go this route, or were you going to say something else?

DR. SCHMIDTKE: That's a paused screen hand.

DR. NESSLAGE: Because I think there is confusion now about how we would set the -- Where we would -- What we would be considering when we set the P^* , because, right now, we consider the PSA scores, right? Can we go to the place in the document where the corresponding P^* guidance information would be, because now I'm getting a little confused.

DR. COLLIER: Mike, which table would you like me to go to?

DR. SCHMIDTKE: Honestly, I am not sure, Chip.

DR. COLLIER: Okay.

DR. SCHMIDTKE: Because, I mean, the tables where the PSA is incorporated are in the current control rule tables. Those are not the proposed changes.

DR. NESSLAGE: Right, and so what is the preferred alternative right now? That's where we kind of need to focus on. Whatever the council is circling around, what they think they might be landing on, that's what we need to be looking at, right?

DR. SCHMIDTKE: I don't know that they have discussed it within the context of developing a preference yet, and this has mostly been trying to develop the alternatives still at this stage, and, I mean, one of the alternatives, and the one that the SSC has at least preferred to this point, has been Alternative 2 to change the control rule to that category format and, when considering the council's risk tolerance, to do so through that format described in Table 4.

DR. NESSLAGE: Right, but that Table 4 includes a --

DR. COLLIER: So the P^* now would be based on basically the biomass levels, more or less, and so you would look at the biomass levels that are coming out of the stock assessment, and that

would be used -- That would be coming from the assessment, and so the scientific side, and then you have this stock rating that would be used, and those two would combine to give you your PSA scores, with a range from 45 down to 20, and, when, you look at the distribution of P*s that are coming out of the stock assessments right now, that falls into the same range.

DR. NESSLAGE: So the breakout group was correct, in that we would be giving up, essentially, control over any biological risk. Obviously, the council would be asking us about it, but, ultimately the socioeconomic concerns, for instance, or environmental concerns might outweigh the biological concerns, and it might end up in a different rating that we might have put it in, and, therefore, there is a concern here, and I think that's where Amy is going.

DR. COLLIER: It sounds like we need to bring those rankings back to you guys and let you look over them. I mean, it's not done in absence of discussion with the SSC. You guys provided recommendations on the scalars that are in there as well as the methods to use -- In order to come up with the low, medium, and high.

DR. NESSLAGE: Thank you. Amy.

DR. SCHUELLER: I was just -- So it seems like there is three alternatives here. The first is status quo, which is that Table 2, and I think that nobody is really happy with that, which is why this amendment has begun, right, and so there's really only two alternatives here that I would assume the council would be considering.

Alternative 2 doesn't have any input from us on like, for example, our first tier would. Like we had a discussion that steepness was fixed, and so, technically, we're using the equivalent of a proxy, and so we're going to decrement for that, because we're uncertain, right, or -- The productivity part of this PSA stuff, this is a low-productivity stock, and so we might want to decrement for that, and so we lose that ability in this sort of second alternative in this Table 4, and I really -- I think a big part of the problem with our discussion was just like how that Table 4 would even be implemented, and it's described literally in that short paragraph above that, and clearly there is much more to it than that.

Then the third alternative, if you scroll down a little bit, has a modified version of what we do now, and so there's still that assessment information stuff and how well we're accounting for -- Well, this one is related to the benchmarks and stuff, and then there's this uncertainty part of it here as well, and then there's this Number 3, the council's risk tolerance, and I don't really know what -- I don't remember what this is, but these are two very different options, and I guess -- I don't know, and maybe this group inadvertently put on the floor whether or not we even think that Alternative 2 is really the one we support or not.

DR. NESSLAGE: I feel this comes to us -- This has come to us numerous times, but this document is really hard -- This is no offense to staff, but it's really hard to follow, and I know you guys have walked us through this a million times, but I'm starting to hear that we need to be walked through this very carefully again, and I don't think we have time today, unless folks want to do that, but, at the moment, if we could go back to the comments, and maybe we can suggest -- The word "PSA" is obviously -- Let's say something like "biological risk" or "biological uncertainty or risk".

You can take out the question of is the council using, because the answer is, yes, it's in that table, and then, maybe rather than -- We can say the text could use some clarifying, but also that we would like an opportunity to reevaluate this, given that this is getting pushed into the fall anyway. I feel like we need -- We forget between times when we see this, and I know I've gotten confused, and I think we're getting confused again, before we -- What would be really helpful is like knowing exactly what -- From our point of view, what the ABC Control Rule -- How we would set the P* under each of these alternatives very clearly laid out. Fred Scharf.

DR. SCHARF: Genny, I think, in that document, just going forward, so we can keep our memories straight if we revisit this in the fall, is the list of SSC recommendations, the first one saying that we support modifying it, but it's that middle one, that's about halfway down, that says the SSC supports varying risk tolerance by biomass levels and considering the PSA risk categories for assigning stock risk ratings, and so there was some confusion. Are risk ratings the same as risk tolerance?

Considering the PSA risk, we weren't really sure what that meant, and so I think clearly we supported the idea, back when we discussed this, of keeping something about that PSA risk that we talked about, in terms of productivity and vulnerability, in the risk tolerance, but, the way that Action 1, Alternative 2 reads, it's not clear it's explicitly a part of it, and it's sort of captured in the council assigning low, medium, or high, and our group wasn't comfortable with that, and I think that's really -- The rest of them, I think we were okay with, for the most part, and it was really that middle one, that we wanted clarification on how it would actually work.

DR. NESSLAGE: I hear you, and that makes sense. Is there any disagreement among the SSC to that recommendation to reevaluate that aspect of Action 1, Alternative 2, or at least regarding our recommendation for it? I apologize to staff for our continually getting confused on this amendment. Amy.

DR. SCHUELLER: I know I was within this workgroup, and so I'm not an outside opinion, but, granted, we saw the big table that the council put together and we reviewed, but, if we go with Alternative 1, or Alternative 2, under Action 1, then we don't have any -- Under our purview as an SSC, we don't have any control over the P* at all, as far as like assessment uncertainties or the things that we typically discuss or the species productivity at all, and we literally don't have a decision, because it's based on the biomass. I suppose that like makes our meetings quicker, right, but it doesn't really take into account scientific uncertainty in a formal way, and so I just feel like maybe there's something missing there even, and so that's maybe not even a plausible alternative.

DR. NESSLAGE: You said something else that's important there, and not only the biological -- The stock susceptibility scores, but also assessment uncertainty, and so, in theory, a lot of that would be -- Ideally, it would be incorporated into the distribution of the OFL, but we've seen assessments where that is not done to our satisfaction, and there is probably no assessment that's done perfectly, and so that would be a concern, from my point of view, from an assessment, or am I taking your comments too far, Amy?

DR. SCHUELLER: No, and, I mean, that's exactly what I'm thinking. I'm just trying to think about the practical implication of this in the future, and I'm particularly concerned if we're in like a low-biomass situation, and then we basically say, oh, we're in low biomass, and now here's the numbers, based on whatever comes out of that matrix that was put together, and I think that's why

we have the note under there that says to review preliminary risk ratings in the future, because I would be really curious to see what P* values we have currently versus what would be coming out of something like this, and maybe we reviewed that and I just am not remembering it right now.

DR. NESSLAGE: I am remembering that Mike Errigo has done a couple of examples for us, as I recall, and maybe I'm off-base, and we seemed okay with those examples, but I don't know that we've seen all of them worked out yet, and so that's a concern, for sure. Thank you, Amy. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. One of the things that I think might help is I get confused when we talk about scientific risk and management risk, because we can talk about vulnerability, and we can talk about biological vulnerability or susceptibility, but the risk has traditionally been management risk, and I do not like to see scientific risk anywhere. I think we need to use a different term, to avoid the perception that we're moving into a management area.

We've talked about biological uncertainty, and we've talked about biological susceptibility, and we've talked about biological attributes, and those are all fine, and they don't get into risk, in the sense of management risk, and, to the extent that others might be having problems with scientific risk and management risk, where risk has mostly been focused on management risk, I would hope that we could get away from using the term "scientific risk". Thank you.

DR. NESSLAGE: You're absolutely right, and I think Mike tried to walk us through that earlier, and so, here, the terminology we're using, "risk" is used to denote management risk, and it's the purview of the council, and "uncertainty" is used to denote scientific uncertainty of assessment results, projections, et cetera, and is the purview of the SSC, and so, Chip, would you mind going back up and replacing "scientific risk" with "uncertainty"? Thank you.

I think there's a couple other places. We're just being a little cavalier about our use of the word "risk" here. We mean uncertainty, like what Amy was talking about, and maybe we don't know what M is, or maybe they haven't completely included all of the uncertainty in the projections, et cetera, the sort of things that we look for in a reasonable distribution around the OFL. Okay. Yes. I'm liking this. Thank you, Fred.

We're not trying to tell them what the socioeconomic implications they should take into consideration are and how they should be weighed, although the SEP might have information on that, and I don't think -- I think that's a totally different topic, right? Okay. Any other comments on any of the ABC Control Rule strawman statements here? Thank you to this workgroup for catching that. All right. No hands raised. We will have an opportunity, remember, to look at these one more time on Monday, but, if you spot anything in the meantime, let me know. That being said, then let's wrap -- I believe that's everything. Is that correct, Mike, for this agenda item at the moment?

DR. SCHMIDTKE: Yes, I think so.

DR. NESSLAGE: You have what you need from us for now. All right. Then let's move on to Agenda Item 6, Dolphin Wahoo Amendment 10. As a little bit of background here, Amendment 10 includes actions that incorporate updated catch level recommendations from the SSC and revise the ACLs for dolphin and wahoo. See Attachment 13.

What we are going to focus on at this meeting -- The primary request that's being made to the SSC is to comment on the council's potential use of geometric mean as a trigger for AMs in the dolphin wahoo recreational fishery, and so take a look at the geometric mean information paper, which is Attachment 14, and then I believe Chip is going to walk us through a presentation, Amendment 15, and John Hadley as well. Go ahead, if you guys are ready, and take it away.

DOLPHIN WAHOO AMENDMENT 10

MR. HADLEY: I will kick it off, and I will hand it over to Chip, but I will try to be brief, but I do want to provide you a little bit of background, to kind of tee-up the discussion on the use of geometric mean in Dolphin Wahoo Amendment 10, and so I will briefly go over some of the actions overall.

I will briefly go over some of the background information on Amendment 10 and some of the actions being proposed, and then Chip will jump in and go over the specifics on the use of geometric mean and go over kind of an overview of the paper that was included in your briefing book.

As a little bit of background on the amendment, for those of you that have been around the proverbial table, so to speak, for a while, this is an amendment that's been around for a few years. It was initiated back in 2016, and it's faced a few delays, most notably due to the change in the MRIP data and a switch from the Coastal Household Telephone Survey to the Fishery Effort Survey method, which changed the landings streams for both dolphin and wahoo quite a bit, and it greatly affected the ability to properly analyze actions, and it kind of brought about the need for a new ABC for both dolphin and wahoo, since they are unassessed species and the ABC for the species, both species, is based upon landings.

As you may recall, the SSC has recently discussed the ABCs for both dolphin and wahoo, at recent meetings, initially at the October 2019 meeting and then again at the April 2020 meeting, as these two species are part of the unassessed group of species, and so there is no stock assessment available. The SSC did discuss application of the ORCS method for setting the ABC for both dolphin and wahoo, and they decided not to move forward with doing so at that time, due to concerns over the method as it relates to the two species, and, really, the updated ABC incorporates a revised recreational landings data stream, and Monroe County, Florida recreational landings, which had previously not been used in setting the ABC, and a new time series overall for both series, looking at 1994 through 2007 for the baseline period and selecting the third-highest landings within that time series.

Overall, the council is taking action to incorporate the SSC's new catch level recommendations into management and address deficiencies in the recreational accountability measure, and, by deficiencies -- I will get into the details of it a little bit, but, overall, both the accountability measures for wahoo and dolphin include a specification, or a trigger, that revolves around the species becoming overfished before the AM would be triggered, and so that is a deficiency that the council is trying to address when revising the accountability measures. Last, but not least, certainly responding to public input on management changes needed in the fishery.

Overall, there are twelve actions in the amendment, and they can be broken down into three major categories, those that revise the catch level recommendations and incorporate the new recreational data landings stream, and those are Actions 1 through 4, and those revolve around setting new ACLs for both dolphin and wahoo.

Actions 5 through 8 address the deficiency, the noted deficiency, in the recreational accountability measures and respecify those measures, and then the last set of actions is sort of the catchall of various management revisions to the dolphin and wahoo fishery.

Briefly, on the next couple of slides, I will go over the Actions 1 through 4 that revolve around implementing the new annual catch limits for both dolphin and wahoo. Actions 1 and 2 cover the total annual catch limit for dolphin and wahoo. For both species, the council is choosing to set the annual catch limit equal to the updated acceptable biological catch level, there again specified by the SSC.

For Actions 2 and 3, these two actions look at dividing the total ACL between the commercial and the recreational sectors, overall being a recreationally-dominated fishery for both dolphin and wahoo, and the recreational sector is still receiving the majority of the total annual catch limit on a percent basis, and I will note that, for both dolphin and wahoo, on a pound basis, the ACLs are going up for both the recreational sector and commercial sector, and this is in relation to the council's intent to not -- They didn't want to look at any alternatives that would have reduced the annual catch limits on a pound basis for either sector.

I will slow down a little bit, because the set of actions -- Well, the next four actions really, kind of are the crux of the ask for the SSC, if you will, to look at geometric mean and its use in management. Overall, in addressing the deficiency, the noted deficiency, and, again, the overfished language that currently exists, or overfished specification trigger, if you will, that currently exists for dolphin and wahoo, and the council is taking a two-step approach for each species and revising the recreational accountability measure.

The step-one is to look at what is the trigger for the recreational accountability measure, and step-two, if you will, is to look at specifying exactly what that recreational accountability measure is. For dolphin, which is covered by Actions 5 and 6, and, in Action 5, the council is choosing to implement the trigger for the accountability measure as being when the total annual catch limit is exceeded, and so the recreational and commercial annual catch limit combined.

Of note is that the commercial sector does have an in-season accountability measure that includes an in-season closure when the commercial ACL is projected to be met, and so there is sort of an in-season stop there. The recreational sector does not have an in-season recreational accountability measure, and the council has decided to keep this in place moving forward, with the intent of looking at a post-season recreational accountability measure. In the case of dolphin, the council is looking at reducing the length of the following recreational fishing season by the amount necessary to prevent the annual catch limit from being exceeded, and so that covers dolphin.

For wahoo, there's a little bit different view on the trigger, and this gets into -- There were actually the same set of alternatives examined for the dolphin and wahoo. However, for wahoo, the council chose, as a preferred alternative, to set the trigger for the recreational accountability measure to follow the three-year geometric mean of the landings, in comparison to the sector annual catch

limit, and so, essentially, it would be a three-year running geometric mean, and, each year, that would be compared to the recreational sector annual catch limit as far as whether or not the accountability measure would be triggered.

There are also specifications within there on what would take place if there is a major change in the ACL, as with a similar -- In the future, if a similar action were to take place changing the wahoo ACL, and what would take place in years-one, two, and three, as far as getting that three-year running average, or three-year geometric mean, up and running again, so to speak, and so, in the first year, essentially, the trigger would be whether or not the recreational sector ACL was exceeded. In the second year, you would look at the two-year geometric mean, and then, in the third year, and every year after, that would be the three-year running geometric mean, there again comparing it to the sector annual catch limit.

Chip is going to get into the data side of that and how that's being applied, and so I won't go into that any more, but that's essentially what the council is considering, as far as on the management side for wahoo, and what the discussion will focus on later on in the presentation.

Then, looking at the recreational post-season accountability measures, and so specifying what the actual accountability measure will be for wahoo, the council is choosing the same preferred alternative as they did for dolphin, which would reduce the length of the following recreational fishing season by the amount necessary to prevent the ACL from being exceeded.

I will briefly -- We can kind of fast-forward through the next set of slides, but I will just briefly go over what else is in the amendment. Overall, the council is looking at allowing -- Essentially, it's specifying that dolphin and wahoo can be landed aboard vessels with trap, pot, or buoy gear onboard. Currently, that is not allowed, since trap, pot, or buoy gear is not allowable gear in the dolphin wahoo fishery, and so sort of an exemption there for those vessels.

Action 10 looks at removing the operator card requirement in the dolphin fishery, and this would apply to both the for-hire sector as well as the commercial sector. Then Actions 11 and 12 look at reducing the retention limits, the recreational retention limits, for both dolphin and wahoo. In the case of dolphin, the council is considering reducing the overall vessel limit for dolphin to forty-eight fish per vessel from the current sixty-fish vessel limit. Then, for wahoo, it's looking at reducing the bag limit to one fish per person from its current two fish per person status.

That was a quick overview of the actions in the amendment, and, again, we'll get into the details on the use of geometric mean and some of the landings data streams for both dolphin and wahoo, but I'm happy to field any questions right now, as they relate to the actions being considered in the amendment.

DR. NESSLAGE: Thank you, John. Are there questions for John? No hands. All right. Why don't we keep moving, in the interest of time. If folks have questions, we'll have an opportunity at the end as well, and you're going to be sticking around, right?

MR. HADLEY: I will be here. Absolutely.

DR. NESSLAGE: Fabulous. Thank you.

DR. COLLIER: Going into the geometric mean for Dolphin and Wahoo Amendment 10, John had mentioned looking at a three-year geometric mean as a potential trigger for an accountability measure, and this was selected as an alternative for wahoo, and then it was also considered as an alternative for dolphin as well, and this has been a developing issue that the council has been talking about. The alternative was added and presented to the council in December, and there was some discussion at the council meeting, and they asked for an information paper to be developed, and it was brought to the council in March, and then they asked for additional discussion and that it be brought to the SSC, and that's why it's being presented to you guys today.

What I'm going to be going through is Attachment 14, which is the geometric mean information paper, and that was provided in your materials. Within this presentation, I have, I guess, one extra slide of plots that might be useful in some of the discussions by the SSC.

When we're thinking about recreational landings data, these are really used in three different ways in management, and I'm going to talk about them in a little bit more detail, but the three ways are to estimate landings for use in stock assessments, to monitor catch or landings relative to the ACL, and to develop management measures. Although these are all very similar, they have important subtle differences, and so let's talk about the first way, the use in stock assessments.

When they're used in stock assessments, they are primarily based on finalized datasets, and they have been reviewed by several people prior to use in stock assessments, and, although the landings are reviewed in detail, they are quite often not changed, and that is because the stock assessment allows some lack of fit to the individual data points, and they also have some estimation techniques in evaluation of uncertainty that are built into the models, and so it's very complex, and there are several different pieces of information that are going into the stock assessments, and it's not just relying on one single information point.

The second way that recreational landings data are used, they're used to monitor landings relative to an ACL. Here, the dataset are primarily preliminary data, and, in some cases, for overfished stocks with a payback, a portion of the landings will be from the current year and a portion of the landings will be based on the previous years, and this is important, because the data have not gone through the same review process as described in the above scenario with stock assessments.

In the third way that recreational data are used, they're used to develop management measures, such as size limits, bag limits, and season analyses, and these datasets are typically finalized datasets, but they have not gone through the thorough review that was done in a stock assessment, and so they are somewhat in between the two different ways that I talked about earlier. Today, I'm going to focus on the recreational landings dataset and their use to monitor catch relative to the ACL.

As I mentioned, or as John mentioned, in Dolphin Wahoo Amendment 3, they include three different methods to compare catch to the annual catch limit and a trigger to instigate those accountability measures. They use a point estimate, which is a single point estimated for a year, and they use an average. I believe, in this amendment, they're using the sum of three years, which is essentially an average, if you divide by three, and then there's consideration of a geometric mean.

When we're developing these triggers for accountability measures, we need to think about two different competing risks that the council must balance for this. One is the risk of overfishing, if the landings exceed the ABC, and I do want to point out, with the Dolphin Wahoo ABC, it is set at the third-highest landings from 1994 to 2007, and that is the ABC, and the OFL is unknown for these species. It's not defined.

The other competing risk is avoiding triggering an accountability measure that's not necessary, and, in this case, they're talking about shortening the season for wahoo, which the council has indicated that is not necessarily something that they want to do, and, when we're talking about risk, throughout this discussion, we've got to remember this is a qualitative risk. Just because something could be high risk, moderate risk, or low risk, it does not indicate that there is any great deal of difference between the two. We don't know the amount of difference between them, but we just qualitatively rank them.

Getting into the landings data, right here, on the left side of the graph, I have landings for dolphin from 2010 to 2019, as presented in the amendment, and to the right of that is the wahoo landings. If you look at the dolphin landings, you can see the blue line, and that is the landings from 2010 to 2019. In general, the landings are between eleven million pounds and about seventeen million pounds. In 2015, there was an exceptional year of landings, where the landings spiked up to twenty-five million pounds.

On a different scale, we have the wahoo landings, which generally bounce between about one million pounds and two million pounds, but there is three years of higher-than-normal landings in that time series, where the landings increased from around two million pounds up to three million pounds in 2015, and then, in 2016, it was right at five million pounds, and then they drop back down to one of the lower points in the time series in 2018, without any management measures or any changes in the fishery occurring overall.

Continuing on with these boxes that I identified earlier, and those were some concern points that we had noticed, as staff, and they could potentially trigger an accountability measure. However, we wanted to make sure, if an accountability measure is being triggered, it's not just based on some potential errors in the survey for the recreational survey, and so, when we're thinking about the recreational survey, it is not a census, like the headboat surveys or the commercial reports, and error could be introduced due to coverage, sampling error, non-response, or measurement errors.

Implementing an accountability measure based on a survey error is a risk that the council is wanting to consider when proposing an accountability measure. Given this risk, the council may wish to consider thoroughly reviewing a method prior to using values to implement an accountability measure or establish a process to review the data before it's implemented, before an accountability measure is implemented, and this is the reason why we're coming here today, is really to talk about these risks.

What I have presented here is landings per angler, and on the left side is the dolphin, and on the right side is wahoo, and each of these data points represent a categorical catch per angler, and I believe that I divided it into about two-tenths, is what it was based on, and each of these plots represent the overall contributions to the overall landings, and so a larger plot means a significant portion of the landings came from that, and a smaller plot means a lesser portion of the landings came from that, and what we're trying to do, when we're looking at this landings per angler, is

trying to see if there was a spike in the catch per unit effort or we're trying to see if there's a spike in the overall effort, and, if you see a spike in the catch per unit effort, that could give some support to a spike in landings. If you see a spike in effort, that could also give some support to the spike in landings, and so this is what we're trying to dig into.

If you look at the dolphin, it doesn't really appear that the 2015 spike, which jumped from the average between eleven to seventeen million up to twenty-five million -- You're not seeing a substantial difference in that distribution. Similarly, with wahoo, you're not seeing a substantial difference there. Although the 2016 point is a little bit broader than some of the surrounding years, it does not appear to be substantially different.

Continuing on and looking at the overall number of trips, and, plotted here, I have dolphin on the left and wahoo on the right. Once again, the years of question, where we had really high points in the landings, those are highlighted within the red box, and so what a targeted trip is on this -- How I defined a targeted trip for dolphin and wahoo was it was the primary species identified, primary targeted species identified. If you look, there is no real significant deviations in the overall targeted trips. For wahoo, you see a high amount of variability in the number of targeted trips, but, overall, there is no real trend, although there might be a trend here, and it's just extremely spiky.

The next thought was, looking at these recreational landings, there is inherent uncertainty in the recreational survey, and we wanted to see exactly how often dips or spikes occurred in the recreational landings data, and we hear about it quite a bit in the SEDAR assessments, that there were spikes, or dips, in the landings, and the way that I am defining these spikes and dips is I'm taking a mean over the past ten years, and then I have a standard deviation that was based on those ten years of landings, and I take two standard deviations above the mean for a spike and then two standard deviations below the mean for a dip.

I looked at this for seventeen different species, and I will go through this slide a little bit slowly, and, for some of the species, I was identifying some species that had trends in the landings, and so, if you look at black sea bass, you go from a very high point to a very low point, and then, for king mackerel, you go from a low here up to a high, and it's pretty smooth data all the way through. With gag grouper, you go from a high point down to a low point, and, for vermilion snapper, you go to a low from a high, and those seem to have significant trends, and, before I had even plotted the mean and the standard deviations, I had selected to remove those, and so those weren't considered in the analysis, and so were left with thirteen species to really look at to see if there were spikes or dips in the data.

The next group that I have highlighted in red here are species that exceeded the mean with two standard deviations at least once in that ten-year time period, and so dolphin, gray triggerfish, greater amberjack, hogfish, red porgy, scamp, and wahoo all exceeded the mean when we're looking at the landings over -- They're two standard deviations above the mean when we're looking at the landings over the past ten years, and you will notice that the landings did not provide the scale bar on there, and it just got really crowded if I provided the actual landings value, but these are -- Each individual species is scaled to their own landings.

In yellow, there is two species that were in yellow, and these two species were blueline tilefish and yellowtail snapper. These were very close to the mean plus two standard deviations, and they were

right at 2,000 pounds below the second standard deviation. The only species that was actually pretty close to being a dip was white grunt, and that was in 2010.

Just to reiterate, we had four species that had trends in landings, seven species out of the thirteen that were really evaluated that exceeded the mean at least once over the past ten years, and we had two of those that were close to the mean. We had one that was close to a dip, and then we had, basically, red grouper, Spanish mackerel, and snowy grouper that did not exceed the mean or they did not have a spike or a dip in the landings.

Looking at -- The council has discussed this quite a bit in the past, and there's been two species that they were really concerned with, blueline tilefish and greater amberjack, where they raised questions on whether or not the recreational data were accurate for these species, and what they identified is they were identifying certain individual data points that really caused significant changes in the estimate of landings, and so they reviewed blueline tilefish and greater amberjack. However, there was no change based on the council's questioning. The council has indicated that it wants to reduce the risk of implementing accountability measures, if possible, while preventing overfishing.

Getting into the data and how these two different species would respond, based on the different techniques in order to trigger an accountability measure, and so, once again, this is the landings of dolphin over the past ten years, and, essentially, if you look at this blue-dashed line, that is the point estimate, and that also corresponds to the landings over the past ten years. The yellow line here represents the preferred accountability, or it represents the preferred annual catch limit, and then these two lines are overlapping each other for pretty much the entire time series, and it's the average, which is the orange color, and then the gray-dashed line, which is the geometric mean.

The important thing to note here is, if a point estimate is used, an accountability measure would have been triggered in 2015, in order to reduce landings, and, in this scenario, the recreational fishery -- The landings did reduce in 2016, with no change in management over that time period.

Looking at dolphin and how the accountability measure would be triggered over time, once again, we have the point estimate, which is in the blue-dashed line, and that, once again, represents the landings for the year, and you can see that an accountability measure would have been triggered in 2015, 2016, and 2017. In the orange line, you have the average. One thing to note from this orange line is you can see that it's always above the gray line, which is the geometric mean, and that is to be expected. The reason that a geometric mean is done the way it is is it's trying to account for those spikes in the data, and that is the reason that you would use a geometric mean, is to reduce spikes on the high side.

The other thing to point out from this is you can see that, in 2015, when the accountability measure would have been triggered using a point estimate, it wasn't triggered using the average or the geometric mean. It was delayed a year, when these landings really spiked up in the second year in a row. The other thing to note is, here, the average stays above the annual catch limit for three years, similar to the point estimate, whereas the geometric mean drops below the annual catch limit in that third year, and so you would only have two years that accountability measures are triggered. With the average, you would have three years of accountability measures being triggered. The other thing to note is the delay that occurs with the averaging, or the smoothing, of the data. It generally delays it a year, and it would keep into the time series a little bit longer.

In the development of the accountability measures, the council is really trying to balance the risk of avoiding overfishing, which, once again, is not defined for either of these two species, and it's also trying to not implement unnecessary temporary restrictive measures when they're not needed.

Looking at these different approaches, these multiyear approaches, they can definitely mitigate some of the anomalies in the data that we're seeing, and we're seeing that they persist over multiple species, and, when we're looking at them, they're always on the high side, which indicates that the geometric mean might be a better choice for that, because they always result in a lower average.

One of the downsides of both the average and the geometric mean is they can persist in the data after the landings decrease, and so, if you have a very high spike, they could be in there for a few years, and this resulted in the council kind of getting rid of this multiyear approach in the past, because of the spikiness of some of the recreational data.

What the SSC is being asked about today, and would like some guidance and discussion on, is the council would like for you guys to comment on the use of the geometric mean as a trigger for accountability measures in the dolphin wahoo fishery and discuss the risk associated with the different methods to trigger accountability measures. What diagnostics should be reviewed when deciding upon an accountability trigger? Are there certain stock or fishery conditions when a method for an accountability measure is triggered is more appropriate? Then, finally, review and comment on any other part of the amendment, as necessary.

DR. NESSLAGE: Thank you very much, Chip. That was the end of your presentation, right?

DR. COLLIER: That is correct.

DR. NESSLAGE: So I didn't just prematurely cut you off? I thought that was, but I just thought I should probably check. Okay. Let's start with clarifying questions from the SSC for Chip and John, if you want to go back farther, and then, once we're done that, we'll take some public comment, and then we'll launch into our discussion. Let's start with Alexei.

DR. SHAROV: My clarifying question is, based on what you presented, it seems that the concept here in applying a geometric mean, or arithmetic mean, is applied assuming that these extreme data points, extreme estimates of higher catch than in most of the other years, seems to be mostly based on the uncertainty or error in the measurement of the catch, because it's a recreational catch, and is that correct? Is it here that, whenever we see an estimate of catch too high, we are assuming that it's probably error in the estimate, and, for that reason, we want to make a correction to that?

DR. COLLIER: When we're thinking about these, I quite often would hear, from SEDAR, that there could be spikes and valleys in the data, and that's definitely true. You could potentially have a spike and a valley in the data, but, for the seventeen species that I looked at -- What I tried to do was get a species from each of the fishery management plans for the finfish fisheries, as well as the assessed species, and so it wasn't a random selection, and these are species that are pretty important species in the South Atlantic region.

In looking at these, yes, everything that we saw, there was a spike to the high side, and they weren't consistent in time, and they would immediately go right back down. Looking at, at least for the

dolphin and wahoo part of it, we did not see an increase in the targeting for -- Based on the number of trips for wahoo and dolphin, as well as the catch per unit effort, and so that seems like it was another part of the survey that is causing changes in the overall estimation of the landings for the species.

DR. NESSLAGE: Does that answer your question, Alexei?

DR. SHAROV: Well, yes and so I would suggest that we think of exactly that point, and that is how do we perceive the variability in catch estimates, and what drives them? Could there be biological or fleet dynamics that could cause it, or is it indeed -- Should we agree with this assumption that this is just the result of the fact that it's a randomized survey? Thanks.

DR. NESSLAGE: Thank you. Amy.

DR. SCHUELLER: I mean, I feel like I had the exact same thoughts that Alexei had. Like, okay, there's a spike in dolphin, but is it real? What is the error around it? Do we know that, yes, it's probably real, or are we just really uncertain, and I would say that there are some species that are on that panel of graphs that we would say that we have -- We're pretty certain the spikes are real, and so I just -- I agree with what Alexei just said, and I'm not sure that the answer was complete enough for us to really make an assessment of that, because some of those species are pretty well sampled, and it seems like we probably would have a better understanding of what the landings values are.

DR. COLLIER: Just to build on that a little bit, and I apologize for not directly answering Alexei's question, but, when you're thinking about the sampling process that goes into the MRIP surveys, the PSEs could be pretty good for the species, but, quite often, it's driven by one or two data points that have a pretty high expansion factor, or they could have very abnormal trip characteristics associated with them, and so, for example, when I was talking about the greater amberjack, that is a fairly well-sampled species. However, there was one sample that had an expansion factor, I believe over 5,000, and with a few individuals on that, it basically led to three-quarters of the ACL being harvested from one trip, based on the expansion factor.

Then, for blueline tilefish, another species that was included in here with a spike in it, when we reviewed those landings data in the past, there was one individual trip that had, I believe, twenty blueline tilefish per person, and so that was expanded, and that resulted in a very high spike in the landings, and that was presented here, and so, based on those concerns, and then reviewing the dolphin and wahoo landings and not seeing significant changes in the catch per unit effort or in the effort, the overall effort, where fishermen are identifying that they're targeting dolphin, that was some of the concern, and so, given that it is a survey, and for the offshore component of the recreational fishery, which is just about maybe 10 percent of the overall number of trips that are sampled by MRIP, in general, it's going to be a pretty low-priority or pretty sparse sample.

Given that, you would expect, at least once a year, that you're going to have a deviation in the landings, and I feel like that's exactly what you're seeing, is, once a decade, you're seeing a deviation in the landings, and so, if you kind of think about that in an uncertainty, or a P value, at that value, you would be thinking about a 90 percent confidence interval, and so, every one out of ten years, you would have a deviation in your landings that are outside of the normal bounds.

DR. NESSLAGE: Thank you, Chip. I have a question, if I may. Has the council, or have you, considered any sort of like broader process for how the trigger might be used and evaluated, and so let's say that one-in-ten is to be expected, and there are a number of examples where the expansion factors are really large, and that's understandable, and we would want to try and mitigate those issues, but, once it's been triggered, I could see the council wanting to then examine what happened, probably post-hoc, right, and then make sure that the trigger doesn't keep triggering.

Like is there any sort of mechanism built in when the trigger would turn into let's stop using the geometric mean and start using the actual point estimates? Like how do you get out of the -- If let's say the stock did start to take off, or the fishery just took off, and that was real, how would you transition to that? Can you explain that a little bit more? Is my question clear? Probably not.

DR. COLLIER: I think so. Basically, let's say you have a condition like here, in black sea bass, where you started high and you went low. Well, that's a bad example. Let's go to the king mackerel, where you start low and go high, and so you're seeing a consistent trend in the landings going higher, and, at that point, with these indicating trends of going higher, that could be a condition where you're seeing a substantial difference, and maybe the geometric mean is not the appropriate place.

The other one is something like a snowy grouper, and you guys just reviewed that at your January meeting, and it's a population that is probably at low levels, as well as red porgy, and you guys have recently -- That one was recently presented to you guys as well, and the stock status is not great for that species, and so maybe, given that it is a stock that's overfished, maybe you don't want to use a geometric mean, because it could induce overfishing for that species, but, for other species, like let's say dolphin, where you don't have an overfishing limit, and wahoo, where you don't have an overfishing limit, maybe you want to consider something different, something that is balancing not only the landings, but also the socioeconomic consequences that could be coming out of the accountability measure. Does that make sense, Genny?

DR. NESSLAGE: You answered my question. I will wait until the discussion to follow-up, and so thank you.

DR. COLLIER: I wasn't a politician.

DR. NESSLAGE: No, and you answered my question. Thank you. Do other SSC members have questions for Chip? I am not seeing any hands, and so I think, if you don't mind, Chip, this might be a good time to go to some public comment, and maybe the SSC will think, in the meantime, if they have other questions or what they would like to think about saying in the discussion, and so do we have any hands raised from the public? No hands raised. We'll give them another second or two here. Okay. Then thank you. Let's go back to the SSC, and it looks like Alexei has something that he would like to either ask or say. Go ahead, Alexei.

DR. SHAROV: It's ask, and I would just add one or two questions for Chip for further clarification, and it's really important to understand, and let's stay on this graph. I think, partially, you already explained it, but I wonder if each of these species that we see here with the catch in at least one year exceeding the mean plus two standard deviations, and the red circle ones, have you, or somebody else, investigated the MRIP data with respect to those outliers?

I suspect that it could be primarily in the angler intercept data, where -- Usually, it happens when the overall number of trips where the species was observed is low and then you have one trip with a high number of fish, and that is being expanded, and it ends up, because it's being applied to the overall effort, and the number becomes really large, and I think that's what you were talking about a few minutes ago. Has each of the species been specifically investigated for the incidence of what caused a particular spike in a particular year, or is it just an example of one investigation that you are applying to all of them?

DR. COLLIER: It started off looking at the catch per unit effort and the number of trips for dolphin and wahoo, and then it expanded to all these other species, and so I did not look at the potential factors for what is the potential driver for some of these. I can say that red porgy does have some very high expansion factors in some years, and that could be leading to some of those spikes, and I believe hogfish was the same way, and greater amberjack was an exceptional expansion factor, based on one location, and some of these might be driven by some of that similar information. What I'm thinking about is greater amberjack, hogfish, yellowtail snapper, dolphin, and potentially wahoo, but there is some sites down in south Florida that have significant expansion factors, and all of those could be influencing this.

DR. SHAROV: Lastly, but these species are generally relatively frequently encountered or not, because the spikiness is often the result of the rare occurrence of observations that is multiplied by a significant effort.

DR. COLLIER: I would say black sea bass, dolphin, Spanish mackerel, king mackerel, those are all pretty -- Those are sampled pretty well, and yellowtail is sampled pretty well, and then the other species -- The groupers don't have as many samples, and they used to have higher samples, going backward in time, probably back before even this analysis starts, and then, the wahoo and triggerfish, some of those are getting into the high PSEs. Red porgy is sticking in my mind right now, and the PSEs are right around 30 to 40, with some years getting pretty high. That 2018 point, I believe, was a PSE of 70, somewhere in there, although that's not circled as a spike, and that was a very high PSE year.

DR. SHAROV: Thank you. Lastly, is it possible that any recruitment events for any of those species could have an influence? That is that a strong year class enters the fishery, because they're legal, but they are being harvested intensively within a year, and then, in the following years, you don't see that increase in the catch, because all of that extensive crop has been harvested, and so could that be a potential explanation or not?

DR. COLLIER: That's definitely a potential explanation, looking for the change in size distribution as well as some of these other factors could be contributing to it, but this is not just an expansion of numbers of fish, but this is actually weight of fish, because that's how we track most of these species, is in -- Actually, I think all of these species, with the exception of hogfish, and they're all tracked -- Sorry. Hogfish and snowy grouper are all tracked in pounds of fish.

DR. SHAROV: Thank you.

DR. NESSLAGE: Thank you, Alexei. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. It's clear that geometric mean is going to have a smoother effect, and so there's no doubt about that. Is it my understanding that you're using a moving three-year average? Is that correct?

DR. COLLIER: That would be correct, and so it would have to be the last year in the time series, as well as the two years prior to that.

DR. SERCHUK: Okay. Have you investigated other durations, a four-year, two-year, five-year, geometric mean?

DR. COLLIER: No, and we were really looking at the difference between the influence of a single point estimate and a three-year average and then a geometric mean. We didn't get into that many scenarios. That is something that --

DR. SERCHUK: Okay, and I'm just saying that clearly a geometric mean will smooth out increases in the -- If there are real increases in the population, a geometric mean will smooth, such that the highest point won't have an influence, but it will -- If there are declines after that, the catches will still remain high above the decline, if it's real, and I'm just wondering -- It might be useful to see what a four-year mean might do. There's nothing special about a three-year mean, is there?

DR. COLLIER: There is not.

DR. SERCHUK: Okay. Thank you.

DR. NESSLAGE: Thank you, Fred. Chris Dumas.

DR. DUMAS: I just had a couple of comments about this. First of all, comparing using a geometric mean to using just a regular arithmetic mean, which is just your standard old mean, standard average, if you use a geometric mean, the number you get is always less than the arithmetic mean, unless your catch values are exactly the same.

If you have three years for the catches, and let's say a thousand, a thousand, a thousand, and so the catches are exactly the same, then the geometric mean will be the same as the arithmetic mean, but, if the catches are different, whether they're increasing or they're decreasing or they're just varying around, the geometric mean catch will always be lower than the arithmetic mean catch. If you switch from arithmetic to geometric, one of the implications of that is that your estimate of catch will always be lower, right, compared to what your estimate of catch would have been with an arithmetic mean, and so that's one thing to take into account. Do we want it to do that? Do we feel that that's, in some sense, biasing the calculation of the mean? That's one issue.

Another issue is suppose you take a set of numbers, a set of catches, that have a given mean, a given arithmetic mean, a standard mean. If you take those catches and then spread them out, increase their variance, so that they have the same arithmetic mean, the same mean, but you're just increasing their variance, and you're increasing the spread among the catches, and, if you increase the spread in the catches, the geometric mean goes down. It always goes down, and so what that means is, if we have increased variance in the catches, then our estimate of catch will go down if we use the geometric mean.

Even if those catches have the same arithmetic mean, and they're varying around the same arithmetic mean, if we increase the variance, then the geometric mean will decrease, and so that means, if we have a catch series where the variation increases, then our estimate of the mean catch will go down if we use the geometric mean, and I have a problem with that, because that means, you know, if there's more variation, if there's more uncertainty in the catches, then our estimate of mean catch goes down, and that means we're less likely to think that it's exceeding the ACL, right, if our estimate of the average, or estimate of the geometric -- If you use the geometric mean to calculate the average, and if the variation in the catches goes up, the geometric mean is going to go down, and so we might not be comfortable with that.

Those are just two sort of basic properties of a geometric mean compared to an arithmetic mean, and so we might want to keep those two things in mind when we're thinking about whether we want to use the geometric mean or not, and, typically, what geometric means are used for is to average growth rates, but the numbers that we're averaging is catches, and they're not catch rates, but they're just catches, and they are just levels, right, and they are not rates, and so the geometric mean might not be good.

Separately from the question of the geometric mean is the question of the outliers, those peaks and valleys, and suppose we're looking at -- Let's just go back to the average of the last three years, and we're looking at a peak that occurs in the last three years, and type of analysis that we could use to decide whether or not a peak is an outlier or not is we could use a branch of statistics called order statistics, and order statistics will tell you -- If you've got sort of a catch series that has an average and a variance, then order statistics will tell you what's the probability of getting a spike of a certain level in the last three years, and so, if you're looking at the last three years of catch, and you see one of the years has a spike, what's the probability of getting a spike that high in the last three years, if your overall catch series has a given mean and variance.

It could also tell you what's the probability of getting a number -- Suppose you're looking at the third-highest catch in the last five years, and it can tell you the probability of that, and so, if getting a catch that large -- If getting a third-highest catch that large -- If the probability of that is less than 5 percent, then you might want to say that's an outlier, and so I'm just saying, if you're looking at averaging over a number of years, like the last three years or the last five years or the last seven years or whatever, if you look at any of those, order statistics can tell you the probability of getting a spike a certain height, or a valley of a certain depth, now likely that would be, given an overall mean and an overall variance of the series. That's the second comment.

The third comment is, if you're looking at a catch series over time, a time series, and you want to know whether a certain spike or valley -- This gets to Genny's question, whether a certain spike or valley is indicating that there's a change in the general trend, and is it just a blip happening, or is it a signal that there's really a change in the trend, and there's some techniques and measures from time series analysis that are specifically address that question. If you're looking at a time series of catches, and you see a particular catch is higher, well, is that just a random error, or is that signaling a change in the trend? I can't remember the name of that analysis, the time series analysis, but I know where to look it up, and so I will look that up and put that in the chat.

DR. COLLIER: Are you talking about sigma-6? Is that what you were thinking, Chris?

DR. DUMAS: No, that was not it, but I will go and find it right now and get back.

DR. NESSLAGE: Excellent. Thank you, Chris. Chip, you seemed like you hand up for a while there, and Chris said a lot, and was this in response to Chris's comments?

DR. COLLIER: Yes, and he had indicated that the -- With increased variances, one reason to caution using the geometric mean, and that was exactly the reason that I was thinking of using the geometric mean, is because we had these higher-variance points that we're observing, and I have been pretty careful not to call them outliers, because this is a survey, and these aren't necessarily outliers, and they're just high data points, and they really need to be investigated, to figure out exactly what they are, and we need to separate the idea of establishing an annual catch limit target, or ABC target, and separate that from the actual estimation of the point, and really considering did that value truly exceed the annual -- Well, when you're thinking about in the accountability measure realm, did that individual point actually exceed the ABC or the ACL and evaluating that point, and what is the best technique to do that with the limited amount of information that we have, and it tends to be highly variable.

DR. NESSLAGE: Great. Thank you, Chip. Amy.

DR. SCHUELLER: First, I have a question for Chip, and then I will probably have a comment, and I had to step away for just a couple of minutes, and so I'm sorry if I missed this and it was in here, but the mean and the standard deviation for the figures on the screen are based on data from 2010 to 2019?

DR. COLLIER: Yes, that's correct.

DR. SCHUELLER: So that's nine years of data.

DR. COLLIER: It's ten years of data, and, when you're thinking about in a non-parametric sense, you should be approaching -- If the data is following a normal distribution, you should be approaching the normal distribution at around ten data points.

DR. SCHUELLER: You think ten? Central limit theory says thirty.

DR. COLLIER: Yes, but, when you're thinking about non-parametric statistics and parametric statistics get to about the same point, it's at nine.

DR. SCHUELLER: Okay. Well, I would suggest that it would be interesting to look at this with a bit more data. I think that there is a much longer set of time series for these species and that my point of view on this is that, if you looked at some of the longer time series for these, you would see spikes that were occurring.

Well, I wouldn't even call them spikes. They're not -- There's like some of these species definitely have values where the values are within the frame of what we're seeing here, and so like this higher variance point, if that is what Chip is wanting to call it, for one of these species would be like totally within the realm of what we've seen historically, and so I feel like this is sort of pulling out just some like select years, in order to try to make a point.

Sorry, but I guess I'm sort of calling out on that, but I just would like to see the longer time series on this, because like blue-line tilefish, and I know that's not a good example, because it's a rare-event species, but those spikes that get called out on that species -- There is spikes, historically, that are the same height, and I know there's issues with that species, but that's true about a bunch of these species, and so I don't -- Right now, what's being used is a single point estimate, right, and the council wants to move to something else, and so those are the two alternatives on the table, but I guess my question is should they move to something else? If these values aren't really higher variance points, depending on the frame of reference of your data, then maybe they're just points, and they're true points, and they hit their limit, and they needed to stop fishing. I just -- I will stop there.

DR. COLLIER: Just a couple of those points that Amy brought up. Naturally, if you're going to increase the number of years in this, that is typically going to decrease your variance, because you have a greater sample size, and so it should be going down. These points would continue to -- They would remain in there, and I am sorry, and it's been a long week, and I am forgetting my other point. I will have to come back to it. I had it in my notes, but I think I forgot to say it today.

DR. NESSLAGE: Well, I'm glad to hear that I'm not the only one who is starting to get brain-drained. Thank you, Chip.

DR. SCHUELLER: Point taken on that, Chip. You're right that, as you add more years of data, if the data are similar, the variance might go down, but it's still possible though for that to not be totally true, and so some of these are like really jagged and saw-toothed, right, and there's high variability in them as it is, and so I don't know that all of these points will necessarily fall out still as exceeding the two standard deviations. I don't know. It is getting long, and I'm glad we don't have a meeting tomorrow.

DR. COLLIER: I think I remembered my other part, and it's we are looking at -- These are all the FES numbers, and so, going back in time, you are beginning to change the influence of non-reporting or the influence of cellphones and caller ID, and those all get into this, and 2015, 2016, and 2017 were the comparative years for the FES, and then, going back in time, you're going to have increased issues, potentially, with comparative data.

DR. NESSLAGE: Thank you, Chip. Amy, did you have something else? I see you're still listed there.

DR. SCHUELLER: No, and I think I just didn't lower my hand.

DR. NESSLAGE: Gotcha. Are there other questions? I guess we're basically -- So we've been asked a couple of things here. Discuss the risk associated with different measures to trigger the AM. What diagnostics should be reviewed when deciding on an AM trigger, and are there conditions when the trigger would be more or less appropriate, basically? If folks are kind of moving away from questions, and I feel like we're moving into discussion now, maybe it's time we got -- We don't have breakout groups for this, and so this all group discussion, and it would be good to get some thoughts on the board here.

My initial questions were going down the line of, if you're going to use this approach, you really need some sort of post-hoc analysis if the geometric mean would avoid a trigger of the AM, and,

if you find that -- Well, I will just leave it at that. I also heard people say there might be room for exploring alternatives to the three-year moving average and see how that performs, although we're not really doing a performance analysis here.

Chris had a whole bunch of points associated with the risk bullet above. He had the order statistics. Thank you. He talked about how you probably are always going to end up -- Well, under most of these conditions, you're going to end up with a lower estimate with the geometric mean, and, therefore, you would be biasing low, which is a risk. The geometric mean isn't typically -- It's typically more applied to a rate, and these aren't rates. These are catches, catch estimates.

DR. DUMAS: Or "levels", instead of "rates".

DR. NESSLAGE: Yes. Sorry. It might be more appropriate to use something that characterizes the probability, or maybe I'm mischaracterizing, because you seemed to be insinuating that it would be good to characterize, perhaps, as well the probability of seeing a catch that high or being the third-highest catch, et cetera, and some measure of probability to accompany this approach in some fashion would be good.

DR. DUMAS: Right, but that was a point that was sort of separate from the discussion of the geometric mean.

DR. NESSLAGE: So maybe we could -- In the diagnostics bullet below, what diagnostics should be reviewed --

DR. DUMAS: That point is a point related to outliers, the issue of outliers.

DR. NESSLAGE: Excellent.

DR. DUMAS: I did have a third point though about geometric mean that I mentioned.

DR. NESSLAGE: Go for it.

DR. DUMAS: That was if you do a mean preserving spread. In other words, if you take the data -- A mean preserving spread, and so, in other words, if you increase the variance of your data points, but they have the same arithmetic mean, and so you keep the standard arithmetic mean the same, but you just spread out the points, then the geometric mean goes down. What that means is, if you see increased spread in the data, and the regular arithmetic mean stays the same, the geometric mean would go down. If you see a decreased spread, then the geometric mean would go up, even when there's no change in the arithmetic mean.

What worries me is, if you see an increased spread in the data, even if the standard arithmetic mean did not change, that increased spread would cause the geometric mean to go down, and so your average of mean catch would go down even if there was increased spread in the data. I think that's -- Typically, we think of increased spread in the data as being associated with more uncertainty and more risk, and so do you want that to cause your estimate of the mean to go down, estimate of the mean catch to go down? I don't know that we would.

DR. NESSLAGE: Well said, and maybe -- Would you mind grabbing the “need post-hoc analysis”, and I’m wondering if that should go up under diagnostics instead, and that’s my bad for telling you to put it there. Good. Okay. Chip, was it to that point?

DR. COLLIER: Yes, it was, and so one of the -- It was pointed out that, typically, geometric means are applied to levels, and that is absolutely right, and it’s applied to things that are non-zero and typically don’t go around zero, but they’re also applied to individual points, where you’re looking at a non-normal distribution, and, if you do a log correction on at least the dolphin and wahoo landings that I looked at, not only were they skewed, but they were non-normal, and so one of the ways that you would do that is you would do a log correction, and essentially what the geometric mean is doing is a log correction of that data.

That’s why I was kind of looking at it and taking a simpler approach than some of the ideas that Chris is bringing up, but we could definitely look into them. I don’t know if we would be able to look into them for this amendment, given that they would like to go final for it, and so it’s more or less -- I think it would be very beneficial to talk about the trigger accountability measures, given the three options that are available to the council, the point estimate, arithmetic mean, and the geometric mean, because I believe -- John, correct me I’m wrong, John Hadley, but they’re wanting to go final in June for this amendment.

MR. HADLEY: That is correct, yes.

DR. NESSLAGE: All right. Thank you. Wilson Laney.

DR. LANEY: Thank you, Madam Chairman. In addition to -- Well, first of all, let me just say that, like Amy, it would be interesting to see the longer time series of data for these species, since so many of them have longer time series, but, in addition to the things that Chip pointed out that you encounter if you pull in that longer time series of data, would it not also be the case that you would also be encountering a lot of other variability from a lot of other factors that influence these data, such as, for example, changing socioeconomic conditions?

It seems to me, Chip, and I think I am recalling from having listened to some of the previous discussions about this particular issue, that another reason for picking a shorter time series is that you may be capturing conditions that are more stable, for example, from a socioeconomic perspective or a climate perspective, if you use a shorter time series than if you go back thirty or forty years, and so that’s just a comment.

DR. NESSLAGE: That’s a good comment, and it’s worth listing under the -- That’s not a biological risk, but maybe a sociological risk, or an interpretation of the data risk, although here we are talking about risk. How about uncertainty?

DR. LANEY: Yes, and just because of the fact that there are so many other factors beyond biological factors that go into producing landings at a certain level.

DR. NESSLAGE: Exactly. Excellent point, Wilson. Eric Johnson.

DR. JOHNSON: Thanks, Genny. One, I just wanted to reiterate what Chip said about measures of central tendency and geometric means being a better measure of central tendency for lognormal

or log distributions. That is the case in other places where they are used. Secondly, if folks do have heartburn about the geometric mean, due its reducing the mean levels, I think the three-year moving average of arithmetic mean would probably get us to the same place, in terms of avoiding -- Or at least adjusting for some of those huge spikes that we may or may not believe represent the true catch or whether they would be inflated due to low intercept data or high PSEs or expansion factors or something else. If we do believe that those levels of catch don't seem to reflect the actual catch, then the arithmetic mean moving average might be another option that I know is there, but we didn't get much discussion.

DR. NESSLAGE: Thank you. I would ask folks to think about that, and we'll see if Alexei is going to comment on that or something else. Alexei.

DR. SHAROV: It's just a reflection on everything that's been said, and clearly it will have a stronger downward adjustment when we're looking at smoothing out the extreme high data point compared to say the three-year moving average, arithmetic average, and I wonder -- So I guess, following the previous comment, a three-year average arithmetic mean seems to be a reasonable alternative as well, which will not result in extreme downweighting or bringing down the average catch, which we compare to -- I wonder why not using the three-year average versus the geometric mean.

I also think that, in discussing sort of the mathematical components of the question, because we are using a three-year average, we are considering three data points, and so we're assuming a certain stationarity there and a continuity of the process. Unfortunately, it's not a single process, and there are lots of them, but, generally, the assumption here is that, within the three data points, the three-year period, I guess you're assuming a relative stability in terms of the overall effort, in terms of overall desire of going fishing, considering that it's a decision made by millions of participants, and there are certain overall guiding economic and social laws that should provide some continuity, and it's the same with the population of fish.

You are generally expecting it to -- Even if it's changing, it's changing gradually, and the climate or weather effects are also variable, but, again, you expect some sort of continuity, and all of this taken together is what subconsciously is driving us to think of this process as being continuous and not random, while the appearance of the extreme high data point suggests that something within the system has gone really wrong, and it's either a true process or probably just measuring it poorly.

Essentially, the approach to this is that either we decide what we think of this process, and do we expect stationarity, and do we think that stationarity is more likely to govern this, versus the random elements, and, if so, then using the geometric mean could be justified, because it essentially sort of tells you what is more likely for the catch to be there within these three data points, what is the more frequent outcome. Of course, if you expand the period, that would be more so, but I would certainly not -- We all know that expanding the interval of averaging results in overall significant smoothing out and nearly removing the trend from the process, and I'm not sure if our observations would be as low variability as the smoothing beyond the three data points would tell us.

DR. NESSLAGE: Thank you, Alexei. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. To be quite frank, I'm a little bit confused. We've had a lot of discussion on the attributes of geometric mean and the variance associated with points and so on and so forth, but I thought, and maybe I'm wrong, that the idea of using a geometric mean as an accountability measure was to avoid exceeding ABC, and so it would downweight the highest points, as you were progressing in an increasing way, because you would still be having some lower points, and it would provide a signpost that says, wait a second, we don't want to go that high, quite frankly, even if you use the regular mean, because we don't want to trigger accountability measures, because we're going to stop fishing before a certain point.

If that is the case, I don't really see anything wrong with it. It's to avoid a bad situation, and, if you're going to be taking a number of points on a trend, particularly if the trend is upward, you're going to stop fishing long before the actual mean would do it, and I think that's a good situation, and I think you want to avoid closing a fishery. Am I wrong? Have I misinterpreted something? Thank you.

DR. NESSLAGE: I will let Chip address that, if that's all right with you, Chip.

DR. COLLIER: Yes, and that's why I put my hand up, and so the council is trying to avoid unnecessary closures, and so what they're trying to do is figure out a way that would still allow for some triggers to be in there, and they also could be implemented if they exceed the ACL, but the concern is, when you're looking at some of these, it appears that there's just some randomness, and it doesn't appear -- Taking on some of Alexei's information, it seems like that some of this spikiness might be due to that probable random error that's in the survey.

That's what the council is concerned with. They have investigated some of these data points in the past, looking at blueline tilefish and greater amberjack, and there was concern with those values being used, and they're trying to figure out a way to continue to monitor the current landings stream relative to the ACL and avoid some of these closures that aren't necessary.

I mean, the other thing to look at is these landings go right back down without any management measures in place. However, with these trigger accountability measures in place, if they're based on a single point, they would have gone in place, even though landings would have decreased without the management changes, or I guess landings wouldn't have decreased. The management changes would have occurred, and I'm not positive what would have happened with the landings.

DR. NESSLAGE: Wally.

DR. BUBLEY: Thanks. I mean, just going to that point though, Chip, isn't -- If you're using any sort of mean at all over multiple years, don't you still risk triggering accountability measures? Say you have one aberrant point that's really high that has the potential to persist for a few years there, and so you're still -- We still may be closing it down, and I think it makes sense to look at those individual points and see if there's something with it, but, anytime you're using this average, while the geometric mean will reduce the pull of that one point, it still won't eliminate it, and so you still have the potential to close down a couple of years even with just one point that potentially could be aberrant.

DR. COLLIER: That's a really good point, Wally, and so I brought up the dolphin data, because it does have this one really high point going from basically -- It's seventeen million pounds in this

year up to twenty-five million pounds in one year, and so let's say the ACL was set at this fifteen-million point. Then, yes, there's some years here where you would be -- The point estimate would be below what would be triggering an accountability measure. However, these other two triggers would be above and continuing to trigger some of the information, and so it could be thinking about these different data points where the current catch levels are relative to their ACL as well would be another consideration for the council.

DR. NESSLAGE: All right. I am looking at the hour here, and we need to start circling around these recommendations. Jeff.

DR. BUCKEL: I guess this is to the diagnostics question. Chip, the charter fleet, now they have a logbook, and is that right?

DR. COLLIER: Yes, that's correct.

DR. BUCKEL: I'm wondering if there's comparisons between the catch per effort from the logbook charter boat and then to the private angler for these data, for these two species, and that might be helpful in trying to figure out if it's a random error because of the MRIP survey or something real with the population, and so that's, I guess, something to look into on the -- Maybe that's more of a research recommendation, but it might help with the diagnostics for the accountability trigger, that bullet.

I guess a separate point is I agree with Fred Serchuk and Alexei that, for dolphin and wahoo, given their vulnerability, and I also agree with the use of the geometric mean, and that doesn't give me pause, given the life history of these two species.

DR. NESSLAGE: Can you just elaborate really quickly on what aspects, just for the record, to help fill out the report a little? What aspect of the life history for those?

DR. BUCKEL: I think, if you look at the PSAs, they're low vulnerability and short-lived and early age-at-maturity, and so a fast life history.

DR. NESSLAGE: Excellent. That's what I was looking for. Thank you. Alexei.

DR. SHAROV: Can we get back to the question of why the three-year average arithmetic mean is not good or why that would not be -- It certainly smooths out the fact of the outlier high data point, and maybe -- Not maybe, but it's definitely not as much as the geometric mean would do, but there is a possibility of an additional analysis that would look at how the triggers would perform, how that trigger would perform, historically if we're used the three-year arithmetic mean versus the three-year geometric mean, and that would help to understand if the three-year geometric is too conservative and will end up as never triggering the accountability measures and whether the arithmetic mean would more perfect, and so what's wrong with the three-year average of the arithmetic mean? Is there anything wrong with it?

DR. NESSLAGE: Basically, you're asking, Chip, why did you gravitate to the geometric mean as opposed to the arithmetic, and is that what you're asking?

DR. SHAROV: Yes.

DR. NESSLAGE: Chip, can you address that?

DR. COLLIER: It was really looking at the distribution of the data and seeing that it was -- All the spikes that I was seeing for those thirteen species without a trend, and they were always on the high side of things, and that's why I kind of gravitated towards geometric mean, understanding that it was a better way to treat the data when it appeared to be a lognormal distribution of the data.

DR. NESSLAGE: I guess the SSC really needs to comment on whether we agree with that, I feel like, because we've got some people suggesting that we should explore arithmetic, or arithmetic is okay, and it might be better, but I feel like that's a key point of Chip's argument, and we need to comment on that. Alexei, would you like to start?

DR. SHAROV: I didn't know that I was there again, but I think I still think there is a difference in how we interpret the data. One thing is that the overall distribution of data points, and say here we have ten data points, or say we had twenty years of observation, and then we would certainly - - For any species where we have the lognormal or certain skewed distribution, the argument is then understandable, but because we -- I mean, we're focused on the three-year smoother, and so what -- In my mind, I guess what's important is what happens within this three-year time interval. If you have a very high datapoint and two low adjacent to it, that's -- I mean, that's generally the process that you are mostly focused on, outside of the overall distribution, whether it's thirty years or fifty or --

DR. COLLIER: Alexei, I'm not -- Are you talking about doing -- So this is what these lines are doing, and it's applying those potential triggers to the current landings estimates, and then also looking at the preferred ACLs, and so Slides 26 and 27. 26 is the dolphin data, and then 27 is the wahoo data. Is that what you are referring to, or you wanted to look at a longer time series than just these ten years?

DR. SHAROV: No, and all I'm saying is that these are the -- Well, we have a point estimate here, and that's the blue line, and then we have a three-year average smoother, which is the orange line, and then the geometric mean -- Again, a three-year geometric mean, right, and so we're running two different smoothers here, right?

As Chris nicely explained to us, a geometric mean smoother will always result in a lower value of the mean, which we see that the gray line is slightly below the orange line, and so I was -- My question was why the arithmetic mean, the three-year arithmetic mean, is not the preferred smoother here, because it is not as strong downweighting process compared to the geometric mean, but it's still removes, substantially, the effect of the higher data point.

DR. NESSLAGE: Are you asking that of Chip?

DR. SHAROV: Yes.

DR. NESSLAGE: Okay. Thanks.

DR. COLLIER: I mean, it was just looking at a range of alternatives, given that -- Like I had mentioned before, the arithmetic mean is included as a potential management option for the council

to consider, and it's not out of the realm of possibility for them to consider, and it's just -- Once again, looking at these data, they definitely have some distribution issues within them, and then it also gives the council -- If you consider some of the ranges of those species, the stocks, you could use the geometric mean in some situations, if you feel the stock is fairly healthy or if you think there's higher error in the estimation of the catch, and you could use other techniques if you feel that the stock is at lower points and you need to be more precautionary. It doesn't always have to be this situation or the other situation, and the SSC could recommend a variety of situations where these are appropriate.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. I'm going to address a different aspect of this, because we're trying to avoid going into the AMs, but what is so sacrosanct about the third-highest of the landings as the trigger, as the preferred ACL? I mean, it's invariant, because you have set it between 1994 and 2007, as I understand in one of the slides, but what if the stock productivity has changed, or what if things have changed in the ecosystem, and maybe it's -- What's so special about the third-highest?

DR. COLLIER: I will return that to you. It was the SSC that established the third-highest.

DR. NESSLAGE: I don't really want to go down that road, Fred, unless it pertains to --

DR. SERCHUK: All I'm saying is it doesn't take into account -- There was a time period in which that was set, and we have now ten years, or thirteen years, after that, and the stock may have been in a different situation, and I guess maybe I will task it back on ourselves, and do we need to take a periodic look at this?

DR. NESSLAGE: I'm going to take a stab at that and say that's what our whole change to the ABC Control Rule for Category 4 stocks would say, is that, yes, we need to take a real good look at this.

DR. SERCHUK: Okay. Sorry to bring up something, but I am concerned that there are changing environments that result in changing productivities, and I realize that this is an ORCS-type stock, and so we don't really have very much information to base it on, but things could go down, and things could go up, and maybe the preferred ACL is not relevant to certain time periods, but, okay, and I've said my piece. Thank you, Chair.

DR. NESSLAGE: I appreciate where you're going, but I just think we're running up against some serious time limits, and so, under the assumption that this is the preferred ACL, which it is at the moment, we need to talk about our thoughts on this approach, and we need to be wrapping this up pretty quickly, and so, if we start to repeat, I'm going -- I might just cut people off. Chris Dumas.

DR. DUMAS: Thanks, Genny. Getting to your question about the comment about whether the geometric mean is more appropriate when you have lognormally-distributed data, and I think you had asked us to respond to that.

DR. NESSLAGE: Yes, please.

DR. DUMAS: Right, and so my response to that is -- I think it was Amy or someone who asked about whether we shouldn't be looking at a longer time series and about whether ten years was enough, and should we look at a longer time series, and I thought that it was said that ten years was long enough, due to the central limit theorem, to have a normally-distributed time series, and so, in that case, the process we're looking at would be normally distributed and not lognormally distributed, and so, if you're thinking lognormally distributed, then Amy's point comes up, I guess, comes back, but, if you're thinking it's normally distributed, then the argument for the geometric mean is not as strong, because, if you have a normally distributed catch, then we could just use the arithmetic mean. Thanks.

DR. NESSLAGE: Okay. Can we capture some of this, please? Let me see if I can repeat what you said, Chris. If we have lognormally distributed data, Amy's concern about there needing to be a longer time series included would be something they would want to consider, but, if the data are normally distributed, then using the geometric mean is not as big of a deal, and is that what I am hearing you say?

DR. DUMAS: Right. What I heard was that, in the argument against Amy's point, the argument was that the data are normally distributed, but, in the argument for the geometric mean, I heard that the data are lognormally distributed, and so which one are we going with? Are we going with the data are -- Do we think the data are normally distributed or lognormally distributed?

DR. COLLIER: Chris, I hope that I didn't confuse you on that. What I was saying is, looking at some of the non-parametric -- Readings of the non-parametric books, they indicate that, as you're getting a sample over nine, you should be approaching a normal distribution, and that was one of the reasons for going with this shorter time series and not the full time series, and so it had nothing to do with the data that is being presented here, and it was reading some non-parametric textbooks, which are very exciting and thrilling reads.

DR. DUMAS: Right. I agree, and so my point was though that, if you go with that though, and if you think, okay, you're approaching ten and you're going to have normally-distributed data, then we're thinking we have normally distributed data, and so then the argument for the geometric mean, that we want to use the geometric mean because we have lognormally-distributed data, that argument would not be as strong, because we don't have lognormally-distributed data, and we have normally-distributed data.

DR. COLLIER: Well, I would say we have lognormally-distributed data based on the distribution that's observed over these ten data points.

DR. DUMAS: Okay, and so then Amy's point that maybe we want to look at longer time periods comes in, but that's okay. For what you're saying, the data that we're getting right now is lognormally distributed, and so that says that the geometric mean could be more useful.

DR. NESSLAGE: Can we quickly go back to our -- I think we're stuck and your screen is frozen, Chip, or whoever is driving. Thanks. So where have we captured that? We've got lognormally-distributed data over nine years, or ten years, however many years you've got, and then the data are distributed lognormally over the ten years you've looked at, but we might need to look at a longer time series, to see if it's still appropriate.

I have been told over email that Shep's comment was exactly what Chris was talking about, and so I think we've covered that. Folks, is there anything else that we need to say here? We need to move along, unless there is something extremely burning. I think we've got a lot of good feedback for the council, and we've got a lot of good feedback for Chip. Chip, is there anything else that you need from us?

DR. COLLIER: I do not believe so. I appreciate everybody's time today, and I know it's challenging to get all of this stuff stacked on top of each other.

DR. NESSLAGE: Yes, and I know folks are burning out, and I feel like it's time for a break, and then we can tackle the SEP report, if Scott is ready, and hit the allocation decision tree agenda item as the last bit for our day. Just so you all know, we will be doing a desk review of the research and monitoring plan. That's going to have to be taken off of our plate, just because we are running against a time crunch here, and so, if we could take five minutes, let's be back at 3:36 and continue pressing on. Thank you, Chip and John. It's greatly appreciated.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Okay, folks. We are on Agenda Item 7, the Socioeconomic Panel (SEP) report, and the report is Attachment 16. The Chair of the SEP, Scott Crosson, will be presenting. Once he's done, we'll take some clarifying questions from the SSC, and then we'll have public comment, and then we do need to approve this report, and so there is one very quick agenda item, and so, with that, I give it over to Scott. Thank you.

SOCIOECONOMIC PANEL REPORT

DR. CROSSON: The SEP met earlier this month, actually, and so we had a much faster turnaround than we normally do on this report, and so, if you'll go to the first slide here, the first thing that we looked at was we received an update on citizen science, from Julia, I think, and we were just asked her questions about the different topics and whether we thought there was anything that should be added.

We looked at some of the social media stuff and the angler reporting, and we threw in a few questions that we had about things that could potentially be added on there, from the economic and social perspective, and then we did bring up the idea that, given the multitude of apps that seem to be proliferating in this domain, it would be really useful, and I don't know how likely it is, but it would be really useful if there was some way of having a unique trip identifier across apps, so that things don't end up getting double and triple reported when they're aggregated.

Jennifer Sweeney-Tookes, who is an anthropologist on the SEP, actually the only remaining one now, from Georgia Southern University, she gave a presentation on work that she and Tracy Yandle were doing on the demographics and economic conditions of the commercial seafood industry of Georgia, which is in dire straits, and so we got to give her some feedback on that one, and a copy of that is in the SEP briefing book, I think.

The biggest thing that we looked at, both before and after lunch when we met, was the allocation decision tree, and we were asked to look at certain aspects of it, the economic and the social, and

so I don't know if this committee is going to be looking at the biological, but these things are designed to be -- The allocation decision tree is designed to basically aggregate a lot of information relatively quickly, so that staff don't have to spend an eternity doing each one, and so, given that, a lot of very standard information was given, like landings and things along those lines, and so we felt that, given the time constraints that council staff are operating under, these questions were sufficient, from the economic perspective.

Of course, any time that you're looking at the landings from one particular species, you have to think about what other species are being landed by that sector, and we also mentioned that part of what is going on from an economic perspective in allocation is that you're trying to make -- The optimal situation is if you can make one sector better off without making anybody else worse off, and, usually, we're talking about one particular species, but we did bring out the possibility, which may be difficult to implement, and it's true, that you could have tradeoff between different species across sectors, and that might result in Pareto improvement for all and may make things a bit easier.

From the social side, again, there was a lot of social information that was coming from different sources. Given the time constraints, it's best to do the stuff that can be quantified relatively quickly, such as the number of directed trips and things along those lines that we currently see in the fisheries amendments that are proposed. We're going to incorporate information from the advisory panels that is useful, but please do remember that the people from the AP are not necessarily representative of the general fishing public, and this is not easily quantifiable, but the things that might be unique cultural signifiers are not something that is probably listed, and it's something that certainly the council should consider from the social side.

Overall, we were asked whether we thought that -- Right now, the allocation decision tree has economic, social, biological, and so on, as different aspects of the decision tree, and that's a very siloed approach. We felt that that was the best way to do it, rather than try and mix it all together, and we also were asked whether the different parts of the tree, or I guess the different branches of the tree, should be weighted, so that everything can be aggregated the way it is for the ABC Control Rule, and we thought that would be difficult, because sometimes the information is not going to be available, and so we did not recommend to council staff that they continue -- That they consider weighting the different parts of the decision tree. Of course, the trees will need periodic review.

There were a number of dolphin and wahoo workshops that went on, both before the pandemic started and I guess they've been finished since then, and that was done by several of the Science Center staff, and we thought that those were very useful, about looking at how fisheries operate and looking at the different trends, even within a particular state, such as in the northern and southern part of North Carolina. There was a social media analysis that was also provided, but it was very time consuming, and so that's going to be something that would require automation, and we thought it was most useful for recreational fisheries and any species that don't respond to management well.

We looked at the fishery performance reports, and we were asked again -- This is not the first time, but we were asked to give feedback about the ways that those reports could be structured and the questions that could be posed to the advisory panels, and there were some general questions, and a lot of the questions that were looked at were like is this particular management effective, or is that one effective, and we thought that was definitely too vague, and so we brought up whether you should rephrase things, and so whether people were having trouble complying with regulations

or something along those lines. As always, those fishery performance reports should be treated as raw data, and they are going to require revision before they can be used. That's it, and, if you have any further questions, you can direct them to Chris Dumas, because he's here, and he was participating.

DR. NESSLAGE: Excellent. Thank you so much, Scott. Are there questions for Scott or Chris? I would just like to say that I had the pleasure of sitting in for the morning part of that session, and I was educated, as usual, and I thought the Georgia study was particularly eye-opening and important, and so I really appreciate all the work the SEP has been doing, and, actually, I do have a question. This bit about the using the fishery performance reports as raw data, are they not being used as raw data, or this is a future recommendation? Can you elaborate?

DR. CROSSON: They're still being collected, and I know that they're being -- Maybe council staff can answer this a little bit better than I can, but they're not -- I mean, they are being revised, and there's still this question of, if you build a time series of these reports, how they're eventually going to be aggregated and incorporated into management, or, I guess, stock assessments, and so we just wanted to make sure that they're going through some kind of system, but I guess that's still kind of up in the air.

DR. NESSLAGE: In development? Okay.

DR. CROSSON: Yes, and in development is a better way of putting it.

DR. NESSLAGE: Excellent. While we're waiting to see if there's any more feedback from the SSC, is there any public comment on the SEP report? No hands raised. Okay. Thank you. We may come back to you for advice and revisit some of your advice here on the allocation decision tree when we get to our next agenda item, but, if there's no other comments or questions from the SSC, unless I hear screams of protest, I am going to consider this report approved, and so speak now or forever hold your piece. All right. Thank you so much, Scott. It's greatly appreciated.

DR. CROSSON: Okay. Thanks, everyone.

DR. NESSLAGE: All right. We are at our last agenda item for the day, but not the least, and we are on Agenda Item 8, Allocation Decision Tree Review. I will point you to Attachments 17 and 18, which is a document and a presentation, and we'll be hearing from Mike Schmidtke, and he's going to talk about how the council is essentially exploring the use of this decision tree approach that Scott referred to earlier, to help determine, when discussing sector allocations and developing kind of an objective and organized approach to these allocations, and they're looking to maintain flexibility and handle decisions on a species-by-species basis.

They want it to be informative, but also be a somewhat methodological and objective manner when they go about making these decisions, so it's a little more understandable and objective and transparent, and so, with that, I am going to hand the mic over to Mike, who will give us presentation. We'll take some questions, and we'll go to public comment, and we'll discuss, and we have a large number of questions here, but I assume that we will have some guidance from staff on what exactly you have as your highest-priority questions for us. With that, I will give it to Mike. Thank you.

ALLOCATION DECISION TREE REVIEW

DR. SCHMIDTKE: Thank you, Genny. I'm actually going to be kind of tag-teaming this presentation, and John Hadley is going to start us off and kind of give an intro to the process before I take over and talk about the landings and stock status portions of the decision tree. John, are you ready to go?

MR. HADLEY: Sure. Absolutely. Thank you, Mike. Just as a little bit of an overview, I think the introduction was great, and the overview that Scott provided as well was excellent. This is something that the SEP did review, and now we are bringing to the SSC, specifically to focus on some of the biological questions in general, but we will provide the entire presentation, if nothing else for background purposes, to kind of get the whole picture of what we're considering, but, overall, this has been -- The allocation decision tree and the blueprint that we've been working on has been put together by a small working group of us, with Dr. Mike Schmidtke, Christina Wiegand, myself, Dr. Scott Crosson, Myra Brouwer, and, before his retirement, Dr. Brian Cheuvront.

As a little bit of an introduction to this process and why it has come about and before the council and become sort of a priority, the council has really been making allocation decisions for decades. A couple of recent major events have kind of brought these decisions to the forefront, and one being the GAO report, which focused fisheries allocation decisions in the Southeast, and so looking at the history of allocation decisions in the Gulf of Mexico and the South Atlantic regions.

Additionally, this -- Well, so, overall, the GAO report recommended, after extensive research, and I know that the council staff was heavily involved with GAO staff, as far as developing the report, but some of the recommendations out of this report included that councils develop methods for analyzing sector allocations, and, overall, the report suggested using trends in catch and landings, stock assessment results, economic analyses, social indicator analyses, and ecosystem models.

The other major event that we talked about, kind of over and over again, touched on for multiple species, is the shift in the method for estimating recreational landings, and so the shift specifically from the CHTS method to the FES method that has changed the recreational effort estimates and resulting harvest estimates. Not only has this been projected forward, but, of course, it was projected backwards in time, and so we have a new historic landings data stream. This is important, because, as we'll get into in a minute, a lot of the historical allocation decisions have been based on landings, and so, when you change your data stream, your baseline has been changed as well, and so those are the two major recent events that have brought the allocation discussion very much to the forefront.

As mentioned earlier, one of the goals, or the overarching goal, is to help the council develop an approach to address allocation decisions in a consistent manner and in an objective manner that can be applied across species.

Specifically, focusing on the request of the SSC, you will be asked to consider the proposed decision tree approach and provide feedback on the draft decision tree questions, the structure of the approach, and the potential utility of the approach in making allocation decisions. As

mentioned, the SEP did review, in detail, the social and economic questions, and so we'll take some time to really focus on the biological questions that are within the decision tree.

As a little bit of a background, since the last reauthorization of the Magnuson-Stevens Act, there has been -- There was -- Well, I should say, with the last reauthorization of the Magnuson-Stevens Act, there was the establishment and requirement of annual catch limits, and this prompted hard allocations, if you will, for -- This prompted allocations between sectors of the ACL, and, in general, these allocation decisions have largely been based on landings, and the reason being the council has a consistent data stream of landings available for almost every species for a relatively long time, and so over several decades.

In most cases, the council has not used data other than landings, largely due to the fact that data, at times, are lacking for many species in the South Atlantic region, or other types of data, I should say, are lacking for many species in the South Atlantic region, and there's not been any consistent method to apply across all species.

Currently, the council is considering allocation decisions in a systematic manner, and there's a little bit more of a time buffer here. There are certainly allocation decisions that are coming up, and, with each stock assessment that incorporates the FES recreational estimates, this is a decision that will come up over and over again, but there's a little bit more of a time buffer than previously, when the council was establishing annual catch limits in the first place, and it allows time to consider additional methods.

Looking at some of the recent council action regarding allocations, the council has discussed this over several of the past meetings. In March of 2020, the South Atlantic Council identified general criteria that they were interested in considering when discussing allocation decisions, and this included landings history, expected and known discard rate, accountability of a sector, fairness, equity, market needs, importance of a species to a sector, cultural importance, and the possibility of removing sector allocations altogether.

At the council's following meeting in June of 2020, the council members were presented with potentially readily-available criteria that relate to those outlined considerations for use in allocation decisions, and, overall, many of these are similar to those that were outlined, but, overall, looking at landings history, discard and bycatch rates, accountability, fairness and equity, market needs and trends, importance to a sector, cultural importance, and, in general, just using an informed judgment for making allocation decisions.

The council also approved developing the decision tree approach, and so, ever since then, staff and the working group that was mentioned earlier has been working to develop the allocation decision tree approach. In approving this development of this method, the council indicated that they wanted to create an objective and organized approach to allocation decisions, and they also did not want to be overly prescriptive, and, in doing so, they wanted to maintain the flexibility to address allocations on a species-by-species basis.

Looking at the overall approach, it uses the same question pattern, or tree, for each species that is being considered for an allocation. As a question is answered, the tree then branches, so to speak, and directs to the next question that should be answered or a potential answer itself, and, overall, this is intended to allow the council to identify the most important factors that they would like to

consider, there again on a species-by-species basis, based on the available data when making allocation decisions.

As a general overview on what the draft allocation decision tree looks like at the moment, the decision trees are slightly modified from the original GAO criteria that I mentioned earlier, and there are four major categories that look at landings history, stock status, economic factors, and social factors, and there are several questions embedded within each one of these major decision tree topics.

Each species would ideally pass through all four decision trees, and some decision trees may not provide a relevant outcome based on the data available for a given species. Additionally, a question in one decision tree could be applicable to another tree as well, and we'll see this as we get into the questions themselves. For example, landings, you will see, occurs over and over again as a stand-alone topic, but it's also brought up multiple times when looking at economic and social factors. With that, that's a general overview of the decision tree approach, and we'll get into sort of the nuts-and-bolts, so to speak, of what we have outlined so far in the draft questions. Mike, I will hand it over to you.

DR. SCHMIDTKE: Thank you, John. The first two categories are really the ones that the SSC is going to be looked to for feedback on. The first decision tree that we'll be looking at is the landings decision tree, and the way that this is kind of formatted is, when we went through this process, we were looking for questions that could be answered with kind of a finite number of responses and having some level of advice to correspond to the end results of each of these branches.

For landings, kind of the big initial question that's being asked in this tree is should future allocations be based on harvest impacted by previous or current allocations? As John talked about earlier, many of the current allocations, if not all of the current allocations, are based on historical landings from a certain time period, and several of these are impacted by -- They are set in a time period where they were not impacted by allocations, and they were set for a time period when the fishery was more or less allowed to play out as it would, in terms of composition, and, when allocations were established throughout the South Atlantic FMPs, through the Comprehensive ACL Amendment, that introduced this kind of allocated regime for many of these stocks.

One question that is really kind of directed towards the council in this aspect, but also to the interested parties, is what they want the fishery to look like in terms of future allocations, and should it be from that past time period where the fishery played out or from a more recent time period where allocations were in place.

If the response to that question is no, that the allocations should not be based on landings during a time period when the fishery was allocated, then you would consider basing these on harvest from a time period that represents the desired composition of the fishery or other factors addressed in other decision trees, and that last little bit, other factors addressed in other decision trees, is a piece that is really repeated throughout all of these nodes, kind of conveying that idea that maybe, if you get a certain result, then you might want to lean more heavily on the results of another decision tree that gives you something a bit more definitive.

If future allocations can be based on landings that occur during an allocated regime, so to speak, then there's a follow-up question there concerning whether both, only one, or neither sector has

met or exceeded its ACL or experienced a closure due to the ACL being projected to be met or being exceeded in the recent years, and we picked five years, and that number is something that could be of debate, if people have concerns about that, but we felt that that was kind of a recent time period, and that's what we're going for in this, is that we're looking at a recent time period, and, if both sectors have, then the thought behind that is that both sectors are hitting their ACL, and there's not really that surplus on one side to provide for the other, and so the advice that would be given would be consider maintaining the current allocations or use other decision trees.

If only one sector is hitting their ACL, then there's the potential there to kind of reallocate from the underharvesting sector to the overharvesting sector in a capacity that the underharvesting sector wouldn't lose out, so to speak, on the landings that it hasn't been harvesting.

There would be kind of that reallocation advice potentially there, and also consideration for a minimum threshold, to avoid reallocating insignificant portions of the ACL, and we wouldn't want to really go through an entire allocation process to move from one sector to another fifty pounds, and that wouldn't make much efficiency sense.

Finally, if neither sector is hitting their ACL, then it's really fairly similar to being in an unallocated regime, where the fishery is more or less playing out, and there's just a limit that neither sector is really hitting. There is an aspect that we did consider, in terms of trends in the fishery, if a sector has recently shown some significant growth, and that could be considered in those allocation options.

Information that would inform the decisions, based on this category of the decision tree, would be landings and ACL by sector, and over the course of the time series, and there would also be the need for a time series of any ACL-induced closures and when those closures occurred, knowing kind of relatively where they occurred within the fishing year, early or late, and so the questions that are posed for this portion to the SSC would be are there additional landings-related questions or topics that should be covered in this portion of the decision tree?

Are there questions that should be removed? Does the SSC feel that the outlined landings data analyses are adequate to inform the advice coming out of this? Are there other readily-available analyses or factors that should be considered? Then are the resulting recommendations from the landings tree appropriate? Are they clear enough to guide allocation decisions without being too prescriptive? I think we can -- Before we kind of change topics, we can pause right there, and, Genny, we can hear some discussion from the SSC.

DR. NESSLAGE: Great. Thank you, both John and Mike. Are there questions for either of them or comments? Fred, go ahead.

DR. SERCHUK: Just the terminology, and, in this case, do we really mean landings, or do we mean catches?

DR. SCHMIDTKE: I think we were meaning landings, as we were relating them to the ACL and whether the ACL was being achieved.

DR. SERCHUK: You didn't consider discards at all? You didn't consider harvest, and you only considered landings?

DR. SCHMIDTKE: Yes. Landings.

DR. SERCHUK: Okay.

DR. NESSLAGE: Are there discards considered in any of the ACLs?

DR. SCHMIDTKE: I may need help from Chip in this aspect, if discards are informing like projected landings within season that would go into enacting closures, but, as far as the time series that we were looking at, we were looking at the landings time series relative to the ACL.

DR. NESSLAGE: Chip, go ahead and see if you can help us out.

DR. COLLIER: It's a little bit species-dependent, and so looking at ACLs for something like snowy grouper, all catches grouped together, and so landings and discards, because it was assumed 100 percent mortality for the discards, and those are lumped together, but, for other species, the ACL is broken up into a landings data stream as well as a discard data stream, and so, unfortunately, I can't give you a clear answer, and it's considered in both. I think my brain just stopped.

DR. NESSLAGE: We better finish this discussion before everyone's brain stops. All right. Thank you. Anne.

MS. LANGE: Because there are quite a few species, and we talked about them this morning, and it was tilefish, where the greatest mortality is recreational discard, I would think part of the allocation is that you should include a consideration for that.

DR. NESSLAGE: It sounds like we might have lost you again, but I heard we might want to consider recreational discards, where appropriate, which is not so much for tilefish, but for many of our other species, and I don't know -- I am writing down some notes here, and I'm sure that staff are as well. Let's see. Wilson.

DR. LANEY: I was just going to say what Anne said. She said it for me. Thank you.

DR. NESSLAGE: Excellent. We're on the same wavelength, and that's wonderful. Chris Dumas.

DR. DUMAS: I would just like to applaud Scott Crosson and some of the other staff who are thinking about the idea of reallocating ACL share from one sector to another. If that could be done without harming one of the sectors, then that would be a Pareto improvement, and it would be a net gain, and I think that's a great idea.

In our discussions in the SEP meeting, we generalized that idea to a lot of other possibilities, and one of them to get to -- Was it Fred who brought up discards, and, in addition to sort of trading allocation across sectors to benefit the sectors economically, you could also trade allocation across sectors to benefit the fish, to benefit them biologically. For example, suppose you had a species that had a lot of discards coming from the recreational sector, but the commercial sector is not producing a lot of discards, and then you had another species where the opposite was the case, and maybe the recreational is not producing that many discards, but the commercial is.

If you traded catch share across the fisheries, you could it perhaps in a way where they both were the same economically after the trade, but both species were made better off biologically, in the sense that discards were reduced for both species, and so that was one example, and so we can think about trading allocation across sectors in ways that benefit the sectors economically, but you could also think about trading share across -- Trading allocation across sectors in a way that benefit the fish.

Whenever the two sectors differ in how they affect a certain species, you might be able to do a reallocation, and so the idea is, when you're thinking about reallocation, you need to think about two different -- Reallocating for two different species or two different geographic locations at the same time, and sometimes a reallocation between recreational and commercial in one species, or one geographic location, could be offset by an allocation in the opposite direction for a different species or a different location, and so we might be able to get some, as Scott says, Pareto improvements, net gains to the system overall, both economically and also biologically, and so hats-off to him and perhaps other staff who were thinking of that, and to the SEP members who worked on that. Thanks.

DR. NESSLAGE: Excellent. Thanks for that, Chris.

DR. DUMAS: Those examples, and others, are in the SEP report.

DR. NESSLAGE: Excellent. Okay. We will highlight that. I will put a note in our report to highlight and point to that section of the report. Are there other comments or questions regarding the landings portion of the decision tree? The South Atlantic loves decision trees. That's my comments. Fred Serchuk.

DR. SERCHUK: This is just another comment, Chair, if I could. There are going to be cases where the landings are going to be affected by other management decisions, such as minimum sizes, and so that is a management decision that will affect the landings, and that's another reason why I brought up whether discards are being included in terms of harvest. Thank you.

DR. NESSLAGE: Thank you. Anything else?

DR. SCHMIDTKE: Just kind of responding to some of the discussion on bycatch and discards, some of that is kind of incorporated later in the presentation, but I will give kind of a preview, because it's pertinent to the discussion. What we were trying to address through this is strictly related to changing management, in terms of allocation, and it was -- Before we settled on these four trees, there was kind of another tree that included aspects such as bycatch and discards, and we thought about sizes and growth aspects like that, and one of the conclusions that we came to is that, if we're trying to impact those aspects of the fishery, they are really addressed more directly using other management techniques than allocation.

In terms of something like an average size, if we're trying to improve the average size, and that might be more directly addressed through something like a size limit, and so we're not intending that the allocation would replace all other forms of management or anything like that, but we're looking at what can be best impacted via the allocation, and that would be used in concert with other forms of management as well.

DR. NESSLAGE: Great. Thanks for that clarification. I don't see any other hands raised. Unless I see another hand raised very quickly here, it might be good to keep rolling.

DR. SCHMIDTKE: Okay. I can go ahead and keep moving on. The next decision tree was relating to stock status, and this is another one that we wanted SSC feedback on, and so the first big question, especially for the species managed under the South Atlantic, is has stock status been determined? There are a lot of species where this is not the case, and so we wanted to make sure that we captured something relating to both sides of that argument, and, if stock status has been determined, then the natural follow-up is what is it?

If a stock is overfished and overfishing is occurring, we kind of took two approaches, or we took an approach to each of those aspects, and so, if a stock was overfished, then the approach that we were thinking, as far as allocation, would be prioritizing in a way such that we would increase biomass, try to increase the population so that it would get to a point where it's no longer overfished, and, if overfishing is occurring, then the prioritization would be towards more efficient fishing, such that there is not kind of that unutilized catch that is caught and then discarded and ending up as dead discards.

Those were kind of the two general directions, but this is something that we would kind of be open to certainly more feedback on, of what kind of advice can be given related to stock status when it comes to an allocation decision, and so, in the sense of overfished and overfishing, the prioritization goes in kind of both of those directions, either in a way that could increase the biomass or decrease dead discards, and, by increase biomass, we took that as prioritizing the survivorship of juveniles and adult females, so that we would have those spawners and the recruits there.

If the stock status is overfished, but not overfishing, then there would be prioritization towards the increased biomass. If not overfished, and overfishing is occurring, then there's a follow-up question there of whether one sector is typically harvesting its ACL, and are both sectors contributing heavily to this overfishing, or is it only one of these sectors, and, if there is one particular -- If there is one particular sector that is underharvesting its ACL and could possibly contribute to the overharvesting sector without inhibiting their ability to maintain current harvest levels, then that's something that could be brought about, and that would also kind of impact the discards, because, if overfishing is occurring and a fishery is going over their ACL, then part of the contribution to that overfishing could be the discards, the dead discards, that are coming into play there.

If there is not a sector that is typically underharvesting its ACL, then there would be that prioritization towards more efficient fishing, towards the sector that has fewer dead discards. Also, there would be advice to consider other measures that would help both sectors achieve their ACLs and not exceed them.

Finally, and this bullet should have been pulled out, but the not overfished and not overfishing, that shouldn't be tiered in the same way, and the not overfished and not overfishing status is kind of an optimal status, where you could consider maintaining the current allocations or basing any changes on other decision trees.

Next, looking at the case where stock status is unknown, the next question there is whether there is an adequate index of abundance that would be able to depict trends in the population, whether that's available, and, if there is, then you would consider that index, or those indices, and see what are the trends that are being seen, and is there a stable or growing trend, where you would kind of say the current allocation seems to be working, more or less, from this aspect, or is there a declining trend, in which case you would prioritize the reallocation towards the sector that would help increase the biomass or make the fishing more efficient.

If there is no stock status, and there is no index of abundance, then we really don't have the information, from a stock status standpoint, to inform allocation decisions, and so you would want to prioritize other aspects, other decision trees, in making these decisions.

The analyses that would go into informing this tree, and any advice that would follow-up in this aspect, would be the SEDAR stock assessments or other stock assessments and stock status updates that are provided by NOAA, as well as, in the case of unassessed stocks, we would be looking at federal or state -- Or other survey programs, and we would be looking at survey programs, to see whether any of those are providing data that could be used for some form of index, to inform stock status in a limited capacity.

Here, we see our discussion questions, and they're similar. Are these questions appropriate? Are there any changes that should be made? Are there questions that should be removed? The second question here, does the SSC feel that the use of population indices, when available, in the absence of a stock assessment to inform stock status, so to speak, is appropriate? Are there other readily available analyses or factors that should be considered to inform the allocations based on stock conditions, particularly for those unassessed species? Then, finally, are the recommendations from the tree appropriate and clear, without being too prescriptive? I can pause once more for a discussion on this topic.

DR. NESSLAGE: Excellent. Thank you. It looks like we already have Wilson in the queue.

DR. LANEY: You do, Madam Chairman, and I'm not sure whether this question belongs in this section or the previous one, but I will ask it anyway, and so, Mike, what happens, and I may be getting ahead of your presentation, but what happens if we have a perfectly healthy stock, or a reasonably healthy stock, but the distribution of the stock shifts, for some reason, and a sector that had an allocation no longer has the opportunity to harvest that allocation, because the species is no longer present? How do you adjust allocation under that set of circumstances, or is that sector just out of luck, because the resource is no longer available?

DR. SCHMIDTKE: Just to make sure I'm understanding the scenario presented, this would be a scenario where we have one portion of the region, like one spatial portion of the region, where a recreational, say a recreational fishery is prominent, and another portion -- We'll say the southern end of the South Atlantic is primarily recreational, and the northern end of the South Atlantic is primarily commercial, and we have a distribution shift in stock such that the southern end does not have as much access to the fishery, and is that kind of what you're getting at, Wilson?

DR. LANEY: That is a perfectly valid example, Mike, but I will give you another one, and that is if we look at the Atlantic migratory stock of striped bass, and Steve Poland may want to weigh-in here, for North Carolina, at one point in time, we had a very viable recreational fishery, especially

charter, but also private boat, fishery off of North Carolina, during the wintertime especially, and we had three commercial allocations for haul seine, gillnet, and trawl.

Because that stock, for reasons that are not entirely clear, has shifted its distribution north of the Virginia state line, none of those sectors can now harvest any portion, at least the commercial, for which things are quota controlled, and they can't harvest their allocation, because the resource is no longer there, and so is it -- I mean, how do you deal with that? From one perspective, we could just say, well, heck, guys, the fish have shifted distribution, and so, yes, you've got an allocation, but it's simply not available for you to harvest, but is that totally fair and equitable? Is there some other way to handle that, and so, yes, your example is a good one, but also think about the striped bass one, too.

DR. SCHMIDTKE: Thanks, Wilson, and, I mean, I don't have a definitive answer or advice that would be produced, and I think, kind of inadvertently, the landings portion of this tree would address that at some point, because, if that situation played out, there would be one sector that theoretically would be bumping up against its ACL, and you would have one sector that is underharvesting, and that would kind of provoke that discussion of reallocation from one to the other.

As far as the question of access and potentially allowing say commercial access that has been lost in one area and allowing that access to another area, that's something that is certainly within the purview of management to do, but it wouldn't necessarily be accomplished through a reallocation of the ACL, of the total ACL, and like that would require other management decisions. Does that make sense?

DR. LANEY: Yes, I think so. I mean, it's complicated, and it's something that I know has been somewhat under discussion, I guess, at the ASMFC, but I think it's something that we're going to have to deal with more and more as we see stocks shifting in response to climate change, and possibly other factors, like prey distribution and who knows.

DR. SCHMIDTKE: I do have to say one thing that has kind of become at least apparent to me as we've gone through this process, and that is kind of the limited amount of factors that can be impacted strictly through allocation alone. It really works in concert with a lot of other aspects of management, and I hadn't thought about it as much in that aspect as I have going through this.

DR. NESSLAGE: Thanks, Mike. I don't see any other hands at the moment.

DR. SCHMIDTKE: Okay. I guess, before moving on, I would just re-question that Number 2 in particular. Does that SSC feel that, when we don't have a stock assessment, that using any available population indices, as kind of a second-tier replacement to inform these decisions -- Is that appropriate?

DR. NESSLAGE: Wilson.

DR. LANEY: Mike, would you mean -- For something that would fit that definition, would the current ASMFC traffic light analysis for spot and Atlantic croaker fall into that category?

DR. SCHMIDTKE: I actually had not thought about that one, but, yes, that would be a good example. Kind of where I was coming from was a horseshoe crab type of mindset, but, yes, spot or croaker, that would kind of fit that as well, and, in those cases, those assessments, we don't have -- Spot and croaker were assessments that did not pass peer review, and so there has been interim management on those populations, using a traffic light approach that's based on state surveys, and federal surveys as well, but it gives management advice based on when the populations go up or down at some level of prolonged period of time, and that's the gist of it, for those who aren't as familiar with those fisheries.

DR. NESSLAGE: All right. I guess, Mike, I have a question. Would the evaluation of the indices be done by staff and presented to the council, and would the SSC have any opportunity to look at those? If there is no -- If there hasn't been -- I guess, if there's no stock assessment, then we're talking about Category 4 stocks, right, and then there is -- We have seen, earlier today, that there may be some index information available for some of those stocks, and not a lot of work has been -- I mean, I know that, for instance, the SEAMAP/MARMAP folks have done a bit of work on their own data, but maybe there is some other data that have been worked up for that particular species, and what is your plan for who would do that work? Would we get a chance to see it? What are your thoughts on that?

DR. SCHMIDTKE: I guess my initial thoughts on that -- When we're looking at these allocation decisions, they would be done within the context, very likely, of an amendment of some form, and so they would -- There would be SSC inclusion in the final decisions and what they look like. One sense that I get from how that process would play out is that these decision trees would be used to develop the options that would be considered by that amendment, and then the council would go through the process of deciding which option they choose, but they would at least be informed by one, if not multiple, aspects of the fishery, but there would be some SSC inclusion. As far as the who would do it, I don't know if I'm able to answer that question, because I don't know, and I don't know that I have that authority, but, yes, that's at least a partial answer.

DR. NESSLAGE: I guess if we made a recommendation that the SSC would -- Perhaps we could be consulted on the use or development of those indices, just in case folks in the group might have something good to add, given the expertise on the group, and that might be something -- Is that out of line, I guess, with how you guys were thinking of the process working? Through the amendment process, we would have a chance to see it, and is that correct?

DR. SCHMIDTKE: Yes, and I think that's totally appropriate. We intended, and we intend, to incorporate, as these decisions get made, incorporate the SSC and SEP, both of those bodies, to get their input on the respective aspects of this.

DR. NESSLAGE: Cool. Thank you. I appreciate that. Fred Serchuk.

DR. SERCHUK: The question, in my mind, revolves around what we consider a stock assessment. A stock assessment, in this case, is seen as an analytical assessment, and, obviously, an index is not going to do the job. On the other hand, there are ways of looking at exploitation rates relative to a stock index, to a survey index, and there are other ways of evaluating stock status that have been used in many parts of the world that don't involve analytical assessments, particularly when the situation occurs where the analytical assessment has run into problems, either because of severe retrospective patterns or data sources are lost, and so on and so forth.

I would say that indices can be used as a measure of stock status if the time series is long enough that the range of values in the indices show that they vary from very low to very high or over a significant range, and I don't know what more you are being asked out of that, but certainly indices have been used to evaluate relative stock status, and then that could be combined with some other information about removals or exploitation relative to the index to give some indication of whether fisheries are having an impact or not. Thank you.

DR. NESSLAGE: Thank you, Fred. Okay. I don't see any other hands at the moment.

DR. SCHMIDTKE: Okay. In that case, I will kind of take that as the questions and recommendations seem appropriate for this aspect, and I would then move down and, John, if you want to take the economic questions.

MR. HADLEY: Sure. Thank you, Mike. I will take the economic questions, and then I'll hand it off to Christina for the social-related questions, and then we'll wrap it up with kind of the concluding slides and the final questions for the SSC. To get to the next set of the overarching topics, we're looking at economic-related questions.

The first economic-related question relates to trends in demand, and so are notable trends in demand for the species? If there is a trend, what is the trend by sector? If demand is increasing in both sectors, consider maintaining current allocations or base changes to allocations on other factors addressed in the other decision trees. If the demand is increasing for one sector and not the other, consider prioritizing reallocation toward the sector that is exhibiting the increasing demand, and, if there is no trend in demand by sector, then consider maintaining allocations, current allocations that is, or basing the decision on other factors in the other decision trees.

Looking at some of the potential analysis, keeping in mind that we're looking at information that can be readily addressed and is readily available to look at trends in demand, we tend to have to look at proxies for demand, and so there is information available. From the commercial side, you could look at trends in ex-vessel price and landings, for the commercial sector. Then, on the recreational side, you could look at trends in directed effort, as well as recreational landings.

The next question, from the economic perspective, looks at the importance of the species and whether or not the species is economically important. If the species is deemed to be economically important, is it becoming more economically important, and so is there a trend there? If it is becoming more important to one sector relative to the other, then prioritize reallocation towards the sector for which the species has the higher economic importance. If it's becoming important for both sectors, which we actually do see quite a bit, consider maintaining current allocations or look in another direction, as far as a definitive answer on allocations. If the species is not economically important, consider maintaining the current allocation or look elsewhere.

Looking at some of the potential analysis to examine economic importance, there is logbook information to determine the commercial importance, and you can do a comparison of gross revenue from a specific species to total revenue overall for a vessel or aggregated. On the recreational side, you could potentially compare some metric of a directed effort for all South Atlantic Fishery Management Council council-managed species and how it relates to the specific

species being examined, and so the specific species at-hand, and, there again, that's a proxy for recreational importance.

Next, we'll take a look at whether or not there could potentially be a change in, or if there's indications on a change in, net economic benefits, and are there clear indicators that changing allocations will likely yield an increase in net economic benefits. If yes, prioritize reallocation towards the sector that would likely result in an increase in net economic benefits from additional ACL. If not, consider maintaining the current allocations or looking in another direction within the decision tree.

Some potential data analysis on this end is we could look at the historical use of sector ACL and whether or not one sector is not using its ACL, while the other sector may be using its ACL fully, year in and year out. Also, the projected use of the new ACL, and so, if it's increased or decreased, under the status quo allocation, and so, essentially, see how projections of landings relate to new sector allocations.

The next economic question, and last but not least, is whether or not there could potentially be a Pareto improvement, and so is it possible to make one sector better off without economically harming the other sector? If this is possible, consider prioritizing reallocation towards the sector that would likely result in an increase in benefits. If not, consider maintaining current allocations or basing changes on other factors.

From this perspective, some potential data analyses, much like previously mentioned, is we could look at the historical use of the sector ACL and/or the projected use of a new ACL under a status quo allocation. That wraps up just a general overview of the economic questions. As I did mention, and has been mentioned several times, the SEP did review these questions in detail, and there is quite a bit in their report on their feedback for these economic questions, and so, with that, I will switch it over to Christina to go over the social questions.

MS. WIEGAND: Thanks, John. I appreciate it. All right, and so there are two social decision trees, and one of them takes a sort of quantitative approach, where the other one takes a much more qualitative approach, in terms of its questions and analyses, and so the first one looks at fishery-dependent, and this really takes a quantitative approach, and it incorporates those social indicator analyses. If you will remember, way back, almost forty-five minutes ago, when we started talking about this, John mentioned the GAO report, and one of the recommendations coming out of that report was finding a way to incorporate those social indicators into allocation decisions, and so that's what we're trying to do here.

The first question really looks at, among communities with a high regional quotient, and that's one of those social indicators, and it essentially measures the relative importance of a given species, or species group, across all communities in a given region, and so are most of them engaged in commercial fishing, recreational fishing, or both? When I say "engaged", again, that's another social indicator, and commercial and recreational fishing engagement are essentially absolute measures of fishing activity, measured by the absolute numbers of that activity, and it can be done with permits, pounds, value of landing, and number of dealers, for example, for a commercial community.

If most are highly engaged in commercial fishing, the next question is are they dependent upon that resource for their livelihood? To get at that, we would be using the local quotient indicator, and that essentially measures the proportion of an individual vessel's total landings of a given species in a fishing year, compared to landings of all species in that year, averaged across a community.

If indeed commercial fishermen from those highly-engaged communities also have a high local quotient, you may want to consider prioritizing commercial fishing opportunities. If they don't, you may want to review fishing opportunities for associated species and consider whether any adjustments to the focus species are necessary to achieve your picture of the fishery. If most are highly engaged in recreational fishing, again, you want to determine whether or not they're dependent on the resource for trip satisfaction, and that can be based on directed trips. If they are, you may want to consider recreational fishing opportunities, and, if not, again, review fishing opportunities for associated species.

Then, if you've got sort of an equal number, or close to equal number, of communities that are highly engaged in commercial and recreational fishing, you may want to consider removing sector allocations altogether or allocating equally between the sectors. Again, I sort of went through the potential analyses while I was going through each of those questions, just to sort of explain the different parameters that I was talking about, but, primarily, we would be looking at using social indicator analysis for that decision tree.

Next up is cultural importance, and, here, we're taking a much more qualitative approach, because quantitative information on cultural importance is fairly hard to capture and come by. The first question is does the fishery play an important role in the history of fishing communities?

If the answer to that is yes, then the next question really becomes is it changes in the regulatory environment that have affected species in that community, and, if they have, you may want to consider allocations that would mirror the real or historical de facto allocations or somehow capture the current values of the fishery, and, if it's not changes in regulatory environment that have affected the role the species plays in communities, then you may want to consider allocations that are prioritizing biological or ecosystem needs, because that is likely what is affecting change in the roles the species are playing in the community.

Again, if it played a historical role, but it's not playing a current role, really, in the community traditions, then you would want to prioritize the historical real or historical de facto allocations, and, if it's not a culturally-important species, you may want to consider allocations that either reflect the current state of the fishery or would allow room for any growth and adjustment in both sectors.

Again, here, we're looking at more qualitative sources, and so it's more of a summary of an analysis, given the time period we're likely to have to put together these decision trees, and we would be focusing on the fishery performance reports that we conduct with our advisory panels regularly and also looking through NOAA's Voices database, which is full of oral histories from fishermen, as well as managers and scientists in the Southeast Region.

Now that we've gotten through the questions, I did want to sort of briefly address some topics that we considered but removed, and a lot of this was already discussed earlier, when Mike was going

over his decision trees, and so it's nice to hear you guys talk about some sort of the same things that we've been talking about, and it makes us feel like maybe we're on the right track, or, at the very least, we're having the right discussions, and, like Mike talked about earlier, one of the things we removed from the decision tree approach was things like bycatch rates and discard rates and mortalities, and the thought here was that those can be difficult to address through allocations, or, alternatively, may be better addressed through other fishery management measures.

Then the second thing was effort by gear, catch by location, particularly considering the changing distribution of stocks due to climate change, like Wilson was talking about earlier, and I won't sort of reiterate a lot of what Mike already talked about, but just to say that the council's allocations are fairly specific. They are almost exclusively sector allocations between the recreational and commercial sector. To my knowledge, we no longer have very many gear-specific allocations, and I know those have been removed, for example, from the CMP, the Coastal Migratory Pelagics, fishery.

The only fishery we have that currently has regional allocations, again, are the king and Spanish mackerel fisheries, and so the extent that we can address changes due to climate change through allocations may be a little bit more limited than in other areas, where they have different sorts of allocations.

Once you've got all of these decision trees, you then have to work with them, and there are a couple of things that need to be considered, and this will lead into some of the questions we have for the SSC. The first thing to consider is that, if possible, we're not going to have the information we need to have every input for every decision tree for every species. For example, there may not be the relevant social information on cultural importance from which to make an allocation recommendation from that decision tree, and so situations like that will perhaps need to be addressed on a case-by-case basis.

Then, second, and perhaps more importantly, it's likely that the decision trees are going to point to different sector allocation recommendations, and I think, through all the discussions this committee has had, it's clear that, oftentimes, biological needs are different from socioeconomic needs, and so I have sort of three options. Prior to applying the decision tree method to a given species, we could choose to rank order the four sort of basic decision tree topics, based on various characteristics, such as confidence in the data or overall importance to the success of the fishery, so that they're already ordered from most important to least important.

Alternatively, we could consider the preponderance of decision tree recommendations. If you've got four decision trees, and three are pointing in one direction and one is pointing in a different direction, the council should follow the recommendation of the three decision trees. Alternatively, we could assign no rank order, and the council could use their informed judgement, based on the information they are provided, and, before we go any further, Mike, were you going to display the Shiny app that you drafted for this?

DR. SCHMIDTKE: Yes, and I will bring that over now.

MS. WIEGAND: Excellent. I didn't want to put you on the spot, but Mike has developed this great sort of Shiny app allocation tool that will show you guys how we intend to present this information to the council, which might help when you're sort of discussing some of these issues.

DR. SCHMIDTKE: Thank you, Christina, and it hopefully will be great one day. Right now, it's a little bit skeleton, but I'm hoping that it's enough to kind of give the gist of what it's trying to accomplish, so you all can see what it looks at and if we're headed in the right direction for developing this.

I have developed this tool, and we have kind of our different categories here, and we have landings, stock status, economic and sociological impacts, and then we have a summary tab, and, right now, I only have information in the landings and stock status tabs, and I kind of paused development of this to prioritize other activities, but also because we wanted to get some feedback from the SEP and SSC that we're headed in the right direction before I go through all the steps of making it pretty.

First off, we have, within our landings portion, we have the questions of our decision tree, and, as you click the buttons, the next level of the tree pops up, and you can go through and click all the way until you get to your final advice piece, and so I have that for landings, and then I will go through, and I will click through for stock status as well, just to kind of give an idea of what we hope to get out of this, and so we have these pieces of advice that we've gotten as we've gone through these decision trees, and they all get stored into the summary tab, and the summary is kind of that end advice, that single page that we would be able to then show to the council as they are making their decisions regarding this, and you all, or the AP, as you're providing your recommendations towards the council on what pieces of advice you think would be helpful in this aspect, and this would kind of summarize the advice given by going through the steps of the decision tree.

We do kind of recognize that, beyond this, there is -- We have the theoretical advice, which is being given through this, and we're trying to be broad and not too prescriptive, and then, on more of that stock-by-stock basis, the council and the IPT, and all the different bodies that go through informing an amendment, would do more of the next step, the quantitative work, to actually put together those allocation options, and so that's what I have at this point for that Shiny app, and I think we can wrap up the presentation, and I think we only have one more slide before we take questions, but I will be able to answer questions on that and bring it back up, as needed.

Just a few slides to wrap up, and not just one more, and sorry, but there are a couple more, but, first of all, we're looking at the timeline for development of this, and you can see that there on the screen. Right now, we're going through this kind of review process with the SSC and the SEP, and we hope to, in the coming months, get kind of a draft sent over to get some review from the Science Center and the Regional Office, and then, over the summer, get some feedback from the APs before demonstrating to the council in September of this year and getting their feedback and looking at a final product, hopefully, by December of this year.

This isn't something that is an amendment process, and so we don't have to go through, necessarily, all the end steps, and it's kind of this is a tool that we want to use moving forward, and we would then be able to incorporate it into future amendment processes.

Finally, we have kind of some general questions, and these were posed -- You saw them in the SEP report and their responses to these questions, and these were posed to them, and we would also pose these to the SSC, to get your feedback as well. The first one looks at kind of the approach

that we've taken of being fairly siloed and looking at the specific disciplines and taking advice within those categories, more or less, rather than crossing topics and using more of a mixed approach, and we wanted to get any feedback that you would have on whether this approach is appropriate and would be the most advised from you.

Then, also, does the SSC feel that the use of a decision tree method, as we've outlined, that it would be useful for the council to systematically and objectively examine allocations, and then it's likely that the outcomes of working through these trees will vary by the topic, and so to provide the council a bit more conclusive guidance, and we have questions about kind of that weighting structure that Christina introduced. Should some topics be weighted more heavily than others? Should there be any sweeping decisions, or which ones should -- Should certain ones be prioritized, or would it be better to not provide weighting to the topics and rely a bit more on that majority rules approach or on kind of an equal type of approach? Those are the questions that we're hoping to get some feedback on, and I can turn it back to you, Genny, for the SSC's discussion.

DR. NESSLAGE: Great. Thank you, all three of you. Are there any comments or questions? While folks are thinking, I will just say that, regarding your last question here, or set of questions about weighting, et cetera, I feel like decision-making processes are rarely linear, and you set up a pretty linear decision tree here, which is nice, but that's not necessarily -- I think it's really good for a springboard for discussion and decision-making and making the decisions very explicit as they go along, and therefore transparent and justified at each stage, but I wouldn't spend too much time fussing with what you've already got, because I think the ultimate decision is going to probably not be as linear as what you've got, and that's just my two-cents, from herding a lot of cats. Speaking of cats, Wilson.

DR. LANEY: Well, I'm not sure that's complimentary, to be referred to as a feline.

DR. NESSLAGE: Sorry. I'm a cat lover.

DR. LANEY: Well, I like cats, and we're not cat owners. There are problems with feral cats, but we can talk about that some other time. I have a question, and I think it's for Christina. Christina, from a cultural importance aspect, there are lots of -- Or at least there were historically, and I think there still are quite a few, and there were lots of festivals that were based around fisheries, a lot of them ASMFC-regulated fisheries, but then there are also lots of tournaments that are based around council-managed species, or jointly-managed species, and so how do those fit into the decision tree? Is there some place in the social or economic tree that consideration of whether or not a local tournament or a local fishery exists and how it might be affected by allocation?

MS. WIEGAND: Thanks, Wilson. That's a really question, and so I will say that information about seafood festivals and tournaments is oftentimes captured in the fishery performance reports, when we talk to our advisory panels, and that is, obviously, fairly narrow in scope, and it's the historical knowledge that our advisory panels may or may not have, but we haven't discussed, or I haven't thought about at this point, sort of quantifying those things and finding a way to work that into the cultural decision tree, in addition to some of the qualitative information, but that's an interesting idea.

DR. LANEY: Just as a follow-up, Madam Chair, I will just say that I think John Hadley and I have talked about this before, in that, if those sorts of things are not factored in somehow, at least

from the standpoint of doing economic studies on fisheries, it seems to me that the economics are incomplete, and I would defer to Dr. Crosson and Dr. Dumas as to whether or not that statement, coming from a non-economist, is a legitimate one, but John and I have talked about other sorts of economic aspects that are generated by fisheries, such as all the advertising that is done by guides.

Any time you stop at a welcome station for any state in the South Atlantic, and you go inside their facility, you're going to find tons of brochures on fishing opportunities that were generated by guides, presumably paying some advertising person to do those, and then the same thing is true for art, which gets a little bit further afield, but Google "king mackerel art", or "striped bass art" sometime, and you'll see a tremendous amount of stuff pop up, but, to me, the festivals, especially when they're focused on a single species of fish, and the best examples that I can think of, again, are ASMFC ones, where you have the American shad festivals, or you have river herring festivals, but certainly the tournaments that focus on council-managed or highly-managed or NMFS Highly Migratory species -- Certainly those, I would think, there would be a place for them somewhere in the decision tree, because they do generate a tremendous amount of revenue, and they are culturally important to the participants, and they certainly are dependent certainly on the distribution of the resource, but also, to a certain extent, on the allocation, I think, as well.

DR. NESSLAGE: Thank you, Wilson. Are there others? Are there any last questions or comments regarding the decision tree, the allocation decision tree? Chris.

DR. DUMAS: Just a quick response to Wilson, and there are a lot of economic studies on the economic impacts of fishing tournaments and seafood festivals, and so that information is out there, and it could be incorporated in the economic aspects.

DR. COLLIER: Genny, I've taken back control, and I'm looking at some of the actions, and I'm not certain if you want to take public comment.

DR. NESSLAGE: Let's see what Scott has to say, and then we can go to public comment. Scott.

DR. CROSSON: It's late in the day, and this has been an interesting week, but another comment is that this decision tree gets the ball rolling, and it's stuff to be incorporated into making allocation decisions by the council, but anything that is actually going to get implemented is going to have to go through an amendment to the FMP, and so there's going to be additional economic analysis that's going to have to be done, a benefit-cost analysis and other stuff that we normally do, and, yes, economic impacts as well are going to appear in it, and so it's not that those things won't be included at some point, but they're more difficult to put into something like this, which is designed to be flexible and more reasonably applied, without having to do a deep dive every time.

DR. NESSLAGE: Chris.

DR. DUMAS: A question for Scott and others, and so it's my understanding that the questions and the decision tree are not supposed to be gone through in a particular order, right, and so the answer to one question is not conditional on an answer to another question, and they're all sort of answered sort of independently, and then the answer is considered together, and is that correct?

DR. SCHMIDTKE: Yes, that's what we were planning for, and that's kind of that siloed approach that we talked about.

DR. DUMAS: Great, and so the order of the questions then doesn't matter, or permutations of the order of the questions, and so that's good, but, in that case, you might want to call it like a decision matrix instead of a decision tree, because, in a tree, there's kind of, I guess, an implied order of the questions, and so folks might think that might be the case. It's a minor comment. Thanks.

DR. NESSLAGE: If there's no hands raised from the SSC at the moment, let's go to public comment. Rusty.

MR. HUDSON: There are too many moving parts, and this would be very overwhelming to make all the sectors -- This, I don't think, considers the history, in some ways, as accurately, based on what has evolved in the last ten or twenty years, versus the last fifty, and so some of this might be useful, but it's just pretty overwhelming. Thank you.

DR. NESSLAGE: Thank you, Rusty. Is there any other public comment? Thank you. Mike, please go ahead.

DR. COLLIER: Mike, it's showing that you're unmuted. Unfortunately, Mike, we're not hearing you again. You might want to add your comment into the question box. He indicated that it was too long of a comment to type.

DR. NESSLAGE: He can send it to a staff member, and, when we have the final public comment on Monday, we can read it out loud, if he's not on audio by then.

DR. COLLIER: Mike, if you want to send it to me.

DR. NESSLAGE: Sorry for the audio problems.

DR. COLLIER: He said he would send it to me.

DR. NESSLAGE: Fabulous. Excellent. Thank you. SSC, I know it's late, and we're past 5:00, and let's look at this very quickly and see if there's any major content that we're missing. Under landings, we have consider releases for some species, as appropriate. Magnitude of landings may be impacted by other management decisions. Let's keep that in mind when interpreting the landings, I assume. Then reallocation among sectors for different species or geographic locations. I'm not sure -- That's about pointing to the part in the SEP report that talks about net gains for both sociological and biological, and that was Chris's comment, and I have some notes on that, too.

For the socioeconomic part, consider tournaments and festivals, right, and that was, as you said, not in the right spot. Additional analyses will need to be conducted during the amendment, and this will help diagnose if allocations are needed. Order of the questions does not matter and call it a matrix. I think somewhere there was a -- Let's see what you have down below.

DR. COLLIER: I was trying not to bounce around too much.

DR. NESSLAGE: No, that's good, and I also had something about -- Wilson had mentioned considering using traffic-light approaches with those indices, if it's appropriate, and that, if we can provide advice, please consult as an SSC on the use of indices, if they're needed.

DR. COLLIER: Indices?

DR. NESSLAGE: Yes. Consider consulting the SSC if the use of indices is needed. In other words, come to us if we can be of help with interpreting those. Then I had a note down -- Fred had some comment under stock status that I did not capture well, and so, Fred, either now or when you take a look at this, by Monday, if you want to flesh that out, if I've missed something, and please forgive me. It's getting late.

DR. SERCHUK: I think that could be subsumed under use of indices, Chair. Thank you.

DR. NESSLAGE: Great. Thank you. That goes for everyone, if we've missed something here. Is there anything else that you would like to add at the moment as a placeholder for content for our consensus statements in the report? I think one other thing I wanted to mention was that they asked about should there be weighting, et cetera, et cetera, and I had suggested that that probably wasn't necessary or helpful, but, if the SSC disagrees, feel free to stop me or voice your opposition. Okay. No hands. Excellent.

Thank you, staff, for the wonderful presentation and for doing it so quickly. We got through the agenda, folks, and that's miraculous, and it's all because of your dedication and hard work, and so I appreciate everyone's involvement in the meeting to-date.

What I would like to do is to ask Chip if he would send me the notes as they stand, as of today. I am going to take a crack, tomorrow morning, at making sure we have complete thoughts down, at least, for everything that we've reviewed so far, so that, when we go to review the final consensus statements on Monday afternoon, we can -- Well, I should take a step back. I will do that tomorrow morning and then circulate, and so folks can have a chance to digest them by Monday afternoon. Obviously, with gag, we'll do it on the fly on Monday, as we're going along. Hopefully that will help speed things up. Are there any questions or comments before we end for the day and reconvene on Monday morning at 9:00? Chip.

DR. COLLIER: I hope to be sending out the presentation for gag sometime tomorrow. That way, you guys will have the weekend to look it over, but I will send it along as soon as I get it.

DR. NESSLAGE: Great. Thank you. All right, folks. I thank you for sticking with us on this bear of a webinar, and I appreciate all your time. Thank you to everyone who presented, and we will see you on Monday.

(Whereupon, the meeting recessed on April 29, 2021.)

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MAY 3, 2021

MONDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened via webinar on May 3, 2021 and was called to order by Chairman Genny Nessler.

DR. NESSLER: We have a lot to do today on our last day of our -- I guess it's now May spring SSC meeting. Where did the month of April go? Let's get started. I just would like to start by reviewing the plan for the day, because I know things have changed, and it's gotten a bit confusing, and so what we're going to do first is Agenda Item 10, which will be review of SEDAR 71, the gag assessment, and we'll go through, as usual, the presentation and have some Q&A and open up for public comment, and we'll have a little discussion of the SSC and do our breakout groups and then review our consensus statements.

Hopefully we'll done that by lunch, I'm hoping, and hope springs eternal, and then, sometime after lunch, or as soon as we're done with gag, what I would like to do is return to our consensus statements, in particular the red snapper -- We'll start with red snapper, and I'm going to start that -- Just to give folks a heads-up, I'm going to start that section with public comment, because we didn't take public comment, with the way the agenda changed last week, and I want to start with that, and then I'm going to close the discussion and limit it only to SSC members, unless we have clarifying questions for staff, et cetera, or NOAA folks, and so please be prepared, if you have public comment on red snapper issues, that that's one of the times that you -- That's the big time when you will have a chance.

Then we will review our final consensus statements for red snapper, and we'll go to tilefish and then work our way down, and then I will take the final public comment, and I guess, if we have time for other business. If not, we'll do that over email, take final public comment, and we'll discuss the next meetings and timelines. Is there any question from either the SSC or staff about how that's going to happen? Everybody is onboard? All right.

Well then, let's begin with Agenda Item 10, SEDAR 71 gag assessment review, and I will bring your attention to our two attachments, Attachment 19, which is the assessment report itself, and 20, which we just received via email this morning, I believe, and hopefully everyone has it. If you don't, shoot me an email, and I will send it to you, which is the assessment presentation from Kevin Craig.

Our task is relatively straightforward, and we need to review the gag assessment and then provide fishing level recommendations, and so I don't know -- Kevin, if you want to -- We have been entertaining questions as we go along, because these are pretty involved assessments, but, if you would rather do questions at break points, just let me know. How would you like to handle things?

DR. CRAIG: I'm fine with questions along the way. I do have break points throughout the presentation, but I'm fine with taking questions as they come up. I guess how do I tell if there's a question from this Google Doc that Chip sent me?

DR. COLLIER: We'll enter the names into the Google Doc. When they pop up, that's somebody indicating that they had raised their hand. It's right underneath "SSC members".

DR. CRAIG: Gotcha. Okay.

DR. NESSLAGE: If you're just talking away, we might just note -- I will just interrupt, or Chip will, and say, hey, so-and-so has a question.

DR. CRAIG: Yes, that's fine.

DR. NESSLAGE: Thank you.

SEDAR 71 GAG ASSESSMENT REVIEW

DR. CRAIG: Thanks, Chip, and thank you, Genny. This is a presentation on the South Atlantic gag grouper assessment that we've been working on for the past several months, and I will follow the same general outline that Nikolai and Kyle followed for tilefish and for red snapper, with a little bit on the background, the data going into the assessment, as well as a description of the assessment model, with a focus primarily on what has changed since the last update to the original benchmark.

Then I will talk about the assessment results, both the base run as well as the uncertainty analysis and the sensitivities, and then I will get to the projections, and so I do have a break at each one of these points, after each one of these sections, but, again, feel free to jump in and ask questions as I am moving along.

The assessment history, the first SEDAR assessment for gag was under SEDAR 10, and so it's fairly old, and it used data through 2004, and it did use the same general catch-at-age model that has been used since then, including for the current assessment, and, based on that original benchmark, it was determined that overfishing was occurring, and so F in the terminal year over F_{MSY} was 1.46, but that it was not yet overfished. SSB in the terminal year over $MSST$ was 1.06, and so it was about 6 percent over the threshold.

This was based on an older definition of the minimum stock size threshold, which was one minus M over SSB_{MSY} . That assessment was updated in 2014, with data through 2012, and so an additional eight years of data, and, at that time, again, the stock was determined to be experiencing overfishing, and, in that case, the metric was the geometric mean fishing mortality over the last three years of the assessment relative to F_{MSY} , and it was 1.23, but, again, similar to the original benchmark, it was not considered overfished, with SSB in the terminal year over $MSST$ equal to 1.13, and so about 13 percent above the threshold, and there was an amendment that changed the definition of $MSST$, and so this is using the updated definition, which is 75 percent of SSB_{MSY} .

The current assessment, SEDAR 71, is an operational assessment, and so we tried to maintain consistency with what was done in the prior assessments, but also allow some flexibility for new data sources and advances in methodology, and this was conducted over five webinars that occurred from October of last year until March of this year. Again, it's using BAM, the same catch-at-age model that was used in the previous two assessments, and we have updated the data through 2019, and so an additional seven years of data since the last update.

In this assessment, the stock was determined to be experiencing overfishing. F , geometric mean F , at the end of the assessment relative to MSY was quite high, about 2.15, and there is uncertainty in those F s, but they don't really affect the qualitative conclusion, and this high F ratio seems to be driven by some recent increases in commercial handline landings, with some contribution from the general recreational fishery in the last two or three years, during a period when recruitment has been pretty low, and the stock seems to be at a pretty depressed state. It was also determined to be in an overfished status, with SSB in the terminal year over $MSST$ equal to 0.2.

A couple of key features of this assessment that have come up throughout the presentation is we did a fishery-independent video index to the assessment from the SERFS survey, and so we have a fishery-independent index over the last nine years, I believe, and that index is suggesting a two to three-fold decline in abundance over that timeframe, and that's consistent with what we see with the headboat index, which is showing a similar decline, and it was also used in these prior assessments.

The other feature is that it does look like there's been fairly low recruitment, and the model is estimating below-average recruitment over the last ten years, with the exception of one year, the terminal year, which isn't particularly well informed, and there's a suggestion that there's a reasonably strong year class in the terminal year of the assessment, in 2019, but, otherwise, it looks like recruitment has been fairly low since the last update.

That's the assessment history, and just a little bit on the regulatory history. There are size limits in place for both the commercial and the recreational sector, and they went in for both sectors at the same time, and they're the same size limit, and so a twenty-inch total length minimum size limit went into place in 1992, and that was increased to a twenty-four-inch size limit in 1999, which is still in effect now, and then there's been various types of catch limits and bag limits, either as part of the aggregate snapper grouper bag limit or more specific bag limits for gag or black grouper.

Commercial trip limits started in 2012, and there's a spawning season closure from January to April that went into place in 2009, and the commercial and recreational ACLs were established in 2011, and so it's about half-and-half. It's 51 percent commercial and 49 percent recreational, and those ACLs were met in the early years after they were established, but not in the recent years, and then there's been some further reductions in the recreational bag limit. Any questions on the background or the assessment history?

I will move on to the data, and so I have broken this up into the various components, and I will go through the life history first, and we did update the population growth curve and the maturity schedule, because there was additional samples to inform both of those, and we also developed separate population and fishery growth curves, and so the population growth curve drives the growth dynamics in the population, and then the fishery growth curve is what's applied to convert the landings, and those --

In the past, we have used the population growth curve for both purposes, but, in more recent assessments, we separated those out, and so we have separate growth curves applied to the population and to the fishery, and we did maintain the same method to estimate natural mortality, and we used the Lorenzen-age-based natural mortality vector, but we updated it based on the new

growth curve, and we also scaled it over the fully-selected ages. In the previous assessment, it was scaled over all ages, which is a holdover from the original benchmark.

Then the other change that we made was we assumed a time-invariant sex ratio, and so gag are a protogynous hermaphrodite, and there was some attempt, in the previous assessments, to incorporate time-varying sex ratios, and we had a number of discussions with the South Carolina DNR folks, and the panel decided that there wasn't really sufficient information to estimate time-varying sex ratios, and so we assumed the time-invariant sex ratio with an age of transition from female to male of about ten-and-a-half years.

Other aspects of the life history were the same as in the last update, and discard mortality was 0.4 for commercial handlines and then 0.25 for the headboat and general recreational fleets. We modeled age-one to sixteen-plus. With one to twelve-plus, we're fitting composition data, mostly due to really low sample sizes of those older ages, and then the length-weight relationship and whole weight to gutted weight conversion and time of peak spawning in mid-April were all the same as in the previous assessment, and we used total mature male and female biomass as a measure of reproductive potential, and that's because of the protogynous life history, and there was concern that the low proportion of males might lead to some degree of sperm limitation, and so we should include those, both sexes, in the measure of spawning stock.

This shows the growth curve on the left, and so these include samples that were collected from surveys and from the fishery at various times when there were size limits and not size limits, so we could correct for that, and inversely weighted by sample size. We do estimate a constant CV-at-age, and you can see the parameters of the growth curve for this assessment, the bottom line here, and then the comparison with the previous assessments, and so SEDAR 10 is the growth curve from the original benchmark, and then the solid-red line is the growth curve from the 2014 update, and then the black line is from the current assessment, and so not a lot of change at the younger ages, but some modest changes in the asymptotic length.

Then this shows the separate growth curves applied to the landings, which is on the right, compared to the population growth curve that I just showed in the previous slide, and so not a slot of consequence here, really. I mean, for some stocks, these two differ quite a bit, but, for gag, they really are quite small differences in K and L infinity, and so we did incorporate these into the model and apply them to the population and to the fishery separately. Each one, the CV and length-at-age, is estimated separately for each one of those.

A little bit more on natural mortality, and so the orange line is the natural mortality vector that was used in the SEDAR 2014. The dashed line is the Hoenig estimate of M , which is about 0.15, based on a T_{max} of thirty years, which hasn't changed across the assessments, and then the blue line is the updated natural mortality vector that includes both the change in the growth curve as well as the changing in the scaling, scaling to ages-five-plus, the fully-selected ages rather than all ages, and so there is an increase in the natural mortality at-age that's being assumed for this assessment. It's higher than what was used previously.

The maturity vector, this was also updated with additional samples, and so the dashed line shows what was used in the previous assessments, and so a younger age at maturity, with an A_{50} of about three years old, and the additional sampling suggested an older age-at-maturity, and that's the green line here, and the data points are shown in black, with an A_{50} of about 4.6 years, and so

maturing at slightly older ages compared to what was used previously, and then there's an assumption that all of the males -- Because they transition at around ten years old, that all of the males are mature.

The sex ratio, again, we assumed a time-invariant sex ratio, but, in the previous benchmark and in the update, there was an attempt to model a temporally-varying sex ratio, and this is kind of what was done, and so, from 1962 to 1982, which is this first sort of blue line here, that's the assumed sex ratio, and then there was a linear interpolation from 1983 to 2005 that was based on different blocks, temporal blocks, of maturity sampling, and then, in the update, there was a further shift in sex ratio to younger age at transition that was kind of a similar magnitude to what had occurred over the previous twenty-two years.

We had a number of discussions with the South Carolina DNR folks, and I guess there was a lot of hesitancy, or there was a lack of confidence, I guess, in some of the sex ratio information and how it changed over time, and particularly this kind of assumed jump in a later time period, and we didn't have any updated sex ratio information, and so the decision was made to assume a time-invariant sex ratio, which is what was shown here in the black line. Any questions on the life history?

For the fleet structure, the fleet structure hasn't really changed, and we used the same fleet structure as in the last update and the original benchmark, and there's a commercial fleet, which is mostly handline, with some contribution, very small, from other types of gear. There's a recreational headboat fleet, and then there's a general recreational fleet that consists of private, charter, and shore-based modes, and then the landings and the dead discards are modeled separately for each of these fleets.

This gives you a sense of the removals, and so this top-left panel shows the landings by fleet, and the bottom-left panel shows the same landings as a proportion of the total, and so you can see, over time, there has been -- Most of the landings have come from the commercial handline sector, shown in red here, and the general recreational sector is shown in pink, with some contribution from headboats in blue and then commercial dive in green, but it's been relatively small, and commercial dive has been pretty consistent over time, and headboat landings have actually declined over time.

Then, for the discards, on the right, most of the discards are coming from the general recreational sector, in pink, but you can see the commercial handline, and there's been some increase in commercial handline discarding over the last five years or so, but it's still dominated by the general recreational sector.

For composition data, we had -- We focused primarily on age comps, and so we had age comps from the commercial handline fleet going back to the mid to late 1990s, through the terminal year, and commercial dive landings, and we had age compositions from the late 2000s through the terminal year, with a couple of years of exception. Recreational headboat landings, we have age compositions going back to the early 1980s, and extending through the terminal year, with a few gaps, and then, for SERFS, we used the video index, and we didn't use the trap index, but we did use the age compositions from the trap to inform the selectivity of the video index, and so we have the trap age compositions over a nine-year period, starting in 2011.

Length compositions, we didn't include lengths, because we had ages for many of these fleets, and BAM is primarily an age-structured model, but we did include length compositions from headboat landings for a few years, 1988 and 1989, and then 1996 to 2000, where we didn't have age compositions, and this actually, in this case, seemed to have improve the fit to the overall headboat age comps, and then we had length compositions for headboat discards over an eight-year period from 2005 to 2013, and so we used those to help inform the selectivity of the discards.

For the indices, there are three indices that were considered for this assessment, a headboat index, which started in 1980 through 2019, a SERFS video index from 2011 to 2019, and we did consider the commercial handline index, which extends from 1993 to 2019, but that was ultimately excluded for this assessment, primarily due to concerns about hyperstability, and it was in conflict with the other indices, and so, based on some of the discussions with the panel -- The commercial handline fishery is pretty specialized, and it fishes particular depths, and either up-current or down-current of ledges, and there is quite a bit of skill involved in targeting gag, and so there was quite a bit of concern that that index may be hyperstable.

We did do quite a number of sensitivities around the indices, to try to evaluate the effects of different combinations of indices, as well as different assumptions about catchability, but the commercial handline index was ultimately excluded from the base run. There was an older MRFSS index that was included from the 2014 update, which was basically held over from the original benchmark, and that index wasn't updated or revisited further for this assessment, and so, ultimately, we have two indices that were included, the headboat index and then the SERFS video index.

These plots show those indices, and so this is the headboat index, and these are the 95 percent confidence intervals from the standardization, and so it's showing a pretty consistent decline in gag abundance since the early 1980s through the terminal year. The commercial handline index shows a number of ups and downs, but it doesn't show the same long-term decline over that period, although, if you look at the post-2010 component, there is a pretty significant decline that is similar to what's observed in the headboat, and so some extent the video, and we did try to -- In one of the sensitivities, we included commercial handline with a block on catchability, to try to capture this decline in the commercial handline index, to see what sort of effect that would have on the assessment. The bottom-left shows the SERFS video index, and so a fairly high abundance in the early 2010s and low abundance in the last three to four years.

There was a trap index that was developed, and that is shown here in the gray line, and the sample sizes were very low, and gag don't trap very well, and I think the average number of fish caught annually was twelve, and the number of trips that had gag was about, on average, ten trips a year, and so it wasn't actually included in the assessment, but I did show it here, because it does sort of suggest the same sort of decline over the last eight or ten years of the assessment period that we see in some of the other indices.

This shows the data summary slide, and so, for landings, landings go back to 1962 for the headboat and general recreational fleet. We did reconstruct the historical recreational landings, using the FHWAR method, which has been used in a number of most recent assessments. Commercial dive landings start in 1976 and are assumed zero prior to that, and then commercial handline landings with the addition of -- Small contributions from longline and other commercial fleets, and that goes back to the start year of 1962.

For discards, headboat and general recreational discards go back to 1981, and they are assumed to be zero prior to that. Commercial lines discards start in 1999, and they are assumed zero prior to that, and then this is for the composition data, and so, again, headboats from 1980 and age comps from 1980, pretty consistently to the terminal year, with the exception of a couple of gaps where we used length compositions. The headboat discards from 2005 to 2013, and then commercial dive from 2009 to the terminal year. Commercial handline age comps from 1997 to the terminal year, and then the chevron trap from 2011 to the terminal year. Then these show the indices, and so headboat starting in 1980 and SERFS starting in 2011, and that included commercial handline as well, although it wasn't in the base run, and so like in 1993.

That's the data that we had to work with. Just to summarize the data updated, we added the seven additional years of data, 2013 through 2019, and we did use the current MRIP estimates for the general recreational landings and discards, which are quite a bit higher than what was used in the prior assessments, and we updated the life history, both the growth curve and the maturity schedule and natural mortality.

We assumed a time-invariant sex ratio, and we separated fishery and population growth curves, and added the length compositions for the headboat discards. We used the historical recreational landings that were based on the FHWAR method, and then we added the SERFS fishery-independent video index. That's the summary of the major changes, or updates, to the data, and I guess I will pause here for just a minute, before I get into the assessment model, to see if there's any questions. I see Fred Scharf has a question.

DR. SCHARF: I was just going back to the life history, and I was just trying to kind of clarify a couple of things. In looking at the natural mortality, you focused on a couple of things that may have -- So the natural mortality kind of shifted upward, kind of just sort of a scale or shift upwards, across the whole age range in this newer assessment, the blue line at the top over the orange one.

DR. CRAIG: That's right.

DR. SCHARF: You were saying, at the bottom, that it was scaled over the fully-selected ages, just five-plus, rather than all ages, and then there was also an update for the population growth curve, and so it would seem like it's -- Maybe the growth curve change is sort of driving this pattern, because you're dropping out some of those younger ages, which you would think would - - If you're focused on only the fully-selected, that natural mortality might go down, as opposed to up, but so, if it's the population growth curve that's driving some of the changes, or most of it, and I don't know, and that's why I was asking.

Then, when you go back to the growth curve, the new growth curve has a much lower K than the previous one, and so new growth curve -- The K was about half, and so, usually, when you would see a lower K -- Is that mostly -- Generally, when you see a higher K, it's associated with a higher natural mortality, right, and so you see fast early growth and associated with higher Ms, but, in this case, the K actually goes down from SEDAR 2014, and so the SEDAR 2014 had a pretty fast K of like 0.35, and you're got a larger L infinity and a smaller K, and so it's a slower approach to that L infinity, which usually would be associated with lower natural mortality, and so I'm just trying to sort of align those two things, where you've got a sort of slower K and older, or larger, L infinity, but also coupled with higher natural mortality.

DR. CRAIG: That's a good question, and I think I can say a couple of things about that. Well, first, the SEDAR 2014 growth curve -- The relationship -- I mean, I think we should be careful in relating that to the natural mortality, because, in the 2014 update, the natural mortality was estimated external to the model, based on an externally-estimated growth curve, and then the parameters of that growth curve were used as the starting values in the assessment, and the growth curve was actually estimated internally, but the natural mortality vector was not updated.

DR. SCHARF: Okay.

DR. CRAIG: Does that make sense? This 2014 update is not the growth curve that was used to inform the 2014 natural mortality vector, because it was estimated internal to the assessment model, and so, really, in that assessment, we probably should have linked the re-estimated growth curve to the natural mortality vector, but that's not what was done, and so there's a little bit of a disconnect here between the SEDAR 2014 growth curve and the SEDAR 2014 natural mortality.

I guess the second thing I can say is -- Let me see. I think have something here. This is that same plot, and so this is the updated Lorenzen scaled to five-plus, and so that's the blue line, and then, if you take that same updated growth curve and scale it to one-plus, that's the yellow line, and so there's a pretty big effect of the scaling, and then the SEDAR 2014 is the scaled to one-plus, but using the old growth curve, and so you can think of the difference between the blue and the yellow as the scaling effect and the difference between the yellow and the orange as the growth curve effect, and so the scaling does have a bigger effect than the growth curve.

I think that decision was originally made to try to be more consistent with current practices, where we've scaled over the fully-selected ages, because you have -- I mean, once you set M , in some ways, you kind of set, or heavily constrain, F , and we're really interested in F for the ages that are subject to the fishery, and so we kind of want to get that partitioning right, and so I think that's why we would scale over the fully-selected ages, but, yes, I think your point is well taken that there is the scaling effect and the growth curve effect, and, particularly, I think the scaling is something that would deserve some more sort of focused attention, along with just the general methods used to estimate M . I mean, we have a number of different methods available now, and, historically, we just used Lorenzen, but now there's Charnov and Then and so on and so forth.

The last thing I would say, and it's just a minor point, is that we didn't use the Then method, but, if you look at the Then point estimate, based on that meta-analysis, it was 0.22, I believe, compared to Lorenzen, which was 0.15, and so Then was suggesting a slightly higher natural mortality as well.

DR. SCHARF: So, if you scaled to the Then point estimate, it might have been higher than even the blue line?

DR. CRAIG: That's right, and so, if I had scaled to Then, then this curve would be higher, and that's right. I mean, you're hitting on -- As you know, the natural mortality is a big uncertainty in most of these assessments, and the only other thing that I could say, and I think we'll get to this when we get to the sensitivities, is that variation in natural mortality didn't play as big of a role in this assessment as it does in some, and part of that is because of where the population is, and so we don't see any kind of qualitative changes in status, based on a number of sort of variations on

natural mortality, but part of that is also because, unlike a lot of assessments, we're estimating all of the components of the stock-recruitment curve here, and so we're estimating steepness, which often you can't estimate, and we're estimating R_0 , as well as σ_{rec} .

One thing that kind of came out in the sensitivities is, when you modify things like the natural mortality, the model can estimate slightly different parameters for the production function to compensate for that and get similar fits to the data and a similar kind of qualitative outcome, and so I think that's one of the reasons that M -- We didn't see huge changes in status as a result of variation in M , because the model has some flexibility to accommodate changes in mortality by changing productivity. Anyway, that's a long-winded answer, and did I kind of get at what you were asking, Fred?

DR. SCHARF: Yes, and I appreciate the thoroughness of the answer. Thanks, Kevin. I appreciate it a lot.

DR. CRAIG: The assessment model, again, this is the same model as was used in the 2014 update, an integrated catch-at-age model for BAM, and the assessment period is 1962 to 2019. We did assume an equilibrium age structure at the start of the assessment that was conditional on an estimated initial fishing mortality, and so that's a slight difference from the last update, in that F_{init} was fixed in the last update, and we're estimating it here. I mentioned earlier that we're modeling age-one to sixteen-plus for the population and one to twelve for fitting the compositions, and the spawning stock is total biomass of mature males and females, and there are separate population and fishery growth curves.

It's a Lorenzen age-based natural mortality, and we did assume constant catchability in this assessment, which is what was done in the previous two assessments, and, although we did, in the sensitivities, consider a number of variations on catchability, including a random walk that allows for annual variation in Q , as well as sort of blocking Q around some of the recent regulations that have been put into place that may be affecting sort of the behaviors in the fishery.

It's a Beverton-Holt stock recruitment, where the recruitment deviations are estimated from 1976, which is when the comps sort of first contain information on recruitment, to the terminal year, and so we are estimating recruitment deviations in the terminal year, because the selectivity -- The SERFS video index seems to have a reasonable selectivity, and I think it's about 50 percent on age-one gag, and so there is some information in that index to estimate recruitment in the terminal year.

We're using the Dirichlet multinomial for the composition data, and so this is becoming fairly standard in most assessments now, and that's a self-weighting, and so we don't apply the iterative reweighting to the compositions, and it also accounts for zeroes in some of the comp bins, and it deals with sort of the inter-haul correlation in length and age a little better than other approaches. We did apply the iterative reweighting to the two indices.

Here's a little on selectivity. For the landings, the commercial handline, as well as the general recreational and headboat fleets, were assuming logistic selectivity, and that's the same as in the last update, and, for commercial dive, we're assuming dome-shaped selectivity, which is the same as the last update. For the commercial and recreational discard selectivities, this is -- We don't have composition data, really good composition data, for any of the discard, fleet discards, and we

do have nine years of the headboat at-sea length comps, and we're going to have length compositions for the fish that are discarded from the headboats, and so what we assumed for discard selectivity was that it was equivalent to the probability that the fish were below the size limit that as in place at the time at a given age, based on the growth curve.

Then we did -- We wanted to see if there was any change in discard selectivity in the more recent period, and so we used the headboat at-sea discard fleets to estimate an age-two selectivity, assuming that selectivity of one on age-ones, and then we estimated age-two, and then we allowed age-three-plus to be equivalent to the probability that the fish were below the size limit, and all the fleets shared the same discard selectivity, which was a similar assumption to the 2014 update, and they're all kind of hook-and-line fisheries and have been subject to the same size limit regulations at the same time.

For the SERFS video selectivity, there was a -- Kyle described this during the red snapper assessment, and so there was a selectivity working group that addressed how to deal with selectivity in the videos, given that we don't have ages or lengths of fish that are observed on video, and so the basic assumption is that the video index has logistic selectivity, that it's seeing those larger, older fish, but that the chevron trap is dome-shaped, due to the size selectivity of the gear, and that seems to be the case for gag, in that gag don't particularly trap that well, and most of the fish in the traps are younger ages, ones, twos, and threes.

The approach was to estimate a dome-shaped selectivity for the chevron traps, based on the trap age compositions, and then assume that the ascending limb of the video selectivity was the same as that of the chevron trap, and that above that age at full selection that the video index selectivity was fixed at one above that, that age at maximum selectivity, and so it's using the traps to estimate the ascending limb, and then it's assuming all fish at older ages are available to the video.

We spent quite a bit of time, in the assessment panel, on the selectivity blocking, and the panel recommended removing the selectivity blocks for the commercial handline fleet, and that was because commercial handlines seemed to be taking older, larger fish, and we weren't really seeing any shift in the length compositions of the commercial fleet around size limit changes, and we also didn't have age compositions prior to the implementation of those size limits to estimate a different selectivity in those early years.

Then, for the general recreational and the headboat fleets, there were some small shifts in length and age composition around the implementation of the twenty-inch size limit that was in 1992, but there didn't appear to be any effect of the increase to a twenty-four-inch size limit in 1999, and so the selectivity blocks were reduced to a pre and post-size-limit block in 1992, and so this is just a summary of the change. In 2014, there were three blocks, a period no regulation, this twenty-inch size limit, and the twenty-four-inch size limit that were applied to all three fleets.

Then, here, we eliminated the blocking for commercial handline and then reduced the blocking for the general recreational and headboats fleets to two blocks just around that initial implementation of the twenty-inch size limit, and so this simplified the model a bit, and it seemed to be consistent with the data, but we just didn't see evidence of shifts to larger, older fish with the implementation of a size limit, and, often, we would see what appeared to be shifts in the opposite direction that you would expect, based on the size limit, particularly for the commercial fleet, and I think that's because there were other processes acting on length and age that were more important than these

size limits. We did evaluate the consequences of this in the sensitivity analysis, where, once we got to a base run, we went back and imposed the same selectivity blocking scheme, to see if it had any consequence.

This is a summary of the model update, and so no selectivity blocks for commercial handline, a pre and post-size limit block for the recreational fleets, and we included the SERFS video index with the selectivity estimated from the traps. Discards were modeled as a probability that the fish were below the size limit at a given age, based on the growth curve, and we did estimate these age-two selectivities in the more recent period.

We used a Dirichlet multinomial for composition data, which was a change from the last update, which used a robust multinomial, and we did an iterative reweighting on the indices, as opposed to the indices and the compositions, which was done in the 2014 update, and then we're estimating F_{init} , and that was fixed in the last update, and we're also estimating steepness, which was fixed at $H = 0.84$ in the last update, and that 0.84 is taken from the -- That's the mode of the Shertzer-Conn sort of meta-analysis for steepness. Those are the major changes to the model, and are there any questions about that?

Seeing none, I will go through the methods quickly for the uncertainty analysis that I will show later, but there is two components. There is the bootstrap component on the data and then the Monte Carlo draws over a few of the key parameters, and so, for the bootstrap component, for the landings and the discards, we're sampling from a lognormal distribution. For the age-length comps, it's a multinomial resampling with the sample sizes equivalent to those that were observed, and then the indices are sampled from a lognormal distribution, with a CV from the iterative reweighting.

For the Monte Carlo part, we included three sources of uncertainty, the natural mortality, discard mortality, and historical recreational landings, and so, for natural mortality, we assumed a mean of 0.15, and this is drawn from a truncated normal, and that's -- 0.15 is the Hoenig M , for maximum age, and then we assumed a range of 0.1 to 0.2, which corresponds roughly to a T_{max} of -- A maximum age of twenty-three to forty-five years.

For discard mortality, we used a uniform that was centered on the point estimates in the assessment, and so, for commercial handline, it's 0.4 in the base run, with a range of 0.3 to 0.5. For headboat and general recreational, it's 0.25 in the base run, with a range of 0.15 to 0.35, and then, for the historic recreational landings, which is this period, it's 1962 to 1980, and we used a multiplier, which was plus or minus 25 percent of the annual value that was estimated, or hindcast, for those historical recreational removals.

We did cull some of these, based on steepness hitting an upper bound, if the maximum gradient was greater than 0.1 and if the F_{MSY} was greater than three, and so that left us with 4,374 runs that were retained to quantify the uncertainty.

To just give you a sense of what looks like, this is the uncertainty in natural mortality, and so the solid line is the estimate from the base run. The dashed line is the median of the Monte Carlo Bootstrap Ensembles, and then the shading is the fit to 95th percentile, and then these are the draws for discard mortality, and so between 0.3 and 0.5 for commercial handline and then between 0.15 and 0.35 for headboat and general recreational. Then this shows the variation around the historic

recreational landings, and so the base estimate is in black here, and then these are the various draws, based on the MCBEs, which are plus or minus 25 percent of that base run estimate.

For sensitivities, we did I think it was twenty-three sensitivities, grouped into these major categories, and so some of the standard ones are steepness, and we used a low and a high steepness, from 0.85 to 0.95, and that was based on the profiling over H, and then we also included the 2014 update, this fixed value of steepness at 0.84. We did a number of sensitivities around the indices, and so we looked at the effect of only including a single index, and so the headboat alone or the video alone, and the base run has both of those indices, as well as the headboat and the video with the weight set to one, and so no iterative reweighting.

Then, in Indices 2, we considered a number of permutations on the indices, and we truncated the headboat in 2009, to look at the potential effects of changes in fishing practices associated with the spawning season closure and the red snapper regulations, but we retained the video. We also looked at -- Because we had excluded the commercial handline, we included that, to see what effect it had, given that it was suggesting a different pattern in abundance, and so we included that, along with the headboat and video, and then we also blocked the commercial handline, again, in 2009, to try to account for some of the potential changes, or effects of the regulations on changes in Q. Finally, we used a random walk on Q for the fishery-dependent indices, and we used a constant Q for the SERFS index, as a third variation on the index configuration.

F init, and so this was a holdover from the last update, and we were estimating F init, but we did do a sensitivity, where we assumed that it was plus or minus 50 percent of the estimated value, and we had high and low discard mortalities, which was based on a paper by Sauls that came out in 2014, and, as I mentioned earlier, we revisited the size limit blocks that were used in the 2014 update and imposed those on the new model, and then there is uncertainty in the video selectivity, because we don't have age or length compositions that are directly measured for fish that are observed on the video, and so, instead of assuming that video selectivity was equivalent to the ascending limb of the trap selectivity and then one thereafter, we just assumed that those two were equal, that the video selectivity is equal to the trap selectivity.

Then natural mortality, as Fred was mentioning earlier, we used the 2014 M, which was scaled to age-one-plus, and then we took our updated natural mortality vector and scaled it to one-plus, as in the earlier update, to look at this effect of the scaling, and then we also considered differences in magnitude and natural mortality, and so M of 0.1 and an M of 0.25, and that range was what was suggested in the original benchmark, and we also looked at a constant M at-age, fixed at the Hoenig estimate of 0.14, based on the maximum age of thirty years.

Because we did make a number of changes to the life history, we did do a sensitivity with the old growth curve, the old natural mortality vector, and the old maturity schedule from the 2014 update. Then, if you remember, the measure of reproductive potential is total mature male and female biomass, and we did that because of the potential that males might become limiting, in terms of the contribution to stock biomass, but we also considered the possibility that reproductive potential is proportional to female egg production, and so assuming that males aren't limiting. Then we did five-year retrospectives, where we peeled back individual years, from 2019 back to 2014, and we looked at how that affects the estimates of F and recruitment and spawning biomass. Those are the sensitivity runs. Anything on the assessment model, before I get into the results here? Jie.

DR. CAO: I just wanted to clarify, for the last sensitivity scenario, where you used egg production for computing SSB, we assume that sex ratio is constant over time for this scenario?

DR. CRAIG: That's right, yes, and so it assumes the sex ratio is constant over time. I mean, this came up -- I think it came up in the last webinar, and you're right that that egg production is going to vary as a function of the sex ratio, but we didn't do a sensitivity that varied the sex ratio over time, and we just assumed that it was proportional to female egg production for a given sex ratio.

DR. CAO: Thanks, Kevin.

DR. CRAIG: The assessment results, and so these are the fits to the commercial landings, and it's commercial handline on the left and commercial dive on the right. The filled circles are the data, and the open circles and the lines are the model fit, and so these are landings in thousands of pounds gutted weight for handline and dive, and so these are fit closely by design.

These are the general recreational landings, in numbers of fish, thousands of fish, for general recreational on the left and headboat on the right, and so you can see most of the landings are coming from the general recreational sector, and there's not much from the headboat sector. These are the dead discards, in thousands of dead fish, from commercial handlines, which have declined over time and been relatively constant for the last ten or twelve years. Then the dead discards from general recreational on the left and headboat on the right, which is pretty high in the early 2000s and the 2010s, and they have declined over the last eight or ten years or so.

These are the fits to the composition data, and so, just to orient you, L comp refers to length comps, and A comp is age comps, and HB is headboat. The years are increasing as you go down, and the N is the observed sample size. The effective N is the sample size modified by the Dirichlet multinomial parameter, and so these -- I will just go through these, and I will try to point out a few things, but, if there's something you want to pause and look at, just let me know.

These are the length comps going down for the headboat survey, and these are for the years where we didn't have age compositions, 1988 and 1989 and then 1996 through 2000. Length comps for headboat discards from 2005 at the bottom, and this is 2006 down to 2010, and so these lengths would correspond to mostly age-one fish, with some contribution from age-two fish, and age comps for commercial handline are starting in 1997, and so the sample sizes are pretty low early, and this is eleven trips, and so the fits aren't great early on, but the sample sizes increase over time, and so, by 2006/2007, there is 225 and 343 trips observed, and we get much better fits to the annual age compositions from the commercial handline. This is 2009 to 2013 and 2014 to 2019.

Commercial dive age comps start in 2009 through 2011, then 2013 through 2019, and then the age comps for headboat, and, again, they start in 1980, and there's not a lot of samples early on, forty-four trips, and then forty-four trips, but they pick up pretty quickly, and you can see some suggestion of age classes, and so that's from 1982, which is one of the early large-recruitment years that you see, and that's age-two in 1982 and age-three in 1984 and age-four in 1985, and so there's some recruitment signal that seems to be showing up in the headboat age compositions. You can see that again here in 1991, which this is the 1990 year class that shows up, and then 1991 and 1992, and to some extent 1993, and then 1994. The headboat age comps run all the way through 2019.

Age comps for the chevron traps start in 2011, and, here, you do see some of these -- Some years, we would get these age-ones that show up in the trap, and, in other years, not so much. It does look like -- You will see this in the recruitment plots later, but it looks like there's a 2016 year class and a 2019 year class that show up in the comps, or show up, and so they're providing some sort of recruitment signal in the last ten years.

The fits to the indices, this is the headboat index on the left, and it's showing a pretty monotonic decline in abundance over time, and then the SERFS video index on the right, which is showing a decline from 2011 to about 2015 or 2016, and then it's stable over the last two to three years.

This is the abundance-at-age, and so abundance has generally declined over time, starting in the 1980s, which is when a lot of the higher exploitation started, but then accelerating in the mid to late 2000s, and that's driven in part by these low estimated recruitments, and so, in the red bars, you're seeing the abundance of age-ones, and so here is the 1982 year class that I mentioned earlier that shows up in some of the comp data, and there's a year class in 1996 and then in 2002, but, since the mid-2000s, age-one abundance has been fairly low, with some suggestion of a moderate year class in 2016 and then in 2019. This last year is basically projected from the terminal year, and so the terminal year is in 2019, which looks like there's some modest recruitment, but nothing of the scale that occurred earlier.

This is the biomass over time, and so you see some truncation of the oldest ages, and so not many fish older than nine or ten in the more recent time period. This is the age structure that is expected under equilibrium conditions with F equals F_{MSY} , and that's the solid black line with the filled black dots, and so the age structure is the truncation of these older ages, and so it's below what you would expect at equilibrium, with the exception of the earliest decade, and these are each by decade, and so the 1980s had more older fish than you would expect at equilibrium, and then the terminal year, which is 2019, which is shown here, is the dashed magenta line, and that has fewer fish at age, older ages, than you would expect at equilibrium.

This is the spawning stock in metric tons, and the green line is the SSB_{MSY} , and then the purple line, the dashed line, is the minimum stock size threshold, which is 75 percent SSB_{MSY} , and so you can see this has declined, and it's been hovering around these thresholds for two or three decades, and this is something that -- I think I have a plot of this later from the 2014 update, and it shows the same thing, that the spawning stock has been below the thresholds, or above, in various years, but fairly close, and then, in the late 2000s, we sort of see this decline in spawning stock biomass, and so it looks like gag is in an overfished state at the end of the assessment.

This is the recruitment time series, and so this is showing the low estimated recruitment since about 2008, and there's that 2016 and 2019 recruitment, and that's a little bit higher, but, in general, it's below-average recruitment over the last ten to eleven years, and this is something that was also seen in the last update, and the last update went through 2012 and had pretty low recruitment in 2010 and 2011 as well, and that pattern seems to have continued since that update assessment was done.

This is another sort of measure, and this is the log of the recruitment deviations around the mean, and so you see declines in recruitment in the most recent decade, and, again, in 2020, that is assumed to be the stock recruitment, and that's assumed recruitment based on the stock-recruitment curve, and the 2019 year is estimated, and so you can see it's pretty close to average,

and so there is some indication of that 2019 year class, and that seems to be coming through mostly from the chevron trap age comps.

This is the stock-recruitment curve, and so recruitment on the left, or recruitment on the Y-axis, and number of age-one fish, spawning stock, on the X-axis, and so, here, the first years, this is the early years, 1963, and then to the left is the more recent years, and this is 2020, and so this is showing why we're able to estimate steepness, and so the declines in estimated recruitment in the most recent decade have resulted in enough contrast in spawning stock that we're able to estimate a steepness value here, as opposed to the fixing it, which was done in the last assessment.

This shows the fishing mortality for the different fleets, and so this is fishing mortality for commercial handlines, and so this is one of the major drivers of F , and you do see this kind of run-up in F for commercial handlines over the last couple of years, and that is because -- It's for a couple of reasons. The landings for commercial handline have actually -- They have declined over this timeframe, but they have increased slightly in the last few years, and so they're fishing on a - - It's higher landings from a depressed stock, and there is also very few of those older fish, age-four-plus and age-five-plus, and so the proportional fishing mortality is pretty high on those selected ages.

On the right is commercial dive, and so the F s are about an order of magnitude lower, and so not really a major player, in terms of contribution to F , although it has been increasing over time. General recreational is on the left, and so the F s have been somewhere between 0.1 and 0.3 over the last three decades. Headboat is on the right. Again, if you look at the Y-axis, it's an order of magnitude lower, and so, even though there's a decline in F in headboat, it's contributing very little to the total fishing mortality.

These are the F s from the discards, and so, for commercial handline, it's fairly low, and the general recreational discards -- For most of the time series, the F for general recreational discards has been on the same order of magnitude, or the same scale, as that for F for the general recreational landings, although there has been a decline in the last few years, and then the discards from the headboat, and the F s are very low for headboat discards, because they just don't catch that many gag.

This is the full F from 1962 to 2019, and then the bottom panel shows F relative to F_{MSY} , and so this is suggesting that overfishing has been occurring since the 1980s, with the exception of a few years, and that's consistent with what was found in the last update, and then this right panel shows the proportional contribution of the different fleets to that F , and so most of it is coming from commercial handline, and then general recreational, and then, for the last few years, you can see that commercial handline has been a larger contributor than the general recreational F , and there's been -- The pink is the discards from general recreational, which is another major source.

The MCBEs, and so this is the abundance estimates of all fish, thousands of fish from the MCBEs, which is showing that decline over time, and then the bottom-left shows the recruitment, with the variability around that, based on the MCBEs, and so recruitment has been declining since about 2005 or 2006, and then this is the abundance of age-two-plus, and so subtracting out those recruits, and it shows a similar pattern to total abundance.

Then this is the fishing mortality, and so this is apical F on the Y-axis over time, and so you can see that fishing mortality has increased, and there's a lot of variability in that fishing mortality at the end of the year, but it's still quite high. Just to give you an idea, F_{MSY} is around 0.37, or 0.38, I believe, and so it would be down around here, and so, despite that variability, the fishing mortality seems to be well above the benchmark.

This shows the variability in the benchmark from the MCBEs, and so this is F_{MSY} in the upper-left, and then SSB_{MSY} is in the top-right. MSY is in the bottom left, and B_{MSY} is the bottom-right, and so the solid line is the distribution from those 4,300 MCBE runs, and the solid line is the mean from the base run, and the dashed line is the median of those MCBE runs. Again, F_{MSY} is around 0.37 or so.

These are the status indicators, and so F over F_{MSY} on the left-top, SSB over $MSST$ on the bottom-left, and then the right shows the probability distribution for the last three years, and this is actually a typo, and this should be 2017 through 2019, and so F over F_{MSY} has been above 1.0, and it was above 1.0 in all of the MCBE runs, and you can see that in the distribution here, as well as the range, based on the 95 percent confidence intervals in the time series plot. Then the SSB over $MSST$, likewise, has been below one, and it's an average of about 20 percent of $MSST$.

Then I just wanted to show this, because this is from the 2014 update, and I just pulled these from the report, and you can kind of see this same pattern, where the spawning stock has kind of hovered around these thresholds, and it's been below quite a bit, but, in the terminal years, it was slightly above, and so it wasn't considered overfished, and then the F s have been -- They were estimated be fairly high over most of the time series, although declining in the terminal year, and so it was still considered overfishing, based on a geometric mean, but pretty close to the threshold in the last update.

In the MCBEs, this is the phase plot that shows the estimated spawning stock in 2019 relative to the $MSST$ on the Y-axis and then the geometric mean fishing mortality over the last three years of the assessment, relative to F_{MSY} on the X-axis, and all of those runs are within this lower-right quadrant, which would indicate overfished and overfishing. The other thing to note is that the uncertainty in the F status is quite a bit larger than the uncertainty in the stock status, but not enough that it really changes the perception that the stock is currently undergoing overfishing.

I just pulled this from the report, and this is Table 15 in the report that shows some of the key benchmarks and the status indicators, and so F_{MSY} is estimated at about 0.37, and here's MSY , and then the terminal status is 2.15 in the base run and 2.27 in the MCBEs, with SSB at about 20, or 19, percent of $MSST$. Any questions on that, on the model or the uncertainty analysis? I see Fred has a question.

DR. SCHARF: Kevin, could you -- What was informing the lower discard mortality rate, the F due to recreational discards in the general fleet during the last like four years, given that the F in the general recreational fleet was pretty high during that period?

DR. CRAIG: So you're asking about the F in the general recreational discards?

DR. SCHARF: Yes, and so I was looking at -- The fishing mortality in the discards, in the general recreational sector, from like 2016 to 2019, was about a third of what it was in the years before

that, but yet the F in the sector was still pretty high in the slide previous, and so the F in the sector was like around 0.25, but yet the F due to discards was down below 0.1.

DR. CRAIG: I think that's because the estimated discards are lower, right? If you go back to the -- These are the general recreational discards, and so those discards are decreasing over the last three to four years of the assessment.

DR. SCHARF: Where is that data coming from? Is it coming from MRIP?

DR. CRAIG: Yes, and these are the estimates from MRIP, and so the discards are declining, and so I think that's why the fishing mortality from discards are declining, even though you're right that like the general recreational landings seem to be stable or increasing over that timeframe, and so, I mean, this would be just the -- I'm not exactly sure why the discards would be declining while the general recreational landings are stable or increasing, and these are just the numbers from MRIP, and so it has something to do with the estimation of the discards, which I think they're independent, and they're based on those reports from intercepts, and so I think they're -- I guess they're connected to the landings, but, Jeff, did you have something to weigh-in on that, or was it a different question?

DR. BUCKEL: It's related to that question, and my guess is it's the low recruitment, and so this has the size limit of twenty-four inches and then a lack of recruitment, and there's just not as many of the sub-legal fish out there, and so then you have the older fish, and so that's showing up in the -- The fish they catch are legal fish, and so we're not catching as many of the sub-legal, and that's my suspicion of what's going on there.

DR. CRAIG: So, proportionally, those age-ones, which are mostly the discards, are pretty low in abundance.

DR. SCHARF: Thanks, Kevin. I appreciate it.

DR. CRAIG: Anything else on the model or the MCBEs? Okay. So we did a number of sensitivities, and I'll just kind of go through these, and these aren't necessarily intended as alternative runs, and they're really just to get a sense of how responsive the model is to some key parameters or some of the assumptions we made, and so we tried to evaluate the consequence of the changes, particularly since the last update, and so these are sensitivities around steepness, and so, in the base run, we're estimating steepness at around 0.9 or so. Here, low steepness is 0.85, and high steepness is 0.95, and then, from the 2014 update, we have the H equals 0.84.

When steepness is higher, there's more resilience to fishing, and so you see a lower F over FMSY, and that's this dark-blue line here, and then, with lower steepness, there's less resilience to overfishing, and so you see a higher F over FMSY, and then the reverse pattern for spawning biomass, and so high steepness and more fish and lower steepness and fewer fish, compared to the -- Or lower spawning biomass, compared to the base run.

This is the natural mortality, and so this is the issue that we talked a little bit about earlier with the effect of the scaling and the change in the growth curve, and so the base run is shown here in the black, and then the 2014 update, which is lower natural mortality, is shown here in the red, which results in higher fishing mortality, and then the effect of the scaling is the blue, which is

intermediate between those two, and so there does seem to be an effect of both the scaling and the growth curve.

In terms of the status, they come out roughly equivalent, in terms of the effect on the F over F_{MSY} , and there is this sort of switching that occurs in the biomass, and I'm not exactly sure what's causing that, but it's consistent with the directional effects you would expect with high and low steepness, but, again, there is no real qualitative change, in terms of the fishing status or the stock status.

Then this is a similar sensitivity, and it's looking at the magnitude, and so the base run is shown in blue, and we used a high M point estimate of 0.25, which would correspond roughly to a T_{max} of eighteen years and then a low M point estimate of 0.1, and that would correspond to an older T_{max} , roughly forty-five years, and you can see the effect of that in the assessment.

The directional effects are a little different than what you would normally expect with changes in the magnitude of natural mortality, and that's because, as I mentioned earlier, we're getting different estimates of steepness, and so the model can kind of compensate for changes in natural mortality by modifying productivity, and so you would expect low M to lead to a higher F and a higher SSB , and we do see that, but then you would expect a high M , and so this dark-blue curve here, to lead to a lower F and a higher SSB , and we don't really see that, and that's because, in that run with high M , we're getting a very different estimate of steepness.

I think the steepness estimate was like 0.43, whereas these other low M runs had steepness estimates that were much higher, more similar to the base run, and so there is some sort of compensating effect that's going on in the model, where, because it has the flexibility to alter the stock-recruitment function, it can compensate for some of these changes in natural mortality, and, again, that's why natural mortality didn't have as big of an effect in this assessment as it did in some. There's an effect here, but it's not really very large in magnitude, and it doesn't really change the qualitative results from the assessment.

Discard mortality, this is the sensitivities based on some estimates in Sauls, the Sauls paper, and we applied a 0.15 discard mortality to all fleets, versus 0.35 for all fleets, and you can see the effect here, and so, with lower discard mortality, you would expect a slightly lower fishing mortality and higher biomass. High discard mortality, you would expect -- This is one where the directional effects are slightly different than you would expect, again because of the compensating effect of steepness and the steepness estimates across these different runs are 0.86 to 0.93, and so it's compensating, to some degree, for the change in discard mortality, but the effect is pretty small, and it doesn't really affect the status.

Initial F , and so plus or minus 50 percent, and there's no real effect on the fishing status, and there are slight impacts on the initial spawning biomass, but those were mostly prior to the 1980s, and there was no effect on the qualitative outcome.

Again, the selectivity blocking, we looked at two things, imposing the blocking that was done in the original -- In the 2014 update, as well as this effect of -- The assumption of a logistic selectivity for the video index, and the dome-shaped video index really had no effect on the model, and the selectivity blocking had some effect early on the fishing mortality, but I think that's mostly because we don't really have any information to inform selectivity during this time period, and so I'm not

sure what it's being driven by, but there is no compositions for the commercial handline fleet then, and so we're getting a deviation in this early time period, but it kind of comes back down to the base run estimate pretty quickly, and it doesn't seem to have much long-term effect on the assessment results.

These are the different indices, and so the first set has to do with which indices were included, and so, in the base run, we had a headboat index and a video index, and we looked at headboat alone, video alone, and then the headboat and video, but with no iterative reweighting. There's very little, if any, effect on the assessment outcome, and I think that's because these are kind of providing the same signal, the headboat index and the video index, and so it doesn't matter too much whether you have both of them in there or one or the other.

We did consider a number of alternative index considerations, and this was based -- This really wasn't based on hard information, and it was more based on some discussions that we had within the panel, and so there is this potential issue with the headboat index because of the spawning season closure that went into effect in 2010, and we tried to account for that by excluding those landings in the construction of the index, and then there were also the red snapper regulations that might be affecting some of the fishing behavior of headboats, and so we truncated the headboat in 2009, and you can see the fit to that index under that scenario, and then we just retained the video index as the measure of abundance in the latter ten years of the assessment.

The second scenario was to take a second look at this commercial handline index, which we had originally excluded, and so, here, you can see that index, and this is part of the reason why it was excluded, is we could just not fit it very well, given that we had the headboat and the video index, and so we did two runs, one where we just included the commercial handline as-is, despite the poor fit to the index data, and then a second one where we blocked the catchability on the commercial handline, starting in 2010, and so, there, we can get a reasonable fit early, and then you see the change in catchability that takes place in 2010, and then we kind of capture this decline, although we're underestimating these last couple of points. Those were the two scenarios under which we considered, or reconsidered, the commercial handline index.

When you do include commercial handline, either as a continuous time series or with a block on Q, you do get some lower estimated fishing mortalities, and so the F over FMSY is around 1.7 or so, as opposed to 2.2 or 2.3, and so it does have a quantitative effect on the fishing status, but not really a qualitative effect, and then there's really no effect on the stock status.

Then we also did a random walk on the fishery-dependent indices, and this shows the fit to the commercial handline and the headboat when we assume a random walk on those two indices, and then this is the fit to the video, and so you can fit all of those indices simultaneously by assuming annual variation in catchability, and it does -- I think it sort of masks some of the potential conflicts in the indices, and it's not clear what is informing -- We don't have any information informing annual variation in catchability in the model, and so it's just using that parameter to fit the index, but, under those assumptions, we get very little effect on the fishing status or the stock status.

Really, even though we had two indices in the model, and we had one fishery-dependent and one fishery-independent, using any of those indices or different assumptions about catchability, or, in the case of the video index, different assumptions about selectivity, really didn't change the qualitative results of the assessment.

We did look back at the changes in life history, and so, in the 2014 update, and this is a slightly faster growth rate to a smaller asymptotic size, and that's the solid line here, the growth curve. A younger age at maturity, and then the lower M , and so, using those life history parameters, you do get an effect on the fishing status and, at least early on, the stock status, and this is mostly driven by the lower M , and so, when the M is lower, more of the mortality is being attributed to F , and that's what is driving the F over $FMSY$ up, and so the life history parameters are actually suggesting a more pessimistic status for the fishery and for the stock than what we got in the base run for the current assessment.

This is kind of getting back to what Jie was talking about earlier, and we did do a little bit to look at this reproductive potential, and so there was a working paper that had some information on spawning frequency, and you can see that here, as a function of age, and then batch fecundity, which is a function of length, or size. That wasn't used in the base run, and so, in the base run, again, we're using total mature biomass, and so the older age classes are the major contributors to the reproductive potential.

If we base that reproductive potential just on egg production, you get this sort of a curve here, because you're only considering females, and there is very few females that are older than eight, nine, ten years old, and so the reproduction is driven mostly by these middle age classes, and so from like six to ten-year-old fish, and so kind of a different assumption about what is an appropriate measure of reproductive potential here, and we're accounting for males, and sort of implicitly accounting for the potential for sperm limitation.

Here, we're ignoring males and basically have maybe a more accurate reflection of female contribution, because we're incorporating some information on spawning frequency and batch fecundity, but, again, we're not considering males, and, as Jie sort of referred to earlier, in this run, we're not really considering time-varying, which was the other reason to use total mature male and female biomass, because it's less dependent on being able to accurately reflect temporal variation in sex ratio.

Under this alternative measure, reproductive potential has some effect on the egg production, mostly because, here, you've got a lot of males in the population that are contributing, but those are getting fished down relatively quickly, whereas spawning biomass is just based on females in the sensitivity run, but there's really no effect on the fishing status.

This is the phase plot from those twenty-three sensitivity runs, and, again, they're all sort of in this overfished and overfishing category. The range is larger for the fishing status than it is for the stock status. Just to point out a couple of the key runs, so you get a sense of what's driving this range in variability, and so the base run is right here. High M and low M , we get very different quantitative estimates of fishing status. Commercial handline is included, either as a continuous index or with a block on catchability, and it gives a little bit more optimistic picture of the fishing status and the biomass status, but, qualitatively, it's the same result.

Then you can see the low M and the high M runs don't result in much change, and so the model is not particularly sensitive to natural mortality, in this case, and that's because of what I was mentioning earlier, that we are estimating the all of the components of the stock-recruitment curve, and so it can sort of compensate for changes in natural mortality via changes in the productivity.

The last set of sensitivities were the retrospectives, and so this shows the retrospective runs from 2014 to 2018, and so this is peeling back one year at a time and then refitting the model, and it shows the F over F_{MSY} plot on the left, or on the top, and then the SSB over SSB_{MSY} on the bottom, and so there does look like we're potentially underestimating the fishing mortality, but it's still -- It's still pretty high.

I mean, we're not anywhere close to the F equals MSY level, and so I think the retrospectives -- Even though there is this little three-year pattern in the first three peels, we're right on the base run for 2015, and then we're slightly below for 2014, and so I think there's some uncertainty in those end-of-year fishing mortalities, but they don't really change the perception of the status, in terms of the fishing mortality. This shows the apical F and then the recruits, and so we may be slightly underestimating F , and then perhaps slightly underestimating the recruitments.

Just to summarize the assessment results, gag seem to be overfished and currently experiencing overfishing. That overfishing has been going on for a while, since the 1980s, and that's suggested by this assessment, and it was also suggested by the last update and in the original SEDAR 10 benchmark. Those prior assessments indicate that the stock has been near this threshold, stock size threshold, until the early 2010s, while the current assessment suggests it's well below the threshold, and that's supported by both the fishery-dependent headboat index and then the fishery-independent SERFS video index, which are suggesting two to three-fold declines in abundance in the last ten years of the assessment.

Then the low estimated recruitments, and so there's some modest recruitment that looks like it's occurring in 2016 and 2019, although that's -- Most of those fish aren't available to the fishery, and they're just becoming available to the fishery, and so they're not particularly well informed, but it does look like, overall, there's been pretty low recruitment over the last ten years. The recent fishing mortalities have remained fairly high, and that's driven by both the commercial longline and the general recreational fleets.

Just a couple of other points, and the assessment results were highly robust to the range of uncertainty that we considered, and we really didn't see any cases in either of the sensitivities or the MCBEs that would suggest a different stock status or a different fishing status. I think the other point worth mentioning is that we are estimating all of the components of the stock-recruitment curve, and so that's fairly unusual in most of our assessments. I think we are estimating steepness, R_0 , and σ .

The fishery-dependent indices I think should be evaluated for effects of regulatory changes, and so we did have some discussions about this, within the panel, about potential changes in fishing practices associated with closures or red snapper regulations or so forth, but we really don't have hard information on that, and so that's why we mostly addressed those via the sensitivity analysis, but it does seem that, increasingly, the fishery-dependent indices are being influenced by regulatory changes.

Natural mortality is a key source of uncertainty here, and I think both the methods to assess natural mortality have kind of increased, and different methods are being used in different assessments, as well as the scaling issue are things that deserve some sort of broader attention, and not just for gag, but for all of the assessed stocks.

Then, as Jie was sort of alluding to earlier, for these protogynous stocks, we have typically used total mature male and female biomass as the measure of reproductive potential, because it includes the potential for sperm limitation, and it's less reliant on being able to accurately estimate temporal changes in sex ratio, which would be important if we're using female egg production as the measure of reproductive potential, and so I think this potential for sperm limitation we don't really have any information on in the temporal variation sex ratio, and alternative measures of reproductive potential deserve some further consideration. That's all that I had, as far as the assessment goes.

DR. NESSLAGE: Thank you very much, Kevin. You have been at it for almost two hours, and we appreciate your outstanding and thorough presentation, but I'm wondering if we should take a quick biological break for folks and come back around 11:00 and then entertain questions, and would that work for you?

DR. CRAIG: Yes, that would be great.

DR. NESSLAGE: Thank you. All right. Let's take a quick break and be back at 11:00. Thank you.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Let's start with some questions, if the SSC folks have questions for Kevin that they haven't already asked, and then we'll go to public comment and then start our discussion.

DR. COLLIER: I am not certain if Kevin is finished. He still had the projections to go through, correct?

DR. NESSLAGE: You're right.

DR. CRAIG: Yes, that's right. Either way, Genny, if you want to talk about the assessment or wait until the projections are --

DR. NESSLAGE: No, I am just getting very tired and losing track of what's going on. Sorry that you're on the last day here of a very long meeting, and so, please, continue your presentation. My bad.

DR. CRAIG: This is the last topic, is the projections, and so just a little bit on the methodology, and there are the same methodologies that we use for most assessments. The structure of the projection model is the same as the assessment, and it's using the parameters from that assessment. We're carrying forward the uncertainties in the ensemble modeling, and so that includes the 2020 abundance at-age, the natural mortality, discard mortality, and the historical recreational removals.

We used a single selectivity curve to calculate the removals, and it's a weighted average across all of the fleets, using the mean F from the last three years. The initial age structure in 2020, which is the first projection year, is computed from the assessment model, and then we use constant fishing rates that define the projections that were assumed to start in 2022, and so there's two interim years, 2020 and 2021. Those are the interim years.

These projections assume that landings during those years are the average for the last three years of the assessment, and these are ten-year projections, and so these are what are in the assessment report. We didn't have projections specified in the TORs, and so I just chose some of the typical projections that we do, and so there's an F equals zero, and so no fishing mortality, continuing fishing at F equals F current, which is the geometric mean of those last three assessment years, F equals F_{MSY} , and then there is one rebuilding projection that is in the assessment report that is a rebuilding timeframe of twenty-one years, which goes out to 2040, and that rebuilding timeframe was based on the generation time for gag, which is estimated at eleven years plus an additional ten years, and so these four scenarios are what is in the report.

Since that time, I had some email exchanges with Chip, and he provided some additional methods that are typically used to compute rebuilding timeframes, and so I will show those at the end, and those are in the presentation, but they're not actually in the SEDAR 71 report.

Just to orient you, and you've probably seen versions of these graphs, and so the thick-blue line is the base run estimate of the benchmark, and the thick-green line is the median from the MCBE analysis, and then the solid line with the circles is from the base run, and then the dashed line with the open circles is the median of the MCBEs, and then these thin-solid lines show the 5th and 95th percentiles.

Under F equals zero, F remains high in the two interim years, but then goes to zero in 2022, and so you see that landings goes to zero, and the spawning stock increases, and then recruits start to increase towards the recruitment expected at MSY after the ten-year period. This spawning stock crosses that threshold in 2027, and so that's eight years of fishing -- Well, it's six years of fishing at F equals zero and the two interim years, and so that 2027 year becomes important a little bit later in one of the alternative methods to computing, or estimating, the rebuilding timeframe that Chip sent me.

This is F current, and so F current stays the same, and the spawning stock goes up slightly, but this is mostly because recruitment is returned to that estimated from the mean value from the stock-recruitment curve, and then we show the landings going up under that assumption of more average recruitment into the future, but still don't reach any of the thresholds after the ten-year period.

This is F equals F_{MSY} , which is about 0.37, I believe, in the base run, and then this is the one rebuilding projection that's in the report, and so, here, the generation time was estimated to be eleven years, and ten years were added to that, which is a twenty-one-year rebuilding timeframe, which would run the projection out to 2040, and then this is what that was based on, and that 2040 is the first year where the rebuilding criteria is met, and there's a 50 percent probability that SSB is greater than SSB_{MSY} , based on the MCBE runs.

This shows that rebuild projection, and so F going down to about 0.33, and recruits start to come up, and so the benchmark spawning stock reaches the threshold around 2040, and then landings approach the MSY levels. Those are the projections that are in the report. I don't have the tables associated with those in this presentation, but they are in the report as well.

These are the additional rebuilding projections, based on the information that Chip provided, and so there's three different scenarios here. This is a little confusing, but T_{max} is no longer the

maximum age, and it's the rebuilding timeframe, and so, in Scenario 1, the rebuilding timeframe is T_{min} plus one generation, where T_{min} is the time to rebuild at F equals zero. When F equals zero, that rebuilding occurs in eight years, and then you add one generation to that, and so the rebuilding timeframe is nineteen years, and then this is the projection period out to 2038, and the F rebuild is 0.325.

The second scenario is the amount of time to rebuild SSB MSY if fished at 75 percent of the maximum fishing mortality threshold, or FMSY, and so 75 percent of 0.37. That occurred in 2032, where that rebuilding condition was met, and that was a T_{max} of thirteen years, and so, there, the projection period is out to 2032, and that F rebuild is 0.278.

The third scenario is just taking that T_{min} , which is based on no fishing and the recovery time, or rebuilding time, with no fishing, and so eight years times two, and that's sixteen years, and that projection runs from 2020 to 2035, and the F rebuild there is 0.307. These are the same plots, and so this is Scenario 1, where the rebuilding timeframe is that T_{min} plus one generation. You can see that things meet those thresholds in 2038. This is Scenario 2, which is the time to rebuild if fished at 75 percent of FMSY, and so that occurs in 2032, roughly.

Then Scenario 3 is just taking the time to rebuild with F equals zero, which is eight years, and multiplying it by two, which gives you sixteen years, and then this shows the projection. F is declining that to that F rebuild and then the spawning stock reaching that threshold by 2035. I hope that I got that right, Chip, based on what you sent me, but those are those three additional projection scenarios.

I have also included the tables, and so these are the same general -- It looks a little bit different, but it's the same information and the same format that's in the report, and so I'm not going to go through all of these, but you can see the landings and the discards from the base run, from the median of the MCBEs and so forth for each year of the projection period, and then that last column has a probability of recovery, and so it gets close in 2038 with this scenario. 2032 under Scenario 2, and then 2035 under Scenario 3, and these are the associated fishing mortalities.

That was basically all I had. I will stop there, and, if there's any questions on the projections or additional projections or approaches to determining rebuilding timeframes, I would be glad to entertain those, or anything related to the assessment as well.

DR. NESSLAGE: Thank you very much, Kevin. It looks like we have a question from Fred Serchuk.

DR. SERCHUK: Thank you for really a wonderful presentation, and a very thorough presentation. The recruitment set you have used in the projections are presumably coming from the stock-recruitment curve, and is that correct?

DR. CRAIG: That's right.

DR. SERCHUK: Okay, and so I have two questions. Was that the same approach that was used in the previous assessment, the one that went through 2012 with the data?

DR. CRAIG: Yes, it was.

DR. SERCHUK: Okay. How well did the projected recruitments from that assessment turn out, relative to what we now see for the recruitment for those projection years? Do you know?

DR. CRAIG: That is an excellent question. I don't know. I haven't looked at that. I did look at the assessment, and that assessment went through 2012, and it did estimate low recruitments in 2010 and 2011, and there's a statement in the assessment report that there might be an expectation of future low recruitment, and that did seem to turn out to be the case in this assessment, but I didn't formally compare the projected recruitments from that assessment to the estimated recruitments here, although I suspect they are much higher, because the recruitments that were used here, or that were estimated here, since the last update are very low.

DR. SERCHUK: So you're getting at my point, in an indirect way, and the recruitments that we've seen in the most recent years are among the lowest in the time series. If one were to take the last ten-year average, it would be around 200, or maybe slightly more than 200, maybe 225, and my feeling is that the recruitments that are used in the rebuilding projections that we have here start to exceed that value I think in maybe the base year of the projections for going forward, and I am thinking that another way that one could just look at the differences between using a stock-recruitment curve, which is very -- It shows a very sharp increase in recruitment at very low stock sizes, which didn't really come to fruition, is to use another scenario of rebuilding, at least in the short term, in which the average recruitment for the next three or four years is some average of the recent recruitment.

I'm thinking, from my perspective, that the rebuilding that is put forward, under any of these projections, is using recruitments that are about -- Instead of being around 225, they start to exceed 300, very quickly, and I'm thinking that we're going -- Because of that, we're going to see a much larger increase in the stock size than would be had if the low-recruitment pattern that we have continues, and so, as a sensitivity analysis, I'm thinking might it be useful to carry forward the recent ten-year average, going forward, because that's what we've seen in the last ten years, and that's just a suggestion, and it's because I believe that the projections from the last assessment, in terms of recruitment, were far too optimistic to what we're seeing now. Thank you.

DR. CRAIG: I don't disagree with anything you said, Fred. I mean, I think you're right that there wasn't this level of recruitment decline anticipated, or there was really nothing in the prior update that would indicate this level of a recruitment decline. I guess the only sort of caveats would be what sort of timeframe is appropriate for which to calculate the average recruitment, and ten years may be okay.

We also have what looks to be a couple of year classes that have relatively high recruitment, but they're just not particularly well informed by the assessment, and so there's a 2016 year class that, again, is below average, based on the recruitment deviations that were estimated here, but they're quite a bit larger than the average over the last ten years, and then, in 2019, which is the terminal year of the assessment, there seems to be a relatively strong year class that is informed almost completely by the video index, and so there are a couple of years where it does suggest there is higher recruitment, and whether those will sort of pan out as being the case I think is yet to be determined.

The only other thing that I might mention, related to that, is we didn't talk a lot about the retrospectives, but I think the retrospectives are suggesting that there is the possibility that we might be underestimating recruitment in the model, and you can see that here, and so I don't think it's of a huge magnitude, but I guess those would be the only sort of caveats, is that there is some suggestion of a couple of late year classes that may be larger and that aren't particularly captured in the data yet, and then we do have this sort of slight indication, or some indication, that maybe we are underestimating the recent recruitments, to some degree, although, beyond that, I don't really disagree with anything that you said.

DR. NESSLAGE: Other questions for Kevin? I have one, while folks are thinking, if you don't mind. I was just looking across the three assessments that we've reviewed at this meeting, and I am curious about the number of MCBE runs that are typically done, and it looks like it kind of varies from assessment to assessment, and they're all in a similar range, but I'm just curious. Like, for instance, for red snapper, it looked like there were 4,000 runs done, with 8 percent culled. For tilefish, it was 4,200, and there were 4,050 retained, and then you said you had 4,374 retained, and I'm not sure out of how many, and I'm just curious. They're all close, but is there possibly any chance of an impact of the number of runs that are actually done on the envelopes that are generated? Is there a consistent protocol for that? I'm trying to remember.

DR. CRAIG: I guess you're right, and so I do have a plot that shows the convergence for the different benchmarks, as a function of the number, and so what number of runs they start to converge. I guess the answer to your question is, yes, there is variation among assessments and the total number of MCBE runs. In my case, the MCBEs can take a reasonable amount of time, and so we end up kind of -- I ended up running them on multiple machines and then sort of putting them together at the end.

I think I did -- The total number was like 5,300, or so, MCBE runs. Then, after the culling -- The culling was about 18 percent of those were culled, in the case of gag, and that was mostly because of the steepness estimates, and so we're estimating steepness in the model, but it's estimated relatively high, about 0.9 or so, and so a number of those MCBE runs hit the upper bound, in terms of the steepness, and that's why they were culled. There is a plot that I can show you, or I can send to you, if I can't pull it up, but we do look at what point those estimates start to converge, as a function of the MCBE runs, and it's well less than 4,000. I mean, it's actually -- In many cases, it's less than a thousand.

DR. NESSLAGE: Okay. Good. So that's done for all of the assessments then?

DR. CRAIG: Yes, and so there's a standard plot, and I'm just going to try, really quickly, to pull it up. For some reason, my computer is not letting me open a PDF, but, yes, those are done for all the assessments. We typically look at them, but we don't necessarily include them in the report.

DR. NESSLAGE: Well, as long as you guys are doing that, that's fantastic, and that's kind of what I was --

DR. CRAIG: This is what I wanted to show you.

DR. NESSLAGE: Good.

DR. CRAIG: This kind of gives you a little bit of -- It gives you a little bit of an idea, and so this is the MSY estimate of standard error, and it's really sort of stabilizing fairly quickly, and so most of our assessments were out here somewhere, in terms of the number of MCBE runs that were retained, and this is for FMSY. This is for SSB MSY, and so once you -- For all practical purposes, once you get above a thousand, or certainly 2,000, those estimates become very stable, and so these kinds of plots are available for all the assessments, if you want to see at what number of runs those estimates start to stabilize.

DR. NESSLAGE: Great, Thank you. That's exactly what I wanted to see. Chip.

DR. COLLIER: Could you come back to me?

DR. NESSLAGE: No problem. Jie, go ahead.

DR. CAO: Thank you, Genny. I just wanted to follow Genny's question about the convergence, the model convergence. If I remember correctly, the maximum gradient -- I mean, the criteria you used for convergence is 0.1, and I'm just curious if this number is the same across species.

DR. CRAIG: That's a good question, and I can't say whether it's the same across species, and I do think -- I mean, there is a certain amount of -- It's a little bit idiosyncratic, in terms of what people use for the culling, and it's sort of what individual analysts use, and so I don't know that that's been standardized. I wouldn't think that that convergence criteria, in terms of the maximum gradient, would necessarily be the same across all species, because the assessments differ quite a bit, in terms of the information and content of the data and the ability to estimate a number of those parameters.

I think, in my case, it's over the number of runs that I did and developing the model, it seemed like I was getting convergence an order of magnitude less than that 0.1, in most cases, and so it seemed to make sense to cut off some of those extreme values of the gradient. I don't really know how many were culled, because on that criteria, and I think most of the culling had to do with the steepness hitting the upper bound, but, to answer your question, I don't think it's standardized across assessments, in terms of what value maximum gradient to use, or even like what culling criteria, and it's somewhat been a matter of personal preference, I think, or particular to the particular assessment.

DR. CAO: Thanks, Kevin.

DR. NESSLAGE: If I could just jump on that though, I was just scrolling through the assessment, and, in the final base run, the max gradient though is 0.0066, from Appendix B, and is that right?

DR. CRAIG: I believe so, yes.

DR. NESSLAGE: Okay. Let me come back to that. Chris Dumas.

DR. DUMAS: Kevin, thank you for a fantastic presentation. Even if we were all California valley girls, and you had a spoon, you could not have gagged us better, and so that was fantastic.

DR. CRAIG: I don't think I've gotten a compliment like that before. I appreciate that.

DR. DUMAS: Well there you go. You can always rely on your SSC. I've got a question about the sensitivity phase plot. You may have explained this, but, if you did, I just didn't catch it. Is there any way you could go back to that? I am looking at the indicator for the low mortality, low M, and also the high M, low M and high M, and those are both on the same side of the base. They are both to the right of the base. Why is that? I would expect one to be one side of the base and the other to be on the other side of the base.

DR. CRAIG: I mentioned a little bit about this earlier on, and it may not have been entirely clear, but we are -- In the model, we have the mortality, which is shown here as the natural mortality, but we also have the productivity, and so the stock-recruitment curve has three main components. It has an R zero, which is the recruitment expected under unfished conditions, and it has steepness, which is the measure of the compensatory reserve, or how quickly the population can respond to increases or decreases in abundance, in terms of its recruitment, and then there's rec sigma, which is a -- It's a measure of variation, and so there's recruitments, and those recruitment variations -- There are some variants associated with those deviations, which themselves are deviation from the stock-recruitment curve, and so that stock-recruitment function has those three parameters in it.

In a lot of assessments, we have to fix particularly steepness, and sometimes rec sigma. I think, in the tilefish assessment, I think both steepness and rec sigma were fixed. I think, in red snapper, just steepness may have been fixed, but, anyway, what is happening here is that, when you change the natural mortality, the model can compensate for that change in mortality by estimating different parameters of that stock-recruitment function, and so, for example, if natural mortality is high, you might get a lower estimate of steepness, or vice versa, and so I think what you're referring to, when you have the low M and the high M that are typically bracketing the base run, that's because some aspect of that stock-recruitment or production function has been fixed, and it's typically steepness, whereas, here, all of the parameters of the stock-recruitment function are allowed to vary.

What's happening is, in those sensitivity runs, you're getting a different estimate of steepness that, in some sense, is compensating for the change in the natural mortality, and it makes the model less responsive to variation in natural mortality than it might be under other conditions where some component of the production function is fixed, if that makes sense.

DR. DUMAS: It does. Thank you. I remember you explaining some of that before now, and I guess that little web of neurons had turned off, but you just sparked them again, and so now I remember that. Given that though, another thing that we had mentioned is that natural mortality is a key source of uncertainty.

DR. CRAIG: Right.

DR. DUMAS: But the results are robust to this uncertainty, and so is that because -- Even if there is uncertainty in natural mortality, whether it's a lot lower or a lot higher, we still end up over there on the right side of the base run.

DR. CRAIG: Yes, that's right, and it's pretty far to the right, and so, partly, that's because -- Well, just to back up, it is robust to natural mortality, and that's partly due to this potential compensating effect of steepness in particular, and it's partly also because the stock seems to be in a very depressed state, with relatively high levels of fishing mortality, and so, when you're at 20 percent

of the minimum stock size threshold, and two-times the fishing mortality threshold, then you're pretty far away from these thresholds, and so, under those conditions, natural mortality doesn't have a qualitative effect.

I guess, just to sort of follow-on what you're saying, it's that you -- I guess the next question would be the model can estimate different values of steepness to compensate for variation in natural mortality, and so then the question would be how reasonable are those estimates of steepness, because those are completely -- They are estimated, and you don't really observe steepness at all, and so, to me, that would be the follow-on question, because, in the base run, we're estimating a steepness of like 0.9, and then, in the low M, I think the steepness is estimated at 0.4 or 0.5, and so you could ask the question of, well, is that steepness reasonable or not, and I don't have an answer to that, but I think, in the end, it does seem to be robust to natural mortality, both because of where the stock is at, but also because we are estimating these components, multiple components, of the stock-recruitment curve that allows the model flexibility, in terms of accommodating that change in natural mortality and still fitting the data reasonably well and getting to the same quantitative outcome.

DR. DUMAS: That all makes sense. Thank you so much.

DR. NESSLAGE: Great. Thank you, both. Chip, are you ready?

DR. COLLIER: I am, and, when I was talking with Kevin, I was under the impression that the stock could not rebuild within ten years, but it sounds like that might be a little bit different situation, and so, in Magnuson, it actually states that, for a fishery that is overfished, any fishery management plan amendment or proposed regulations prepared pursuant to rebuilding shall rebuild within -- Not to exceed ten years, except in cases where the biology of the stock of the fish, other environmental conditions, or management measures under international agreement in which the United States shall participate dictate otherwise.

I guess that would be one question to the SSC. Is the biology of the fish and the environmental conditions or management measures preventing the stock from rebuilding within ten years, and, therefore, if that's not the case, we're going to need to consider an F rebuild within ten years, with, in all likelihood, the management starting in 2023 or 2024.

DR. NESSLAGE: Thank you for that clarification, Chip. I thought I saw another hand up, maybe one of the Freds, but it's gone now. It's back up.

DR. SCHARF: Genny, that was me, but it's just -- I can come back to it later, when we're talking about uncertainty, just to add some stuff to the notes, and it kind of builds on what Chris was asking Kevin about and he was explaining, and so I just have some other sort of comments or questions about that, but I don't want to belabor it here, and there's no qualitative effect right now, and so it's just more for future reference.

DR. NESSLAGE: Gotcha. All right. Don't forget. Write it down. Are there questions? We're focusing on questions at the moment. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. Your implication of stock rebuilding in ten years, given the F equals zero scenario, this is exactly the reason why I raised my point about recruitment. My

feeling is, if recruitment is not going to be at the level assumed through the stock-recruitment curve, which is why I asked how well the previous projections -- This stock will not be able to rebuild in ten years, and that's my feeling, and that's why I asked for this other run, because, if there is uncertainty with respect to the recruitment scenario in the projections, and it doesn't pan out, we're going to be imposing, under F equals zero, possibly a regimen that will be impossible to meet, and so that is precisely the reason that I raised my earlier comment. Thank you.

DR. NESSLAGE: Excellent. Thank you. Chip, is that a vestigial hand up, or do you have a new comment or question?

DR. COLLIER: Sorry. I forgot to take it down.

DR. NESSLAGE: All right. Vestigial hand. Okay. I'm not seeing any hands at the moment, and so I think I would like to take a quick break, if we might, and solicit public comment, if staff are ready, and then we'll return to SSC discussions.

DR. COLLIER: We are ready for public comment. Give me just one second to take control from Kevin.

DR. NESSLAGE: All right. Chip, do you want to just -- Since this is the first day of this meeting, do you want to just give the little spiel?

DR. COLLIER: Sure. It's looking like some of the public are already doing this, but, if you would like to make a comment, click on this icon right here, and it's the raise-your-hand function. If your hand is lowered, it will be green, but, if it turns red, that means -- That is indicating that your hand is raised. When your hand is raised, staff will unmute you. There should be a recognition that you're being unmuted by an organizer. After that, we'll call your name, and then you'll have a chance to give a public comment. If that is not working, you can also type your question into the question box.

DR. NESSLAGE: Great. Thank you, Chip. It looks like we already have someone lined up. Michael, would you like to go ahead, please?

MR. SMARRITO: I did listen in on the presentation on the data for the grouper, and, currently, and I know last year with red snapper, they required the descending devices, and is that being taken into consideration by the staff for future management of the gag grouper, so that we can -- I guess decrease the mortality rate for the discards, is what I'm trying to get at.

DR. NESSLAGE: That's a great question. I don't know if that should go to Kevin. You didn't incorporate decreased discard mortality in any of your projections, and is that correct? I think that's what he's asking.

DR. CRAIG: That's right. I mean, for this assessment, the discard mortality was assumed to be constant in time, and I'm not sure if there is any -- Actually, I don't know if there's descender devices or venting or something that's required on the fishery or if we have any information on sort of potential decreases in discard mortality more recently for gag, but, yes, it's assumed constant.

MR. SMARRITO: I was just thinking that maybe that staff could consider that for the future, because I know, in watching TV shows and the devices used for red snapper, there is video evidence of it working fairly well when it gets to the bottom, and so that's just a comment. Thank you very much.

DR. NESSLAGE: Thank you. I appreciate that. Are there other public comments? No hands. Nothing in the chat box. Okay. Thank you. Okay. We have a few minutes left before lunch, and I would like to, if we could, return to the SSC then and have -- Start our general discussion, and I know folks had said they had a few more questions and some general comments, and then we can start brainstorming our response to our action items, and I thought, before public comment, there was a Fred hand up, but maybe that got tabled, if you would like to --

DR. SERCHUK: I didn't take it down, Chair. Sorry.

DR. NESSLAGE: Okay. Is there any other general questions or comments, before we launch into drafting our -- Or at least starting to think about our action items, before we go to breakout groups. I am not seeing any hands raised, and so how about we start working through this, and then, maybe after lunch, we can return to our breakout groups and then come back and review, and would that be logistically feasible? Staff, I guess I'm looking to you all.

DR. COLLIER: We can make whatever you like work.

DR. NESSLAGE: Thanks. You guys are great. All right. Let's take a look at our action items, and the first set is the standard do we believe the assessment addressed the TORs, is it BSIA, and does it provide an adequate basis for determining stock status and fishing level recommendations, and I will look to the SSC to give me some ideas of how folks are settling. Fred Serchuk.

DR. SERCHUK: My responses, Chair, are yes, yes, yes.

DR. NESSLAGE: Outstanding. To your earlier suggestion, and this is just a placeholder for our later discussion, I have started to -- I really like your suggestion of, after this last bullet, of kind of justifying our yes with some positive feedback on what we thought were improvements with this assessment, and so we can review some of that language later, but I was kind of just starting off suggesting that, maybe after that third bullet, we say something like, yes, best methods have been used, and there were improvements with this assessment, including -- Then listing them. As folks are thinking, whoever is assigned to this section, if we can think a little bit about some of the improvements, although nobody is assigned to this section, because we haven't been doing this, I just noticed, but, if folks think of things, shout them out, and we'll fill it in. Wilson, go ahead.

DR. LANEY: Thank you, Madam Chair. Fred beat me to the punch. I was going to say yes, yes, yes, and I agree with you with respect to putting in the things in this assessment that were improvements over the previous one, and so I think we can do that as a group.

DR. NESSLAGE: Great. I will just throw out that the growth and natural mortality and maturity were all updated, which is -- Unless someone disagrees. If anyone disagrees with this as being a pro, please speak up. There were separate growth curves applied for the population of the fishery, and I thought those were improvements. Then I know that there were changes made in how the sex ratio occurred, and I just wanted to throw that out there. That wasn't accounted for, and I

guess I just wanted to throw that out there. If folks feel that's an improvement, we can throw that in there. If we feel it's a source of uncertainty, or both, we can put it in another section, but go ahead, Jeff.

DR. BUCKEL: Again, I want to thank Kevin for the excellent job and the thoroughness of all the sensitivity runs, and so I think capturing that here, and the questions would come up, as I was looking at the changes in the life history data, for example, and then you would see the sensitivity run, to see how it impacted the assessment, which was really helpful, to know that the stock status is robust to these changes, and so maybe a bullet on the sensitivity analysis was very thorough. Thanks.

DR. NESSLAGE: Yes, and there was a thorough suite of sensitivities done to evaluate stock status, something along those lines. Excellent suggestion. Fred Scharf, go ahead.

DR. SCHARF: Just following-up on what Jeff just said about the robustness of the qualitative results to new data sources and changes, that sort of validates the responses above, where we're answering yes to all three of those questions, and the stock status is robust to all of the uncertainties and sensitivities, and so it's not necessarily an improvement, per se, but it just gives a certain level of confidence in the predictions.

DR. NESSLAGE: That's a great suggestion, and maybe it's a second bullet under there. I like that. Are there other thoughts? We can add as we go along, of course. Chris.

DR. DUMAS: I think I recall that they updated their analysis method with the composition data, using the Dirichlet multinomial method. Did they also add the SERFS video index? Isn't that new?

DR. NESSLAGE: That's correct, isn't it, Kevin?

DR. CRAIG: Yes, those are both correct.

DR. NESSLAGE: Great. Thank you. Good catches, Chris. Fred Scharf with a question-mark.

DR. SCHARF: Sorry. I just left my hand up.

DR. NESSLAGE: Okay. That was another vestigial hand. We like that. Chris, go ahead.

DR. DUMAS: Sorry. I left my hand up.

DR. NESSLAGE: Okay. All right. Let's keep scrolling. That doesn't mean that we can't add later, but let's take a look at uncertainties. We've already got a few things fleshed out here, and it looks like Chip was kindly taking some notes.

DR. COLLIER: These may not be in the right spot, but I was just taking notes, like you said, and I wasn't looking to see where I was putting them.

DR. NESSLAGE: Understood. There is always uncertainty in natural mortality, and that can have a huge impact on the assessment, but here it seems to be robust to the assumptions and the changes

that occurred, and so we might want to move the -- I see what you're saying. While he's typing, Wally, go ahead.

DR. BUBLEY: It goes along with that, and there was the conversation that, while typically it didn't behave the same way we typically see when natural mortality is estimated, it's because the steepness parameter changes, because it's estimated within the model, and so that could be a source of uncertainty with this as well, because do we have faith in the steepness that is being estimated from there?

DR. NESSLAGE: Right, and so we had somewhat counterintuitive results for when natural mortality changed, and that is likely due to our estimation of steepness, which has uncertainty. Which is a source of uncertainty, as always. Thanks. That's a good catch. Chris, go ahead.

DR. DUMAS: I think I remember -- Didn't Fred Scharf ask a question about the estimated discards from MRIP and how there might be some uncertainty in that that might be having an effect? Fred, do you remember saying something along those lines?

DR. SCHARF: Yes, and it was something I was still a little concerned about. Jeff brought up a good point, that maybe the lower discards is because of poor recruitment, and that certainly looks like it could contribute to it. It does seem like it's a little bit disconnected in time though, and it seems like the poor recruitment has been going on for a decade, and there was this sort of real sharp drop in the last four years, in terms of the estimated number of discards.

I'm assuming that's coming just from the intercept surveys, and so -- Plus, there's still no old fish out there, and so it's not clear what's being landed. The age-ones and twos still make up the biggest part of the stock biomass and abundance, even though there's less of them from recruitment, and so it just seemed like a precipitous drop in discards that seemed a little misaligned with what was happening, and that's all. It seemed extreme, to me.

DR. NESSLAGE: We should probably suggest that -- Well, we can see what we want to suggest later, but, yes, definitely worth noting. Under the recruitment bullet above there, I think we probably want to capture some of what Fred Serchuk said about it appeared that, in comparing with previous assessments, as well as the retrospective, both indicate that we might be underestimating recruitment. Please clarify if I'm mischaracterizing. Go ahead, Fred.

DR. SERCHUK: Figure 50 in the report suggests we've been overestimating recruitment.

DR. NESSLAGE: Oh dear. Did I get it backwards?

DR. SERCHUK: The final assessment, for a number of year classes, now shows that recruits are lower than were estimated in retrospect, and the report says that. It says that retrospective analyses suggested some overestimation of F and of recruitment in some of the years, Figure 50. You can see when the -- If you look at 50, the middle figure on recruits, you can see that the terminal year was estimated at a higher recruitment than was actually seen in the most recent assessment. That was another concern that I have, Chair. Thank you.

DR. NESSLAGE: Okay. Thank you for clarifying, and so the retrospective indicates that we've been overestimating recruitment, but am I correct in your discussion with Kevin there, for the moment, that, compared to the old assessment, we were underestimating recruitment previously?

DR. SERCHUK: No, because I don't -- What I was indicating with my earlier comment, Chair, was it would be useful to see what recruitment was projected from the previous assessment or in the projections, which we now have recruitment estimates in the most recent assessment, and my feeling is that, again, I think we may have been too optimistic in the recruitment assumption we've used in the previous assessment, but that's just conjecture on my part, and I haven't looked at the previous assessment. Thank you.

DR. NESSLAGE: Thank you for catching me. That's exactly what we needed. Wally, go ahead.

DR. BUBLEY: With this, we're using -- Total spawning stock biomass was utilized in this assessment, versus, normally, the female spawning stock biomass, and so we have some uncertainties with that, trying to determine sperm limitation use, as well as I think Jie pointed out some of the time-varying sex ratios potentially going along with that as well that could affect it.

DR. NESSLAGE: Excellent point. While we're thinking about these points, and these seem to be the main ones, we might want to take a little bit of time to brainstorm the next bullet, the what are the potential consequences of these uncertainties, and I think Fred Serchuk had some thoughts on the matter. I don't know if you want to help us with some wording here or --

DR. SERCHUK: I guess -- May I make a comment, Chair?

DR. NESSLAGE: Please.

DR. SERCHUK: I don't know how great the uncertainty is, and that's the reason I asked either to have a rundown using recent average recruitment, ten years, which I think is a reasonable average to use for the past, and/or to have some evaluation of the recruitment that was projected in the previous assessment and what actually occurred in this assessment, and, without having those, I don't know how uncertain the assessments are, and I'm thinking -- The reason I raised this, and not to be bug-bear about it, but, if we don't quantify, or semi-quantify how uncertain issues are, we can't really talk about the reliability of our projections, if those elements are going into projections.

Our job is, and obviously we've discussed this previously, is to talk about how we consider scientific uncertainty in our projections, particularly, or the state of the stock, and, unless we do the exercises that I have talked about, if possible, we'll only do that in a qualitative sense, and, therefore, it doesn't give as much direction to managers, in terms of how firmly we feel about our projections. Have I made myself clear, Chair?

DR. NESSLAGE: I think so.

DR. SERCHUK: Thank you.

DR. NESSLAGE: So then I guess I would ask you then -- Would we want to see that and then decide, or we would want to -- Our hurricane alarm is going off here, and so I will let you comment,

but is that something that you're recommending for the future or something that you're recommending to help us make a decision regarding what projections to use, and I think it's the latter, and am I correct in that?

DR. SERCHUK: Yes.

DR. NESSLAGE: All right. How do people feel about the risks of the other issues up here regarding steepness, natural mortality, discard estimates, and the issue of total spawning stock biomass? Amy, go ahead.

DR. SCHUELLER: I just keep thinking about this recruitment thing, right, because we just keep talking about recruitment over and over again, and I was looking at Figure 27 in the report, and, as Fred is pointing out, all of the points in the last years are below that recruitment line, and there is a stock-recruitment curve fitted here, and I feel like that part of the curve is impacted by steepness, and so I just wondered if Kevin could speak to how well steepness was actually estimated for this assessment. Is it pretty well defined? It feels like it should be, based on the look of these points, but I am also just a bit concerned about -- Maybe it's not, and maybe it's a bit more broad, and we don't necessarily have a good idea of what that part of that curve should look like.

DR. CRAIG: That's a good question, and I think it's hard to know how good steepness estimates are. I think, in developing this model, we were pretty consistently estimating steepness in a range of about 0.85 or so to 0.95, which is a bit higher than what's been assumed previously, and, based on the profiles over steepness, that 0.85 to 0.95 is a range of about two AIC units, and so, if you use two AIC units as a measure of significance, then you would say that steepness has a minimum at about 0.9, with a range of 0.85 to 0.95, based on the profile.

Having said that, in the MCBEs, when you start changing the data, as we do in changing some of the key parameter estimates, we did have a number of those runs, somewhere around 18 percent, that were culled, and those weren't culled -- Which is a reasonably high number in most of those, and I didn't separate out what were culled due to steepness versus the max gradient or the MSY criteria, but I think the vast majority of those were from steepness hitting an upper bound, and so it seems to be high, although it seems to go to an upper bound pretty easily once you start changing the data or key components of the assessment, but, in general, just in developing the model, and certainly from the profiles, it looked like was a reasonably-defined minimum, and I wouldn't characterize it as strongly defined, and there was some variation among the data sources that were contributing to that estimate, and so it wasn't the case that every data source, the indices, the age comps, the length comps, et cetera, were pointing to a steepness estimate of 0.9. That's just what the model is estimating.

There were some that were in that general range, but some were suggesting a lower steepness, 0.8 or 0.7 or something like that, and some were suggesting something much higher than that, and so, when you integrate those data sources, you're coming out at around 0.9, but it wasn't like every data source was pointing to the same estimate of steepness, if that kind of helps, and so, yes, I think, in general, steepness was well estimated by the model, given the data and the assumptions in the base run, but I don't know that I would say that it's strongly estimated, and I don't know -- I mean, it seems to be high, and I would say that. There's not much support at all for steepness lower than like 0.7 or something like that, and so I hope that's helpful.

DR. NESSLAGE: Amy, did you want to follow-up on that, or are you good?

DR. SCHUELLER: I will just think about it some more. I do feel like it's a pretty broad range, and I don't know what the likelihood profile looked like, but just let me think about it some more.

DR. NESSLAGE: All right. That's fair. In the meantime, let's go to Fred Scharf.

DR. SCHARF: Just coming back to the risks of the uncertainties, the text that Chip was writing above, and it's coming back to the point that I had raised earlier, and then Chris Dumas pointed it out in the phase plot, was just that the effect of changing M in the model and how the model responded in a way that was atypical -- When we lowered the scaling for M and used the constant M , the model responded as we would expect, where it estimated a little bit higher F , but what differed was when the M was increased by quite a bit, and the model responded with predictions of much higher F s, where the F ratio to F_{MSY} went from about two up to like three-and-a-half, and, typically, when we raise M as a source of mortality, the F usually goes down, relative to the base.

Then Kevin brought up this idea of, well, because the productivity parameters for the stock were not fixed, and they were being estimated internally, and steepness being one of those, those were being estimated differently, depending on how M was estimated, but I think the risk is just to make sure that those productivity metrics for the stock are within a reasonable bounds in the future. Right now, it doesn't matter, qualitatively, because the overfishing status of the stock still stays the same, and it's still that overfishing is occurring, but, if the stock was closer to F_{MSY} , it may matter a lot, in terms of uncertainties about M and then the model responding by changing productivity of the stock.

DR. NESSLAGE: Thank you. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. If we could go back to that stock-recruitment curve that Amy pointed out, it's clearer in this one that those points that are among the lowest points should have been, from the stock-recruitment curve, estimated to be higher, because the curve is much higher at those stock sizes. You can see this if you go to the bottom figure, where you look at the log recruitment for spawning stock, and you see that bevy of points there that are considerably below where you would have predicted it off the stock-recruitment curve.

My only point in raising this issue is I don't want -- I would feel very badly, and I think it would be not helpful to the council, if we locked them into a ten-year rebuilding horizon because we have not parameterized, or not cautioned, about that -- We have not taken account of this underestimation of recruitment compared to what the stock-recruitment says.

They will be locked in then, based on what Chip told us, to rebuild the stock in ten years, where in fact the recruitments that will be realized may not be possible to do that, and that is the only reason I'm trying to get a way of trying to get a measure on that uncertainty, because, if we just go ahead with what we have, under an F equals zero, it's possible, and the recruitment assumptions that have gone in from the stock-recruitment curve say that it is possible to rebuild in ten years, and I think the council's hands will be locked into place, and that would not be a good thing, from our point of view, if there's not going to be a high probability of getting that recruitment. Thank you.

DR. NESSLAGE: Thank you. Okay. We have brainstormed a couple of these bullet points. What I am aiming at here is to break at 12:30, after this brainstorming, and do a half-hour lunch and come back for our breakout groups at 1:00 and then reconvene as a group around 1:30, just so you know what I am thinking, and so maybe we could scroll down a little and take a look at some of these other questions, just to see what folks have. We'll let the breakout -- We may need to -- We can go through the P* , or the breakout group can go through the P* decision tree, but I would love to get some brainstorming on the potential reasons for change in stock status.

We talked about recruitment scenario quite a bit, and so let's table that one for the moment, and hopefully that breakout group can capture some of what's been discussed, but also monitoring the stock and research recommendations, and what do folks think? I will open the floor here for anything you want to throw up on the board. Jeff.

DR. BUCKEL: I agree with Fred's concern about this lower-than-expected recruitment, and so that would be a research recommendation to check into, and I was looking at the MRIP live releases inland, and so, for folks that don't know, these are gag, and the young of the year are in the estuaries, in seagrass beds, and then, in the fall, they emigrate to the ocean. During that time, they are large enough to be caught by hook-and-line, and so you do see a decline in those inland live releases of gag, and so that may point to some areas for research into where is the bottleneck, I guess, because, if we're going to expect this in the future, to Fred's point about what should be used in the projections.

They do require SAV beds, and that's one of the -- When they first come in, they spend several months in SAV beds, and those have been in decline in the South Atlantic, and so maybe part of the bottleneck -- Obviously, spawning stock biomass is low too, but the habitat may be something to keep an eye on.

DR. NESSLAGE: Thanks, and do you think that would apply above as well, for the potential reasons for change in stock status, this continued low recruitment, and is that what folks are saying, too? Am I characterizing that right?

DR. BUCKEL: Yes, I would agree with that.

DR. NESSLAGE: So maybe it can go a little in both places. Great. Thanks, Jeff. Wilson.

DR. LANEY: So Jeff beat me to the punch, and I was going to say something similar, and we did spend a lot of time talking about this particular point during the assessment, and one of the things that was uncertain, and, Kevin, chime in if you think that I misspeak here, is that the data on those live releases from the estuarine areas was not very robust. If I'm remembering correctly, we had pretty small sample sizes, but I am in total agreement with Jeff with respect to the habitat issue.

In terms of SAV decline, which has certainly been documented in North Carolina, and there's a pretty tight connection, we think, between juvenile gag and SAV beds, but the interesting thing is that gag range, obviously, throughout the whole South Atlantic, and so, in South Carolina and Georgia, and you colleagues from those states also give me a reality check too, but there isn't hardly any SAV. Oyster beds, in some respects, may take the place of SAV, as far as three-dimensional structure and habitats in estuaries go, and so it would be another interesting thing to do, would be to look at whether or not we can look at live releases from the estuaries by state,

since we don't have much, if any, SAV in South Carolina and Georgia, and we have a tremendous amount, even with the estimated recent declines, in North Carolina and Florida.

I would certainly agree with Jeff's comment and think that those are definitely productive areas for additional research, not only with respect to trying to document the live releases, but also to look at the habitat relationship between SAV, but also possibly with respect to oyster bars in South Carolina and Georgia, and I see George has got his hand raised, and so hopefully he can add to this discussion.

DR. NESSLAGE: Chip, I think I heard Wilson say something about maybe taking a peek at the live release by state estimates too, to try and inform that, and I don't know if everyone is in agreement, but let's hear from George.

DR. SEDBERRY: Wilson is right that sub-tidal oyster reefs and oyster bars are the important habitat for juvenile gag in South Carolina and Georgia, and, of course, those oysters are subject to harvest as well, and so we may be losing habitat for gag due to harvest and due to general degradation of estuarine habitats. At one time, the MARMAP program, and other programs, monitored juvenile gag ingress post-larvae through neuston net sampling off of bridges and with habitat traps placed in seagrass or oyster reefs, and it might be worthwhile going back and looking at those data and seeing if there was a good pre-recruit index, or recruitment index, developed from that sampling, and maybe revive it, if it looks like it would be worthwhile.

DR. NESSLAGE: Great. Thank you, George. I feel like some of these ideas could also be placed under the metrics section, and so, those of you who are in the metrics section, you can peek at these as well. Chip has been putting these, just brainstorming, under the research recommendations that are in the assessment, but, for those of you who are in this breakout group, we will probably want to move some of these down to our recommendations, but you'll also want to take a look at what's been provided in the assessment and then comment on those, because I don't believe we've seen a summary of that today, and so go ahead, Fred Scharf.

DR. SCHARF: Genny, I just wanted to -- Kevin mentioned it in his presentation, in his summary, related to some research recommendations, a little bit related to the reproductive -- Aspects of reproductive potential, and so related to age-at-maturity and size at sex transition, whether that's really time-invariant, as well as female spawning frequency that may affect age-related egg production, and so some of those areas, given the protogynous life history, are going to be important to quantify, moving forward.

DR. NESSLAGE: Excellent.

DR. COLLIER: Where did you want those put, Fred?

DR. SCHARF: I was just thinking right under where you had been working, because those are ones that were sort of included in the presentation, and so just kind of reiterating those, that they would reduce risk and uncertainty, given the life history of the species.

DR. NESSLAGE: Absolutely. Staff just informed me, because I am not up to date on this, that descending devices are required to be onboard, but their use is not required, and so I'm wondering if we want to follow-up on the public comment about discard mortality and descending devices

and make that part of the monitoring as well as research recommendations. If folks feel differently though, please speak up. I feel like that's going to be an important component for many of these species going forward.

While Chip is typing, I will say that the breakout group who has the fishing level recommendations, and it looks like, Fred Scharf, you're the rapporteur for that group, and it's also Yan and Scott and Dustin, and I might join you on that group, but, also, I think we need to think about a couple of things, not only our decision tree, but also these issues that have been brought up about F rebuild and what we might need to make our recommendations, and so think about that as you guys are discussing. Are there other thoughts or other comments? Chip, if you could just throw -- You're already on it, I think.

DR. COLLIER: No, I'm not. Tell me what to do.

DR. NESSLAGE: I had suggested that monitoring include use of descending devices. Just put it in both places. It's hard to say whether someone would call certain things monitoring versus research, and it would depend on how it got funded, I feel like. Before we break, the one thing I would like to hear -- We heard a lot from Fred Serchuk about recruitment concerns, and a couple of other folks have chimed in, but how does the rest of the group feel? If you haven't spoken on this issue, I would love to hear your thoughts, because this is obviously becoming a big issue for several stocks. Wilson, go ahead.

DR. LANEY: Well, I agree, Madam Chair, with you that clearly recruitment is something that is very critical, and we've had that discussion in all three of the assessments that we've reviewed during this meeting, and I agree with Fred Serchuk. What I'm wondering is, is there some sort of a generic formula that we could come up with that would give us some sort of a consistent or better approach to what sort of a recruitment level we use in projections?

I mean, we've noted, in this case, that we have the 2016 and 2019 year classes that do seem to be up a bit from the last ten years, but, on the other hand, as Fred noted, the overall recruitment has been low for the last ten years, and then we have the red snapper case, which appears to be somewhat different, and so I know these things are case-by-case, and you do have to look at each species and the stock trajectory for each and whether you have a stock-recruit relationship and all those sorts of things, but I was just wondering if anybody thought there was any sort of persistent methodology that could be applied to help us get past these issues, and maybe we need a recruit - - What would we call it? Some sort of a projected recruit control rule of some sort, and I don't know, and what do the rest of you think?

DR. NESSLAGE: Well, I hear you there, and consistency is probably something we need to be careful about, absolutely. Let's hear from Amy.

DR. SCHUELLER: I wanted some time to think, because that's exactly what I have been thinking about, is you have to take this to the council and explain why we're doing what we're doing in each of these different projections, and so recruitment is already an incredibly uncertain thing, and fitting a stock-recruitment curve is like super difficult, and it's something that clearly we spend tons of time on, as assessment folks across the world, and so I don't know.

What I've been doing is looking at the stock-recruitment curves across the three species, although there isn't really one for red snapper, because it's using a median or a mean and then estimating deviations from there, and so I feel like that one is sort of in its own class, and so I guess I'm going to leave that one out of the discussion here.

I was looking at I think it's Figure 27 in both of the assessment reports for tilefish and for -- It's Figure 20 in tilefish and Figure 27 for gag. If you look at the tilefish figure, there's no points that are clearly below the line, and so, if you're looking at Figure 20, at the bottom panel, there's sort of this spawning stock size and gonad weight versus the log of the recruits over the spawner, and there's just a distributional on that sort of fitted line, and it's not -- I don't know, and I don't have too much concern about that particular curve, but, when you look at the Figure 27 for gag, if you look at that same panel, lower panel, as Fred has pointed out, all of those points are below the line, and it just has a different appearance.

I was thinking that those comparisons of those figures might help to explain any decisions that we end up making or not in this case, and maybe that is some sort of thread to start thinking about this a little bit more holistically across species, and that's just my two-cents, I guess, rambling two-cents, based on trying to figure out what I think is the way to go here on this.

DR. NESSLAGE: If I were to summarize, and let me just try, and correct me if I'm wrong, with gag and tilefish, recent recruitment has been below the stock-recruitment curve, but snapper has been above. Well, we don't have a stock-recruitment curve for snapper, and so that's its own thing, but, at least for those two, and I believe -- Was that the case for red porgy, too? That was the last one where we had to make a decision like this, and maybe someone can take a look, really quick.

DR. SCHUELLER: Not to cut you off, Genny, but, Chip, can you show Figure 20 for tilefish? I don't necessarily think that tilefish recruitment was below the stock-recruitment curve, and that's what I am trying to say. If you look at Figure 20, it doesn't look the same as Figure 27 for gag, and I'm leaving red snapper out of this completely, because it's not using a stock-recruitment curve, and so it's not the same discussion, in my opinion, and so they just look different.

DR. NESSLAGE: Right, and so correction. Gag recent recruitment is below the curve. In tilefish, it is not largely grouped below the curve, hence -- That's what you're trying to point out, correct?

DR. SCHUELLER: Yes, that's what I'm trying to point out. I think, hence, it leads you to one thing, logically, with the recruitment projections than it does for gag, potentially, and so, if you scroll down a little bit, this is what I'm talking about. That looks not too bad, but then, when you look at the gag one, over Figure 27, then all of those points on that left-hand side are noticeably away from that line.

Now, I guess we could have some major discussions about what do we think the uncertainty bounds looks like around this line, and stuff like that too should probably play into this, but I am clearly eyeballing this on a thought process that is still developing, but it's just something I am noticing here between these two stocks that might help us in the future explain this to the council, but also make our own decisions about what we should do with projections.

DR. NESSLAGE: Excellent suggestion. Thank you. What do the rest of you think, if you haven't spoken on recruitment yet? Alexei.

DR. SHAROV: We're focusing on an interpretation of the effect of the position of a few data points on the stock-recruitment relationship, and we're trying to find a logical explanation to why a number of them happen to be below the fitted line, but, unfortunately, we have to make a decision whether the -- If we're agreeing with the concept of the stock-recruitment relationship being fitted to all data, and they cumulatively are our best representation of what the stock-recruitment relationship is, then, obviously, depending on what we have, the overall ends up with not all of the ranges of recruitment being evenly distributed up and down, or below and above, the fitted curve. I mean, it seems to be obvious, right?

There is a natural variability, and there is an effect of the points for -- In this case, we have a group of the points that are estimated for the low SSB and then a number of points on the high level of SSB, and they define the overall curvature, and so we're fighting between -- We are looking at the local effect, or local observation, versus the overall stock-recruitment relationship.

Considering the uncertainty overall, the uncertainty for the stock relationship for every species, we should either accept this and then use the estimated stock-recruitment relationship and its uncertainty as our best available information, and, in that case, the fact that a number of data points happen to be below the fitted line, it's not necessarily an underestimation, right?

DR. NESSLAGE: Yes, I hear you, and so you're arguing that some of what we're seeing is likely natural variability.

DR. SHAROV: I'm saying it is what it is. Right. It is what it is. Then, if you keep in mind, in the back of your mind, that you change M just a little bit, as was done here, and you re-estimate the steepness, you have a totally different stock-recruitment -- Or we have a very different slope, which brings way more uncertainty in the overall consideration of the stock-recruitment compared to just the location of those few data points. I think that is a much more strong level of uncertainty that comes from that information.

DR. NESSLAGE: Good point, Alexei. I see you, Fred, but you've had quite a bit to say on this, and I would love to hear from a few other folks first, and so let's go to Anne.

MS. LANGE: I share Fred's concerns about the most recent time period, and the recruitment is low, and I think it's worth doing a run with an average from the last ten years, or some more recent time period, just to get an idea of what kind of scale we're talking about, in case this most recent thing is a pattern that's going to continue. To ignore the fact that the recent years have low recruitment -- I think we need to look into it more.

DR. NESSLAGE: Okay. With the exception of perhaps Alexei, does anyone disagree that we should at least explore this option? I will ask it that way. Alexei, are you going to agree or disagree?

DR. SHAROV: I do not disagree that we should explore the options, and certainly, as a what-if scenario, that's totally fine and logical. If this is the real thing, and that reduced level of recruitment will continue, here is what it is going to be, and I'm totally fine, and, actually, I always want to do

things like that, because that gives you an understanding as to what range of uncertainty in the future you're looking at, in terms of rebuilding the stock. That's helpful, for sure.

What's not helpful is that that doesn't mean that we can actually truly predict what is going to happen, and we'll just have a range, and then we'll have to -- We or the council will have to make a single choice, and it will be based on a number of risk elements, et cetera, of whatever is more important, but I am not against it. Thank you.

DR. NESSLAGE: Thank you. Let's go to Fred Serchuk, and then, unless others have comments, we'll split for lunch. Go ahead, Fred.

DR. SERCHUK: Thank you, Chair. Can we put up Figure 14 for a second? That's the actual recruitment series. I am looking at page 76.

DR. NESSLAGE: Do you know what PDF page that is, Fred?

DR. SERCHUK: I don't have it in front of me, Chair.

DR. CROSSON: It's 114.

DR. NESSLAGE: Thank you.

DR. SERCHUK: If this figure was a return on your capital and your investments, during the last ten years, I think you would be concerned that whatever fund you had, which was providing annual income to you, you might be thinking about switching out of your fund. That is because not only do the points decline, but we've seen the lowest points in the entire time series in the last ten years, and so, while there is some indication that, most recently, things might have improved, my feeling is this would give us cause for concern.

All I'm asking is what Anne suggested, is we take a look at using the average recruitment over the last ten years and see how much of a difference it makes in the projections if, for this pattern of having lower-than-average recruitment, particularly when we have some indication, from the retrospective analyses, that the most recent values of recruitment tend to be overestimated, rather than underestimated, and I think it would be helpful just to use the average recruitment of the last ten years and see how much of a difference it makes. I am not suggesting that we even -- The committee then can decide how we should move forward, and that's all. Thank you.

DR. NESSLAGE: Thank you. All right. Thank you for bearing with me. We went even longer than I thought, again, and I apologize. Let's take a half-hour break, and let's meet back with your breakout groups at 1:15, and so you get a little bit more than a half-hour, and then we will reconvene at 1:45 and try to finalize our recommendations. Does that hopefully work for everyone? We will see each other in our groups back at 1:15. Thank you all very much, especially Kevin for the great presentation this morning, and we'll see you again soon. Thanks.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Thank you, all, for your participation in the breakout groups, and I hope they were productive, and I know that our group was. I don't know, Chip, if you've had a chance to

collate stuff as it's been coming in, but I think we'll need to take a look at what folks have suggested as strawman recommendations here.

DR. COLLIER: All right. If you give me just a couple of minutes to pull those together, if there's anything else that you want to go over or talk about while I'm pulling that all together for you, any slides that need to be brought up that were of interest to the group.

DR. NESSLAGE: Did any of the groups have specific requests of things they would like to see while all that's being collated?

DR. SERCHUK: Can I make a suggestion, Genny?

DR. NESSLAGE: Of course, Fred.

DR. SERCHUK: I know this sounds trivial, but I didn't see a table in the assessment that gives the removals by age, total removals by age, or total catch by age. That's generally, I thought, a standard table, and we have that in the red snapper, in Table 23, but I didn't see it in the gag report. They have the age compositions, but I just wondered why, and was it just an omission? It certainly must be produced by the BAM model.

DR. NESSLAGE: For sure, yes. Kevin, is that something that you could spit out for us and share at some point, or I don't know if you're allowed to do corrected reports, and that's a bit of a bear.

DR. CRAIG: It wouldn't be a problem to do that, and then we could just add it as an addendum to the report or something. Let me make sure if I understand what Fred is asking for, and so you're asking for the total removals?

DR. SERCHUK: At age, and it's similar to Table 23. It just gives you some idea whether there have been some significant shifts in the total age composition of the catches across years, and that's all.

DR. CRAIG: So total removals by age across years.

DR. SERCHUK: Yes, for all the years included in the assessment.

DR. CRAIG: Okay.

DR. SERCHUK: I'm sure it's a standard table that you could download from your package.

DR. CRAIG: Yes, and so I'll make a note of that.

DR. NESSLAGE: Thank you. Then, depending on -- Just a heads-up for everybody, but, depending on how this goes, if folks want to see alternate projections, in order to set the OFL and ABC, then we wouldn't finalize those at this meeting, and we might need to revisit -- It sounds like we're going to have another meeting sooner than later, and so that's hopefully not too much of a disappointment for you all, not having another meeting, and I love chatting with you all, but as in we might not make the final numbers decision today.

DR. COLLIER: I am on to the last one, and so I'm very close. Sorry for my delay.

DR. NESSLAGE: Don't apologize. We're putting you on the spot to do something real fast, but we appreciate it. Everybody can breathe for a second.

DR. COLLIER: All right. I think I have everything in there, and I forgot to copy who sent it, but it was identify and summarize the uncertainties.

DR. NESSLAGE: I think your screen is locked.

DR. COLLIER: Sorry about that.

DR. NESSLAGE: Thank you. Sorry. Go ahead. You were saying?

DR. COLLIER: I was just going to look up who was in charge of the uncertainties group, but I'm sure they can chime in.

DR. NESSLAGE: I think this was Wally. Was this you?

DR. BUBLEY: You are correct. It was me.

DR. NESSLAGE: Why don't you take it away and give us a little summary, please?

DR. BUBLEY: All right. Basically, we were just trying to wordsmith, and we didn't add a lot more to what we had in there already, but we had put a portion in about the status of the stock being robust to the natural mortality, but the steepness being re-estimated within the varying model runs caused a result that was unexpected, based on previous changes in M, and so, I mean, the language is there. If anyone has any harsh feelings about it, or wants some adjustments, let me know, but we're trying to capture the gist of what we were getting there.

We had that, and we had the recruitment being low over the last ten years of the assessment, and essentially what that meant, and then we also had mentioned the sharp drop in the estimated number of discards from the private rec and headboat sectors, though the recruitment levels have been low for a longer period of time. Then we discussed the total spawning stock biomass being used, instead of the female spawning stock biomass being used, and the potential implications.

DR. NESSLAGE: Excellent. Is there more below? There is.

DR. BUBLEY: Yes, and Fred has a question, and I don't know if it was to anything up on that top portion, if we wanted to --

DR. NESSLAGE: Do you want to take it piecemeal? Fred, was it to the top section?

DR. SCHARF: Yes, it was, and it was just a clarifying point. I thought the retrospective analysis maybe was underestimating recruitment, potentially, in the recent years, right, and didn't it go up a little bit when you took away some of those years near the terminal year? Maybe Kevin could speak to that, but I thought the retrospective --

DR. CRAIG: That's right, and so, when you peel back those years, the recruitment estimates actually increase, which suggests maybe we're underestimating recruitment in the current base model.

DR. SCHARF: Okay, and so we'll have to adjust that text then.

DR. CRAIG: I guess one other just quick comment, and was there a statement about protogynous stocks and other SEDAR assessments? I might check that last bullet, because I think -- My understanding is that, for most of the protogynous stocks, we use total male, mature male, and female biomass.

DR. NESSLAGE: So the combined?

DR. CRAIG: Yes.

DR. NESSLAGE: Okay.

DR. CRAIG: There may be an exception to that, and I would have to check, but I think, for most of the protogynous stocks, we use total mature male and female biomass.

DR. NESSLAGE: But I think we're probably -- Wally, correct me if I'm wrong, but we're probably safe to say that there is still significant uncertainty regarding how to handle protogyny and whether it's handled well in this style of modeling, or this configuration of the model, right, and I think that's what you guys are getting at anyway.

DR. SCHARF: Right, and, I mean, especially this one, because the male ratio was so low for gag, compared to any of these other protogynous species that we've had. I mean, I can't remember many of them being lower than 15 or 20 percent, and I think gag has been around 5 or 8 percent, something like that, and so I think that is one of the biggest issues.

DR. BUBLEY: I would agree with that statement, Genny.

DR. NESSLAGE: Cool. Can we just add a little -- Just for my sake, when I'm going to draft up the report, and can you just add something about just general uncertainty in modeling protogynous species? Thank you. Fred Serchuk.

DR. SERCHUK: I think we have to get this underestimation, or overestimation, of recruitment clarified. When you start peeling off years, we're getting -- Well, let me begin again. Typically, the most recent assessment has the most information in it, because it has another year of information, and the terminal estimates in previous years are the most uncertain, and so, if you have another year of data in your assessment, that uncertainty lessens, and so, when you see a retrospective pattern with a peel indicates higher numbers, then the terminal estimates in the most recent year -- Typically, that means that you have overestimated recruitment in earlier years, in earlier assessments. Am I correct in that?

DR. NESSLAGE: Can we pull up the retrospective and zoom-in on that R graph, please? I think I have it as Slide 78 of Kevin's presentation, and I think this is what you're talking about, right?

DR. SERCHUK: Yes. Let's go to the recruitment.

DR. NESSLAGE: It's a little hard to see, but --

DR. SERCHUK: Generally, if the earlier peels -- If the blue dot is higher, the purpose dot is higher, the pink dot is higher, than the most recent estimates, I usually thought that meant that recruitment has a tendency to be overestimated, if that's consistent. Normally, as you go back, you see a great concurrence in earlier data, but we need to -- I think, among ourselves, we need to finalize what it means. If I'm wrong, fine, then I will admit it, but my understanding was, when the peels indicate higher recruitment in the peels, it means that they have been overestimated relative to the most recent assessment.

DR. SHAROV: Yes, that's correct, and that's what we see.

DR. NESSLAGE: What is the wording? Now I'm getting confused. What is actually said? Sorry to make you jump back and forth, Chip.

DR. SERCHUK: The wording is correct as it is in the first sentence, but I just thought we had a comment that it was the other way around, and maybe I misunderstood. I'm sorry if that's the case, Chair.

DR. NESSLAGE: No, not at all. We would have to go back and look, but recruitment may be overestimated, right, because -- Something along those lines. I'm wordsmithing now, but, yes, you're right. Okay. Are there other concerns with this section? Thank you for catching that. If not, Wally, do you want to give us a run-through of the next section down there?

DR. BUBLEY: Sure. We felt the need just to put in -- This first bullet just kind of applied to all of the uncertainties, and it's essentially saying, considering the outcomes from the sensitivity runs, the assessment uncertainties are unlikely to affect the status of the stock, but it could potentially play a role in fishing level recommendations and future yield predictions, and so we felt that was a review kind of everything that we looked at, and then we essentially just kind of reiterated the portion about the recruitment level and the changes in M and how they affected steepness, and so it's kind of redundant from the section above.

DR. NESSLAGE: That's fine. What does make sure the productivity metrics are within reasonable bounds mean?

DR. COLLIER: That was my interpretation of -- I can't remember who had said it, but there was some concern -- Actually, it was Fred Scharf that had mentioned it, that, because of the changes in M , there were different changes in the steepness parameter, and he just said to check to make sure that those productivity metrics are within reasonable bounds when you're changing these M values. Do I need to clarify that a bit?

DR. NESSLAGE: I guess, if we don't think steepness is in a reasonable place, we need to say so, and, if not, I think -- Maybe I'm misunderstanding, Fred, but I think we should take it out, because I'm not sure -- I'm not sure what I would do with that in the report. Fred, do you want to -- Was this you, Fred Scharf?

DR. SCHARF: Yes, it's me, and maybe I'm alone, but it struck me as odd that, when we raise natural mortality, and it was scaled to an M of 0.25, that our F actually increased considerably, which is not typical.

When we normally raise M , F goes down, and so Kevin explained that as because the productivity measures, steepness being one of them, are being estimated internally in the model, and they are responding to the input of M that was going into the model, and it -- Again, the fact that it caused F to go up from a ratio of about two to about three-and-a-half was unexpected, and I'm not sure what's driving the model to do that. Maybe, in that run, the metrics are not reasonable, but I don't know. I'm not sure what -- I'm not really sure how productivity can change that much, to cause the F to almost double when you raise M . I would defer to some of the folks in the Center that are more familiar with how the BAM model works.

DR. NESSLAGE: Well, no one is jumping to rescue us, and so I guess what I'm having a hard time with is the wording there, but I think I get what you're saying, and so I'm good, and so not to belabor the point, and I think I can help flesh that out, and I might look to you, Fred, to help me when I write that section a little bit too, because you're saying it very well, but we're good. Thank you. I think I understand. Since your mic is on, would you like to walk us through the next section, since you were our fearless leader for this?

DR. SCHARF: For providing the fishing level recommendations, yes, and I think we could go down, below the P^* , first, just to answer the questions that we had, which were the last assessment indicated that the stock was close to the management thresholds, and the question was has the stock condition improved, and comment on any reasons for the change in status, and so the answer to that is, no, the stock has not improved, and the stock condition has worsened.

Then we just listed some possible contributing factors, and so continued low recruitment during the last decade, continued decline in the indices of abundance, both the headboat and the video index, and then there's been at least a broad peak in discard mortality over the past two decades or so, and so those were just kind of broad-level, high-level, sorts of factors that likely contributed to the worse condition of the stock.

Then below that was just a question about the recruitment scenario to project future fishing level recommendations and whether those recommendations should be based on the recent low recruitment, and we spent time talking about the consistency in the application of an approach that the SSC needs to take regarding recent recruitment trends, and so we talked a little bit about maybe looking at some of the other fisheries, to see a signal-to-noise ratio and the duration of those recent recruitment periods that would help maybe inform an approach.

We kind of talked about that maybe as a research recommendation, and so we didn't type it here, Chip, for that reason, because we were kind of thinking about it more in terms of a research recommendation, but just to guide the SSC going forward, but, for this particular assessment, we said, yes, we should use the recent low recruitment, mainly because it's been consistently low for ten consecutive years, and it represents the lowest recruitment levels in the time series, and there is no indication of high-recruitment events within this period of time.

That contrasted a little bit with what we were seeing with red snapper earlier, or last week, where you saw a lot of high-recruitment events, but there were some very low ones mixed in, and we

don't see that here at all. We see consistently low recruitment, and it was for a long period of time, for ten straight years. Then I think, below that, we may have had some -- I don't know if we added any comments, and we just left the ones that were there, in terms of natural variability and the estimates and the stock-recruit curve and the time period of low recruitment that was already in there, and so we didn't really change that.

If you come back to the P^* up above, the assessment tier was zero percent, and it was at the top of the tier, in terms of the information, and the uncertainty tier was two-and-a-half, which was Number 2 in there. The stock status tier was seven-and-a-half, because it was both overfished and overfishing was occurring, and we left the PSA tier at 10 percent, in terms of high risk, because of susceptibility in the fishery, and it's a shallow-water grouper species that was highly accessible, but also still prone to discard mortality.

Then, in terms of some of the productivity risk, it was related to some uncertainties in the reproductive -- Aspects of the reproductive biology that impact productivity, in terms of sex ratios, timing of maturity, egg production, et cetera, and so we left the PSA tier at 10 percent, and so the total adjustment would be 20 percent. Then I forget exactly how that equates to a P^* , and so we didn't get to type that last piece in.

DR. NESSLAGE: Right, and I think we need to kind of clarify a little bit what we need to do here, and I'm looking to Chip. He has his hand raised. Thank you though, Fred. It's greatly appreciated.

DR. COLLIER: It's just simply fifty minus the value that you guys come up with will be the P^* , and then we'll build a P rebuild from there as well. The one thing that I did want to comment on was the assessment tier. Typically, if it's not including environmental factors, it is only a -- It would be a Number 2 in the assessment tier, and it wouldn't be a Number 1, because it's not accounting --

DR. NESSLAGE: I think you're thinking of Tier 2.

DR. COLLIER: Sorry. No, this would be a zero. Never mind. Brain fart.

DR. NESSLAGE: No worries. Then the recommended P rebuild, if you go through our decision tree, becomes fifty plus twenty, right, and so seventy?

DR. COLLIER: Correct.

DR. NESSLAGE: Sweet. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. Our discussions, in terms of whether the projected stock sizes and projected fishing mortalities and projected recruitment now match up with what had been forecasted in the previous assessments. I would suggest that we make this a term of reference in all assessments, to ask the analysts to compare their projections from the previous assessment, with respect to stock status, stock size, recruitment, and fishing mortality, to what has been observed for those projection years in the current assessment. I think that would help us parameterize uncertainty a little bit better, and so I'm just offering that as a suggestion for a TOR. Thank you.

DR. NESSLAGE: I am making a note, mental note, and writing this down, but, also, when we go to review our next set of TORs, let's collectively remember. Thank you. Are there other comments on this section, or shall we keep plugging along and trying to stay on track here? No hands. Okay. Let's keep scrolling. Now the hands are coming in. I am going to guess Fred Scharf, just because Fred Serchuk just talked, but I could be wrong. Fred Serchuk back again. Go for it. Hand not up? While staff are trying to figure out Fred, let's go to Anne.

DR. SERCHUK: My hand was up, but I should have lowered it. Thank you, Chair.

DR. NESSLAGE: My apologies. Anne, please go ahead.

MS. LANGE: I'm just wondering. On the P*, is it 30 percent, and then it's 50 plus 30, or is it 100 minus 30? What is the P rebuild?

DR. NESSLAGE: 50 plus the adjustment.

MS. LANGE: Okay, and so where does the 50 minus 20 come in?

DR. NESSLAGE: That's the P*.

MS. LANGE: Okay. Gotcha. All right.

DR. NESSLAGE: Can you put equal signs in there, just to make sure that people aren't confused? Sorry, Chip. Amy, go ahead.

DR. SCHUELLER: Before I say what I'm going to say, are we just going through all of these bullets first and then coming back and commenting on them, or are we just commenting on this section right now?

DR. NESSLAGE: We're not going to have time to revisit this later today, and so go for it.

DR. SCHUELLER: Okay. I just don't want to speak out of turn or anything. Anyway, I was going to say that I agree with the, yes, consistency of low recruitment estimates for ten consecutive years, and that we would like projections for that, and I was going to suggest that, as much as we love workgroups, that maybe we need one to have a more holistic viewpoint on how to deal with recruitment in projections, given that this has come up for gag, tilefish, red snapper, red porgy, black sea bass, and red grouper, and some of them have stock-recruitment curves and some don't.

I just went, through lunch, and looked at gag, tilefish, red porgy, black sea bass, and red grouper, and, based on my eye, which is not how you should do things, I might sort them a bit differently if I had looked at them as a group instead of individually, and that's my recommendation. We probably should look at this recruitment projection topic as a more holistic workgroup across species.

DR. NESSLAGE: That is not a bad recommendation, Amy, and I'm guessing the council would probably support that right now, because they're a little confused about our decisions as well, and so, unless I hear any screams of protest, perhaps folks can think a little bit about who might like to serve on that, but, if anyone disagrees that we should be doing this -- I feel like we'll need some

Center representation as well, just to kind of help us -- To make sure we understand exactly what was done with those assessments, and so think about that a little bit as well. Are there other comments on this section? I am not seeing any, and let's keep going, please. Monitoring. Who was in charge of monitoring? Jie.

DR. CAO: It's me, and so our section is relatively straightforward. The first bullet point is basically just what we have done for other species, and so we should regularly update the current sources of data, landings, discards, and abundance indices and length and age composition. Also, we talked about the -- We think it's important to monitor the discard mortality, basically the use of descending devices, and we also talked about the potential to develop a recruitment index, but we think it might be more realistic to put it under research recommendations, but we're not sure about that, and we will like the group to decide where it goes.

DR. NESSLAGE: Or it could go in both.

DR. CAO: Yes, and that's a good idea, Genny.

DR. NESSLAGE: Some of these are like monitoring implies a long-term consistent thing, and some might be a shorter-term study, right, and so whatever is doable, and I think this stock would benefit from both, probably. Great. Thanks. Do folks have other things they would like to add, or do you disagree with anything that's on the screen? Thank you, Jie. All right. Not seeing anything, let's move on to research recommendations. The first bullet is usually do we agree with what they said in there, and, if so, is there something that we want to highlight. George, would you like to walk us through this?

DR. SEDBERRY: Okay. This looks a little different from what I sent Chip, but maybe he's done some editing to it, and I'm not sure what happened, but, anyway, there were four research recommendations in the report that we agreed with, and the only one that's listed there is the protogynous reproductive strategy incorporated into the model with time-varying maturity. I don't know why that's the only one listed there now, but it is.

The other ones are in the report, as I mentioned, and they had to do with the need for continued and increased age sampling, and I mentioned the bridge net monitoring of post-larval ingress as a recruitment index, and then the utility of the SERFS video index for future assessments could be improved, if length information of the observed fish were included. There we are. Those were already included in the report.

Then, moving on down to that first green bullet there, this is what came out of our public comment, looking at discard mortality in light of use of descender devices, and so there's a research need to determine compliance rates, the effectiveness of reducing mortality, and, for the projections in the future assessments, the projections might require a lower discard mortality, if they can be determined from this research.

We have observed lower-than-expected recruitment, and there's also been a decline in inshore and coastal live releases of gag and to research and look at a bottleneck in the population, and this might be occurring in submerged aquatic vegetation beds that are important for juvenile fish in North Carolina and Florida, and then oyster reefs and oyster bars as well are important in North Carolina, South Carolina, and Georgia.

There is ways to sample and monitor recruitment to oyster reefs by setting out oyster trays, and this had been done in the past as a monitoring program done by MARMAP, but, since that time, there's been a lot of -- Tray culture of oysters has been implemented in the Carolinas and Georgia, and perhaps in Florida, and monitoring those culture trays, those oyster culture trays, might provide an index of recruitment of juveniles to oyster reefs and oyster bars that could give some indication of recruitment.

Witham collectors, likewise, kind of collect the stage between the bridge net sampling and the oyster trays, and these, again, have been used in the past, and it might be worth looking at that again, along with the bridge nets and channel nets, and these are nets that are set across tidal creek channels, and, historically, it was a shrimp fishery in the fall to catch shrimp as they migrate offshore, and juvenile gag would be caught in those channel nets as well. That fishery is kind of defunct, I think, but it would be used as a fishery-independent index by setting up channel net sampling in all those states to monitor egress of juvenile gag as they move offshore. There is existing data on all those estuarine sampling devices that we might want to look at and see what shows the most promise as an index and conduct further research on that gear.

We have mentioned sperm limitation several times, because of the skewed sex ratio, but we don't really know how to measure that, and we might be able to do some egg sampling, to look at percent fertilization rates in the spawning locations offshore, and that would be kind of a needle in a haystack kind of thing, but it might be possible someday, particularly with environmental DNA sampling.

We need to continue monitoring of sex ratio over time, to make sure that there's enough males. Chevron trap catches that have been used in the assessment are dominated by age-one to three, and so they might also provide a recruitment index of juveniles that could be used to monitor recruitment.

As Fred Serchuk has mentioned several times, it would be good to look at how well the recruitment estimates and the projections in these assessments work out, looking at empirical data from years subsequent to the assessment, and we predict recruitment, or we project recruitment, and then, five years from now, when we do another assessment, how well did those projections work?

As has been mentioned before, genetic analysis of gut contents of gag and its predators would help us understand natural mortality and gag's role in the food chain. We need probably to look at discard rates of undersized gag in the estuary and coastal waters as an index of recruitment, or we might see how discard rates of undersized gag relate to recruitment over time, and then I think we mentioned this also for red snapper and other species, but egg viability with age. Are young fish eggs -- The first couple of times fish spawn, are their eggs as viable as middle-aged fish, and, likewise, is there senility? Does senility set in at some point? Are very old fish, even though they're capable of producing a large number of eggs, are those eggs viable, and so that's another research question, and I believe that's it.

DR. NESSLAGE: Excellent. Thank you, George.

DR. SEDBERRY: Okay.

DR. NESSLAGE: It's greatly appreciated. Do folks have anything to add or anything that they disagree with that they would like to subtract from what has been said, or modified in some way? It's a very thorough list. No hands. You guys did a fabulous job. Chris Dumas, go ahead.

DR. DUMAS: I've just got a quick question about the recruitment and the stock-recruit relationship on the presentation, and so, on the presentation slides, Slide Number 45, which is the recruitment, the BAM base run recruitment, all the points over on the far left, when we were -- I guess we're assuming that the fishery is in, I guess, equilibrium or something, and are the recruitments at the same level, and we're assuming the stock size is high, and we include all those -- I think we're including all those points in the stock-recruit relationship estimation, and so go down two slides, to the BAM base run stock-recruitment relationship, and so Slide 47.

All those data points that are on the far left in the previous slide are now over on the far right, and all those points that are on the far right, that are right along the dotted line, that's where you've got the high spawning stock and all the recruitment, and that sort of grouping of points to the far right is really holding down, pinning down, that stock-recruitment relationship, and, in my opinion, I think those points would have a large influence on where the stock-recruitment curve lies. Do we want to give that much weight to those points from the far past that we're not really that sure about?

If I understand how the stock-recruitment relationship -- How that's developed, that's a lot of data points and a lot of weight that we're putting on the far-right end of that stock-recruitment relationship that's holding it down, and those are points that we're not really sure about, because they're from the past, and we don't have a lot of data from the past, and so one thing we might want to do is just estimate the stock-recruit relationship with those points gone, or maybe just using one of those points. Just give one data point where we think the fishery was in equilibrium back in the 1960s and 1970s. Just give one data point to that and then see what happens to the stock-recruitment relationship.

DR. NESSLAGE: Chris, are you talking empirically outside of the model, because this is done internally. You would have to redo the way you estimate the whole model would be done.

DR. DUMAS: If it's very difficult, maybe not, but are all those data points -- I mean, are there that many data points going into -- The model is fitting the stock-recruitment relationship to those data points, to those points, and there are a whole lot of data points on the far right that I assume we're really unsure about, and all those data points are pulling the stock-recruit relationship down to go through them, because there is so many of them in that one location. Do you see what I'm saying?

DR. NESSLAGE: Yes, we see exactly what you're talking -- Like I see exactly what you're talking about, but I'm just thinking about how BAM is structured, and I guess I would look to Kevin or Erik, or someone else who has their hands deep in the code, whether it would be -- I would have to think about how that would be restructured.

DR. DUMAS: Is it possible to leave those points out or just put one of those points from that group and allow the model to fit just one of the points from that group? That's all.

DR. NESSLAGE: That's all. He says, that's all. Erik, come to my rescue, please.

DR. WILLIAMS: Kyle will probably say the same thing, but those points are not being fit in the stock-recruit curve. They are actually set up by the -- It's sort of the other way around. The way to think of it is those points are determined by the stock-recruit curve as it's fit to those freely-estimated recruitment parameters.

DR. DUMAS: Okay. Great. Thanks.

DR. NESSLAGE: Excellent. Thank you. Okay. Do folks have any other questions or comments? I think one thing we still have to do is give Kevin some clear guidance on what we would like to see with regard to projections, and we also have -- Sorry. Chip highlighted that we need guidance on the next assessment. George, did your group tackle that, or did anyone tackle that?

DR. SEDBERRY: Sorry about that. I think I just fell down on the job there, and I didn't see that part of the assignment there.

DR. NESSLAGE: No worries. You guys were brainstorming like crazy. Does someone want to throw out a suggestion, George or someone else?

DR. SEDBERRY: The default is five years, and is there anything that we are proposing in our research and monitoring that might want to make us look at it sooner than that?

DR. NESSLAGE: If that's even possible, yes. Let's hear what Fred Serchuk has to say.

DR. SERCHUK: I would agree with the suggestion for five years. It really depends on what our final projection is going to be. If the projection indicates that a longer-term stock rebuilding program, more than ten years, is going to be the pragmatic way to go forward, then five years would seem to be fine, because we're going to be halfway there, but, if we don't recommend that scenario, and we recommend that -- Well, it seems like five years would be -- Under the current scenario, if you go with the assumed recruitment and no fishing mortality, you would have to put a rebuilding plan in, and you would probably have to -- That would have to be done probably in - - We would probably have to look at that in five years as well, and so I endorse the five-year timeline.

DR. NESSLAGE: Outstanding. Does anyone disagree with five years? Obviously, we can revise that, if we see something crazy in the projections or something else comes up, and I assume it would be operational, unless the Center has some idea of something fancy they want to try that's new. Okay. I am not seeing any hands raised, and so let's go back to projections. I want to make sure it's very clear what we're asking Kevin to tackle, and, Kevin, if we're not making any sense, please speak up, because we want to make sure everything is -- We want to make sure that we're making sense.

It sounds very much like folks would -- With regard to the recruitment assumptions, folks would like to see options that include the recent -- I would assume ten years, a ten-year average, as well as the stock-recruitment-based recruitment estimate, and is that an accurate -- What he's already done, as well as the ten-year average, recent average, recruitment as an alternate, which it seems like we're leaning towards. If that's the case, if no one has problems with that we, we need to think about what F scenarios we would like to --

DR. CRAIG: Can I ask a question about that, Genny?

DR. NESSLAGE: Yes. Go for it.

DR. CRAIG: Are you asking for the low-recruitment scenario to be the average of the last ten years of the assessment, which would be the average recruitment from 2010 to 2019, projected forward as a constant, or are you asking for like a recent recruitment scenario, where we would draw from a distribution of recruitment values that were observed over that ten-year period, if that makes sense, and they're slightly different. One is fixing the projected recruitment at a constant average value, that of the last ten years, and the other is projecting forward, assuming some distribution of recruitment values that have been observed over the previous ten years, which might be different from the average.

DR. NESSLAGE: Someone correct me if I'm wrong, but I believe, for instance, what we've been doing recently with -- What we asked for recently, at least, for snapper and grouper, was using the recent average, but I'm now thinking -- I'm starting to worry a little. If we're going to have a working group, do we want to wait to have you do this until after there is some general recommendations? Maybe Erik is going to speak to that or something else, and why don't we have Erik -- Folks, think about it, and, Erik, go ahead.

DR. WILLIAMS: Sorry to complicate it even further, but the difference between this one and other stock assessments is we have a stock-recruit curve that we're estimating, and so now you have to decide not just whether you're going to resample recruitment, but are you going to resample recruitment deviation, and so, in other words, are you still going to use the underlying stock-recruit curve, but then allow a sampling, say, of deviations, which is what we really are seeing in the recruitment deviations, is that they're below-average deviations, and so we would still -- Then, again, you then have to then make the decision that Kevin was just alluding to of do you want to resample those, or do you want to assume a parametric distribution of those.

DR. NESSLAGE: Yes.

DR. WILLIAMS: Sorry to confuse everyone more.

DR. NESSLAGE: No, and that's why we're having this discussion, because I want to make sure it's clear. That's true, because we actually have an estimated stock-recruitment curve. I guess -- Well, first of all, I feel like we need to make a decision about whether the workgroup will make any general recommendations before -- I feel like I'm floundering a little bit, because it's unclear how quickly we need to get this answer to the council to be able to act on gag and whether something like a working group would just delay things too unacceptably long. I guess I'm looking to staff, but, Amy, you're the one who made the original recommendation, and what were you thinking at the time?

DR. SCHUELLER: I guess I don't understand the timing with the council either, and so, if there's a rebuilding plan put in place, what are those requirements, but my initial gut feeling was that we can still make a recommendation and look at it. I don't necessarily think that -- I would hate to see gag languish where it's at without a recommendation, because we're trying to take a more

holistic view. I guess my viewpoint is do what you have to do with what you have now, and then, as new science and information is developed, then we can modify it in the future.

DR. NESSLAGE: Right. I hear you. Chip, would you like to shed some light on what's needed here?

DR. COLLIER: I agree with Amy that we can go forward with gag the way it currently is, with what you guys recommend, and then come forward with -- You guys can make additional recommendations, as things are going forward, and so, in all likelihood, we're going to get notification that overfishing is occurring for this stock, and that puts us on a timeline of ending overfishing within two years, and so we'll be working on that, and we're going to be under a pretty tight time crunch, in order to get everything done to do scoping and public hearings and analyze the data. We're going to work on all of that stuff, as well as dealing with allocations that are going to be coming out of this, due to changes going from the CHTS-MRIP survey to the FES-MRIP survey, and so there's going to be a lot going on for gag.

DR. NESSLAGE: Yes, and so there's opportunity for us to make revised recommendations, if that's what comes out of the workgroup, is what you're saying, and there will be lots of changes forthcoming anyway, right?

DR. COLLIER: Well, I would say make the recommendations on the projections scenarios to come up with an OFL and ABC, and you guys review those at a future meeting, but, at that point, it would be stuck, and then the council will be making decisions on that and going forward with it, and it makes it difficult if you're going to be changing the benchmark as they're developing different management measures, because they're going to have to restrict harvest, all in likelihood, in order to end overfishing.

DR. NESSLAGE: Agreed. Okay. Thank you. I appreciate that. We still have the issue of how exactly we want recruitment modeled for us here. Fred Serchuk, this is your baby. Help me out here.

DR. SERCHUK: Okay. Here's my recommendation, and you can knock it around, but I would use the average of the past ten years and going forward. That would be consistent with what we've done for some other stocks, in terms of what we have recommended going forward when we've seen low recruitment. That will get us started, and, if we're going to revisit this in a working group, we want to revisit this in a very synoptic fashion, and so this is not going to be the only stock that we're going to be dealing with, but, just to get the ball rolling, I suggest that we just use the average of the past ten years going forward for a recruitment estimate.

DR. NESSLAGE: That's the average recruitment estimates from the --

DR. SERCHUK: 2010 to 2019.

DR. NESSLAGE: Right, but not the -- Remember what Erik said, and we have a stock-recruitment-curve-based estimate. You're just saying from the actual estimates of recruitment for the last ten years.

DR. SERCHUK: That's exactly right, and that's what we've done for some other stocks, when we've seen very low -- We're consistent in that way. We may be consistently wrong, after the working group meets, but, to get the ball rolling, that's what I'm suggesting, and that's just my suggestion. Thank you.

DR. NESSLAGE: Then the -- If we go that route, my additional suggestion would be that part of the statement of work would be for folks to consider alternate options when you have an estimated stock-recruitment curve, which you look at the deviations, et cetera, et cetera, and would you agree with that? What do other folks think? That is one proposition. Does anyone disagree with that proposition? Okay.

We still have to decide are we thinking -- We still have FMSY, the 50 percent OFL, P^* , just to be clear, and I just want to make sure that Kevin knows exactly what we're asking of him. It's the OFL projection -- It's the F equals FMSY P^* of 0.5 to end overfishing, and then the ABC would be our P^* , correct, and was it 30 percent, with management starting in when, Chip? Was that clear to everyone? I just want to make sure.

DR. COLLIER: In conversations with other staff, it's likely that it's going to be the two-year timeframe, and so it's probably going to be 2023 is when management would be in place.

DR. NESSLAGE: All right. What am I forgetting?

DR. COLLIER: The P rebuild.

DR. NESSLAGE: Does that --

DR. COLLIER: Or we already have that up here.

DR. NESSLAGE: Yes, and so, if anyone disagrees with any of this, speak now, because Kevin is going to be doing some work here, and, Kevin, if any of this is unclear, please let us know.

DR. COLLIER: I would also -- Kevin, if you're not comfortable getting all of this done in a time crunch, let us know, and it just might not be in the draft report for the SSC, because this is sounding like a lot of work for him, but, Kevin, I will let you speak to that.

DR. CRAIG: From what I understand, we're going to assume 2020, 2021, and 2022 are interim years, and is that correct?

DR. NESSLAGE: Yes.

DR. CRAIG: So I think that might mean redoing the current projections, which only have 2020 and 2021 as the interim years, and so do you want to see the current projections with the recruitment from the stock-recruitment curve for comparison to these new ones? That's fine, and I just have to rerun those with a different set of interim years.

DR. NESSLAGE: I will go out on a limb and say -- Unless the SSC members scream in protest, I would say yes, because I think -- I don't think we want to put these in the report, Chip, or at least I wouldn't be super comfortable putting something in the report that the SSC hasn't had a chance

to discuss, and there may be consequences that we haven't thought through, and so, unless you think this has to go in for some reason, I think we would want to see that and have a chance to review it before we need to make the final decision, and then we would have a report generated from that that would include these, and I think -- If the group doesn't need to see the -- We've already got the P* 50 percent, but I think -- Do you want to see the P* 30 percent and the 70 with the regular old recruitment and not the recent low? I feel like, even if that is our -- Even if the recent low is our recommendation, and we don't change our mind, it's helpful to understand what the impact is, but do folks disagree? While people are thinking, Chip, go ahead.

DR. COLLIER: I think, with that low-recruitment scenario, I think it's going to be important to get it run out at least ten years, like he did with some of them already, just to make sure that we can check to see if it can rebuild within ten years, and I think that's an important part, and it's actually listed in Magnuson, and we need to check that out.

DR. NESSLAGE: Good point. I am not hearing no, and that's a lot of double-negatives, to both ways, which is a bit of work, but I am not excited to put all of that in this report, and so does that help answer your question, Kevin?

DR. CRAIG: Kind of. I'm just trying to nail down the specifics for the projections, and so it sounds like redoing the current projections with additional interim years is a yes, and then doing the P* 50, or the FMSY projection, with management starting in 2023 and running out at least ten years from the terminal year of the assessment, with the low recruitment set as the average of that in the last ten years. Then can you clarify the other one? You said the P* of 30 percent, the one for the ABC?

DR. NESSLAGE: That was the P* 30 percent.

DR. CRAIG: P* 30 percent. Okay. For the same interim years and the same duration?

DR. NESSLAGE: Yes.

DR. CRAIG: Okay, but not any of like the rebuilding timeframes, the alternative rebuilding timeframes, that I showed at the end of the presentation? There is that sort of flexibility, I guess, in determining the rebuilding timeframe, and so there was three different scenarios, and I think they varied from 2032 to 2038.

DR. NESSLAGE: How -- Chip, help me out here. Are we supposed to do that yet?

DR. COLLIER: Those decisions, as far as rebuilding alternatives, those come in if the stock cannot rebuild within ten years. If it can't rebuild within ten years, then the council gets to choose a rebuilding plan, and that's within their prerogative, to see which one of those works out best, based on their decision-making process. They would need an ABC and catch level recommendations for each of those, if that scenario is allowed to occur.

DR. CRAIG: Okay, and so I have to check on whether -- Just to sort of repeat what you said, Chip, I have to check on whether it rebuilds within ten years or not, and then, if not, rerun the projections out under each of those three scenarios.

DR. COLLIER: That's correct, yes, until it rebuilds.

DR. CRAIG: Okay. Just to sort of clarify the low recruitment, this is going to be the actual average observed recruitment from 2010 to 2019, assuming the same stock-recruitment curve, and we're not re-estimating a stock-recruitment curve or anything like that, and so it would just be the straight average observed recruitment projected forward.

DR. COLLIER: It would just be a single point, essentially, right? It would just be like this part right here?

DR. NESSLAGE: Not resampling from those ten years.

DR. CRAIG: Right, and so not the resampling, where it would be some distribution of recruitments in the future, and it would just be a fixed average, based on 2010 to 2019.

DR. NESSLAGE: Yes.

DR. CRAIG: Okay.

DR. NESSLAGE: Is that clear as mud?

DR. CRAIG: I think I've got it.

DR. NESSLAGE: This is how we reward your outstanding work, with more requests. You poor thing. All right. Have we tortured Kevin long enough? Is there anything else from the SSC before we complete this agenda item? I am not seeing any hands. Thank you so much, Kevin. It's greatly appreciated. If you have questions as you go along, please let us know, and, if there's something that needs to be clarified with the SSC, I am happy to facilitate that, along with Chip and other staff.

DR. CRAIG: Okay. Great. Thanks, Genny.

DR. NESSLAGE: Thank you. Okay, folks. I would like to take a six-minute break. Be back at 3:00. At that point, we're going to switch over to reviewing our consensus statements, and I'm going to start with public comment on red snapper, and so please be prepared, and we look forward to that in just a few moments. Thank you.

(Whereupon, a recess was taken.)

DR. NESSLAGE: Folks from the public, this would be the time -- I apologize that, on Tuesday and Wednesday morning, things got crazy, and we didn't take a moment to do public comment at that time, and so I appreciate you bearing with me, and we look forward to hearing what you have to say, and so what I would like to do is hear from the general public, and then, if there's anyone from NOAA that would like to make a comment, that would be fine next, and then we'll take any council members that have anything they want to say, and then we'll close public comment, and so please raise your hand if you have public comment. Really? No public comment? Where is Rusty? Are we having technical difficulties?

DR. COLLIER: I don't believe so. His hand just went up.

DR. NESSLAGE: Good. Go ahead, Rusty.

MR. HUDSON: I was outside. Sorry. Then I stubbed my toe, and so it must be a sign, and I don't know what to say. I'm actually looking forward to what they have to say. Since the red snapper stuff the other day, Chip, you may have gotten an email from Mike Merrifield, who couldn't talk the other day, on the allocation decision tree. Otherwise, with the red snapper, we're just looking to see what's going on here towards the end of this assessment, because Figure 44, and I hope I'm saying that right, Jimmy Hull wanted to talk about that, the difference between SEDAR 41 and SEDAR 73.

That's where I'm going to leave it, because the outcome is really what we're looking forward to, because, like we said, we're rich with red snapper, and we're rich with sandbar sharks and other stuff, but it's obvious that we've got gag problems and sea bass problems and red porgy problems, but we don't have king mackerel problems, and so I'm just saying this out loud for the SSC, because we have been trying our best, as a commercial entity, but we're a census, and we're not an estimate, like some of the other inputs here. Thank you.

DR. NESSLAGE: Thank you, Rusty. I'm not sure what -- We'll have another final public comment at the end of the day.

DR. COLLIER: All right. I was just checking on that, to make sure.

DR. NESSLAGE: Okay. So folks will still be with us then?

DR. COLLIER: Mike was having audio problems, and then Sherri had sent some comments in as well regarding the allocation decision tree and golden tilefish.

SEDAR 73 RED SNAPPER ASSESSMENT REVIEW (CONTINUED)

DR. NESSLAGE: Okay. Then let's take -- I just want to kind of keep focused on red snapper right now, and then we'll take those at the end, as usual, if that's okay with you all. Okay. Any other comments on red snapper specifically? Okay. Anyone from NOAA or the council that would like to say anything at the moment? All right. We appreciate that. Thank you.

What I would like to do is then we're going to keep this discussion very focused on SSC members, and hopefully folks will be kind enough to answer any questions that we might have if things pop up, but we really need to finalize these consensus statements. It's been a difficult discussion. What I did on Friday was try to take our initial brainstorming notes and flesh them out a little bit more, to try to identify areas that seemed like we didn't quite come to consensus or areas where we needed to elaborate a little bit more and make our arguments clearer, at least in my mind, and so I would like to go systematically through them.

I will just go straight down the list, and so, as we go along, if you have any comments, any things you would like changed, anything you would like added or deleted, this is the time, SSC folks. We had suggested that we wanted to add things to our section on is this BSIA and is this -- What

did we think -- Why did we think that, and not just say yes, but add some justification for that, and so I threw up some ideas, based on what I thought I had heard folks say, as well as some of the changes that had been made, which I assume we approved, since we approved the assessment as BSIA.

That included some of the changes, but they are not necessarily limited to incorporating new data sources, some of which were quite innovative alternative data sources, updating the natural mortality vector to be a little bit more species-specific, or at least group specific, and there was updated batch size information, and they had split SERFS, the trap and video indices, and applied the selectivity working group's recommendations. There was incorporation of the Dirichlet multinomial, estimation of mean recruitment, as opposed to the stock recruitment, and that was a change. Calculation of additional measures of fishing intensity, which was a nice addition.

There was thorough exploration of model sensitivity to assumptions and new data sources, and then there were some strengths. There appeared to be coherence of abundance index trends in recent years, which I thought we talked a little bit about that, as well as the MCBE estimates were all -- 97.8 percent of the runs resulted in the same stock status, and so that seemed, to me, as the things that popped out from our discussions, but, as far as positives, strengths, things that we seem to be gravitating towards as thumbs-up, but, if you want to take any of these off the table, that is perfectly fine with me, and, if you have anything you would like to add, this would be the time, folks. No hands. Okay. That says, to me, that nobody has any objections, and so, if that's the case, that's great. Let's keep scrolling. I am sure that we'll find plenty of things to disagree upon below.

Under the last bullet in that section about whether the stock assessment provides an adequate basis for determining status of fishing level recommendations, I had put in a placeholder there that said, yes, for the reasons stated above, but that we tabled our OFL and ABC recommendations until we can review, in more detail, this alternative two-step forecasting method and some of the data that go into that, and we should probably add that, and could you just put a placeholder in there?

Now that I say it out loud, Chip, it's pretty obvious that we needed to look at some of the descender device information that was assumed in there. Thank you. Anything else on that bullet point, or I shouldn't say anything else, but does anyone disagree with what I have said there or would like to modify it any way other than -- We'll avoid wordsmithing for now, but content-wise is what I'm looking for. No hands. Let's get to the harder ones then. Amy, go ahead.

DR. SCHUELLER: I was just thinking about this in the context of what we just discussed for gag, in that I said something like we should make a recommendation that we can later address, pending a workgroup discussion, and so I guess what I'm wondering here is, is this is a workgroup, or what's the timeline on this review of this method, I guess?

Only because I hate to see the assessment sort of sit there and wait for something, when we could potentially put something in place and then review a method, and I don't know. I'm just thinking about this in the context of what we just discussed with the other species, to try to be consistent, but then also make sure that we are providing things in a timely enough manner for the council, and so I don't know what the timeline for this is meant to be.

DR. NESSLAGE: Just my preliminary chatting with folks, it sounds like -- Obviously, we will probably not meet before the council meeting, but soon after, and that we would receive some more detailed presentations on the descending device working paper as well as a bit more fleshed-out description of what's going on with the two-step forecasting method, and so I feel like those are very -- In my personal opinion, I feel like those are much larger methodological changes than what we were exploring before, but, if you disagree --

DR. SCHUELLER: No, and they are, and so this is not a workgroup situation, and this is a we've made requests, experts are going to present to us, and we're going to make an ABC decision at that point, right, and so -- I am sorry if I'm not remembering, but is Kyle basically going to be able to come to that meeting with those projections, all the different choices run, and then we're good to go, right?

DR. NESSLAGE: That's my ideal.

DR. SCHUELLER: Okay. That's good. That's fine. I just don't want to meet and discuss a method and then have to meet again to set the ABC.

DR. NESSLAGE: Not in my mind at least, and so I think we're on the same page then, right?

DR. SCHUELLER: Yes.

DR. NESSLAGE: Cool. Let's see if Scott is on the same page. Scott.

DR. CROSSON: If that's the case, then I can accept it. I agree with Amy that I am very uncomfortable with leaving this meeting without having made an ABC recommendation, even some sort of interim one, but, if this is going to be happening on a timeline relatively soon, then I guess I can be comfortable with that.

DR. NESSLAGE: Great. Thank you. Other folks on this bullet point? No hands, and so let's continue then to uncertainties. We had down some very generic wording about natural mortality, and, when I looked at what was already said it in the assessment, it seemed to be said already very well, in my personal opinion, and so I just grabbed a quote from the assessment and then added basically -- Well, let me go back and just say that, if we agree with this statement, we could say that the SSC echoes the statement made on blah-blah-blah page that the scale and age dependence of natural mortality were estimated using meta-analytical methods, as is common in SEDAR assessments. While such methods describe relationships between M and other life history characteristics averaged across species, they may not describe well the natural mortality of any particular species. Results of this assessment are sensitive to natural mortality.

Then I added, in particular, something that you all had mentioned, that stock status is sensitive to -- It says that twice then, doesn't it? Oh, it's stock status, in particular, is sensitive to natural mortality assumptions, and so not just the results of the assessment, but, in particular, stock status to highlight that. How do folks feel about -- Then I should say, while we're on the topic of natural mortality, if we go to the next bullet, the SSC adds that natural mortality may be density dependent, and may therefore change with year class, which was something that you all had noted, and I just fleshed it out a little bit. Then we move on to some other life history characteristics, and let's

tackle the M issue first. Are folks comfortable with something along those lines, the content of those statements?

MS. LANGE: It works for me.

DR. NESSLAGE: Thank you, Anne. All right. I'm not hearing any screams of protest, and so let's move to the next section, which has to do with other life history characteristics, please. This has to do with maturity at-age for females being relatively high at young ages for a long-lived fish, and folks noted that several times, and it also is high compared to red snapper in the Gulf of Mexico, and then there was a note placed in there about there being about half of 500 samples being of age-one red snapper from the South Atlantic were mature, and I thought that was Wally, but my memory is starting to fail, and I think we just need to flesh that out a little bit more if we want to use that as an example, if someone can provide the details. That can be done now or later, but, if you're interested in including that as some backup evidence.

Then the SSC noted that this life history characteristic may be plastic, and then I feel like we made a lot of statements, but we didn't necessarily spell out the implications of our statements for the council, and so I threw this in here. If it is plastic, such high productivity may not be sustained when the stock is full rebuilt, as in rebuilt with a higher spawning stock biomass, and so I wasn't sure if that's really what we were implying, a, and, b, if not, what were we implying by that comment about potentially plastic or density-dependent maturity?

I am assuming that no hands means that you agree, and so I'm going to go with that general assumption and keep us moving here, if that's the case. If you do disagree, you will have to speak up at some point.

Moving on then, the SSC noted that egg viability may be low for young fish, relative to older fish, right, and that -- Here's, again, where I was trying to flesh out the implication. Future productivity of the stock may be impacted if the age structure is not allowed to expand further. I felt that kind of captured what the concern was, but, if that's not the case, or you would like to modify this, or delete it, in any way, just let me know. Wilson, go ahead.

DR. LANEY: The only question I would have there, Genny, was, when we were having that discussion, we noted that that was the case for other species, and so did we want to just note that that -- I will ask George about this, I guess, but is that -- George and Fred or anybody else, but is that a general characteristic that we could say is true for quite a few different species, that, as the females age, egg viability goes up, along with fecundity?

DR. NESSLAGE: George, Wilson is calling you out. Go ahead.

DR. SEDBERRY: I don't know that we can say that. I think, generally, and this has mainly been done with aquacultured species, is that there's a -- There's kind of a maximum viability somewhere in there, and so the very youngest -- The very first batches of eggs that fish spawn may not be completely viable, and then, as they get older, fecundity increases, and they produce more eggs, and more viable eggs, but then, at some point, as with all of us, senility sets in, and the viability goes down, and that hasn't been worked out for very many species, I don't think, but it has for some cultured species, and so there's a sweet spot somewhere there in the middle, but, for red snapper, or any of the species that we're managing, I don't think we know.

DR. LANEY: Thanks, George. Maybe just leave it alone then. If we know that's the case for red snapper, but we don't have a generic biological principle that we could plug in there to further justify the statement, I'm fine with that.

DR. NESSLAGE: Well, let's see. We had a couple of hands raise as soon as you mentioned that, and so let's see what Church has to say.

DR. GRIMES: As far as I know, the quality of egg effects stuff, the research has been recently done with mostly west coast rockfish, the big old fat females that you hear quoted over and over, and what it's related to is that larger fish, females, produce larger eggs, and they provision the egg with more lipid, and, subsequently, the fish, when they hatch, the larvae are bigger, and they grow faster, and they grow bigger faster, but I don't know that anybody has done that with red snapper or anything like that. I think hatchery managers have known forever that they use the larger -- Their large females as a brood stock, because they get better survival of the larvae. Anyway, that's what I would say about the specifics. Now, whether you need to put all that kind of bologna in the comments here, I don't know, but you asked about specific mechanisms.

DR. NESSLAGE: Thank you, Church. That's great. Fred Scharf.

DR. SCHARF: I would agree with what Church and George were just saying, and so there definitely is some strong evidence for some of the species on the west coast, but not as much outside of that region, and so there's been a lot more work, like Church said, and people are starting to focus looking more biochemically at eggs and lipid concentration, like Church said, but also lipid classes and the structure.

I think, related to this, I think what was maybe more important in the presentation that Kyle gave was just showing that the stock composition was really important to productivity, maybe even more so than biomass itself, and so, because of the way that the egg production is scaled with red snapper size, and in terms of female contributions to egg output, even discounting viability, and just egg output, and so I think that was the real key thing, I think, was that that productivity was really tied to the composition of the stock and that we really needed to allow the age structure to full expand, to take advantage of that.

DR. NESSLAGE: So that would imply that we would get rid of the first part of that bullet, that the SSC noted that egg viability --

DR. SCHARF: I think you could leave part of that, but I think focus mostly on -- I would focus more on the fact that the stock composition was really an important driver of productivity of the stock, and then maybe also say that egg viability may be low for young fish.

DR. NESSLAGE: So switch the two?

DR. SCHARF: Yes, and I think the importance of stock composition for productivity and then -- But keep the egg part in there too, to say egg viability may be low, and I think it would be a productive area of research to see, especially within the snapper grouper complex here, whether there was evidence for female effects, in terms of age and size, on egg viability.

DR. NESSLAGE: Okay. Does anyone -- I really like that addition. Thank you, Fred, and thank you everyone who has commented. Does anyone have any problems with this, at least in general, as it stands?

DR. GRIMES: No, I think that's good, but that's -- That's good, and I agree with everything that Fred and George said, but inferring about red snapper and things like that from west coast rockfish is a little tricky, in that rockfish are not straight up oviferous like your snapper groupers are, and they're sort of ovoviviparous, and fertilization is internal, and then they eventually shed the eggs into the ocean, but, anyway, the physiology of it has to be a little bit different. Anyway, that's --

DR. NESSLAGE: Great. Chip, could you get rid of my notes then on this bullet and the one above, and leave the one for data source, please. Thank you. Jeff Buckel.

DR. BUCKEL: Thanks. I remember Kyle, and, Kyle, correct me if I'm wrong, but, when you showed the plot of how increased age structure -- You're going to have the potential for higher productivity, but you also mentioned that that's true, but then we've also had the highest recruitments on record with the age structure what it is, or what it's been in the last ten years during these periods of high recruitment, and so I don't know if we want to qualify this bullet with we have had the highest recruitments with the truncated age structure. Kyle, correct me if I'm wrong, but I think you had made those when you showed the age structure productivity, or egg production plot, and you also made that statement.

DR. NESSLAGE: I think you're correct, Jeff. Kyle, go ahead.

DR. SHERTZER: That's exactly right, that we do see higher egg production from older females, larger females. What we don't see in the assessment results is a strong connection between population fecundity and recruits.

DR. BUCKEL: Chip, or I'm not sure who is writing, but it would be current recruitment is at an all-time high. Thanks.

DR. NESSLAGE: Great. Thank you, Jeff and Kyle. Okay. Anything else on that bullet? Okay. The next bullet has to do with some of the changes in the data sources, including the use of the revised MRIP estimates and separation of the SERFS trap and video indices. We had a note in there about how the revised MRIP estimates likely had a -- There was a note about MRIP being an uncertainty and so I fleshed that out into something semi-generic about how it likely had a quantitative impact on model estimates.

I'm not sure how folks feel about that statement, and then that was quantified with some of the other comments that folks had made about sensitivity runs indicated there was little impact of each alternative weighting or removal of the individual indices from the model. Correlation among the separated indices should be -- Although those things were shown in the sensitivity runs, we felt that correlation among the separated indices should be properly accounted for in the likelihood function, and that is also echoed in the research recommendations below from the assessment, and so does anyone have anything that they would like to add or delete or revise to this section regarding data uncertainties? Wilson.

DR. LANEY: A minor edit. In that next-to-last line, "accounted" instead of "accounting".

DR. NESSLAGE: Excellent. Thank you. Others? Okay. Then the next one has to do with that famous Figure 44, where the stock status characterization prior to the -- Around 1990, it differed between the last assessment and this one, demonstrating uncertainty in quantitative estimates. However, you also noted that recent stock status and trends are similar qualitatively across assessments.

Then I had a question here about whether we should include something along the lines of differences, maybe due in large part to the inclusion of new MRIP estimates, and I don't know that we -- I think we danced around that a little, but I'm not sure -- We talked about Figure 44, but we didn't -- I don't recall, but my brain is starting to fail me, if we really settled on an explanation. I feel like the council will ask either Kyle or me, or both, and so we should be prepared with some sort of answer, and so I will look to the SSC to comment, and, Kyle, if you want to add anything, that would be great.

DR. COLLIER: I figured that I would pull up the figure, so you can see it.

DR. NESSLAGE: Thank you.

DR. COLLIER: As a reminder.

DR. NESSLAGE: If you don't have it already emblazoned in your brain. Basically, to recap, the SSC had brought up that this was a potential concern, or uncertainty, but we didn't really talk too much about why. Amy, go ahead.

DR. SCHUELLER: I think we did. I mean, we did talk about this, because I remembered that I probably made my cranky statement about how I don't like continuity runs. I think that we said stuff about several types of datasets that have changed for this assessment, and we listed those sort of in our first section of this, and there are things besides MRIP, and so, I mean, a whole suite of those things have changed, and, without documenting them piece by piece, it's hard to really know exactly what is contributing to what, although I'm sure we have our suspicions, but maybe we can just make a bit more of a broad statement about lots of changes were made.

DR. NESSLAGE: That's true, yes. Sorry. I didn't mean to cut you off there. I apologize.

DR. SCHUELLER: No, I'm done.

DR. NESSLAGE: You're right, and I remember you saying that now, and, yes, let's make it more generic, since we haven't done the complete diagnosis there, and are unlikely to here, or we can't with MRIP.

DR. SCHUELLER: We're not going to.

DR. NESSLAGE: New data sources, and just change it to -- There we go. Yes, we're not going to. Will that please folks? Fred Scharf.

DR. SCHARF: Do we need this statement above that says sort of demonstrating uncertainty in the quantitative estimates generated by this assessment? Is that an accurate statement, like just because it doesn't align quantitatively with a previously assessment that -- I guess I'm not sure

what it means when they're not -- Like Amy said, you have these sort of continuity checks, and they don't align, but I'm not sure that we should expect that they would align, right, given that we have changes in the model configuration and different aspects of the life history that have been updated and new data sources, and so that statement seemed a little strong.

DR. NESSLAGE: All right. Delete it. I'm happy with that. It's going to be a long report anyway. Are there others on this? Amy, go ahead.

DR. SCHUELLER: I am going to wordsmith, and so I agree with Fred's comment, and can we just say "differences are due to changes described under improvements to the model"? That way, there is no questions about -- There is no question, and those differences occur because these improvements were made, and these improvements were considered the best scientific information, basically, is where this report, I think, is settling.

DR. NESSLAGE: Yes, and it wasn't that there were major structural changes in the model, like it was a research track and you suddenly switched to a different type of model or anything like that that it might be due to, and so, yes, that sounds great. Anyone else? Okay. Excellent.

Moving on to the next bullet point, we talked about fits to the catch-at-age for older fish appeared to be either over or underestimated in places, and that might indicate potential model misspecification. I think this was Jie that brought this up, and I just added that that might impact accuracy of the model or something, but we need to say why that -- Explain to the council why that's important to note, and so I threw that in there as strawman wording, but it's probably not great, and so any modifications, additions, or deletions are welcome. I am not hearing anything, and so I'm going to assume that that's okay with folks.

Let's move on to the next one then. We were concerned about this issue of whether inclusion of years prior to 1980 may impact our understanding of stock status, and so this, Chip, is where if you could bring up those -- I pulled up -- Oh dear. Hold on a second. I pulled up the relevant figures that Kyle had been referring to from the previous assessment, and, if you look at Table 25 and Figure 43 from SEDAR 41, I believe Kyle was saying that there weren't major qualitative, or even really quantitative, differences for that sensitivity, where they started the model for SEDAR 41 in 1978, which is close to 1980.

It looked, to me, like the relative stock status and F were not very different, at least for that model, but, if you go to the Table 25, there were some minor differences with regard to the ultimate table of numbers, and so that could impact the ABC slightly, but it didn't look to me, squinting at it, like it was going to have a huge impact, and so Scenario 26, the 1978 start year at the bottom there, with the base run at the top, those are what you want to take a peek at.

I guess the question here is do we still want to raise a question about the impact of including data prior to 1980, and, if so, do we want to ask Kyle to do that run? Do we need that right now, or another option is -- So the options are drop this concern, based on what you have seen here, and the second one is ask Kyle to run this, if they can negotiate that with the Center, and then third being we make it a research recommendation, that future assessments include some sort of run that would clip the data out prior to 1980, and so how do folks feel? I feel like, Fred Serchuk, this was your suggestion, I think, but others may have concerns as well.

DR. SERCHUK: What exactly would you like me to comment on, Chair?

DR. NESSLAGE: You seemed concerned about inclusion of years of data prior to 1980, and there seemed to be some movement towards maybe seeing what the impact of an alternative run, sensitivity run, where there was -- It was a 1980 forward model, and then Kyle had said, oh, we did that the last assessment, and so that's what happened with the last assessment, and so go ahead.

DR. SERCHUK: Okay. I think I made the comment in reference to that most of the available time series came onboard after 1980, and, in that respect, I thought the more recent time period would be more well described by having more indices. Prior to that, I think it was mostly catch data, and that was the reason that I thought, well, how much influence would the older catch series have if there wasn't ancillary data of the type that existed from 1980, to buttress just the catch series, and that was my reason for I think indicating that perhaps we should start at a date more recent than what started in the original assessment, and does that make sense?

DR. NESSLAGE: It does make sense, and so now I'm asking you -- Is looking at the old sensitivity run enough to convince you that it doesn't have a big impact, or do you want to ask Kyle to do this, or do we just want to make it a research recommendation? That's what is on the table right now, and we have to make a decision.

DR. SERCHUK: If Kyle has looked at it and felt that it doesn't make a difference, then I would withdraw the recommendation. If he hasn't done it, then I would say proceed. I don't want to make more work than is necessary, quite frankly, Chair. Thank you.

DR. NESSLAGE: Understood, and so I think it probably was Katie in the past, right, but it doesn't matter. The point is it looks like it's been explored in the past. Kyle, would you like to address that?

DR. SHERTZER: It was explored in the last two red snapper assessments, and SEDAR 41 was what you just showed, Genny, and then, in SEDAR 24, there were two different start years, and one was in 1976, and the other was in 1986, and, like you said, it didn't have any effect on the qualitative results, but it has the potential to affect the quantitative estimates, and so I don't know how that would look in this particular assessment, and I haven't run that yet. I certainly think it's something that should be considered in the TORs for the next red snapper assessment, is reconsider the start year for the assessment, whatever you decide for what you ask for from this assessment.

DR. NESSLAGE: I agree, and so I'm hearing that at least that might be a nice compromise, that we put that in research recommendations and say this would be something to explore with the next assessment. Does anyone feel strongly against suggesting that? No hands, and so let's do that for now. Thank you.

The next bullet has to do with the model assuming an average discard mortality rate that is not age or size dependent, and that was, I think, a point that Jie brought up, and so I just added -- I think, again, we need to put an implication in there to explain why that's important to the council, and so I added "which may impact the accuracy of overall fishing mortality", and it should probably say "estimates", but maybe that wasn't what you were implying, Jie, or you can help me out, or someone can help me out, with regard to trying to explain why this is an uncertainty that we wanted to highlight. Jie, go ahead.

DR. CAO: I think, Genny, you're right, and that's what I mean, the accuracy of overall fishing mortality estimates.

DR. NESSLAGE: Cool. Does anyone disagree with making this statement? All right. Then let's move on to this last red bullet here. Estimates of stock age structure prior to 1980 are uncertain, due to a lack of length and age composition data. That was something that we had said, and so I felt that we had to flesh that out a little, again, with an explanation, and so I put "which could impact estimation of fishing mortality, stock size, and reference points", and is that what we were getting at, or help me out here, folks. I think this is to Fred's -- Well, yes, it is. Well, it's to Fred's point and beyond. Okay. Not seeing any hands raised, we'll keep moving along.

Then we come to the uncertainties associated with released fish, and the question was are there significant uncertainties, and, if so, how have they changed, and how does this affect fishing level recommendations? I put "tabled" in there, because I felt like we had a lot of round-and-round discussion about discard mortality and descender device usage and that we really hadn't all agreed yet, but perhaps we have, or someone can help us come to consensus. Amy.

DR. SCHUELLER: Sorry, but I raised my hand slightly delayed for the last bullet that we just talked about.

DR. NESSLAGE: Go ahead. Let's go back.

DR. SCHUELLER: I was just, I guess, slow to think about this, but I guess I'm just wondering if we need that bullet at all, because we can't go back in time and get length and age comp data prior to 1980, and it makes things more uncertain, but we're sort of acknowledging that in the recommendation that we just discussed and moved down that Fred made, and so I guess I'm just wondering if that's necessary or just adds to some additional -- I don't know, but I'm just trying to minimize any confusion with what we're saying, and so I don't know that this helps, I guess.

DR. NESSLAGE: Is it useful in justifying that research recommendation? Should we just copy-and-paste it below with --

DR. SCHUELLER: Yes, I think that's true, and it does justify why we would consider or explain why we would want to consider different start dates in an assessment, which people from outside of the SSC may be wondering why would we consider that, and so --

DR. NESSLAGE: Unless folks disagree, maybe if we could -- Or at least just put a note in there to me to add to justification of research recommendations, and I will move it later, so we're not scrolling around too much. Thank you, Chip. All right. Then back to the next bullet, which is -- I really didn't want to go into too much about this issue of release mortality, because I feel like we still had some questions, and so, if folks are okay with that, in general, the wording, you can wordsmith it later, but I was going to put a placeholder in there, and we will fill out the answer to that question at our next meeting.

If that's okay with folks, then the next question has to do with addressing uncertainty consistent with SSC expectations, and I said yes. They used the MCBE procedure, and we really liked that, and does anyone have any problems with that? Okay.

Then we go on to fishing level recommendations, and so I put draft wording here as a strawman, and we can change it, and please know that. It's not set in stone. The first question is the stock is overfished and overfishing for the last assessment, and how has the stock status changed, and my understanding of our consensus, when we finished Wednesday morning, was that we seem to agree that the stock is still overfished and experiencing overfishing, and does anyone disagree? I am not seeing any hands, and so I'm going to assume that is no disagreement.

Moving on to the next bullet point, it has to do with the rebuilding plan. Is the stock responding as expected? If not, why? Again, my draft wording, but here's what I thought, to get us started, and so the stock appears to be responding to the rebuilding plan, as evidenced by some of the highest recruitment and abundance in recent years. The age structure of the population is expanding, but it's estimated in recent years to be composed primarily of young fish, ages-one to four. Although total biomass and spawning stock biomass have been increasing in the last decade, rebuilding of spawning stock biomass to SSB relative to SSB F 30 percent has not yet occurred. Therefore, the stock is not yet rebuilt, and I didn't know if any or all of that was something we wanted to say. Scott, take it away.

DR. CROSSON: I don't want to get too philosophical here, but how do you know that the stock, the recent increases in recruitment that we've seen, are related to the rebuilding? I know that we talked earlier about the gag, and we were talking about a lot of the biological factors and the environmental factors that tend to drive recruitment, and so we don't have any -- I didn't understand that there was any clear evidence, with red snapper, of what was driving this increase in recruitment.

DR. NESSLAGE: So, at best, you would say the stock may be responding to the rebuilding plan.

DR. CROSSON: Yes.

DR. NESSLAGE: Would that help?

DR. CROSSON: Yes.

DR. NESSLAGE: All right. What else have you got? Anything else on that point, Scott?

DR. CROSSON: No.

DR. NESSLAGE: Great. Thank you. Amy.

DR. SCHUELLER: I wondered if we wanted to put in a sentence here about the level of discards being too high and how that's related to basically recreational effort, right, and so it says, if not, comment on reasons why the stock is not rebuilding, and why is it not rebuilt? We have made this statement over and over before, about general recreational effort levels and discard rates, but I think it's good to just keep reiterating, and it's a multispecies fishery, and so that plays into it as well.

DR. NESSLAGE: Okay, and so give me some wording here. Discard mortality rates may be hindering rebuilding, something like that?

DR. SCHUELLER: I don't think they may be. I think discard mortality rates are hindering rebuilding. I mean, if we looked at those stacked F plots, the bulk of the mortality was discard mortality.

DR. NESSLAGE: All right. Anyone disagree with any of what's on the screen here in neon pink? Do we want to make the "recent years" a little more explicit? If so, I would love someone to give me a number. Fred Serchuk.

DR. SERCHUK: I had a different point, Chairman, on an earlier issue about the stock is primarily composed of young fish, ages-one to four. I will take that second, if you want to go with the point that you just raised right now.

DR. NESSLAGE: No, go ahead. This whole bullet is good. Go for it.

DR. SERCHUK: Well, when I'm looking at the pictures in the assessment, we're not talking about we're having significant more numbers of fish from five to ten, although the biopsy of that age composition is far less than historical levels, and the total actual numbers of fish now is really near or at a historic high level, and presumably because there is good recruitment and because it's being seen in an expansion of the age population.

DR. NESSLAGE: Okay, and I need you to suggest alternative wording. My brain is starting to break down here. If you don't like what's on the screen, I want to hear alternative --

DR. SERCHUK: Are you talking about biomass in the age structure, or are you talking about numbers in the age structure?

DR. NESSLAGE: Numbers.

DR. SERCHUK: Then I think it's an incorrect statement. I've got to find the figure that gives you the numbers here. I will come back to it in a second, Chair. Go on.

DR. NESSLAGE: Yes, please do. Okay. Placeholder for that, and, yes, I appreciate people correcting me if I'm wrong. What about the rest of the statements? Is there any heartburn with the rest of the paragraph?

DR. DUMAS: At the very end, do you want to say the bulk of mortality is discard mortality?

DR. NESSLAGE: Sure. I believe that's what Amy implied. Thank you. Chip, go ahead.

DR. COLLIER: I would just say the first sentence, that the stock may be responding to the rebuilding plan, as evidence, and then you have discard mortality rates are hindering, as the last sentence. Maybe wordsmith the last one, where recovery would potentially be occurring faster with lower discard mortality rates, or something along those lines, but it seems contrary to the first sentence.

DR. NESSLAGE: That's a great point. Thank you. Amy, would you object to that revision?

DR. SCHUELLER: I think it says the same thing.

DR. NESSLAGE: All right. Alexei.

DR. SHAROV: I wanted to ask what is meant here under the discard mortality rate, and you can interpret it in two ways. One is the mortality of the fish that are being released, or discarded, and so you could think of reducing that mortality by using descending devices or other fishing practices or whatever, or are we talking about the discard mortality rate as the rate -- Essentially, rate of the total -- Well, as a component of the total mortality, the dominating component of the total mortality, within the population.

DR. NESSLAGE: So you're talking about total discards versus the rate, which may be improved through descender devices, et cetera, et cetera, and so maybe total discards?

DR. SHAROV: What are we focusing on? When we explain what we're focusing on here, are we saying that too many fish are dying as a result of discarding, because their abundance is high, and the fishing effort is high, and so they are being intercepted very frequently, and so, if it's the issue of with the discard mortality rate, where we would use the rate that they die when we release them, that I think will be not as critical, as opposed to the overall losses for the population, which are mostly from the overall number of discarded fish, which, in addition to the mortality rate itself, is also a factor of the effort, of the number of fish that are actually caught and then being discarded.

DR. NESSLAGE: Right. If you don't mind, let's hear what Amy thinks about that. Good point.

DR. SCHUELLER: Alexei, that's a good point, and so clearly --- What I think is the discard mortality rate being applied to those fish that are caught, based on the scientific studies, is what it is. The point really is that there's a lot of effort on the water, and there's a large proportion of the population that's being encountered with that effort, and that is then discarded, of which some of it dies, and so it's the total losses to the population due to discarding that is a concern here.

DR. NESSLAGE: Thank you for that clarification, Alexei and Amy. If Fred hasn't found the figure, I found the figure that I was referring to, but do you have Kyle's PowerPoint up, per chance?

DR. SERCHUK: You're correct, Chair, and I'm not arguing with you.

DR. NESSLAGE: You are? I mean, you aren't? That's great.

DR. SERCHUK: I am agreeing with you. I found the figure itself, and you were correct. No need to go over it.

DR. NESSLAGE: Okay. Good. I'm like, oh, I'm losing my mind. Okay. Great. Just for people's edification, I was looking at Slide 48, and we spent a bit of time on that, but just so folks can see what Fred and I were chatting about, and so you see that expansion of the age structure. One was that recruitment pulse that probably wasn't management related, maybe, and then the other one is this more recent triangle that you see, and so that's what I thought we had talked about, and so, unless folks are interpreting that in a different way, hopefully this language captures that sentiment. We like to see expanding age structure. Okay. I think we've beat this one up a little bit. I don't see any hands, and so let's keep moving.

Discuss the appropriate recruitment scenario, and so here's where we had a lot of discussion, and I anticipate that we will have more discussion in the future, and so this was my attempt to capture what we said. We noted that, although the stock had demonstrated an exceptionally strong year class strength in recent years, there is no guarantee that recent high recruitment will continue to occur in upcoming years.

Since the mid-2000s, the stock has demonstrated nine years of exceptional recruitment and five years of below-average recruitment, and that was straight out of our notes. Given the overfished and overfishing status of the stock, and the fact that the stock has not yet rebuilt, the SSC recommends a precautionary assumption that average recruitment be used in projections to set fishing level recommendations. That was -- That latter part was what I thought I heard you all saying at the end of our discussion, but I recognize this is a very difficult decision, and we -- I may be mischaracterizing it, and so, if folks think that doesn't quite capture where we ended up, please speak now. Fred Serchuk.

DR. SERCHUK: I don't agree with the statement, in terms of using a precautionary assumption, but do we have to be as precautionary as the long-term average, which is less than half of the size of the year class strengths that we've seen recently. I mean, what's the level? You could set it at zero, or you could set it at 10 percent, or you could set it at the mean, or you could set it at half the recent average, to be precautionary.

There is nothing sacrosanct about the long-term average being precautionary relative to any other precautionary values that are below the recent average of the large year classes, and I'm being a devil's advocate here for a second, because the level that is going forward is I think 434, or something like that, if I read the projections, and the current average is above a thousand, the current recent recruitments. It's just a matter of how much precaution do we want to put in the projections.

DR. NESSLAGE: Thank you, Fred. So I don't know that -- I am a little loathe to open up this can at this moment, but, if we don't feel like -- And that's fine. That's perfectly fine, and I think we need to -- If we haven't come to consensus, we need more time to discuss this, and, if that's the case, I think we could probably -- I will open it up to discussion, but I think we could modify the sentence as a placeholder and say -- Hold on. Let me just stop talking and see what other folks have to say.

DR. SERCHUK: Just one other comment, Chair. Let me put it in perspective. The recruitment that's being used now is 434 as the long-term average. Of course, we had another run in there, in Table 31, that talked about the recent average of being 1,145, and so it's almost -- It's a little bit more than one-third of the present high recruitment, and that's all I'm saying, being very precautionary. Thank you.

DR. NESSLAGE: Understood, and so we've heard a lot from Fred on this, and we've heard a lot from a couple other people on this topic, and there's some people from whom we have not heard at all, and I would really like the quieter folks to have a chance to speak at this point, and, if we're not centering around consensus, then we will just table this as well, and hopefully we can get a little bit more time dedicated to hashing this out, and so, folks who have not spoken on the issue of what level of recruitment we should be using in the projections, I would love to hear from you,

because I need to get an idea of what the whole committee thinks. No hands is not acceptable. I know you have opinions. Chris Dumas. Thank you.

DR. DUMAS: This is what I think. We've talked a lot about recruitment for three different species, right, for tilefish, gag, and red snapper, and it seems to me that the discussion has ranged far and wide, and I hope that we could talk about coming to a methodology, a similar methodology, that we could apply across all these species, possibly, just for consistencies sake. Maybe start -- I don't know, but start twenty years back, ten years back or twenty years back, and Bayesian update with autocorrelation for each one, and say that's what we're going to do, and then project that forward. That's my two-cents.

DR. NESSLAGE: I appreciate that. Thank you, Chris. Wilson, how do you feel?

DR. LANEY: Well, I like what Chris just said. I mean, that gets to my earlier point about having a certain amount of frustration over the lack of any sort of a consistent methodology. With respect to red snapper in particular, I can see Fred's point about the fact that we have -- We seem to have entered a period of a much higher recruitment trend, and it does seem extremely -- Maybe that's not the right word, but it certainly seems precautionary, if you're going to plug in your values that just reminded us about, the 437 and then that being just about a third of the current value, and so it is very precautionary.

I think precautionary management is dictated, in some cases, when we're dealing with particularly controversial situations, which we may be in this case, and I don't know. I am ambivalent, and I still remain ambivalent about it, but I like what Chris said about coming up with some sort of consistent methodology that we can apply across multiple species.

DR. NESSLAGE: Excellent. Thank you, Wilson. Anne.

MS. LANGE: I thought there was something that we were looking at on Tuesday relative to developing a method for this, but I know that the one thing we did decide was that we were not going to use the high-recruitment runs, and so I'm not sure what that -- I don't see an issue with using the average, because that includes some of the high years as well as the low.

DR. NESSLAGE: Thank you. Alexei.

DR. SHAROV: In order for us to use the short-term, the most recent average that suggests that there is consistently high recruitment, we need to have some theory, some idea, some hypothesis, as to why this is happening, so that we have some reason to believe that this process is likely to be continuous, or at least continue into the future, within at least several years.

Alternatively, and traditionally, we're looking to the interannual variability, as it is an interannual variability, which, for every year it is a result of a multiple number of factors that, if we have an absolute ability to account for everything, we would have known why exactly we've got what we've got, but, overall, we just the recruitment variability as such, as a random variation around the stock-recruitment model that we think is appropriate, and that is generally the baseline approach, the base approach, and so I didn't hear Fred saying that he is opposing this, but he didn't like the application of the word "precautionary", and we can remove "precautionary", but it's just

that it is essentially a baseline approach, where you use the whole dataset on the stock-recruitment relationship.

I certainly am in favor of exploring the fact of the increased level of recruitment and what it would do, if that is possible to have in the report as well, as an alternative, which you may call it optimistic or some other way, but you would -- This would be conditional. This would be a conditional scenario that is conditional on this trend to continue, and, if we could point at the theoretical background, the reasoning behind that process, that would be great. If not, then we'll just say, well, if it will continue, for whatever reasons that we cannot explain, that's what is going to happen.

DR. NESSLAGE: So I felt like the kind of a trigger-based ABC that would be dependent on continued high recruitment was not popular when I suggested it, but I hear you saying that you would be open to that, Alexei, and is that correct?

DR. SHAROV: Yes, and, again, because it's part of the uncertainty that we are trying to characterize, and particularly about the future, about the potential trend, and so this is sort of the boundaries envelope, essentially.

DR. NESSLAGE: Okay. Were you done?

DR. SHAROV: I think that, for the standard projection, we have wide bounds around the projected recruitment, and we certainly are looking, generally, at the mean value, but there are wide intervals around it, to account for uncertainty in that recruitment, obviously, and the increased average, or increased -- The mean of the last ten years, with the increased level of recruitment, is most likely to be within those bounds, and so, if we are not focused only on the point estimates for the projected years, but consider the full range of recruitment variability, then that issue may be -- It will go away, as a whole.

DR. NESSLAGE: Thank you, Alexei. So I have heard a wide variety of opinions here. I am not, frankly, hearing really strong consensus or movement towards a very specific recommendation, which worries me, and I am floundering a little, with regard to how to move forward, because I feel like, unless we have very specific recommendations for Kyle, then that puts us behind the eight-ball with providing management advice at our next meeting.

I hear support, in general, for this working group idea, and I fear though that that's going to take longer than the next month-and-a-half, that that kind of work is not going to get done in the next month-and-a-half, which is when I anticipate that we'll be meeting again, sometime in probably July-ish, and so I hate to do this, but I feel like there's been really good discussion, but I am not feeling like we have strong consensus yet, and this is a very important decision. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. One of the things that Alexei recommended, which I fully support, is removing the word "precautionary". That is a management prerogative, of how much risk they're willing to take. We have to talk in terms of uncertainty, and I think we have in this statement here.

Of course, we have two runs in the assessment report, and we have the long-term average, and then we have recent high recruitment. I think those -- At this point in time, I don't -- If the committee decides to take one of them, the lower one, because they feel that that's the amount of

uncertainty that they feel is in the future recruitments, then take the average. If they feel that that's too low, you could take a different value, but my point is that we have to talk about sort of the realm in which we expect future recruitments to be, and, if it's the long-term average, fine, and let's just say it's an uncertainty and not a precaution. Thank you.

DR. NESSLAGE: Yes, and my apologies for using that word. I think it's in there a few times, and so we should probably get rid of the one below as well. It was a long week last week.

DR. COLLIER: Sorry, but my sound went out for a second. Which part did you want me to get rid of?

DR. NESSLAGE: Well, just moving down, and there's a few places that I have "precautionary" in there, and we just need to change those. Just take out "in order to help rebuild the stock", if you would. Thank you. While you're doing that, Chris Dumas.

DR. DUMAS: It's the case that recruitment is determined endogenously inside the model, right? The model estimates recruitment?

DR. NESSLAGE: Yes.

DR. DUMAS: We don't have direct data on recruitment, correct?

DR. NESSLAGE: Right.

DR. DUMAS: Okay, and so why can't we use some methods like Nick Farmer's method, his SARIMA models, time series models, Seasonal Autoregressive Integrated Moving Average models, to do forecasts and pick a method, something like that, and use that for all of these species? I mean, take advantage of the time series forecast.

If the issue is about forecasting, forecasting recruitment, but we're also trying to forecast landings and forecast catch and forecast stock size and all that stuff -- It's forecasting, based on the data series that we have, and so why don't we use those time series methods to do that, or Bayesian methods, which are about optimal updating as new data come in, optimal forecasting, or Bayesian with sort of autocorrelation built in, those methods, and are there reasons why we're not doing that now?

Talking about the different species, it seems like we're really ad hoc in talking about do we use the last ten years, or the last three years, or do we do something different if the trend is up, versus if the trend is down, for different species and trends in recruitment, and so it seems not consistent. There are methods that are available to help optimally forecast, based on the data that you have, and how to optimally update forecasts as new data come in, and is there a reason why we're not using those methods now? I will just end with that question.

DR. NESSLAGE: Amy, are you going to try and answer that question or bring up a new point?

DR. SCHUELLER: Well, I mean, what I was going to say is sort of linked to what he's saying, and I would suspect we're not using that because we just haven't been using that, and I think that those things take time to develop. From my perspective, those types of things have been used in

other assessments outside of this South Atlantic region, Council, and my thought on it is that -- Well, I don't know. I don't know if there's someone better to answer that question besides me.

What I was going to say was that those types of topics are things that I think should be covered by the workgroup that gets put together, because they can look at different options for that kind of projection, to see not only when should we be doing something different, but how we should be doing something different, and I just think that's outside the scope of what we're going to do here, and I think that it is all a longer-term question, and that we shouldn't really wait for that, because that just -- I don't know how long that's going to take.

I guess what I was hearing, and what I had thought we had decided, was to move ahead with the average recruitment, and I totally take the point of getting rid of the word "precautionary", and I thought we were saying that, basically, the SSC recommends that average recruitment be used in projections to set fishing level recommendations. I thought that's where we had left off on last Tuesday.

DR. DUMAS: Just to be clear, I am absolutely fine with that approach. I just didn't know whether these other approaches had been tried in the past, and folks had problems with them, or that there were some known reasons why they did not work in this situation, and I know that, if they had not been tried in the past, that it would take some time to put these things together and to try them out, and so, if it's just something that is to be looked at in the future, and we need to do something in the short run that's practically based to move forward, I am totally fine with that. I just didn't know whether these had been tried before and so they had already been ruled out or whether they're still open to possibility in the future. That's all. Thanks.

DR. NESSLAGE: Thank you. Because you have asked a very specific question, I will entertain Erik, if you wouldn't mind answering that specifically.

DR. WILLIAMS: Chris's point is a really good one, and it deserves a sort of understanding of the history of stock assessment modeling and recruitment estimates, and I think I can speak a little bit on that. I think we're at a point in time, in the South Atlantic, where we're just getting to that stage where our time series are long enough to start to do some of those methods that you actually listed, and so that's one thing, to recognize that we just haven't really even had enough length in our time series to do some of those methods.

Two, there is sort of a literature history to forecasting recruitment that goes back to the 1990s in the sort of stock assessment literature, and even the early 2000s, and a lot of people pushed some of these methods, the ARIMA-type methods and time series methods, as well as correlative processes, where you bring in a lot of environmental data, and the problem, and I think why people shy away from it, is what we largely discovered is those methods tend to fall apart pretty quickly once you start implementing them.

Then the third precaution that I would add is that these recruitment estimates that we have from these stock assessment models sometimes are influenced in ways that they may not exactly measure recruitment in the way that we think they are. In other words, when you have age data that might be in conflict with an index, I worry about the quality of those recruitment estimates that come out.

One thing to keep in mind in these assessment models is recruitment is pretty much the only mechanism that the model has in its function to make the population go up and down, other than, obviously, the removals, and the removals are more or less fixed, and so there are situations where recruitment patterns can be -- They might not actually measure the year-to-year variability of recruitment as much as they are trying to pick up on trends that are in the data, and so that's just the whole sort of my summary in a nutshell, but, yes, Chris is exactly right, and I think it would be good to try and reinvestigate those, but I think there's some precaution there, that, in the past, these methods have fallen apart.

DR. NESSLAGE: Thank you, Erik. I appreciate that. I will say, to I think Amy's and Anne's points, this is where we had landed on Tuesday, and I'm asking about the wording of it. With this addition of the suggested working group, I feel like this might be the way forward, or this is the temporary, or whatever you want to call it, short-term ABC, with the hope that we would develop new methodologies that would be more -- That might be the best practices, moving forward, and that we make sure that we're being consistent in applying this across stocks, but let's hear from Alexei.

DR. SHAROV: Thank you. I actually, essentially, wanted to respond to Chris's question, but Erik said it much better than I would have, as to why we're not currently doing the time series analysis, and there is a long history of attempts, and, essentially, there were a number of circles where people tried and failed, and then forgot and tried again, and the whole experience probably was negative, while the traditional approach is that we assume a certain mechanism, a number of relationships as to how the population works, and that's what essentially is our stock assessment model, and that prediction is -- As simple as the model is, nonetheless is based on our understanding of the processes within the population, as opposed to sort of a mechanical time series analysis.

I would like to propose that we approve the recommendation as we have it right now on the screen and proceed with the years of the average recruitment, based on the whole time series of the estimates.

DR. NESSLAGE: Thank you, Alexei. Then what I would suggest adding here, after the end of the first bullet after "recommendations", then would be that we add something about, however, we discussed alternative approaches and would echo our recommendation that a working group be formed to something, something, something, to develop best practices for incorporating recruitment and projections across all stocks, given a variety of conditions, or something along those lines. Can everyone live with this? I know there's a lot of angst. Amy.

DR. SCHUELLER: I can live with it if we actually say "recommend average recruitment". Right now, it's crossed out, and it says, "base level", and I really know what base level means. This looks good to me.

DR. NESSLAGE: Thank you. Anne Lange.

MS. LANGE: I agree. It looks good to me.

DR. NESSLAGE: All right. Are there other hands? Last chance here for this moment. I'm sure we will be revisiting this discussion at-length in the future, as hopefully this working group does -
- Fred Serchuk.

DR. SERCHUK: I concur, Chair. Thank you.

DR. NESSLAGE: Thank you, Fred. Anyone else on the SSC? Kyle, do you need guidance here? Is that why your hand is raised? I think we'll get to the more specifics later. Chris Dumas.

DR. DUMAS: Thank you, Erik and Alexei, for the background. I appreciate that. So, if we go with something like this, where we're just saying the average, then are we -- Is that based on an assumption that sort of one year is independent from the year before it, independent from the year before it, and so we're just going to go with the average? If the years are not independent, if we have some type of -- Like Alexei was saying, just some type of model, stock assessment model, why can't you just roll projections forward from that? I mean, unless the years are independent -
- Are there years not tied to each other at all? You can't just roll you model forward in time to get some estimates?

DR. NESSLAGE: The problem is that fish recruitment tends to be highly episodic, and assuming that the last few years are going to be the next few years turns out to be really not -- It's often not the case, and so just rolling it forward is why -- It's why a lot of people are having heartburn over that assumption, and so I think, unless you have strong objections to what's on the screen, we're going to go with what we've got here, and we will explore better approaches, perhaps, in the future. Is that okay, Chris?

DR. DUMAS: That sounds great. Thank you.

DR. NESSLAGE: I like the brainstorming, and I see that we're going to be picking your brain extensively as this working group moves forward, and so I appreciate that. Okay. We had a few other comments regarding this, justifying our decision, and do we want to still mention the retrospective analysis and the fact that some of the estimates and some of the peels were outside of the uncertainty bounds, or do we not want to? We've got the wording there, if you could highlight that, and we're on the top bullet there. Thank you. This was in our notes. Any problems with this? We can wordsmith later, and I'm looking at the clock. No hands. All right.

We also had mentioned that, for previous assessments, we had assumed lower recruitment when there was an extended time series of lower-than-average recruitment, I guess in recent years, and we should probably -- I'm not sure -- That we had assumed low recruitment in the past, because there had been a long time series of low recruitment. Amy, go ahead.

DR. SCHUELLER: I was just thinking that we could delete this or move it to where we're recommending a workgroup, so that they understand the scope of the species that are being impacted, because it's red grouper, black sea bass, red porgy, and we talked about it with tilefish, gag, and red snapper, and so there's six species that we already have discussed this topic for, and I don't want to -- I don't think we should get into the nitty-gritty of any of them, or the nuts-and-bolts or the ups-and-downs, and we should just say this workgroup is a recommendation, and these are the species that have been impacted. I don't know where that just got plugged in, but --

DR. NESSLAGE: I will make sure -- It got moved under the recommendation for a workgroup, but we may have to move these around, but I agree, and I've got you, completely. Maybe throw tilefish in there, just to remind me, if you would, please. Thank you, Amy and Chip. Okay. Unless folks disagree, I think that's a nice compromise there.

Then we're down to the typical information that we would use to look for evidence of year class strength in the years following the terminal year of the model, and those are not available for 2020, and so the whole point here is someone had made the point, and it was in our notes, that we might feel -- I'm not sure. I feel like this was a little shaky here. Would one more year of good recruitment change our minds? I am not sure we would, but I think this was from our discussion of would we have a trigger-based approach, and we're not going to have 2020 data, and so I'm happy to delete this, but it was in there. While folks are thinking about that, Kyle, do you have a point of clarification?

DR. SHERTZER: Not clarification, but I just wanted to mention, really briefly, that the Science Center has already formed a working group to examine best practices in forecasting, including the recruitment question, and I only mention it so that we don't have two parallel groups, if it's not necessary, but maybe joining forces.

DR. NESSLAGE: Yes, and are there are SSC members on that group?

DR. SHERTZER: No, and, right now, it's strictly Science Center.

DR. NESSLAGE: I think that's fantastic news, and I'm glad to hear that. I think we'll need to rope in some of the SSC on this, eventually at some point, and we can all work together to figure out how to make that happen, but thank you. That's good to know. This issue is coming to a head, clearly. All right. ABC Control Rule, do we want to -- I am feeling like that was part of a discussion regarding a potential alternative way to set an ABC, and is anyone bothered with getting rid of that? Jeff, go for it.

DR. BUCKEL: I was just going to suggest maybe having it as a sub-bullet underneath the working group, to give them something they can consider, right? Instead of losing that nice summary that you provided, that could be some part of the recommendation of that group, or something for that group to consider.

DR. NESSLAGE: How do we deal with the fact that we lost a whole year of information? Yes. Anyone opposed to that? We'll massage the wording. Fred Serchuk.

DR. BUCKEL: I guess just broader that this is -- Say they want to talk about a trigger. Then the broader thing is that these SERFS and catch-at-age composition data would be a potential to look at as a trigger.

DR. NESSLAGE: Yes. Chip, if you could just move that up under the workgroup recommendation, I will massage it in there. Fred Serchuk.

DR. SERCHUK: The only reason that I thought it would be useful to keep it there is that it does point out that we've lost important information, because of the pandemic, because there was no sampling, and the fact is, and I think the projections at the average of the high recruitment showed,

that this stock could be rebuilt by the middle of -- By 2025, or 2026, and so there's a stock that, as I recall, in a previous assessment couldn't be rebuilt until 2044 or 2045.

We have another assessment that says the stock is rebuilding, and we're seeing recruitments that we didn't project in the last assessment, and we don't know whether these recruitments will continue, and they may or may not, but we're going to assume average recruitment, because we are uncertain about whether this recruitment series of high recruitment will continue, but the impacts of the high recruitments continuing is extremely important, because it basically cuts down the rebuilding period if it proceeds from the next five years to going out to the next twenty years, and so there's a huge implication about what recruitment will be in the next few years relative to attaining the rebuilding target in a much shorter time series, and I don't think that's clear in any of our comments. The loss of data is what I'm saying, as a signal in 2020, and hopefully everything will be back by 2022, I guess. That's my only concern, Chair.

DR. NESSLAGE: Okay, and I just want to try and translate into what you want to --

DR. SERCHUK: The implications of not continuing -- Of recruitment not maintaining at its current level, that uncertainty and the lack of information, independent information, on recruitment hampers the impact of attaining the stock rebuilding target at much earlier time period than was predicated on the previous assessment. The stock has shown increases in productivity that were not forecast from the last assessment, and, if the last assessment was the one that set the rebuilding year to the mid-2040s, and conditions have changed, or at least the recent recruitments have shown that that target that was set on the assumption of average recruitment during an earlier period, and that's all. Thank you.

DR. NESSLAGE: All right. I'm going to suggest just leave it there, Chip. I will work with the committee to figure out exactly how to get that in there, but I didn't hear anyone say take it out, but it's just a matter of how it gets incorporated in there, and so let's keep moving.

I don't want to spend a ton of time on this, because we already did, and a bunch of this is tabled, and so the final decision regarding the ABC itself was -- That's it. I am just tabling it, but we did make some preliminary decisions along the way, and they are recorded here, with regard to what projections we wanted to see. I changed the recommendation that we do the P rebuild 50 percent to kind of soften the wording that the Center may wish to do that, because we anticipate that will be a request from the council, and that wasn't our recommended P rebuild. Hopefully that captures our discussions.

Regarding how we move forward, that's what this third red bullet there -- Regarding use of the two-step approach to forecasting, we have tabled our decision until we have an opportunity to review the following information, and this is what I need from you guys before we leave today. I want to make sure that I have a good understanding of what you would need to come consensus and make a solid decision on this, because I will be working with council staff and the Center to make sure that we have all of this for the next meeting and you have adequate time to review it, and so I thought I heard us say that we wanted a refresher presentation on the new proposed two-step approach to forecasts, because, by then, it will not be fresh in our minds.

A presentation on available descender device usage data, and that would be that Working Paper 15, as well as any other critical information that was used to characterize discard mortality by

block, and I feel like there was a lot of roundabout about what block to use as well, although we kind of settled on three, but it was a little tenuous, and so I would like to make sure that we understand the decision we're making and can justify it.

Then there was a recommendation in our notes for some comparison of some of the metrics among the various assumptions, or runs with different assumptions, and so a comparison of SSB, total kills, discard mortality, and landings for Scenarios 1 and 5.

Then I assumed that what people were saying, if I understood correctly, is we wanted to see both the 25 and the 75 percent descender device assumptions, with and without reallocation of dead discards to retain catch, and we went round and round, and I feel like, if folks would like to -- This is a bit of work for Kyle, and so, if we can narrow this list at all, that would be great, but, if we really feel like we need to take a look at all of this, then we need to be honest and ask for it, but we need to do it now, because he needs time to prep for our next meeting, and so I will open the floor to SSC members. Does this capture what we're looking for? Anne.

MS. LANGE: I guess, if we're looking at the two-step process, isn't the last bullet the second step? Isn't that the reallocation of the dead discards to retain catch, or am I way off remembering things from several days ago?

DR. NESSLAGE: No, you're right. I believe so. Kyle, correct me if I'm wrong in anything I'm saying. I guess where this is coming from is we seem to be -- There was a -- I don't remember, off the top of my head, but it seems like there were folks who were supportive of the second step and those who weren't, and seeing the total impact -- All we had from the slide from Kyle was he had done one run, and it was like a 21 percent difference in the landings, but that was kind of just a one-off that he had done because he was doing it at the last minute, and so a more thorough exploration of the impact of this decision might be something that would help the SSC move in a direction towards coming to a decision. Amy, what do you think?

DR. SCHUELLER: I had two points. One, there is -- It says a presentation on available descender device usage data and any critical information used to characterize discard mortality by block, and I would really like more information on uncertainty related to that as well, and so, if we could just add in a little piece that says, "and uncertainty", I would be happy with that.

Then I'm sort of going to come back to what Anne just said and what you asked, and so the with and without reallocation of dead discards to retain catch, my thought about it is that we're reviewing that method to determine whether we're going to use it to set an ABC, and, if we do not have that, then we won't be able to set an ABC at that meeting, and so I think -- I know it's work for Kyle, but I think we should have that information at-hand, so that, whatever we decide, we have everything we need to set an ABC.

DR. NESSLAGE: Well said. Thank you, Amy. Scott.

DR. CROSSON: Amy said it before I did. I mean, I just want to make sure that we walk out of the next -- Well, not walk, but virtually walk, out of our future meeting with an ABC recommendation and not more recommendations for more investigations, because I want to know -- We're limiting ourselves right here, and so, for the people that were not willing to set an ABC at this meeting, I want to make sure that they're willing to make a choice, based on the limited

number of options that are going to be available to them at the next meeting, and I'm concerned, and I don't want us to get to a point -- I don't want to be dismal about it, but I just don't want to get to a point where we get to the next meeting and we're still stuck with two different wings of the committee not agreeing.

DR. NESSLAGE: I agree. Well said, Scott. Anything that anyone wants to see added? This is the time. Jie, while you think about it, I had moved that recommendation, and it sounded like you might want to see exploitation in terms of SSB. If you still do, this would be the time to ask Kyle to do that. If not, we can take it off the plate.

It doesn't have to do with projections, per se, but it was more information regarding how to characterize the stock, and I just threw it in there, because it seemed out of place where it was in the notes, and so, folks on the SSC, is there anything else that you want to see? Kyle, if any of this is unclear, this would be the time to please speak up. You can get rid of that next comment as well, please, Chip. No hands. All right. I'm not sure -- If Jie really wants exploitation in terms of SSB, he can -- Kyle, how hard is that?

DR. SHERTZER: I was going to ask for clarification, if I could.

DR. NESSLAGE: I don't know if Jie stepped away. I might have just called him out. We're getting close to 5:00, and so I'm afraid that we're going to start losing people. Jie, there we go. Go ahead.

DR. CAO: I am not sure how big of a difference they are, and maybe Kyle can speak to that a little bit.

DR. SHERTZER: I guess my question is exploitation in terms of SSB?

DR. CAO: Yes.

DR. SHERTZER: I mean, I guess I could add that into the computation in the assessment model, and it would take a long time to rerun all of that for all the MCBE runs.

DR. NESSLAGE: Can you just do the base run, just to give us an idea?

DR. SHERTZER: Yes, I could do that.

DR. NESSLAGE: Is that what you're looking for, Jie, just some idea of how it differs from --

DR. CAO: Yes, exactly. Yes.

DR. NESSLAGE: Okay. So that's doable then, Kyle, do you think?

DR. SHERTZER: Yes, I think that's doable. I mean, I don't think it will differ much, and doing an abundance versus doing it in total biomass of age-one-plus didn't differ much, but I can certainly add the maturity vector. I can do this.

DR. NESSLAGE: Thank you. Okay. I don't see any other hands for additions or modifications. Kyle, do you think we're at a good place here, with regards to communication?

DR. SHERTZER: Well, I just have some questions, I guess, about the different scenarios that are being requested. So there's the with circle hooks, 25 percent, and that's using the Block 3, right, and so that's asking for standard projections, but based on Block 3, if I understand correctly, and then, with circle hooks, the 75 percent, that's using Block 4, and so that's essentially what was already done, the method that was in the report.

DR. NESSLAGE: Yes.

DR. SHERTZER: Then the next one, with and without reallocation, that's the -- That, I think, pertains to the two-step approach.

DR. NESSLAGE: Yes.

DR. SHERTZER: That is whether or not we use the Block 3 there, but then you can reduce the discard F, and then there's the option of whether you want to allow those surviving fish to be caught or stay in the population, and so that's sort of a branching point of whether we increase the landings F or not.

DR. NESSLAGE: Was that a question, or you're --

DR. SHERTZER: I'm just stating my understanding, and, if I'm wrong, then tell me. So I think what's actually listed here are four different scenarios.

DR. NESSLAGE: Yes, I believe so. That's my understanding, but, if anyone else has a different understanding, this would be the time to tell Kyle.

DR. SHERTZER: Those each get applied with the P rebuild, two different P rebuilds, and so --

DR. NESSLAGE: The OFL -- Yes. Scenario 1 and Scenario 5, in particular.

DR. SHERTZER: So there's two P rebuilds and then the F 30, and so there's three different scenarios, and so it's three by four projections that you're asking for.

DR. NESSLAGE: Yes.

DR. SHERTZER: Okay. I did have another question about the start year. The week before the SSC meeting, the council asked for revised projections with a start year of 2021, presumably because they had expected to make decisions at the June meeting, but that's not going to happen this year, and so is the start year going to be 2022 for these projections?

DR. COLLIER: Kyle, could we get back with you on that after the June meeting and I can see what the council has their project schedules?

DR. SHERTZER: Maybe. How quickly after the June meeting do you want to look at a report?

DR. COLLIER: That is a good question. It, obviously, would be as quickly as possible, but how much time would you need after the June meeting, I guess?

DR. SHERTZER: Well, I mean, I can set the code up. Several weeks, I think, to run everything.

DR. COLLIER: Okay. So if we plan a month after the June meeting, would that --

DR. SHERTZER: Do you expect, at the June meeting, that there will be a lot more discussion that might change or modify this SSC request?

DR. COLLIER: I mean, it's likely to be 2022 when management would go in place, but I'm not for certain on that. You know, maybe there's going to be an additional request to try to get this done in 2021, or maybe they're going to delay it until 2023, and I'm just not certain exactly where we might be, and so I wish I could give you more guidance, but I just can't right now, Kyle, but, if council members want to provide any guidance, they are more than welcome to chime in here.

DR. NESSLAGE: I would think the council members would want to converse amongst themselves first. Is it possible that Steve could orchestrate that and get back to Kyle before the June meeting? Sorry to put you on the spot, Steve.

MR. POLAND: Yes, and I would have to talk to John about that. I don't want to run afoul of open meeting issues and that kind of stuff and having a discussion that might affect policy, not within a public forum, but I'll check with council staff and see.

DR. NESSLAGE: That's a good point. Okay. So I will leave this to council staff, the Center, and the council to hash out, but this is at least the SSC's wish list, and is that -- With regard to whatever the council wants for the start date of management, and is that understood? Are there any other questions, Kyle?

DR. SHERTZER: No. Thank you.

DR. NESSLAGE: Thank you. We recognize this is a lot of work. Okay. I know it's 5:00, but I would like to at least go through the rest of these very quickly, and I don't think the rest of these are as contentious, and so hopefully we can finish up quickly here. The SSC -- Some of these are minor, and we can hash these out in the report section, about using a working group, like we had our group meet, and hopefully that's not too controversial, but you can tell me, if so, in the report edits.

The rest of that is placeholder for pointing people to elsewhere. If we scroll down, the interim bit I killed, because that didn't seem to be going anywhere, even though that was still in the notes. We talked about monitoring and recruitment signals in the SERFS data as monitoring metrics, as well as changing the age composition of the catches. In the report, they had a suggestion to continue improving recreational landings and discards and increasing sampling with stereo video cameras, which seemed very reasonable, and so, if anyone has any objections, but I thought we could echo that recommendation, and we always want better monitoring of recreational landings and discards, and that probably goes without saying. I am not seeing any hands in protest.

We'll keep moving on to research recommendations. I organized them into ones that were already in the assessment and ones that are not, and we were in agreement on the we need empirical estimates of natural mortality, particularly of the young fish, because that's where the uncertainty was in the curve.

Monitor the use of descending devices and account for non-independence of the two indices that were split, and that was already in there, and so we're just echoing that, and those were already in our notes as well, and then our new recommendations were study timing of peak spawning, quantify egg viability, and conduct a retrospective review of projections.

I believe that's it for red snapper. I am not seeing any hands raised, and so I'm going to give folks a chance to breathe, but I think we might have made it through, and I recognize it's 5:03, but there is one other item that was brought to my attention regarding tilefish that we need to discuss before we break, because it impacts what Nikolai would do for projections that we didn't think about when we were going through, and so if we could very quickly go down. At this point, you've all seen these. If you have any other comments or changes to the notes from last week, but, Scott, go ahead.

DR. CROSSON: I guess I'm maybe jumping the gun here, but we're going to be getting tilefish projections in the SSC report, and gag projections, for the ABC level recommendations that are coming from those two assessments before we sign-off on it?

DR. NESSLAGE: Yes, that's my understanding.

DR. CROSSON: That's my understanding as well. Okay. I'm sorry to interrupt.

DR. NESSLAGE: No, and the one we won't have is Table 1, red snapper, but I won't ask you to approve it afterwards either, and so, Chip, do you want to walk us through the concern that was raised?

SEDAR 66 TILEFISH ASSESSMENT REVIEW (CONTINUED)

DR. COLLIER: Sure. When I was going back and reviewing the last development of the ABC for golden tilefish, you'll notice that there was a question in here about the buffer between OFL and ABC, and that was -- There was an ABC that was recommended from the SSC in 2016, and then it went back to you guys in 2017, and one of the reasons for that is the buffer was around 40 percent for tilefish, which is much higher than any other buffer that we have between the OFL and the ABC, and so Regulatory Amendment 28 actually revised the ABC recommendation for tilefish, and what the SSC recommended, at that point, was 75 percent FMSY be used, as opposed to the ABC Control Rule with a P*.

A similar situation is occurring here as well, where, if you look at the buffer between OFL and ABC recommended that would be developed through the P* approach, that is going to be larger than what would be the 75 percent FMSY predicted yield stream, and I believe those are both in Nikolai's presentation that he gave to you, and they were the last two tables in the assessment report, and I can -- If you give me one second, I can pull it up for you guys.

Although Scenario 3 isn't exactly what you guys had recommended, and I believe it was a P* of 32.5 is what is being recommended, you will see, here in 2022, that the median landings is 375,000 pounds, and then, continuing on into that 75 percent FMSY, it's looking at 426,000 pounds, and so I just wanted to have some discussion about which method you guys would recommend or if both were equally valid, given that both have been used. One has been used for tilefish in the past, and then the other is the more common method, and so I just wanted to point that out to you guys, because I did forget to bring it up while the discussion of SEDAR 66 was going on. Did that make sense?

DR. NESSLAGE: I think so, Chip. Thank you for that, and so do we have -- How do folks feel about our old recommendation relative to our new recommendation? The new recommendation was simply going through our decision tree, and I admit I had forgotten as well that we had made that alternative recommendation, and so shall we be consistent with our last recommendation and go with 75 percent of FMSY, or do we go with our new P*? I recognize that it's really late in the day, and this is throwing a curveball at folks at the last minute, but I feel like it will probably -- The question is going to come right back at us in June, and so, if we can hash it out today, that would be great. Amy.

DR. SCHUELLER: My question is what was the reason that we moved from the standard method for all the species to that method, and seeing two landings tables doesn't help me with that. Is the only reason because some folks feel that the uncertainty distribution is broad, or is there any other reason? I know I was here for those decisions, but I don't remember.

DR. COLLIER: As you guys have discussed during this meeting, there was -- A lot of the uncertainty is due to the natural mortality estimates and the range that was -- Which was larger in the previous assessment, and the range of natural mortality was reduced in this assessment, but I just wanted to bring that to the SSC's attention and have you guys discuss it, and, yes, the broadness of the buffer was an issue when we were looking at -- I think it was over a 50 percent buffer between the OFL and the ABC for a commercial fishery that is monitored by -- It's a pretty well-monitored fishery, and it's a small fishery, and it's got all the attributes that we would want for collecting data. However, you do have that long lag time between when recruitment starts and when fish are born.

DR. NESSLAGE: So this stock is no longer overfished or overfishing, correct?

DR. COLLIER: That's correct. You just have that 2.5 there in the stock status tier, which is indicating that it's close to the boundary, but it's not overfished, and overfishing is not occurring.

DR. NESSLAGE: I guess could you -- Maybe you had it up before, but can you pull up Nikolai's projections, and I think it's his PowerPoint, page 66? So F would go down, correct, and the spawning stock would continue to increase under this scenario? Am I reading that right, but it would give them a little bit more landings, and is that essentially what we're talking about?

DR. COLLIER: That is correct, yes.

DR. NESSLAGE: Does the SSC feel that the buffer is -- How do I put it? Possibly incorporating more uncertainty than is necessary, which is essentially what's being asked when we're asked to consider this Scenario 4, right? I think we've worn them out, Chip. Amy.

DR. SCHUELLER: I'm still here.

DR. NESSLAGE: I know you are. You're great.

DR. SCHUELLER: I think that we -- The assessment panel addressed the uncertainty in natural mortality in this assessment. I think that the MCBE runs still show a high degree of uncertainty, based on data that we feel like are pretty uncertain, given the indices and other things for this species, and, when we looked at that sort of plot of status for those different MCBE runs, and we spent a lot of time talking about how, while the base run is in a status that we're happy with, or everybody should be happy about that, it's not really super certain, and so I don't know.

I guess I'm feeling like we should be using the standard method to apply -- By applying the P^* , unless there's some really compelling reason to do something otherwise, and I can't really say whether a little bit of extra landings -- What impact that might have on the stock, but it might be a negative impact on the stock, and they might end up in a status where they are suddenly overfishing, which I assume the fishery wants to avoid in the assessment, potentially, and I just think there's a lot of uncertainty in this assessment, and I think that the P^* approach is pretty standard, and I don't really see a big reason to move. I understand it's a small fishery and that they have good accounting, and I appreciate that, for sure.

DR. NESSLAGE: Thank you, Amy. Scott.

DR. CROSSON: I agree with what Amy said. This is a largely commercial fishery that's run with good accounting. To my mind, it's like this doesn't change anything, and I feel like we should just -- We already went through everything with the ABC Control Rule, and, if we had come to some major conclusion about why this was not applicable while we were going through it, then we would have decided it then. At this point, we didn't see anything like that come up, and so we talked about the uncertainty with the stock assessment and how it seems to be hovering around a lot of the reference points, and I think we came to a reasonable conclusion about how to apply the ABC Control Rule based off of those factors, and so I think we should continue forward with the methodology that we've used at this meeting already.

DR. NESSLAGE: Thank you, Scott. Chip, to that point?

DR. COLLIER: I was just going to read the reasoning from Regulatory Amendment 28, and so the council asked the SSC to consider setting the acceptable biological catch for golden tilefish at 362,000 pounds for 2019 and 2020. This is whole weight ABC implemented by an interim rule for 2018, and the council is willing to accept the risk of overfishing associated with this harvest level, which equates to approximately a P^* of 40 percent.

The SSC agreed with the rationale provided by the council to increase risk tolerance for setting the ABC until golden tilefish can be reassessed. The next assessment is set for 2019. The SSC cautioned, however, that, given the amount of uncertainty in the update, there may be significant risk with accepting a higher risk tolerance, but, since golden tilefish is primarily harvested by commercial fishermen, it's easier to control. Additionally, historical management of golden tilefish has a good record of not exceeding its annual catch limit. That was from Regulatory Amendment 28.

DR. NESSLAGE: Thank you. I am not seeing any other hands raised, which makes me think that we might make this recommendation to the council, and, if they still are willing to accept that level of risk, and would like to make a similar request, then that would be the way we would go, and we can reconsider at a later date, but I feel like, at this point, I'm not hearing a lot of support for this, at the moment. I am watching the hands, and I'm not seeing anyone raising their hands in support of changing it, and so thank you for bringing that up, and I expect we will discuss it again in the future, but I think, at this point, we will leave our recommendation as it stands.

We are at 5:17, and I recognize that. We have a number of consensus statements that I sent around. I am going to -- In the interest of time, unless someone looked through this and saw something that they absolutely couldn't live with, I am going to suggest that folks take a very close look in the next day or two, and, if you see anything that's absolutely horrid and you just can't live with it, and it needs to be brought up to the SSC -- Not on red snapper, but any other issue that we haven't covered at this point, then bring it up, and I will facilitate an email discussion but I think we did a really good job coming up with consensus statements on the fly for all these other agenda items.

I'm going to give it a few days, as I start to draft this report, and, if anyone has any major heartburn over any point, please let me know, and I will make sure it's ironed out, but you will have a chance to see the report. I am hoping to get it to you within the next week, as a draft, and you'll have a little over a week to get it back to me, and then I'll have a chance to edit it and get it in the briefing book for the end of May, and so that's my plan. I see no hands still, and so there's no burning screaming about any other consensus statements. Scott has got one. Go ahead, Scott.

DR. CROSSON: I am not going to break any kind of consensus, but I just wanted to acknowledge that you did an amazing job chairing this SSC meeting this time, because this was a really rough one. That's all.

DR. NESSLAGE: Scott, you made my day, my week. Thank you. Thank you for bearing with me, everyone. We still do need to take public comment. There were a few other comments, and I'm going to table Other Business. We will do Other Business over email, and so, staff, am I forgetting anything other than the public comment?

The other thing, regarding next meetings, is we need to mess with those dates, and we'll get back to you regarding dates, because those dates aren't necessarily good for me, and we discussed that, and so we will be in contact regarding dates for the fall meeting with you also over email. Is that correct, Chip?

DR. COLLIER: That is correct, yes, and the topics that are in Other Business -- It's not necessarily management-related topics, and so there's not much concern what's going on with those. One is looking at the schedule for the National SSC and providing comments for that, and another is talking about setting -- It's just a little bit of discussion on the EwE model, when the reviews of that would occur, and then the final one was -- I'm drawing a blank on it. Let me scroll down, real quick.

DR. NESSLAGE: The scamp research track. We need volunteers.

DR. COLLIER: Yes, and we need two volunteers for that, and the reason that we need volunteers is because we've had some SSC members that were part of the assessment development team, but we also need reviewers for the assessment, and they can't be the same people. Thank you.

DR. NESSLAGE: Yes, and so all of that will be just communication with the SSC, to try and coordinate that. Is there anything else that I'm missing, Chip, besides public comment, and we'll end with that?

DR. COLLIER: Just the research recommendations, and, once again, that has nothing to do with catch level recommendations or anything like that, and that is just looking at research, and we felt like, given the importance of all these other topics, that that could be covered through a desk review as well.

DR. NESSLAGE: So you will be hearing from Chip. All right. Anything else from the SSC before we go to public comment? Questions or comments or complaints or accolades?

DR. SCHARF: Genny, is the plan that we would be meeting back in-person again in October for the fall meeting?

DR. NESSLAGE: Again, we will be in contact with the whole SSC to try and make that decision, with everyone's feedback, and so hold on tight regarding that. We will be reaching out to you.

DR. SCHARF: Okay.

DR. NESSLAGE: Is that a good enough answer for the moment?

DR. SCHARF: Yes.

DR. NESSLAGE: Okay. Cool. I had similar concerns and questions, and so we're going and try and work that out as a group. Good question. Anything else from the SSC? If we have the ability, let's go to public comment. Those folks who are still with us, I'm so impressed. Please raise your hand if you have something you would like to share with us. Rusty, go ahead.

PUBLIC COMMENT

MR. HUDSON: A question, and am I allowed to comment overall, or just on red snapper?

DR. NESSLAGE: Anything you want at this point. Go for it.

MR. HUDSON: Cool. Let me just start with red snapper, just for grins. That one to four-year-old reference that you all have on the largest age class, you wind up needing to realize that, when we established the twelve-inch minimum size in the early 1980s, it was a one-year-old. When we established, in 1992, the twenty-inch minimum size, it was a three-and-a-half-year-old, and so that all fits into your one to four-year-old, but your five to twelve-year-olds gets into those growth sizes that wind up taking you right up to what we call sow snappers and pony snappers and fat chickens and whatever, historically.

Those animals don't tend to hide from whatever is going to prey on them, and they're actually able to maneuver around, and they get into the higher water columns than the chevron traps ever dreamed of being able to film anything in.

Looking at the various situations with the commercial hook-and-line that came up, there is two ways to look at that. There is the rod-and-reel with the monofilament, and then there's the bandit reels, with usually a type of wire on their spool. The bandit reels could fish in the deeper waters and catch the bigger red snapper, but the problem is that, from Port Canaveral south to Fort Pierce, that got closed in 2000, and that bottom, out to say 330 foot, from the big ledge at 165 on top and two-hundred-and-whatever, you go offshore, and that's where you can find not only the big red snappers, but the black bellies, the big gag male groupers.

You all should be collecting those gonads and otoliths from every male that comes across the dock, commercially, and have weight and lengths assigned. There seems to a paucity of information about the reality of our fishing, but, right now, our red snapper have taken over a lot of our reefs, inshore and offshore, but, when you talk about descending devices, you've got to talk about ninety foot or less, or, like Mel Bell, and he should be on here right now, the sixty-something-foot mark.

Either way, you have a bulk of those animals that don't need descending devices and do not need venting, and yet I supported everything from dehooking devices and venting devices and descending devices for two decades now, and all of that is a better way to operate, but these estimates of estimates from the recreational impact, on whatever input you want to deal with, discards, catch, landings, playing with your food and releasing it to die, and I hate to say that, and I'm sorry I said what I did about the allocation thing, and I had a real big problem, the other day, with the shadow shark, and I'm sorry, and the lack of pounds and using values across the years to compare to whatever in the recreational, and it was like total apples and oranges.

That's part of what we're seeing from us, the food producers, that are about to go belly up, and I think anybody in the fishing business knows what that means, and so back to the large red snapper, the twelve pounds to thirty pounds. They get up into the higher water column than the small red snapper that have to hide from the proliferation of sandbar sharks and other stuff that's going on, because we're rebuilding stuff without previous stock assessments and without previous understanding of everything.

Essentially, golden tilefish, the peewees, you know, when they did the first expanded area of the Oculina, they took it out to 660 foot on the north end and whatever down, 600 foot, on the south end, and it was parallel to the shore, and Ben Hartig can tell you about the peewees that he could catch just south of that in the shallower water, 450 to 600, but nobody has been sampling that for twenty-something years. Why? That begs the question. The other day, you all might have saw this NOAA Hawaii thing on sound assessments of snappers, and you all ought to look into that. Thank you.

DR. NESSLAGE: Excellent. Thank you, Rusty. I believe Chip has something from Mike.

DR. COLLIER: It is Mike Merrifield from yesterday, where he was unable to provide a comment, and he was having some audio issues.

DR. NESSLAGE: Do you mean earlier last week, or was it earlier today?

DR. COLLIER: Yes. Sorry. My days run together now, but, yes, it was during the allocation decision tree discussion.

DR. NESSLAGE: Thank you.

DR. COLLIER: So Mike provided this following comment. First, I have a comment, on numerous occasions, the comparison of recreational to commercial. The commercial impact has always been an apples-to-orange comparison. The commercial economic impact is based on ex-vessel price, the entry point into the economy, and it's not inclusive of any costs that make it happen. The recreational impact analysis has typically included boat, trailer, mileage, meals, hotels, restaurants, and more. Commercial vessels require constant maintenance, fuel, tackle, replacement, bait, captain, crew, insurance, a place to dock or a trailer, and more.

Then there is the extended economic value of the landed product in the market. For every dollar of product landed at the dock, there are transportation and distribution processing and packaging costs associated with getting the product to the retailers and the restaurants around the country for U.S. seafood consumers. There are dock employees, transportation employees, processors, market workers, restaurant employees, and that one dollar of product has a multiple of twenty-five to fifty-times by the time it reaches the end consumer.

Just like advertising that is a temporary blast to maximize participation in a sport tournament, retailers and restaurants are advertising every week to sell the fresh catch that they are offering. I feel the commercial sector is about to be marginalized in the allocation process, as more allowable catch is being added, based on an FES survey that few have any level of confidence in. The commercial sector is currently allocated 27 percent of the finfish in the South Atlantic. 27 percent of the finfish are for the American seafood consumer, and the remaining 73 percent are for recreational anglers that can afford a boat or to pay someone to take them fishing.

We cannot meet the demand of the American seafood consumer with the domestic seafood production, but we could do better. Analysis of national seafood consumption trends should be included in the allocation decision tree or tools. Seafood consumption in the U.S. is up, but it still does not meet the USDA daily average recommended, which means it will most likely increase. 35 to 38 percent of the seafood consumed in the U.S. is domestic, according to new analysis by the Sustainable Fisheries of the University of Washington.

During the COVID pandemic last year, seafood was the fastest-growing supermarket category in May of last year, and it has continued to surge. This was a much-needed shift in the demand, as the restaurant industry was in full or partial lockdown. I have had to purchase more imported finfish in the last year than ever before, due to the demand and the lack of available domestic product.

Accountability is a major issue, and the commercial sector is completely accountable for resources being caught, and there needs to be a better accountability across sectors. I heard references to the most efficient sector and most economic gain regarding allocation, but I did not hear most accountable sector.

This is a complex issue, and it will not only require a complex tool and process, but it will require good, complete, thorough, and transparent data on the frontend to put through the process. Otherwise, garbage in, garbage out. Thank you, Mike Merrifield, Cape Canaveral Shrimp Company.

DR. NESSLAGE: Thank you for that, Mike, and Chip for reading that, and sorry we were having audio issues earlier. Is there other public comment? No hands raised. Excellent. Well, thank you all very, very much for a very long meeting, four days of intense SSC business, and I thank you for your attention and your contributions and your patience with me, and I look forward to communicating with the SSC and getting the edits to the report and reporting that out to the council in June. Steve Poland, do you have something to share?

MR. POLAND: Thank you, Genny, and I'm not going to take long, because it's already 5:30, but I just wanted to thank the SSC for all of you all's time and engagement and hard work since last Tuesday, and even before, because I know you had to prepare for the meeting, and so I just wanted, on behalf of the council, to thank you all for the discussions over the last week, and good job, Genny. This was a long, tough meeting, and you did a great job chairing.

DR. NESSLAGE: Thank you so much, Steve. It's greatly appreciated. All right. Chip, is there anything else to come before the SSC that you know of?

DR. COLLIER: Recess or adjournment?

DR. NESSLAGE: All right. Unless I see anything else in the next few seconds, we are adjourning, and we're adjourned. Thank you, all, so much.

(Whereupon, the meeting adjourned on May 3, 2021.)

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May 20, 2021

Scientific & Statistical Attendee Report: Committee Meeting

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Scientific & Statistical Attendee Report: Committee Meeting

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Last Name

Addis
BYRD
Bell
Bianchi
Brouwer
Bubley
Buckel
Cao
Carmichael
Chaya
Cheshire
Collier
Conklin
Courtney
Cox
Craig
DeVictor
Dumas
Emery
Errigo
Finch
Fitzpatrick
Flowers
Foss
Franco
Gentry
Grimes
Grimes
Griner
Hadley
Helies
Hoog
Howington
Hudson
Hull
Iberle

First Name

Dustin
01JULIA
00Mel
Alan
01Myra
Walter
Jeff
Jie
01John
Cindy
Rob
Chip
Chris
Dean
Derek
Kevin
Rick
Christopher
Jeff
Mike
Margaret
Eric
Jared
Kristin
Dawn
Lauren
Shepherd
Churchill
Tim
01John
Frank
Andrea
Kathleen
Rusty
James
01Allie

Johnson	Eric
Klibansky	Nikolai
Kolmos	Kevin
Kyp	John
Laks	Ira
Laney	Wilson
Lange	Anne
Larkin	Michael
Latchford	Lauren
Li	Yan
Marhefka	Kerry
McCoy	Sherylanne
McCulloch	Tracy
Mehta	Nikhil
Merrifield	Mike
Neer	Julie
Nesslage	01 Genny
Poholek	Ariel
Poland	00Steve
Pulver	Jeff
Ralston	Kellie
Reichert	Marcel
Rhodes	01Cameron
Runde	Brendan
Scharf	Fred
Schmidtke	01Michael
Schueller	Amy
Sedberry	George
Serchuk	Fred
Seward	McLean
Sharov	Alexei
Shertzer	Kyle
Smarrito	Michael
Smart	Tracey
Smit-Brunello	Monica
Stemle	Adam
Switzer	Ted
Thompson	Laurilee
Travis	Michael
Turley	Brendan
Vaughan	Douglas
Vecchio	Julie
Vincent	Matthew
Walter	John
Wiegand	01Christina
Williams	Erik
Wyanski	David

beckwith
crosson
sminkey
thomas
vara

anna
scott
thomas
01suz
mary

Scientific & Statistical Attendee Report: Committee Meeting

Report Generated:

04/30/2021 09:12 AM EDT

Webinar ID

548-857-227

Actual Start Date/Time

04/29/2021 08:32 AM EDT

Last Name

Addis
BYRD
Bell
Bianchi
Brouwer
Bubley
Buckel
Carmichael
Chaya
Cheshire
Conklin
Courtney
DeVictor
DuBeck
Dumas
Emery
Errigo
Evans
Finch
Fitzpatrick
Flowers
Foss
Franco
Gentry
Grimes
Grimes
Griner
Hadley
Helies
Howington
Hudson
Iberle
Johnson
Klibansky
Laks
Laney

First Name

Dustin
01JULIA
00Mel
Alan
01Myra
Walter
Jeff
01John
Cindy
Rob
Chris
Dean
Rick
Guy
Christopher
Jeff
Mike
Joseph
Margaret
Eric
Jared
Kristin
Dawn
Lauren
Churchill
Shepherd
Tim
01John
Frank
Kathleen
Rusty
01Allie
Eric
Nikolai
Ira
Wilson

Lange	Anne
Larkin	Michael
Latchford	Lauren
Li	Yan
Marhefka	Kerry
McCoy	Sherylanne
Mehta	Nikhil
Merrifield	Mike
Neer	Julie
Nesslage	01 Genny
OFarrell	Halie
Peterson	Cassidy
Poland	00Steve
Pulver	Jeff
Ralston	Kellie
Reichert	Marcel
Rhodes	01Cameron
Scharf	Fred
Schmidtke	01Michael
Schueller	Amy
Sedberry	George
Serchuk	Fred
Seward	McLean
Sharov	Alexei
Shertzer	Kyle
Sinkus	Wiley
Smart	Tracey
Smit-Brunello	Monica
Stemle	Adam
Stemle	Adam
Tong	Amanda
Travis	Michael
Vaughan	Douglas
Vecchio	Julie
Vincent	Matthew
Walter	John
Wiegand	01Christina
Williams	Erik
Wolfe	Jordan
Wyanski	David
beckwith	anna
crosson	scott
sminkey	thomas
thomas	01suz
vara	mary

Attendee Report: Scientific & Statistical

Report Generated:

05/03/2021 07:58 PM EDT

Webinar ID	Actual Start Date/Time	Duration
548-857-227	05/03/2021 08:36 AM EDT	8 hours 60 minutes

Attendee Details

Attended	Last Name	First Name
Yes	Addis	Dustin
Yes	BLOUGH	HEATHER
Yes	BYRD	01JULIA
Yes	Bell	00Mel
Yes	Bianchi	Alan
Yes	Brouwer	01Myra
Yes	Bubley	Walter
Yes	Buckel	Jeff
Yes	Cao	Jie
Yes	Carmichael	01John
Yes	Chaya	Cindy
Yes	Cheshire	Rob
Yes	Conklin	Chris
Yes	Cox	Derek
Yes	Craig	Kevin
Yes	DeVictor	Rick
Yes	Dumas	Christopher
Yes	Emery	Jeff
Yes	Errigo	Mike
Yes	Finch	Margaret
Yes	Fitzpatrick	Eric
Yes	Flowers	Jared
Yes	Foss	Kristin
Yes	Gentry	Lauren
Yes	Grimes	Churchill
Yes	Grimes	Shepherd
Yes	Griner	Tim
Yes	Hadley	01John
Yes	Helies	Frank
Yes	Howington	Kathleen
Yes	Hudson	Rusty
Yes	Hull	James

Yes	Iberle	01Allie
Yes	Iverson	01Kim
Yes	Johnson	Eric
Yes	Klibansky	Nikolai
Yes	Laks	Ira
Yes	Laney	Wilson
Yes	Lange	Anne
Yes	Li	Yan
Yes	Marhefka	Kerry
Yes	McCoy	Sherylanne
Yes	McGovern	Jack
Yes	Mehta	Nikhil
Yes	Merrifield	Mike
Yes	Neer	Julie
Yes	Nesslage	01 Genny
Yes	OFarrell	Halie
Yes	Peterson	Cassidy
Yes	Poland	00Steve
Yes	Pulver	Jeff
Yes	Ralston	Kellie
Yes	Reichert	Marcel
Yes	Rhodes	01Cameron
Yes	Sanchez	Joseph
Yes	Scharf	Fred
Yes	Schmidtke	01Michael
Yes	Schueller	Amy
Yes	Sedberry	George
Yes	Serchuk	Fred
Yes	Seward	McLean
Yes	Sharov	Alexei
Yes	Shertzer	Kyle
Yes	Smarrito	Michael
Yes	Smart	Tracey
Yes	Smit-Brunello	Monica
Yes	Stemle	Adam
Yes	Travis	Michael
Yes	Turley	Brendan
Yes	Vaughan	Douglas
Yes	Vecchio	Julie
Yes	Vincent	Matthew
Yes	Walter	John
Yes	Wiegand	01Christina
Yes	Williams	Erik
Yes	Willis	Michelle
Yes	Wyanski	David
Yes	beckwith	anna
Yes	crosson	scott

Yes
Yes
Yes

sminkey
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