# SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## SCIENTIFIC AND STATISTICAL COMMITTEE

**Town and Country Inn**
**Charleston, South Carolina**

**April 18-20, 2023**

**Transcript**

**SSC Members**

Dr. Jeffrey Buckel, Chair
Dr. Frederick Scharf, Vice Chair
Dustin Addis
Dr. Walter Bubley
Dr. Jie Cao
Dr. Scott Crosson
Dr. Kai Lorenzen
Anne Markwith
Dr. Marcel Reichert
Dr. Chris Dumas
Dr. Jared Flowers
Dr. Eric Johnson
Anne Lange
Dr. Fred Serchuk
Dr. Alexei Sharov
Dr. Jennifer Sweeney-Tookes
Dr. George Sedberry
Dr. Amy Schueller

**Council Members**

Dr. Carolyn Belcher, Chair
Trish Murphey, Vice Chair
Mel Bell
Tim Griner
Kerry Marhefka

**Council Staff**

John Carmichael
Dr. Chip Collier
Julia Byrd
Dr. Judd Curtis
John Hadley
Dr. Julie Neer
Meg Withers
Roger Pugliese
Dr. Mike Schmidtke
Kathleen Howington
Myra Brouwer
Kim Iverson
Nick Smillie
Suzanna Thomas

**Observers and Participants**

Rick DeVictor
Shepherd Grimes
Nikhil Mehta
Frank Helies

Other observers and participants attached.

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at the Town and Country Inn in Charleston, South Carolina on April 18, 2023, and was called to order by Dr. Jeff Buckel.

## INTRODUCTIONS

DR. BUCKEL: Good afternoon, and welcome to the April 2023 South Atlantic Fishery Management Council's SSC meeting. My name is Jeff Buckel, and I will be chairing the meeting today. Thank you all for attending. We're going to first do voice recognition, and then we'll get to meeting items, and so I'll go first. Jeff Buckel, North Carolina State University, and then we'll start with Anne and go around.

MS. LANGE: Anne Lange, South Atlantic SSC.

DR. SERCHUK: Fred Serchuk, SSC.

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

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

DR. REICHERT: Marcel Reichert, SSC.

DR. FLOWERS: Jared Flowers, Georgia DNR, Coastal Resources Division.

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

DR. SCHARF: Fred Scharf, UNC-W, and current Vice Chair of the SSC.

DR. CURTIS: Judd Curtis, South Atlantic Fishery Management Council staff and SSC liaison.

MS. MARKWITH: Anne Markwith, North Carolina Division of Marine Fisheries.

DR. LORENZEN: Kai Lorenzen, University of Florida.

DR. SWEENEY-TOOKES: Jennifer Sweeney-Tookes, Georgia Southern University.

DR. SCHUELLER: Amy Schueller, NOAA, Southeast Fisheries Science Center.

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

DR. SEDBERRY: George Sedberry, South Atlantic SSC.

DR. CAO: Jie Cao, NC State University.

DR. BUCKEL: Thanks, everyone, and, Chris, if you could do voice recognition for us.

DR. DUMAS: Chris Dumas, University of North Carolina Wilmington.

DR. BUCKEL: Thanks, everyone. We also have some council members present that I would like to recognize. Carolyn Belcher and Mel Bell are here. Thank you both for attending, and our Southeast Fisheries Science Center representative, Erik Williams. Erik, thank you. I think I was told this is the Erik Williams show this next couple of days, and so I appreciate it. All right.

A quick update on SSC membership, and, if you hadn't heard, Yan Li moved from the North Carolina Division of Marine Fisheries to Duke University, where she's a researcher, and so she stepped down from the SSC, but we're in capable hands, and Anne Markwith is here, from North Carolina DMF, representing the State of North Carolina, and so thank you, Anne. We look forward to working with you. All right, and so I'm going to point you to the agenda, Attachment 1a, and the overview. Are there any changes, additions, deletions? Judd.

DR. CURTIS: We have, as of this morning, an updated, or revised, agenda and overview. Unfortunately, we're having to strike the greater amberjack count update from our agenda. The presenters were not able to make that time slot, and so we're going to postpone that to our July webinar meeting. Other than that, all the other items remain intact.

DR. BUCKEL: Anyone else have any changes, or questions, about the agenda? If you do, raise your hand. Okay. Seeing none, the agenda is approved. The next item is to please take a look at the Excel spreadsheet that I sent to you, via email, and pay particular attention to the items that you were assigned to, as we move through the agenda over the next three days.

The meeting minutes from our last meeting are in Attachment 1b. Does anyone have any edits to the minutes from the last meeting? Seeing no hands, we will consider those approved, and, before we go to public comment, Judd has a few items that he would like to cover, and so go ahead, Judd.

DR. CURTIS: Thanks, Jeff. Just a couple of things that are in Other Business that I just wanted to bring to your attention at the start of the meeting, so you can start thinking about them, and one is that the SCS 8 meeting will be taking place in 2024, being hosted by the New England Fishery Management Council and SSC, and that's essentially the National SSC Meeting that some of our members attended last year, and they're soliciting themes for the meeting, and so just keep that in the back of your mind throughout this week, and then we'll -- When we bring that up in Other Business on Thursday, if you have any ideas, we can jot them down, and then I will send those up to the organizing committee for that meeting. The second announcement is that our photo is very outdated, and we've got some new members since the last one, and so we're going to take an SSC group photo just before we adjourn today. That's it.

DR. BUCKEL: All right. Thanks, Judd. We'll move on to -- We have a general public comment period on the overall agenda, and so any members of the public? I checked, a couple of days ago, online, and I didn't see anything. Are there any members of the public here that would like to speak? All right. Seeing none --

## PUBLIC COMMENT

DR. CURTIS: We've got Thomas Newman on the line.

DR. BUCKEL: Go ahead, Thomas.

MR. NEWMAN: I just wanted to say that I appreciate all you guys' extra energy and time that you -- My name is Thomas Newman, and I'm a North Carolina fisherman, and I also work part-time with NCFA, and I'm also on the Mackerel Cobia AP, and I really do appreciate all the extra time and energy that you guys have spent with the Spanish mackerel stock assessment. You all went above and beyond, and I know, for my personally, and others that I regularly communicate with, this open process has been very positive, and it has helped the confidence, you know, with the whole fisheries management process, and I wanted to be there in person tomorrow, but I don't think I'm going to be able to make it, but I will definitely be listening in, and I just wanted to thank all you guys for your time and your dedication to the resource. Thank you, all.

DR. BUCKEL: Thanks, Thomas. Any others? All right. Seeing no other public comment at this point, we will have public comment periods after each agenda item, and so we'll move into the first agenda item, which is the Review of the Population Projection presentation by Dr. Erik Williams.

## REVIEW OF POPULATION PROJECTIONS

DR. COLLIER: Before we get into that, I just wanted to give a brief -- A reason why we're having this presentation, and so, with the scamp stock assessment, the landings and discards, or releases, were combined, and so, when that comes to the council, it gives them a couple of different options to look into, as far as how to deal with the discard issue and allocations. Typically, the way it's done is the council is provided a catch stream, and they're also provided a discard stream, and you guys provide the ABC based on those F rates that come out of the stock assessment.

Because landings and discards were combined for scamp, there is the possibility where the ABCs could be developed for the -- Or an ACL could be developed, based on allocations, first, and then discards taken out of that, and, that way, each of the sectors are dealing with the discard issue within that, and so, if one sector is discarding a lot more fish than the other, their catch levels would go down compared to that, and we realized that this was going to be -- It would require a very iterative approach, coming back to the SSC and talking about potential allocation changes, and maybe changes in selectivity, because of those, and so we sent a letter, or a request, of how current stock assessment projections are done, and so Erik is going to provide some feedback on that, because he was interested in the topic.

DR. WILLIAMS: All right. Thank you, all. That's an interesting definition of "interested", and so what I was going to do today is sort of basically go over a review of what the current process is and how we do our population projections from stock assessments. For some of you, this will be no new news to you. For others, maybe there will be one little tidbit here or there that might be something new, that maybe you didn't realize about our projections, and maybe that's my biggest hope, is to hopefully get everybody up to sort of a similar understanding of what our population projections can and cannot do under the constraints of the assessment, as well as the process itself. With that, I will proceed.

If we sort of step back and look at the steps that we use in providing population projections, the first step is the SEDAR stock assessment itself, and, when that assessment is conducted, we usually

develop the methodology and set up the way we're going to do the projections at that stage. They are usually preliminary, almost -- I can't think of any case where we've actually used the projections right from the assessment report for an ABC determination, and usually there are some refinement steps, and so that's why there's these other steps.

The next step is the SSC review, and that's where we begin the refinement process of figuring out what configurations should we put into these projections to match what is needed for that stock assessment. Part of that may be based on the stock status, whether we have to do a rebuilding plan or not, things like that.

Then, oftentimes, there's even further follow-up, maybe because that first SSC meeting wasn't sufficient to finalize the ABC, but at least finalize the idea of the projections, and then we just have to go back and run the analysis and then come back with the final numbers, and then that's when an ABC gets set. Then, after that process, there's oftentimes even further follow-up projection analyses requested, often for either amendment alternatives or sometimes other considerations, and the Regional Office sometimes asks us for projections, et cetera, et cetera.

Let me drill down into those steps, just a little bit, and so that first step is the SEDAR population projections, and they're usually very simplistic, and they're often prescribed by the terms of reference from the SEDAR project, and it pretty much -- What we often do is assume something like a simple F adjustment, which would be total F, and we just adjust that to either match some benchmark in the future that we're trying to achieve with the population or to match some recent average of landings over the next few years, et cetera, et cetera, but, during that, there's an assumption about what is the starting year for management, and that often sometimes gets modified, and so that's another reason why these Step 1 projections are often really just a step one, and they're not going to result in a final ABC determination.

Then there's constraints on the population projections, and I mentioned that a little bit earlier, which is, depending on whether the stock is overfished or overfishing, we have to -- That puts constraints on what we do with the projection analyses, such as making sure the population reaches a certain benchmark at a certain time, rebuilding time, or making sure that the F stays below FMSY.

Those Steps 2 through 4 are the subsequent steps, and that's where we do have to do -- This is where they get prescribed by the SSC sometimes, and sometimes the Regional Office, or the council, or all three, working together, provide us with sort of a final configuration for the projections to be used, and then an ABC is set.

We often have to modify things like P*, and we change interim years between which is the interim years. or the years from the end of the assessment to the first year that management is going to kick in, and so we usually have to make some assumptions during those interim years, and then we make some assumptions about what management is going to do. Sometimes we have to modify the rebuilding timeframe, based on some decisions in Steps 2 through 4.

One of the key things to point out is that final ABC determination is often made before the management action is fully determined, and I will explain why that can cause some problems. Sort of a tangential thing, just to put upfront, and you will see this in all of our assessment reports, and this is standard language that we often put in our assessment reports, that many of you probably

just skip over, or maybe briefly look over, because you've seen it, but it's important to highlight what we put in here and why these things are important, and so there are some major assumptions that go into our population projections.

The first is they're, obviously, highly uncertain. We're trying to guess at future states of a population that we oftentimes don't have the ideal information that we would like to have about that population to begin with, and now we're trying to forecast it into the future, and any type of forecasting is always fraught with error, uncertainty, all sorts of problems.

Our projections do not include structural uncertainty, and so they're basically just a continuation of the existing stock assessment model, and so, whatever assumptions or conditions we apply to the base sort of stock assessment, that just usually gets carried forward into the projections, and we often assume that the fleets will stay in the same proportion that they were in the last few years of the stock assessment, and I will show later, in a few slides, why that's important, and so maintaining that ratio of say commercial to rec to discards -- There's an assumption behind that.

Projections also assume no change in selectivity, and so, if management is going to put in a management action that radically changes selectivity, say putting in a minimum size limit when there was not one in place, that's a big change to selectivity that we need to account for. If we know that's where they're headed, we can try to, you know, pre-predict that, and try to build that into the model, but sometimes we don't know that, and sometimes it's already past the ABC determination stage when a decision like that might be made.

The last one is just sort of a standard one, and that is that mortality occurs throughout the year, and that's sort of an assumption of using the Baranov catch equation in our stock assessments, which is a standard equation that's used in most all stock assessments throughout the country, but the reason I highlight that is, when you start to contract seasons down to really small increments of time, then you start to violate that assumption.

There's a lot of decision points that have to be dealt with in population projections, and the first is, you know, what are the interim years, and, you know, you have a terminal year in the stock assessment model, and then you have some years in between before management action is expected to actually be implemented, and so we have to figure out what years that is, what years those are, and then what are we going to assume for those years, what are we going to assume about landings, what are we going to assume about recruitment and all these other things, and then management kicks in, and we have to make assumptions about what management is going to do.

One of the big ones, that I know this committee is very familiar with, is understanding how we predict future recruitment, and certainly there's been plenty of discussion on that, and I probably don't need to go into too much detail on that, and everybody is aware of the issues with that. Recruitment is extremely difficult in fisheries to predict, and it always has been, and it always will be, probably.

Then there is trying to predict, or trying to make decisions, about whether there will be a change in total F and the ratio of the fleet-specific F, and so that gets back to that ratio of commercial to recreational to discards, and is there going to be a change in that, and can we predict that? Changes in selectivity, and can we predict that or not? When we can't predict it, we just sort of fall back to the what was done in the original assessment.

This is just another follow-up to this, and so there's many ways -- We typically -- As I said, we typically do constant F projections, but we can do other types of projections, where we predict specific values of landings and discards, and that just requires us then to fit F. When we fix F, we are then determining the landings, and so there's a one-to-one ratio between the F and the landings, is what I'm trying to get across here, and you can either fix landings or you can fix F, but one determines the other, and you can do this with average values, or you could even, in some rare cases, get the actual data for those interim years, and let's say the assessment doesn't get reviewed until a year after the terminal year, and you have another year -- You have that most recent year of data in-hand, and, well, you could put that into the projections, and actually use that, and come up with an estimated F.

Recruitment, as I said, I think you guys are all familiar with that, and you can -- There's lots of options there and we can use recent average recruitment, and we can use the long-term average, and we can use the stock-recruit relationship, et cetera, et cetera. Landings and discards, in particular selectivity, again, whether we used fixed or modified or estimated, and so, in other words, if we just fix selectivity, we're making an assumption about it.

Usually, from the assessment model, we're estimating it based on data, and then we just assume that it's going to stay the same forward. Well, when we modify it, we may not have data to know, for instance, going back to my example of a minimum size limit coming into place, and that might be a little better predicted, in the sense that you can say, okay, well, fish over a certain size are not going to be -- They're going to be caught, and fish below a certain size are all going to be discarded, and the reality is that the fisheries don't actually behave that way, rarely, and there's always some slop in that, and so, ideally, we want to actually fit that, those selectivity curves, to actual age or length data and come up with the actual selectivity curve, but, again, we can't do that, because we usually don't have the data at this point, and so that's why we do what I have labeled here as a modified selectivity curve, and then, of course, if we had age or length data, we could actually estimate the selectivity.

I have that equation down on the bottom, just to sort of remind you that these are the components that go into this, and we have to predict recruitment, and we have N which is the population from the prior year coming in, and then there's something we have to do with F, and there's something we have to do with selectivity, and so fishing mortality, selectivity, and recruitment all have to be sort of -- Decisions have to be made about those and what we're going to do with those going into the future.

This is just another way of hammering the point home that there is this issue of we do an assessment, and it has a terminal year. That terminal year is sometimes one, and, in rare cases, two years, until it gets reviewed, and so we may have an assessment that ends in 2020, and it doesn't get reviewed until 2021, and then it doesn't get an ABC set until 2022, and then management is going to take its time, and it's not going to -- Management is not going to kick-in until 2023, and so, in that case, we have to make decisions about, okay, what are we going to do in those interim years, and what are we going to do from the terminal year of the assessment to the point in which management kicks-in, and we have to make all those decision points about recruitment and fishing and mortality and selectivity.

Here's just another -- I'm a visual person, and so this helps too, to sort of just visualize what we're talking about, and, if you think of the population as being a population expressed in a matrix, and it's numbers-at-age by year, and that's what is shown in this matrix, and that's one of the main sort of pieces of data that get out of a stock assessment, is this table filled in for us, with estimates of what the recruitment was at age-one and then what are the subsequent ages, how many fish are there in each of those ages.

One thing to note is that the progression of time also progresses with age, and so, when you look at this table, you should be thinking about things going in the diagonal here, and so that age-one in 2018 then becomes age-two in 2019, age-three in 2020, et cetera, et cetera, and so you can kind of see, in the last year of the assessment, which I've highlighted here in green, 2020, what we have is age-two through five -- We have estimates from the model, but then, as you go forward in time, we start losing assessment information, until you get down to like 2025, and it's all projected data at that point. There is nothing left over from the assessment.

Also highlighted here is an example of, you know, a typical condition, where maybe 2020 is our last year of our assessment, and then we have two interim years, and then let's say management starts in 2023, and then we project that out. One of the other things we run into is, if age-one is not our age at recruitment, then we often have to sort of fill in recruitment values in the last couple of years of the assessment, because that's not the age of recruitment, and so we have to come up with methods for that as well.

This is a series of plots just to illustrate the effects of changing selectivity on benchmarks, and so, in each of these cases, the selectivity on the right is the selectivity being applied to the fishery, and everything else is set the same, and, with those three different conditions, and one is sort of a full selection, starting at age, you know, one and carrying on through, and the other would be an example of say a minimum size limit implemented, and just caught fish, with selectivity starting at age-four, and then flat-top, and then the bottom one is dome-shaped.

What you can see, to the side here, is the effects that that has on the benchmark estimates, and it can be quite dramatic, and so, in one case, FMSY is 0.1, 0.26, or 0.21, and even the MSY value can change quite a bit with these changes in selectivity, and so the sort of message to get hammered home here is that changing selectivity changes your benchmarks.

Here's another illustration of that, and this is an example where it's more sort of what we're facing, and let's say we had two fleets, and one is a discard fleet, which would be the one on the far-left column, labeled "Fleet 1", and the middle column would be Fleet 2, which would be a kept, retained, catch fleet, and then the selectivity, to the right, is how we would compute the sort of overall selectivity, or the F-weighted selectivity, which is typically how we weight the selectivity among the ratios of those various fisheries.

In the top row, it's where we have the Fleet 1 equal to Fleet 2, in terms of fishing mortality, and you can see the benchmarks that get computed from that shown right here. If we double the fishing mortality of the retained fleet, Fleet 2, you end up with this set of benchmarks and this type of selectivity shown here. If you double the Fleet 1, and I think I got that -- I've got it the other way around. Sorry. This one was doubling Fleet 1, and this is doubling Fleet 2, and you end up with this selectivity and this set of benchmarks, and so, again, it's just hammering the point home that selectivity can change the benchmarks, and the ratio among those fleets can change the

benchmarks as well. In this case, they're not changing as much. I mean, the MSY values are changing a fair amount, but the Fs aren't really changing too much.

Again, circling back to our sort of default population projections, we usually just stick with a constant F, because we just don't know enough about those other decision points to do anything otherwise, until we get more information, and so we usually assume no change in selectivity, no change in the fleet proportions, and that's what we use in these projections, and that's usually what you see come before you, certainly out of a stock assessment, and even probably at the ABC determination stage. The problem is they're often violated, and those projection assumptions are just completely violated.

Here's an example. This is vermilion snapper, from SEDAR 55, which the assessment ended in 2016, and so this is a little bit of a dated assessment, but, nonetheless, it serves the purpose for illustrating things. When you look at our tables, and so I just wanted to make sure that you understand that these are the typical tables that we provide, and you'll see this in most of our assessment reports, and it has a lot of information, and I think some of it gets overlooked, and it shouldn't get overlooked, and so that's one of the messages to get across here, is pay attention to what this table says in the heading and what is contained in the actual table of information.

What I will point out is, in this, you can see what's going on with this one, just by looking at the table, that we have a couple of interim years, where we fixed F at a value of 0.28, and then we assumed management was going to kick-in, in 2019, with a new F of 0.35. The other thing that is in this table is the projections, or the discards, the assumed discards, that would be associated with these changes in F and the assumption that the selectivity is the same as it was in the assessment and that the ratio among the fleets is the same in assessment. That's what is in this sort of table.

Here's an example of how that gets violated right away, and these would be our discard numbers that we projected for vermilion snapper in 2016, or from the 2016 assessment, with this ratio of commercial, headboat, and MRIP, and so it's mostly MRIP, 72 percent, but I just pulled the vermilion snapper MRIP discard estimates, and just the MRIP alone has already exceeded it, our projected total discards, and so there we go, a failed projection, and so what we're trying to do is figure out how can we stop this disconnect, or fix this disconnect, or make our projections better, make our management process better, and I don't know which one it is.

I also want to make sure that we understand that this is not a modeling hurdle, not at all, and, I mean, we can change selectivity, and we can change proportions of F, and this is a prediction hurdle. This is an information hurdle, because what we don't know is what will the final management action be, and what will the fishing behavioral response be. Those are tough things to predict, very tough, particularly the fishing behavior one. Those of us who have been in this business long enough know that fishermen can behave in ways that we may not have anticipated, given a particular management regulation that goes in place.

I am going to leave you with just some -- I have no preference, and these are just some quick ideas of how we might change this process, and one is we could change our default projections. Instead of assuming that those ratios are constant, maybe there's a better assumption. Maybe we should assume something like discards will at least stay the same, or something like that, and maybe that's a better default assumption.

We could try to inject a new step in the process, so that we can adjust the final projections, and so, once we have a better picture of what the management might look like, we can make an adjustment to the projections, redo them, and, of course, that might require resetting ABC. Another way would be a brute force way, and maybe we just run every possible scenario that we can think of under the sun, and provide that at each stage of the process, and then, hopefully, the right one is somewhere within that whole range of options, or, lastly, if management can change, and we can set ABC for discards, or include discards in the management action and monitoring, and that would be another way to consider going.

I think that's all I had, and so that's sort of an overview of our population projections and all the issues we have around that, and I hope that cleared up some things for some people, and it probably raised more questions for others.

DR. BUCKEL: Thanks very much, Erik. That's super helpful, and it will be a nice presentation for us to go back to when we forget how those are done, and so that's much appreciated. Questions for Erik? Scott.

DR. CROSSON: On Slide 16, the one where you showed the predicted discards versus actual discards for vermilion, do you happen to know what the -- These are all the projected, and, on the left side, you have the predicted ones, and do you know what was the 2016 number, which was I guess the terminal year, off the top of your head?

DR. WILLIAMS: I don't.

DR. CROSSON: Okay. I was just curious as to how those numbers on the right would compare to, you know, if we had just kept it going at whatever the existing rate was.

DR. BUCKEL: I also had a question on that slide, if part of the difference is CHTS versus FES, or do you --

DR. WILLIAMS: No, and I confirmed that this is all FES.

DR. BUCKEL: Okay. Great. Thanks. Other questions for Erik? Fred Serchuk.

DR. SERCHUK: I guess the question is -- You've brought up a lot of issues in which projections don't pan out the way we thought they would pan out, and do we do a retrospective analysis of every assessment, when it comes in, to see what are the sources of variance, or error, away from the projections that we initially used, sort of as a check?

DR. WILLIAMS: We don't, but that's a good suggestion. I mean, that would be something we can add to the process.

DR. SERCHUK: I mean, I think that would be good housekeeping, to see how well our assessments do, and then, of course, it would be useful if we could get information in the intervening years, okay, when they become available, to see whether the assumptions that we did make for the intervening years actually held, and I'm just trying to make the assessment process more reliable, okay, and that's just some of my thoughts. Thank you.

DR. BUCKEL: Thanks, Fred. Alexei.

DR. SHAROV: Like Fred, I don't have a question, and, essentially, I just wanted to move into the discussion of just following Fred's advice, and I had a similar idea, thinking of -- We could, you know, break the, for example, the historical period of the assessment, for whatever species it is we're looking at, and this is sort of a standard procedure of checking the forecasting reliability, right, and you break it in the middle or whatever, and you select an interval for which you know, in the past, how it performed, but do the projections, for example, and you start your projections in 2000, and you project it forward and then compare it to the actual performance and look at, like Fred suggested, potential drivers and where exactly the assumptions did hold, and where they didn't, and why.

The second part is, and I think you touched upon it, and maybe not sufficiently, but, when we do projections, we always present results with the estimated uncertainty, which, you know, encompasses the uncertainty of a number of elements that are included, but what is important, when comparing the projected with the actual, for example -- In the case of discards, for example, the MRIP estimates are, in themselves, an estimate, and they have an envelope, and, therefore, we should be considering, as long as they primarily overlap -- Then, essentially, we're staying within the level of uncertainty that we defined initially, based on the assessment, and, therefore, we cannot state that there is a difference or underperformance of the model.

In other words, we need to emphasize more how uncertain they are, and just learn how to live with it, as opposed to doing so much -- Sometimes we report uncertainty, but then we make a decision based on the actual point estimates, not evaluating whether we did well or not, and that's just sort of a reaction. Thank you.

DR. BUCKEL: Thanks, Alexei.

DR. WILLIAMS: All good points, Alexei, and, of course, I agree with you, and I would say that your first -- One of your proposals was to hindcast, and so to distinguish hindcasts from sort of what I thought Fred Serchuk was talking about, is actually taking just our projections and then looking at how well the population performed relative to the last set of projections, whereas what you were describing was a hindcast, where we actually peel back data and forecast, you know, a year ahead and see how the model performs, and those are both valid things, but I just wanted to make sure that we understand that those are two slightly different things, and they -- Certainly the hindcasting has actually been recommended by some of the CAPAM workshops as best practice for stock assessments, and we are actually working on implementing a hindcast system in our BAM sort of assessment, and so you probably will see that, going forward.

In terms of monitoring, that's a great one, because I think that's where, if we're going to help management in any way, and the biggest bang for our buck in helping management, is to provide them with more update on exactly what we predicted was going to happen and what is actually happening, and that can be monitoring the projected discards, or it can be monitoring the projected landings, and it could also be monitoring what we're going to start producing, and this is a new thing that we're going to be putting out in BAM, is projected index values, and then we can actually compare that to the observed index values that come out of the survey.

Those are all things that I wholeheartedly agree are great things to be looking at, but we just need to sort of institutionalize that process, and then figure out how to use it, and I think there is some steps in there that we have to be careful about, some landmines that we have to be careful about, in terms of what do we do when that information, when it comes to us, and how would we react to it.

DR. BUCKEL: Good discussions. Marcel.

DR. REICHERT: In the example of vermilion snapper, did you guys -- Were you guys able to figure out why there was such a divergence in the actual discard numbers and the predicted numbers? In other words, what was the potential process that made a difference between the projected and the actual discards, and are there processes that are more influential, potentially, than others, although I assume that the answer is that depends on the fisheries and the management actions.

DR. WILLIAMS: We, honestly, did not delve into why this is different. I mean, on the face of it, probably the obvious answer is the problem we face with some of these other stocks, where the management action is focused purely on the landed catch, and not the discards, and so that might be the explanation here for vermilion, is that the retained catch numbers were adjusted, but not the discards, and so then the discards are just there.

DR. BUCKEL: Scott.

DR. CROSSON: I'm sorry, but I just wanted to briefly answer my own question. The terminal year was 2016, and I took that B2 number times 0.38, for looking at the MRIP data, and that would have been 479, would have been what you would have had in the right column, and so it's really been higher than all but one of those years.

DR. BUCKEL: Other questions for Erik? Erik, I have one. Including the discards in the projections, like what is done for scamp, and if the ABC is set with total removals, who -- When we compare the -- We need to have a comparison between the ACL and what's happening on the water, and that's been done in the past, with SERO giving us a report of here's what the landings were relative to the ACL, and so that's not going to be apples-to-apples, because the landings is going to be harvest, and we need to have the dead discards to make that comparison, and how do you see that happening, or who would be doing that calculation?

DR. WILLIAMS: This would be a good one to ask Kyle too, when he presents updated projections, but the reality is that -- In the case of scamp, the CIE had recommended that we combine discards and landed catch, and I can't remember the justification for that, but there must have been some reason for that, but, by combining them, what you are, by default, assuming is that the selectivities are the same, and so then, if that is the assumption within the model, it's easy to separate it out, and so you can separate our landed catch and discards, because the assumption is they have the same selectivity.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: As part of the process, I wonder whether -- Because you've shown, for example, that we might have to have two years of interim information before we even start the projections,

and I'm just wondering whether there is any opportunity, during the interim years, to gather information, to say, okay, this is what we projected, okay, and we now have new information, and it's either on the discards, and it's either on a new survey index that came out, that suggests that the projections that we did were right-on, or they're within an uncertainty buffer, or they're outside of the uncertainty buffer, and that would basically say, wait a second, we have to take this step because they're -- We don't have to do anything, because they're inside the uncertainty buffer, but, if they're outside of the uncertainty buffer, then wait a second. What we predicted three years hence may not be representative of what we believe either the recruitment is or the population status.

I think other -- To the extent that we can get interim information in the years after the assessment, it would be very helpful in validating whether the assessment is robust or isn't robust, and I know it's not possible in all cases, but I know that other councils try to use whatever information they have in an interim year as a check on the veracity of the assessment. Thank you.

DR. WILLIAMS: You're exactly right, and, I mean, the issue is we don't always have that data, and, in fact, we have to make a concerted effort to pull that data. The data provision is onerous enough to sort of get the total landings, the total discards, whatever we might need, in a position to match it up to the assessment, and it's equivalent to having to do a data provision that we do for a stock assessment, and that's an onerous process right now, but I will say that what you're hitting on is interim analysis, and this is a type of interim analysis, and we've talked about interim analysis with this committee many times, and I will circle back to my comment earlier that, if we can find a way to institutionalize some of these update --

You know, producing that data, and finding out which data to produce, and like maybe it is -- Maybe the most important is we should be updating the indices every year and comparing that, but, you know, we need to sort of look at what is our biggest bang for the buck, which data should we be updating, because it comes with a resource cost to update that information, but I think there is some large gains that can be done with that, but we just have to institutionalize in some way, in the sense that everybody knows, okay, this is what we're going to do once we finish the assessment, and here's the data we're going to ask the Center to provide, and here's how we're going to update our projections, and here's what we expect to see out of it, and here's how we're going to react to that new changing information, et cetera, et cetera.

DR. BUCKEL: Thanks, Erik. Fred Scharf.

DR. SCHARF: I just wanted to follow-on with what Marcel was saying, you know, regarding what Fred and Alexei were saying about, you know, hindcasting and trying to identify sort of when the projections are not accurate and then being able to try to identify the process that drove that inaccuracy, and so, you know, as you were saying, most of the time, the thing that's hard to predict is sort of fleet behavior, and how the fleet dynamics are going to change, and so, if we could --

When we look backwards at projection performance, you know, trying to identify if there were changes in selectivity, if there were changes in the allocation of F, and if those were then linked to very specific management actions, so that you could try to predict that, if we manage this way, we're likely to see this behavioral change, but then, you know, on the flip side, what if we nail the fleet dynamics, in terms of the projections, and it's all in recruitment, right, and then what do we do?

DR. WILLIAMS: Right. I agree with everything you just said, and I think, you know, this is where Alexei's point comes in about just being clear about what we know and what we don't know, and making sure we characterize that uncertainty fully, and I appreciate his comment about that, because that's really -- You know, at some point, we have to fall back on what can science do, and science has its limitations, and science has its limitations in forecasting, and we just need to make sure we fully express what we do know and what we don't know.

DR. BUCKEL: Alexei and then Chris.

DR. SHAROV: So it's a good discussion, and I think it's not ground-breaking. We've been thinking about these elements over the time that I've been here, in the results or projections for different assessments, but it's important that we are very straightforward in sort of summarizing that, all together, it covers different scenarios, and that's something that I wanted to also, in addition, say, that -- Well, at least the projections relate to the forecast, and they essentially continue our assessment moving into the future, and they just provide an estimate of the population, biomass, fishing mortality, and what are the corresponding estimates of uncertainty, but, when we try to focus further into the elements, and we judge our success or failure with the elements, like, for example, predicted discards, because they're important for catch allocation, then we need to focus on developing the models, the projections, that will include the element that specifically predicts discards, that specifically looks at the variables that affect it, and that we collect information that will allow us to predict it better.

For example, the difficult component, the unwieldy, is the recreational fleet, because we have millions of participants, where effort is affected each year by a bazillion different variables, yet we are trying -- There is two models currently being developed that predict the recreational effort and the recreational catch, and I think one is the Northeast Fisheries Science Center, and other is by the Massachusetts -- Regarding fisheries surveys.

Those actually are being tried now in developing the TAC predictions, or setting the TACs, for the future, and so the elements could be focused, and probably should be, on our particular interests, and we just need to, in addition to the general modeling world, we want to develop sub-components that are important to us and develop the better prediction models for them.

DR. BUCKEL: Thanks, Alexei. Chris.

DR. DUMAS: My comments follow-up, I think, on what Alexei was saying, in that there are two different things. Sort of, from my perspective, there is projecting something, and then there's understanding what is causing changes in those projections, what's affecting those projections, and, right now, if I'm understanding correctly, we're not doing either one of those things particularly well, because it's hard, because there are a lot of factors involved, a lot of uncertainty, and so, you know, we're doing well, given the situation that we're attacking, but we might make some progress, just on projecting, just if we throw everything we have into, you know, a vector autoregression and just project.

If there's something you want to project, throw every data stream you've got in and estimate it, and it might estimate better. You might get a pretty good estimate, a better projection, of the thing you're trying to project, but you just won't know what's causing the projection to move as it's

moving, but you might get better projections, and at least we'll be meeting one of the goals, which is trying to project something, right, although we still won't be meeting the goal of understanding why the projection is behaving as it is, and it still might be good to have a better projection, say of landings or of, I don't know, stock size or whatever, and so we might --

You know, we might be able to improve projections just be throwing everything and the kitchen sink into a forecasting model and seeing, you know, how well -- Using sort of some hindcasting techniques and looking at, you know, how well -- If we throw everything in the model, how well could we have projected, and could we have projected better, and that at least might improve that part of what we're trying to do, and then we can make, you know, separate efforts in trying to understand, okay, what are the different factors that are causing those projections to change, and looking at sort of causality as a second effort.

Erik, do you know, or does anyone else know, and has anyone tried just throwing everything, all biological data streams, all socioeconomic data streams, into a big forecasting model and just trying to forecast landings, or forecast catch, or forecast SSB, or whatever, and just seeing if you get better projections? That might be something worth throwing a grad student on at some point.

DR. BUCKEL: Thanks, Chris. Other questions or discussion? Erik, I guess one thing that you mentioned -- The way I've been viewing this is what came out of scamp, is this combined catch, or landings, and dead discards, right, and it's all lumped into one value, but where do you find those -- Are you going to continue to provide those, and they can be separated, but how we deal with those, and they wouldn't be linked with the same -- We could say, based on past -- This would be, you know, I guess, a research need, unless you guys have already looked into this, but, when we have projections, and it's undergoing rebuilding, what we've seen, you know, 80 percent of the time, is that we have the discards wrong.

We assume it's just going to track with landings, and it doesn't. You know, the landings go down, but removals, or the dead discards, go up, and so we can -- For future rebuilding scenarios, we're going to change that, and those can be -- You would still -- They could be provided separate, so that the ABC, the landings, we can still compare to what's hitting the dock, so that's apples-to-apples, and then we'll better have the dead discards accounted for, and not make that mistake, and so I guess is that something you want input from us on here? I am looking at the action items, and I think there may be a little -- Some of those are a little -- The questions there are a little different than what's in your presentation.

DR. WILLIAMS: Sure, and let me respond to one thing though, just to make sure that everybody appreciates that scamp is just a unique situation and that we did not model landed catch and discards separately, and I think it's, in part, because we just didn't have data to estimate an independent selectivity for discards, or, if we did, it was close enough to the catch that it was perfectly fine to just combine them, but, in most cases, we do model discards separately, and so that's something to keep in mind, and, yes, we do assume -- Those constant F projections assume that that ratio of landed catch to discards remains the same, going forward in time.

That would be -- You know, if we were to sort of look at, okay, what is potentially the biggest error occurring in our projections, again recognizing Chris's comments, that we kind of really don't know where all the problems are coming in, but perhaps that one -- Instead of assuming that discards react with the changes in the catch, is keep the discards constant, and assume that they're

not going to change, and maybe that's a better default assumption for most of our stocks, especially if management is going to only focus on landed catch in their ABC and management actions, and so that would be one example.

DR. BUCKEL: Thanks. Fred Serchuk.

DR. SERCHUK: I have a question, Chair. Some of the ideas that have been brought up, would they apply to both operational assessments and to benchmark assessments equally, or would they apply to one or the other? If we have these two tiers, and one tier says use the methodology, more or less, that we've used in the last assessment, and just update the data, and another one says that -- As I understand it, the benchmark basically says everything is open, and you can change the methodology, and you can change the model, and you can change the projection scenario, but I'm just wondering whether we need to have a discussion about that, whether it applies across-the-board to any assessment or it applies to just the benchmark assessment. Thank you.

DR. WILLIAMS: I think, to answer that, is the projections are the same for any assessment, and so whether it's benchmark or operational, and they're essentially the same. They're doing the same thing, and they have the same set of assumptions that have be made, or the same set of decision points that something has to be said about them, or left unchanged.

DR. BUCKEL: Marcel.

DR. REICHERT: One comment, or question, is, Fred, with benchmark, you're referring to the research track, because that's the standard now, correct, the research track and then operational assessments? Okay. So just as a clarification.

The other question was, again, a clarification, Erik, and so you mentioned the combining landings and discards was unique for scamp, and so there's no plan, or intention, to, in the future, combine those two, and this was just a unique situation? Okay, and, I mean, it doesn't change any of the problems that we discussed, but that's just for my clarification.

DR. WILLIAMS: Yes, that's exactly it, and I think they were combined either because there was probably -- Again, I didn't pay that close attention to the scamp CIE review, but they probably thought that the selectivities were close enough, and so they just assumed that they were the same, until data proves otherwise, I guess, would be sort of the default, for parsimony's sake.

DR. REICHERT: Because, and to follow-up, I think, in the past, we have clarified that some of our ABC recommendations include discards, and, in other assessments, we specify that they did not, or some did and some didn't. Okay. Thanks.

DR. WILLIAMS: Yes, and so, if there's one big take-home message from this, it's make sure you understand what you're implying about discards when you select your ABC.

DR. BUCKEL: Good summary, Erik. Thank you. Are there other questions for Erik, or comments? Do we go into the action items now, Judd, or take public comment?

DR. CURTIS: You can take public comment right now, if there is any.

DR. BUCKEL: All right. Any public online or here, please raise your hand if you would like to make a comment.

DR. CURTIS: I'm not seeing any hands.

DR. CROSSON: Can I comment one more -- Maybe this is going to be part of the general discussion, but I was trying to go through this in my mind, and looking at the projected discards versus the actual discards, and I told you that, if you use 2016, which is the terminal year, you come up with 480,000, and so I thought, well, okay, maybe we should do something more akin to what we did when we were looking at recent recruitment trends, and so maybe we should put a longer time series in, and, if you do the six years, going back 2011 to 2016, inclusive, and, of course, obviously, there is PSEs that are involved, but it biffs it even worse, because there's a number of years where you're going to come in with much lower numbers, and so, if you use the average, the average for the six-year time period that's in the projections, it's 209,000, is what was projected.

The actual were 344,000, but, if you tried to use the average of the previous six years of landings, you would come up with 169,000, and so you would have been way under on that, and so that's not necessarily a better solution, and so, yes, we have to come up with a methodology for addressing this.

DR. BUCKEL: Thanks, Scott. All right, and so, moving into the action items, if I -- I guess a question for council staff, and some of these questions have to do with the -- Is this to scamp specifically, where it's combined, where the landings and discards are combined, and how we're going to deal with the control rule, P*, because it sounds like that was a unique situation, and it's not going to be that way moving forward, unless I'm missing something.

DR. CURTIS: That came out of the scamp kind of assessment, when they were pooled together, as Erik was talking about, but we wanted to posit these questions and just discuss how that would be approached in the scamp assessment, and then, if it were to happen forward, although it sounds like that is a unique aspect, and so it may not necessarily be relevant, but I think Chip is going to elaborate a little bit here.

DR. COLLIER: I guess this could be a question for Erik, but is there any reason -- If you think about the other assessments, the way that they're done, in order to develop the landed catch ABC, you had the commercial landed catch plus the recreational landed catch, and then, for the discards, you add together the recreational fleets, the number of discards there, as well as the commercial, and could you separate and do an ABC, a combined ABC, but then think about taking out the commercial afterwards, and so all the commercial landings and discards would be in one group, and the recreational landings and discards, and Erik is nodding his head that that would be a possibility, and so it would end up being very similar, and it would just be -- There's a recognized difference in selectivity between the landed and discarded catch, if that makes sense.

DR. BUCKEL: Chip, was that a question to Erik?

DR. COLLIER: Yes, and so Erik had nodded his head, indicating that --

DR. BUCKEL: I thought it was, and I didn't see the head nod, and so we'll put that on the record, that Erik nodded his head.

DR. COLLIER: And agrees.

DR. BUCKEL: Yes.

DR. COLLIER: In that case, then this could apply to other stocks as well, but it just depends on how the council would like to go forward. If they're thinking about developing catch streams for fleets, or for sectors, for the recreational sector versus the commercial sector, and then you would have to take out the discards from there, whether it be -- So the way that it would work, thinking about a triage approach, is you would have a combined ABC, and that would be both commercial and recreational and both the landed and discarded catch, and then you would also -- From there, you would separate out into ACLs, based on allocations, and then, to get the landed ACL, you would take out the discards from that, and so, that way, you would keep the same streams, kind of, but it would just be adding it all up differently.

DR. BUCKEL: Okay. Thanks, but the action items here in front of us are dealing with the situation where there would be the same selectivity for the dead discards and the landed catch, aka scamp, or potentially others, that this occurs, and so think of that as we're working through this, because, often, it's going to be different selectivities for the dead discards and the landings, and those will be not combined in the projections. Marcel.

DR. REICHERT: To my previous comment, I think it's important to hear, because we have done it differently, in terms of including or not including discards, and is that -- We specify very clearly that our ABC recommendation, in those cases, include both landings and discards, just to make sure that that's fully understood. That comment goes back to -- That's scamp only, this time, and so this is not kind of a general recommendation from us.

DR. BUCKEL: Go ahead, Chip.

DR. COLLIER: I think this has occurred for snowy grouper, tilefish, and maybe blueline tilefish, and it's generally the deepwater fish that have 100 percent -- That was assumed to have 100 percent release mortality, and so it happened in those as well, but we just didn't point it out at that point.

DR. BUCKEL: Okay, and so that first bullet, consider how this change will impact the application of the ABC Control Rule, evaluation of P*, and providing fishing level recommendations for the council, and, specifically, discuss how changes in discard assumptions, or catch selectivity, for management actions will affect the ability to provide updated ABCs, and so we spent time talking about how to investigate the ability of the projections to predict, and there was some good discussion on that, but that may be something that we want to capture below, because there were some good research recommendations on that, but that discussion didn't address this first bullet, and so if we can have some discussion on that, for these situations like in scamp, where it's combined. Marcel.

DR. REICHERT: In terms of the ABC and our current ABC Control Rule, in the past, whether they were included or not included, I don't think it impacted how we developed our ABC Control Rule, in terms of our tiers, correct, and so does it matter whether or not they are included or not,

or did we -- I don't remember following a different procedure in the cases where discards were or were not included, but maybe someone can refresh my memory, and I'm not sure if, in the new ABC Control Rule, that would be different, and I didn't reread the new ABC Control Rule, but maybe someone can refresh my memory.

DR. BUCKEL: That's my recollection too, Marcel, that that's not been treated differently within the control rule. Scott.

DR. CROSSON: Can I -- I feel like I'm not following everything correctly in my head right now, and so we have an ABC that comes out that is a combination of landings plus projected discards, and then the actual -- We find out afterwards that the combination, from the combination of I guess commercial landings and MRIP, that the actual number surpassed whatever our ABC recommendation is, and, at that point, and, I guess, at that point, it must have also exceeded the ACL, right, and so, at that point, should the accountability measure kick in? That's what I don't follow. It seems, to me, that, if the landings have gone over, and those landings -- You know, because they've exceeded the ABC that we've given, then there's an issue of compliance, and so why don't accountability measures kick in at that point, either taking it from the next year's quota, and shortening the season, or what, and I'm not following something here with the way that enforcement works.

DR. REICHERT: Are you talking about interim years or in general, because that's --

DR. CROSSON: I'm talking about in general. We give an ABC recommendation that has the catch plus projected discards, okay, and that's what our ABC is, and, now, if the actual numbers, in combination, exceed that, in the subsequent years, and, again, you know, we have an ABC that goes out for five years, and, if the actual numbers that are landed and discarded, the estimated discard mortality, exceed that ABC recommendation, isn't there an issue of compliance, and shouldn't an accountability measure kick in at that point? That's what I don't follow, and I need somebody to -- If Chip, or somebody, could walk me through that, and that's what I'm not grokking here.

DR. COLLIER: I know, for species like tilefish, we have gotten a letter of we have exceeded the OFL, and it's not if we exceed the ABC, and it's when you exceed the OFL, and they will send us a letter that overfishing was occurring, and it's usually a little bit delayed, because it takes a while to get the commercial landings estimates, and it's even longer if you want to include discards from the commercial fishery, and we don't get those on an annual basis, and those are generally developed for stock assessments, and that's one of the reasons why we've been kind of hesitant on tracking the discards, is because of the difficulty in getting the commercial discard estimate.

DR. BUCKEL: Scott, just -- I'm going to try to clarify something, and, if I'm wrong, Judd or Chip can correct me, but so the situation with the vermilion, that Erik was showing, that's, you know, how -- When the projections are done, and the landings have a different selectivity than discards, and so there's two streams that are being projected, both the landings and the dead discards, and, in this case, these action items I think are specific to the situation where that's not done, and it's combined into one, and so what's being projected is a combined removals. That's what was done for scamp, and so we're being asked, in those situations, like in scamp or some of the other deepwater species that Chip mentioned, does that impact the application of the ABC Control Rule and evaluation of P*, et cetera.

As Marcel pointed out, in the past, for those deepwater species, we didn't do anything differently, but, as Chip mentioned, we set that ABC, and it included dead discards, but then what we're comparing it to is -- We don't always have the dead discards, and we just have the landings. Marcel.

DR. REICHERT: This may be a little outside the discussion now, but, as I asked earlier, in the new ABC Control Rule, is the discard issue -- I don't remember, and that's part of -- You know, that comes into play in the new ABC Control Rule, correct, and that's -- Okay.

DR. CURTIS: No, there wasn't any specific language in there that talked about landings versus discards in those projections.

DR. REICHERT: Thanks for that clarification. That was my recollection, but -- Because, again, what happens is we apply the ABC Control Rule, and we've got a P*, and then the divvying up occurs after the fact, in terms of fleets, discards, and landings. Thanks.

DR. BUCKEL: Chris.

DR. DUMAS: I just wanted to make a comment on Scott's point earlier about, if the actual landings and discards turn out to be greater than the projected landings and discards, then should accountability measures kick in, and it seems, to me, that it depends on why the actual landings and discards were larger than the projected. If it's because fishermen were fishing more than you thought, and so there was overfishing going on, and the fishery is overfished, well then, yes, maybe accountability measures should kick in, but, on the other hand, maybe just the fish stock grew more than you thought, and so they weren't fishing anymore, but it's just that they were catching more, because the stock size was larger.

In that case, maybe you wouldn't want accountability measures to kick in, and, instead, you would want the opposite. You might want to allow them to catch more, because the stock size was growing, and so, if there's a discrepancy between actual and predicted, we might need to know why there was that discrepancy, or what was causing that discrepancy, because the projections are conditional on an assumed stock size at the time of the stock assessment, I think, right, or am I misunderstanding what you said?

DR. CROSSON: No, and I understand what you were saying, and you were telling me why it might happen, and that doesn't address the fact that the ABC is not going to change in reaction to the stock size. We assume that there's going to be up-and-down recruitment over the time series that we're projecting, and so I don't -- I understand that, yes, that might happen, but that's still not going to address the legal question of what happens.

DR. DUMAS: I see. Thanks.

DR. BUCKEL: Do folks have other input on the action items, particularly those that were assigned this item through the Excel spreadsheet? If you haven't looked at that yet, your name might be associated with this one.

DR. CURTIS: Also, feel free to comment on some of the possible improvements in Erik's slide as well, and that's on the right side, and so we can add some of that SSC discussion to those bullet points and include that in our report as well.

DR. CROSSON: I'm sorry, and Shep is trying to answer my question, and so he says that nobody is noticing that he's trying to speak, and so could you unmute him? Unmute the lawyer.

DR. CURTIS: Shep, go ahead. You should be unmuted now.

MR. GRIMES: Thank you. To get to Scott's question, I guess, I was going to say that, at least in terms of catch in-season, why it's not being picked up by the accountability measures, is it would only be picked up if we have in-season accountability measures that close down in-season, and we have some of those, but they're not ubiquitous, and the post-season accountability measures generally are looking at catch after the season has occurred, and there generally are not paybacks, and so they're not paying back any overage in the following year, and the season is just reduced, or whatever measures are implemented to try and constrain catch the following year to the ACL, but not address the overage that occurred in the prior year. Thank you.

DR. BUCKEL: Thank you, Shep. Other comments, either on the action items or the possible improvements slide? Fred Serchuk.

DR. SERCHUK: I'm a bit unsure, Chair, about what actually this action item refers to. It seems, to me, that the bullets there don't really address changes in discard assumptions and catch selectivity for management actions. If they occur, when will we know about that, so that we could change the ABCs? It's not whether we lump the discards with the landings, and it seems, to me, they're looking for a corrective action, when we have reason to believe that the assumptions that we used for the modeling, either the catches that were used in the discards or the catch selectivity, have changed.

I think that's a different issue than what we're addressing with our points up here, and I don't know whether the management process is flexible enough right now, either in terms of understanding where these changes occur, or what the magnitude of the change is, and how quickly they can implement it, and so I think we need to -- From my point of view, we need to focus a little bit more on those aspects than combining discards with landings, and that's just my perspective. Thank you.

DR. BUCKEL: Thanks, Fred. To put it, and, Fred, you can correct me if I'm not capturing your thoughts, but, to put it another way, what would we like to see, right, coming out of the projections, and then, also, what would we like to have reported to us, and we get the landings reported to us, and we could compare the landings to the ACL, which, in the past, that ACL has been based on the projected landings, but, in the future, we also -- It sounds like we would like to also see the dead discard projections separate, and the estimates of the actual dead discards, so we can make that comparison, and those aren't -- As Chip mentioned, we're not going to see that as quickly, in real-time, as we do with the landings.

DR. SERCHUK: My point is it says, "updated ABCs", and, generally, we provide ABCs for the years out, and the word "updated", to me, means, well, wait a second, we see something different that's been going on in our initial evaluation, and we can update it, and I don't know how quickly

the management can actually implement those updates, even if they had them, or whether the process allows for it.

DR. BUCKEL: Thanks, Fred. Marcel.

DR. REICHERT: To that point, I think, in the past, we've received updates on, you know, landings, and I don't think we get those anymore, and, if I remember correctly, we got those updates in the meeting, and, you know, the council always can ask the SSC to take another look at -- To provide ABC information, but I think the -- You know, the presentation we will receive later in the meeting, and updates on landings, those may be types of information that we can then compare to, you know, what were the projections, and others could potentially do that, and that may provide some flags, in terms of, you know, would it be useful for us to take another look at some of the ABC recommendations that we have provided in the past. Is that kind of what you were getting at Fred? Thanks.

DR. BUCKEL: Thanks, Marcel. Others? As an SSC, what do you want to see, to see if we're on track, in relation to Erik's presentation?

DR. CROSSON: I am hesitant to even say it, but is this something that we need a working group to cover? I wasn't going to mention it, because I'm --

DR. BUCKEL: Then you'll be the chair.

DR. CROSSON: That's what I was worried about, but this is ripe for further discussion and refinement, and so, if there were questions, that would be -- I mean, what Erik has got up there for possible improvements is a good start, but there's a lot of different assumptions that I can think of. I mean, there's a perfectly good argument for using lots of different approaches for these things, and it would be helpful to see how they perform against even just the sort of thing that Erik just did with vermilion, just looking at how they've compared over the years.

I mean, honestly, in a multispecies fishery like the snapper grouper complex, you would assume that -- I would assume, a lot of times, that, if you reduce the actual retained ACL, the discards are going to go up, because people are not allowed to keep them anymore, and so that's something that I could see being implemented. Go ahead.

DR. BUCKEL: This should be -- The data can be examined, to see how that -- That may depend, as I mentioned before, if it's in a rebuilding scenario or it's not, that you might expect that ratio of discards to landings to be different in those two situations. Marcel.

DR. REICHERT: To that point, you know, in Erik's presentation, he mentioned management actions, and they were thinking about, if we get a stock assessment of Species A, what is the impact of a potential management action of that Species A to your projections, but, more often than not, there is management actions on other species that affects discards, and so, you know, as was mentioned earlier, and Chris mentioned it, you've got a whole complex of issues, but maybe, if we occasionally can look at what's happening in fisheries, and the landings and the indices, then that may give us a signal, in terms of whether or not it would be useful to take a look at certain species.

DR. BUCKEL: Thanks, Marcel. Alexei.

DR. SHAROV: I am just listening to the discussion and trying to actually understand what is the greatest concern here, and I'm a bit confused, and maybe that's just my problem, but I wanted to ask, and, if you want to specify, or make a comment, whether we're particularly concerned about the projections of the dead discards or the cases of where the species were discards, dead discards, comparable -- The dead fish comparable to the actual catch, and, in other words, are we concerned with all this or just only species where discards are so significant that they are equivalent to the actual catch, or larger, and that's why we're focused -- Because, in general, every fishery has discards, and for some they are substantial and for some they are not, and I just wanted to define, at least for myself, the scale of the problem. Are we talking about the cases where discards are significant and they affect the allocation for those species, in terms of the actual catch?

DR. BUCKEL: I think we're talking about if there's some situations where the dead discards are a small amount, and maybe Chip was -- That was for the deepwater species, because some of those are -- They're assumed to have 100 percent mortality, and so there's less -- The dead discards make up a smaller percentages, because the regulations are such where they're allowed to keep everything up to, you know, until the quota is met.

Then we have many species, right, where the dead discards is a substantial part of the overall removals, and so I think, in the case of scamp, it sounds like -- I'm not sure if it was a magnitude situation there, but it was, as Erik mentioned, maybe the selectivity was thought to be the same, and so I'm not sure on the scamp example, but we're talking about both, I guess, Alexei, but we are talking about the dead discards, and monitoring that, and that would be -- In my mind, and you make a good point, and that would be for the species where the amount of dead discards is substantial, relative to landings. Alexei.

DR. SHAROV: If I could, again, this is -- This is just thinking out loud and trying to figure out the elements that altogether sort of contribute to this problem, and we're seeking the best solution, but, when we do projections, we come up with estimates of the population size and the probability distribution for that abundance of biomass, and, therefore, we can come up with the P* estimates, and we can come up with the likelihood of us achieving a certain target, but we're not providing uncertainty estimates, for example, for the catch, and, generally, we are projecting forward with a constant F or constant catch or catch by year, but still without any --

When we look at the performance, we can say that, in the interim year, the actual discards happened to be this that year, like 30 percent larger than the projected ones, and we're not accounting for uncertainty in those estimates, and I think it needs to be accounted for, and, therefore, a procedure should be established to, when we actually define the discards do indeed contribute sufficiently, and discard estimates generally, particularly in the recreational fishery, are much more uncertain, relative to the landings, because they are not observed, and recall, et cetera, and they don't want to tell all the details, but, because of the uncertainty is substantially higher, it would have to be included into the process of deciding whether the contribution of discards to the overall ABC is significant.

Just taking this as we do, the single point estimates, is not sufficient, and it probably creates, in part, the problem in itself, and so, in many cases, we could have said we're not sure that actually we did have that level of discards, and then, based on the rule that was set, this is important or not, or we're just making the decision uncertainly.

DR. BUCKEL: Thanks, Alexei. Other comments? Chris.

DR. DUMAS: Alexei, I was thinking almost something exactly the same, just before you said that same thing, and so, Erik, coming out of BAM, for everything that we're going to project, you get a point estimate of an estimate, and then you get a probability distribution around that point estimate, for each year going forward in the projection, and so, getting back to your point, Alexei, we could look at the point estimate, and the distribution around it, and, based on looking at the distribution, know what one or two standard deviations away from that point estimate projection is, and then, when an actual interim number comes in, we could see how far that -- How many standard deviations that is away from the initially-projected estimate, to help us decide whether or not that's an unusual number, an unusual interim number, and something that should be looked at, and that might be one way we could start going forward doing something along the lines of what you were describing.

As far as updating, based on that interim information, just focusing on the projection part, and I was talking earlier about the vector autoregressive models, and those, in combination with error correction models, are a way just to take all the data streams you have, and put them all together, and just try to project something, as best you can, and you can make a projection, get a probability distribution around that, and then you can use -- There is also Bayesian updating versions of those models, and so, as new interim --

As a new set of information comes in, every year in those interim years, we can use the Bayesian updated versions to optimally update your projections going forward, and so that might be a way that we can incorporate interim information in an optimal way to update the projections, as we go forward from the terminal year, going forward into the future, through the interim years and then actually into the management years, until the next -- What is, and I can't remember, but a base assessment, or a baseline assessment, and not an interim assessment. A benchmark assessment. I just had a blank there. When a benchmark assessment occurs. Thank you.

DR. BUCKEL: Research. Thanks, Chris. That's, I think, a good discussion on the projections, but then there's the -- In terms of the dead discards, there's the what do you compare that to, right, and so the observed dead discards, and that's where we've commented before on the issues with the commercial -- That those discards have gone down, or have a lot of zeroes in those reported dead discards, and so that's --

Do we want to make a comment here, on that second bullet, how projected stock level discards and landings can be allocated to fisheries sectors, to provide ACLs, but you need to have an improved -- The observed dead discards, there needs to be improvement there, and so we have -- And we've made those -- We don't have to get into the details, because we've provided that in past reports, but unless folks would like to make comments on that, but I see that as something that we don't have -- We don't always have that for species, and we would need it if we're going to monitor an ACL on dead discards, for example.

Okay. We're going to talk about working groups later, and so we can add this one, because I think, based on the discussions, there's a need for this working group, to have time to dive deeper into it, and we need some time -- We need to make sure that we have time for black sea bass, and we'll move into that now, but do you want to do a -- I've got 2:36, and so let's do a ten-minute break,

and then we'll come back to the table and get a presentation on black sea bass, and that's from Matthew Vincent. All right. Ten minutes.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right, and so we're moving on to the next agenda item, SEDAR 76, South Atlantic Black Sea Bass, and we have a presentation from Dr. Matthew Vincent. All right, Matthew. Take it away. Thank you.

## SEDAR 76: BLACK SEA BASS OPERATIONAL ASSESSMENT

DR. VINCENT: All right. Sounds good. I am giving the stock assessment for the South Atlantic black sea bass, and so I've separated it out into six different sections, and I'll stop for questions at the end of each section. I think the first one -- I would be surprised if there's any questions, but we'll go ahead and start with the background.

In 2011, there was SEDAR 25, and this found that the stock was not overfished, but it had not been fully rebuilt. It was still below the SSB MSY, and the previous assessment, before that, had found that it was overfished, and so it was still in a rebuilding plan, and then it also found that overfishing was occurring. There was an update conducted two years later, in 2013, which found that the stock was not overfished, and it was above the SSB MSY, and then it was also not undergoing overfishing. Then, also, in SEDAR 56, in 2018, with a terminal year of 2016, the assessment found that the stock was not overfished and not undergoing overfishing. Then that leads us to the current operational assessment, and, as you all are aware, I'm assuming, having read the report, it is overfished and undergoing overfishing.

In SEDAR 76, the terms of reference were approved in June of 2020, and that set the terminal year of 2021 as the last year of -- Or 2020 as the last year in the assessment model. However, the final schedule wasn't approved until March of 2021, and then we didn't start working on the model until August of 2022, and so we decided to extend the terminal year of the model to 2021, so that it would be as up-to-date as possible for management advice.

We didn't get our final data until -- It was after the deadline of August of 2022, and even after the scoping call of September of 2022, but we had most of the data by that point and were able to proceed. We then were -- We conducted five assessment webinars between September of 2022 and February of 2023, and this -- During these webinars, we got input from all the panel members, and any decisions and changes to the model were approved by consensus, and then this leads us to the SSC review today, in April of 2023. I will pause and see if anybody has any questions, which I doubt. Okay, and so we will move on to the data.

The data that was used in the assessment, it included four indices of abundance, and two were fishery-dependent, one from the commercial handline and then one from the headboat, and then two fishery-independent indices, one from the MARMAP blackfish trap and the other from the SERFS video and trap, which is combined using the Conn method. We also tested a couple of different sensitivities to the indices, and we'll talk about that later, when we talk about the model results.

This plot shows the different indices that were used in the stock assessment. There was generally good agreement between the different indices, and the purple line and the orange line weren't actually used in the assessment, but they were used to create the black line, which is the CVID, which is the SERFS fishery-independent index.

The stock assessment included eight different series of removals from the population, and half of them were from the commercial fishery. The trawl fishery occurred at the beginning of the time series, in the 1990s, and then we also included landings from the handline and the pots, and then there was a combined discard for the handline and the pots, which also included the open and closed season. Then there was four additional removal time series from the recreational fishery, from the headboat landings, and then a separate one for the headboat discards, and then there was general landings and general discards.

This plot shows the landings for the different fisheries. In this plot, MRIP stands for the general recreational, and they generally had the majority of the landings, especially towards the end of the time series. Then this plot shows the discards for the different fisheries and, once again, MRIP is the general recreational, and I just wanted to point out that the handline fishery -- We had a lower -- The scale of the open-season discards from the handline was lower than what was previously estimated from the logbooks, and it was noted, during the webinars, that the current logbook -- 70 percent of the logbooks reported no discards of any species at all, and that was thought to not be very honest, or accurate, but that was the data that we have, but the majority of the discards are from the general recreational, and these discards would have to be orders of magnitude different from what they are in order to have a major impact on the population.

Then the composition data that was used, the general tenet that we used was, if age composition was available, we would use it, but, if age composition wasn't available, but length composition was, then we would use the length composition, and so, for the handline and the commercial pots, we had age composition from around the mid-2000s until the end of the time series, but, for the pots, we only had length composition for the last year.

For the headboats, we had a similar situation, but, for the general recreational, we only had length composition, because the age composition weren't thought to be representative of the entire Southeast Atlantic, and then we also only had length composition for the headboat discards for the last couple of decades, and then there was also the fishery-independent indices, where we had age composition in 1983 for the MARMAP blackfish traps, but length compositions for all other years, and then the SERFS used an age composition for all of the years, except 2020, when there wasn't an index available, and so this is a graphical representation of the data availability that was used in the stock assessment. I could go through all of the different abbreviations, but, if you have any questions, I will be happy to let you know what they are.

Moving on, one of the terms of reference was to update the life history, and so the first thing we looked at was updating the growth, and so we took a look at the age and length composition date, or mostly the age composition data, and we plugged it into a von Bertalanffy growth curve, using standard code from ADMB that weights it by the calendar age, where ages-nine and older are grouped into a single age, and this was the same procedure that was conducted in SEDAR 25, and, when we estimated the von Bertalanffy growth curves, the estimates were relatively similar to what was used in the previous assessment, a slightly higher L-infinity, and a small change in the K.

We also looked to see if there was any differences in the life history or the maturity and the fecundity of the species, but we didn't find any new information since the previous assessment, and so we used the ogives that were available from SEDAR 56, and so these include the proportion female, and the proportion mature as well, and these were used to calculate the SSB used for management, but, since we assumed a mean recruitment model, they don't inform recruitment of the population.

Then one of the other things that we looked at, or were tasked to look at, was the discard mortality, and so, as a reference, in SEDAR 56, the commercial pot discard mortality was based on the Rudershausen et al. 2008 paper, which gave a mortality of 14 percent for the one-and-a-half-inch panels, but 6.8 percent for the two-inch panels, and then the discard mortality for the handline was based on the Rudershausen et al. 2014 paper, which gave an estimate of 19 percent for the commercial handline. The headboat and general recreational discard mortalities was recalculated based on the estimates from Rudershausen et al., using the depth and the condition of the fish from observers in the for-hire, off the coast of Florida, and that's where those values came from.

It was noted, in the Rudershausen et al. paper, that the release of gas, or the tagging of the fish caused the release of gas from the abdominal cavity during the tagging of black sea bass, and this might be influential, because of a later study conducted by Rudershausen et al. that found that survival from venting and descender devices was one-and-a-half times the survival of the control, and so the original study may have underestimated the discard mortality that was occurring, due to the release of gas from those fish, and there is also new studies that estimate higher discard mortality, and so there was the Schweitzer et al. paper from 2020 that used a commercial trap of one-and-a-half inches, with their standard vent size of two-and -- I think that's six-eighths, or something like that, off the coast of Maryland and Delaware, where they fished in twenty-five to thirty meters, and then they let the commercial fishermen sort the fish, which resulted in some fish being on deck for more than ten minutes, and then they would -- After that, they put them in a cage for up to four to ten days and then assessed their mortality, and their estimate of discard mortality was 47.1 percent.

Then the Zemeckis et al. paper, from 2020, was conducted off the coast of New Jersey, in forty-five to sixty-seven meters of water, and this was conducted on a headboat in the winter months, and these fish used acoustic tags, which allowed for the predation mortality by sharks and other large predators, and this study found that tags that were vented had a discard mortality of 21.9 percent, which is somewhat similar to the Rudershausen 2014 estimate, and then they found that those that were not vented had a much higher estimate of discard mortality of above 50 percent.

However, despite these studies, there were many panel members that were hesitant to disregard the Rudershausen et al. 2008 levels of discard mortality. Particularly, there was concerns, with the Zemeckis study, that these were fishing in waters deeper than conditions typically fished in the Southeast, particularly in the headboat fishery, and then there was also the concerns that the exposure time from the Schweitzer et al. paper was longer than typically experienced for pot fishermen in the Southeast.

As a result, we decided to retain the base levels of discard mortality from SEDAR 56, but then we expanded the uncertainty scenarios to include these higher discard mortality rates, and we will talk about that later in the uncertainty scenarios.

The other thing that we looked at was updating natural mortality, and so, as the reference, in SEDAR 56, natural mortality was estimated using the Hewitt and Hoenig 2005 equation, which estimated a natural mortality of 0.38, and then this was scaled to a natural mortality at-age using Lorenzen's 1996 paper, and then it was reweighted to give the average survival, and so, to start out, for SEDAR 76, we took a look at the Hamel and Cope 2022 paper, and this gave an update of natural mortality of 0.49, and then we decided that we were going to rescale it using Lorenzen's new generalized length inverse mortality model, which would scale the natural mortality at-age based on that mean natural mortality, but, as they say in the cheesy TV ads, but, wait, there's more.

We decided to try to estimate natural mortality within the model, and it gave us a somewhat reasonable estimate of natural mortality of 0.26. However, looking at the likelihood profile, you can see that it seems to be informed by the length composition a little bit, and the discards, but it seems to center on the conflict between age composition and the index, and both of these changing likelihoods was from the SERFS index, and so the panel decided that it probably wouldn't be very good to estimate natural mortality based on the conflict of two data sources, but that it should probably be informed by natural mortality and that the minimum -- The best fit and the likelihood for the age composition should be close to the estimate.

Since this wasn't the case in this model, they decided that there wasn't enough evidence to use this as the base model. However, since it had a better fit to the likelihood, and it was a reasonable estimate, they decided that we should include it in the uncertainty, but that it would be best to take the average from the estimate from the Hamel and Cope and that of the BAM estimate, and then this gave us an M that ends up pretty much back to the value that we started at from the SEDAR 56, ironically, but we did change it by scaling it to the inverse length, instead of using Lorenzen's 1996 paper, and so, to choose the age over which we scaled the mortality at-age to be consistent with the constant mortality, we took a look at the estimates that were used in -- Essentially, it was the Then et al. paper, and I forget the year, but their database of natural mortality, and we found that most of them were based on fully-selected fish, and so we took a look at our fisheries for the black sea bass and found that age-three and older -- Age-three was the first age that it was fully selected to some fisheries, and so we decided to have the survival from age-three and older to be the same as the survival for a constant mortality. That brings us then to the data, and so I will stop and pause for questions. Okay. Then we'll keep going with the assessment model.

We made quite a few changes to BAM, the Beaufort Assessment Model. Generally, they were minor changes, like changing the code to accommodate for the missing year from the SERFS index, and then we also made some changes to the Dirichlet multinomial, which had been minor tweaks in subsequent assessments since SEDAR 56, and then we also changed the biomass calculations, so that they were in thousands of pounds, just for my convenience, so I don't forget to convert it at the last second, like we did for Spanish mackerel.

Then, also, there were minor changes to the parameter estimate, the phasing of parameter estimates, so that it would converge more efficiently, and then the change -- So there was a lot of discussion about the commercial discard selectivity, particularly for the pot fishery, and we found out that that was due to discards in the most recent years.

The closed season isn't actually a closed season, and it's a limited area closed season, and so they can't fish inshore, and so we decided to treat the discards in the most recent years, from 2013

onwards, to be an open-season discards, and so we modeled only the discards in the 2009 to 2013 to be a closed-season discards, which affected the selectivity, which we'll see later in the model results.

The other changes that we made were small corrections, so that the start date for the recreational, and some commercial, selectivities in the recent time block started when management was implemented, as well as the discard mortalities for the general recreational and headboat had accidentally been switched in the previous assessment, and we corrected that.

Then there was also -- We changed the calculation of natural mortality within BAM, so that it could be estimated as well, and then we set the initial F at the multiplier of the average of the first three years to be equal to one, because it was being estimated at the lower bound, which was deemed unreasonable, and then the next three points we will talk about in more detail in the next slide.

One suggestion that was talked about was looking at domed selectivity, and so I investigated the domed selectivity for all fleets and all surveys, but only the SERFS selectivity resulted in an improvement in the likelihood, and so we then decided to conduct a likelihood profile over the two parameters that control the doming of the selectivity, to determine if these were estimable parameters, and so these plots show the likelihood profiles on the left is the A52, and so this is the age at which 50 percent of the -- Or the selectivities at 50 percent on the descending side, and then the slope is the profile on the right. As you can see, these were informed by the age composition and the length composition, mostly from the SERFS index, but there was also the length composition from some of the other fisheries that seemed to inform these parameters.

As a result, these profiles, along with the more than twenty-point change in the likelihood, and a better fit to the data, suggested that this was a better model to use, using the dome-shaped selectivity, and it didn't have that big of an impact on the assessment either, and so we decided to proceed with this model.

The other thing we looked at was the spawner-recruit model, and so we conducted a likelihood profile over the steepness for the Beverton-Holt model, and this showed that there wasn't very much change at all over a wide range of values for the steepness, and so it generally suggests that this parameter might not be well estimated by this model. Particularly, there also wasn't any individual data sources that seemed to inform it, and they were either best supported at a lower or higher value of the steepness value. Additionally, there wasn't any information, external information, that I could find about black sea bass, and so, as a result, we decided to follow the precedent of the red snapper and the scamp assessments and switch the mean recruitment model.

Then we also took a look at the estimates of the terminal recruitment deviates, and so, at the bottom left, this is the time series when you estimate all of the years, and you can see this estimate, the terminal estimate, in 2021, is estimated to be really close to zero, but, when we took this parameter out, and conducted a likelihood profile over it, it was estimated to be at a value closer to negative-1.75, and the change in likelihood was very small, and so it suggested there's not really very much information to estimate these parameters.

Then we proceeded on to the next year's recruitment deviates and conducted a profile for the parameters in 2021 and 2020, and this one was also estimated, and so, in the original model, it was

estimated at a negative-0.5, but, in the likelihood profile, it's also estimated at a high value of negative-1.75, and so it suggests that the -- So, when it's estimated in the original model, there's a bunch of penalties, and the deviates must sum to one, and so that's why there is some difference between the two models, but, also, the change in likelihood is very small, is relatively small, smaller than what we would like it to be, and so we decided that the 2020 year was also poorly estimated by the data.

Then we looked at the 2019, and we can see that the change in likelihood, the Y-axis, is much larger, and so you have a pretty large change in likelihood, and the estimate is -- It's somewhat larger, and it's at negative-two, but it's more similar to the estimate from the deviate, and so, as a result, we thought that there was probably more information, as you can see that there's actually a minimum in the likelihood for the age composition, and so there's just conflict between the different data sources, and so, as a result, we thought that this year would likely be able to estimate the terminal recruitment deviates, and so we set the 2020 and 2021 at the average -- We set the average at the mean from the -- Well, we conducted a change point analysis and determined that there was a cutoff in the recruitment deviates starting in 2014. We took the average recruitment from 2014 to 2019 and used this as the recruitment for the 2020 and 2021, and, essentially, it's a forecast with a fixed average recruitment. I guess we'll stop there and ask for questions about the assessment model.

DR. LORENZEN: I don't know whether now is a good time, or later, but I have a sort of a philosophical question about the switch from the Beverton-Holt to a constant recruitment model and whether you would then call the reference point you get out of that MSY and FMSY, because it seems to me that it's a Fmax multiplied by an average recruitment, and whether, if you do that, you should not switch to using an SPR reference point. You're treating it as though it was accounting for compensation, when it's not.

DR. VINCENT: Well, so the reason why we were able to get MSY was because there actually is a maximum, and that's a result of the yield per recruit having an actual dome in it, whereas, usually, it's pretty asymptotic, and so that's why you usually can't have a maximum in your -- When you have a mean recruitment. Usually, you don't have a decline, and so I think it has something to do with the difference -- Or the discards and the yields modeled in the same, or in the assessment.

DR. LORENZEN: No, because it's a yield per recruit curve that you have, and it's not MSY, if you're not accounting for compensation. It's just a maximum yield per recruit, is my take, because, MSY, per definition, should account for recruitment compensation, whether you estimate it or assume it, and, if you don't have information on that, you can switch to, you know, using an SPR, and the appropriate proxy for FMSY comes out of considerations that you make that involve assumptions about compensation. You know, I was looking at this and thinking, okay, where did they get MSY from, and, from my mind, that's not MSY.

DR. VINCENT: Usually, in the -- When you increase fishing mortality, your yield usually increases with the fishing mortality, when you don't have a stock-recruitment -- When you have a mean recruitment relationship, and so your yield just keeps going up and up, with more fishing mortality, because you don't have that compensation.

DR. LORENZEN: No, and, I mean, it depends on the selectivity, and so, depending on -- You know, you can have selectivity where you get a flat yield per recruit curve, but that's a different

question, as per -- In fact, the definition, and I don't know whether that's National Standard 1, and so there's basically MSY should -- If you don't have a stock-recruitment relationship, and that means one that implies a level of recruitment compensation, then it's not MSY, to my mind. I am sorry to throw this into the work at this state, and, actually, I really like this assessment, and it's more of a question of is what you're looking at actually MSY, and maybe you can enlighten us.

DR. BUCKEL: Go ahead, Erik.

DR. WILLIAMS: If you go to Slide 58, that is the definition of FMSY, is equilibrium landings as a function of fishing mortality. In this case, and I don't disagree with you, but it just happens that FMSY is equal to Fmax, but that is the technical definition of FMSY. It is the equilibrium landings as a function of F, the peak of that, and there's your peak.

DR. VINCENT: Like I was saying, I think this is potentially just a function of the selectivity difference between your discards and your landings, and so, when you increase your fishing mortality, more ends up being allocated to your discards than to your landings, because they catch the fish at a smaller size.

DR. LORENZEN: I don't disagree, and I don't agree, but just by -- You know, if you assume constant recruitment, then, naturally, your Fmax equals the FMSY, if you define your MSY like this, but I'm just not sure that it's an appropriate definition of MSY, but okay. We can maybe -- If nobody else has a comment on that, then -- It seems to me that, as we go to more and more using constant recruitment models, we're actually changing the goalpost.

DR. BUCKEL: We'll let Matthew continue, and then we're going to revisit that in the discussion, for sure, Kai. Thank you.

DR. VINCENT: Yes, good point. Alexei has got a question.

DR. SHAROV: It's not about MSY, but could you please remind us -- I'm trying to look in the document, and we're talking about the recruitment and SSB, and is SSB here females only?

DR. VINCENT: So SSB is one to tenth eggs, and so it includes proportion mature, proportion female, and fecundity and batch size, I think.

DR. SHAROV: Okay. All right, and so I just wanted to make sure that the SSB that we calculate here -- It's just that female SSB is usually -- Thank you.

DR. BUCKEL: Thanks, Alexei. Marcel.

DR. REICHERT: Just a question. That domed selectivity, that was for the combined one, correct?

DR. VINCENT: Yes.

DR. REICHERT: Thanks.

DR. VINCENT: Jie.

DR. CAO: Just a few quick questions. The first one is how was the missing value in 2020 dealt with? Was it just not including in likelihood?

DR. VINCENT: Yes.

DR. CAO: The second question is the recruitment deviation in 2020 and 2021, and so, basically, they were fixed, and all the deviations prior to those two years -- Do they sum to one as a constraint?

DR. VINCENT: Yes, it's a dev factor, yes, and so all the years before that sum to one, and the previous two, or the last two, are just, yes, that recent average.

DR. CAO: Okay.

DR. VINCENT: Wally.

DR. BUBLEY: So, Matt, you're probably going to be sick of me hitting on this again, because I bothered you a lot during the actual portion of it, but the dome shape of the SERFS index, and that's one thing that I just wanted to get on the record here, and so the comments in the report talk about it's potentially due to behavior availability differences compared to the fisheries, and that's -- I think that's where I have the biggest issue with it, is that it's essentially -- You're treating it as a relative selectivity, compared to using those fisheries with the baseline with it, because knowing -- Knowing the gear, and knowing like the blackfish trap is -- The fact that it's flat-topped, and it has a smaller opening, and it's fished in shallower water, where smaller fish are, and yet that's flat-topped.

In the chevron trap, which is larger opening, and it's fished in deeper water in the fishery, but it is fished in shallower water as well, and it covers a wider range in the fishery, and so that's the concern I have, especially because that index is being predominantly used for 2010 on, to inform things, and so do you have -- Is there a concern?

I know you looked at those sensitivity runs, and it doesn't affect it, and so that's why I hesitate to bring it up, a little bit, because it doesn't seem to have much effect, at least with this species, but I worry about setting some precedents in the future, and I at least wanted to get some clarity on my end about how that works, because of -- If the commercial fishery tends to fish in just the deeper water, and catches the larger fish, because there is some ontogenetic movement of them, your -- If you're using that as your base point, it's going to be dome-shaped, because it's covering the shallower water too, where they have the smaller fish, and that's the concern that I have with it, going forward, is that it strictly is a relative selectivity and not necessarily representative of what the population is, and, Erik, I know it has its problems too, and it might not -- It might be biased in some other ways too, with the SERFS fishery, or the SERFS survey, but the concern is that it's -- You're potentially underestimating these larger fish, or, actually, I guess overestimating.

You can go the opposite direction, and so, if you did happen to catch some larger fish in there, then it's going to bump up that number of larger fish that are -- That the model is accounting for, because of the selectivity, and so I just wanted to bring it up, and, as I said, I know it doesn't affect it, with the sensitivity runs, but it was just something I felt the need to bring up again.

DR. VINCENT: Yes, and there is two comments that I want to make about that, the first being that you can sort of think also that the selectivity is relative to each other, and so, if the commercial selectivity -- If they're all assumed to be logistic, then you can't have targeting of older fish by the commercial fisheries and stuff like that, and so, by allowing it to be dome-shaped, you kind of allow for that targeting of the -- Or the increase in selectivity for the older fish, relative to the younger fish, to some more degree than just the logistic for both the survey and the commercial fisheries.

Then the other thing was, partway through the assessment, somebody brought to my attention that there may be sampling from some of the -- Like the size bins, like small, medium, and large, for black sea bass, and so, if you equal numbers of samplings per size bin, and so, if you do equal sampling of that, that's not a random sampling across your population, and so this is something that we're still trying to dig into more, but I don't think there's anything currently that can be done about it, because the data isn't currently available, and it's a continuing research project, but it was something that was kind of was in the back of my mind when I was investigating the dome-shaped selectivity as well, so that, if there is a -- Well, I don't even know if it would cause bias, but, if there is some sort of mis-sampling, or un-random sampling, that could explain the potential -- If the SERFS index is a more accurate representation, that could explain the overabundance of the older animals in the commercial samples. I don't think I explained that very well, given your facial expression.

DR. BUBLEY: No, and, I mean, I was just a little -- You had me until the very end, and there was non-random sampling early on in the survey, and it's been more than fifteen years since it's just been a random sub-sample of what's being taken from length bins, and so the majority -- Probably the majority of the fish caught are just from randomly selected -- So, those early years, potentially you have that issue associated with them. With the later years, it's all random sampling.

Like I said, it strikes me as odd that the blackfish trap is flat-topped, knowing the gear, and that one -- That one is not, and so, if chevron traps catch any species, it's black sea bass, and there doesn't seem to be a difference, in terms of what our catches are, at least compared, and I think our sizes, at the same depths that the fishery is operating at, are probably very similar.

DR. VINCENT: Those are good points. I guess I just did it based on the statistical fit, that it's a better fit, a better-fitting model, and so -- But I do understand your concerns as well.

DR. BUCKEL: There are no other questions, and so please proceed. Thanks.

DR. VINCENT: Okay. We'll talk about the assessment results now. We'll start with looking at the fits to the commercial landings, and the model fit the commercial trawl to handlines and the pots all pretty well. Then, moving on to the recreational landings, we have really good fits to the headboat fishery on the left, and then there is a pretty good fit to the general recreational, but we might not be reaching some of those peaks quite as much, but it's still a decent fit, overall.

Then we have the fits to the discards. On the left, we have the headboat. In the middle is the commercial combined -- Or commercial pots and handlines, and, on the right, we have the general recreational, and these are all generally good fits to the observed data.

Then this plot, these four plots, show the fits to the landings and discards, combined into a single plot, and so the first letter, D, indicates a discard, and L is a landing, and then MRIP is the general recreational, HB is headboat, and COM is the commercial discards. CT is your commercial trawl, and CP is commercial pots, and then the CL is the handlines, the commercial handlines, and so the plot on the top-left is the landings by weight, and then the bottom-left is the landings by number, and then the right column is your proportions, and the top is, once again, weight, and the bottom right is proportions by number.

You can see, at the end of the time series, the majority of landings and discards, by number, are from the discard from the general recreational, and the landings from the general recreational, but, in terms of weight, the general recreational landings are the majority, but it's closely followed by the discards from the general recreational, and there is a smaller contribution from the commercial handlines, and so people like they're intently staring at their screens, but, if they're staring at their screens, I think they can keep looking at it, and so I will -- If we need to go back to it, let me know.

We'll move on to the fits to the fishery index, and so, on the left, this is the commercial handline index, and on the right is the headboat, and so the green tile on the bottom shows that it passed the residuals test, with an alpha of 0.05, and that the residuals are within three standard errors of the standard deviation assumed for the index, and then this is the fits to the fishery-independent indices, and on the left is the SERFS index and on the right is the MARMAP blackfish trap, and there was only one point that fell outside the three standard deviations, and that was the 2009 estimate, which was below the three standard deviations, and then both of them, once again, passed the runs test.

Then we have the fits to the age and length composition for the MARMAP blackfish trap, and you can see that there's not a great fit to the age composition from 1983, but there is a pretty good fit to the length composition, and, in the model, the age composition was downweighted for this survey and upweighted for the length composition, and so you only have the one year of data for 1983, versus multiple years from the length composition, and so the model does a better job fitting to the length than to the ages.

Then we have the fits to the age composition for the SERFS index, and, overall, it's a pretty good fit for the pooled and weighted compositions, and then this resulted in the selectivities. On the left, we have the blackfish trap, and, as we talked about, the domed selectivity for the SERFS trap, where both of them are mostly fully selected at age-three.

Then this is the fits to the age composition for the handline, are the left two plots, and that's a pretty good fit to your data, and then, on the right, you have the length composition. In the top right, in very tiny letters, that I can't see, unless I'm looking at my own screen, they have the years over which the different selectivity blocks were, and, if anybody wants to know which ones are which, I will be happy to answer that.

Going on to the fits to the commercial pots, on the left, you have the length composition, and then at the top is the size block from 1990 to 2012, and then below that is from 2013 to 2020, and then your length compositions are on the right, and those are the first three time blocks. Well, actually, no. That's wrong. The top one is for 1984 to 1988, and then below that is 1999 to 2012, and then the bottom plot is the length compositions just for 2021.

These are the selectivities for your commercial fisheries, and you can see that, with the increase in your minimum size limits, you have a slight shift to the right, to slightly older ages, for the two different fisheries. For the model, the commercial trawl was assumed to have the same selectivity as the commercial lines.

Then we have the plots for the fits, the combined fits, for the headboat. On the left, once again, is the age composition, and on the right is the length composition. You can see that the fits to the age composition, overall, is pretty good, and the same can be said of the top two fits to the length composition, but the fits, particularly to the bottom-right, where it tends to overestimate the fish below the size limit, and this was a result of this being only a single year that was used, and so this was just the 2020 length composition that was used, and so it seems to be a different -- Probably a misspecification in your growth, and we investigated a bunch of different ways to try to remedy this, such as changing fishery-dependent growths and doing a length -- Or like a vulnerability based on length, and a whole bunch of different models, and none of them -- They actually performed worse, and so this was the best that we were able to do, but, in general, we thought that fitting one year, or fitting the age composition, was probably better than trying to fit just one year of length composition data.

Then, moving on to the length composition for the general recreational, you can see that we have pretty good fits to all of these time blocks in this fishery, and so these are the resulting selectivity at ages for the headboats and the general recreational, and, once again, you can see that, as you increase the size limit, you result in a rightward shift of the different selectivities between these two fisheries.

Then, moving on to the length composition for the headboat discards, we have three different time blocks for these discards, and, in general, it does a pretty good job of fitting this data source, and so we have a selectivity on the left, and this is the commercial discards, and, if you look at that blue line, where it has the higher selectivity at ages-five and older, this is because this was the time period when we had the closed season, and so we weighted the selectivity from the landings in that time period to be included as the selectivity as well as the discards, and that's why you have that higher selectivity at that time period, to account for the closed season discards. Then, on the right, we have the general recreational discards from the -- The selectivity for the general recreational and headboat discards. That's what I was trying to say.

Then this shows the landings, or the selectivity, for -- On the top-left is the weighted landings selectivity, and on the top-right is the weighted selectivity for the discards, and then, on the bottom, in the middle, we have the total selectivity weighted by all landings, and you can kind of see that there's a gap between the peak and the discards and where it's fully selected at around age-four through six. Then these were included just for information purposes, and I don't really have much to talk about them, but, if anybody has any questions about those, we can go back to it.

Then we have the abundance-at-age, and you can see that the majority of the abundance is from age-zero, and then you have a decline with progressing ages, and then the plot on the right is the proportion at each age over time, and then we have the plot of biomass-at-age, and the proportion for age-zero is much less, and you have a larger contribution from more age classes as the fish grow, and you have significant contributions up to age-six or seven, but then the contribution for ages older than that is relatively limited for most of the time series, and it's only a couple of percentages.

Then this plot shows the spawning stock biomass, in terms of one times ten to the tenth of eggs, as we talked about previously, and you can see that the spawning stock biomass falls below the SSB MSY in 2014, and then it falls below the MSST in 2016, and then the plot on the right shows the B over BMSY, and it falls below the B over BMSY in 2013.

Then these plots show the recruitment deviates on the left, with a fit by lowest curve. As you can see, there's been a dramatic decline in the recruitment since 2014, but, as we talked about, the last two recruitments are fixed at that average recruitment from 2014 through 2019. Then this is the fit to the spawner-recruit model, where the black line is the mean and then the dashed line is the bias-corrected mean, and you can see you start up at the top-right, and it kind of floats around that mean level, but then it has been declining, in terms of recruitment, and in terms of spawning stock, for the last decade or so.

This slide shows the three different ways of looking at fishing mortality, and so, on the left, we have the proportion of F-at-age, and you can see where there is a change in the different management by the change in proportion, like in terms of minimum size limits and stuff like that, and so you can also see that in the middle plot, which shows your fishing mortality-at-age, and so, specifically, if you look at around 2011, there was a decrease in your fishing mortality on age-five, but then an increase on the other ages, and this happens also back in 1999, and I think 1984, to some degree as well, when we've had those changes in selectivity.

Then there is also -- On the plot on the right is your fishing mortality by the different fisheries, and the largest contributor, in the last decade or more, has been from the MRIP, and then there's also a large contribution from your MRIP discards as well, or general recreational. Sorry. I switched my terminology on you.

Then we move on to this is the equilibrium landings that we showed earlier, and, as the fishing mortality goes up, your equilibrium landings go down, but your dead discards goes up, and I think we're currently at a fishing mortality closer here, at maybe about one-and-a-half percent, where we have five-and-a-half million discards, and then our equilibrium landings would be lower here than our maximum equilibrium landings. Then this shows the spawning potential ratio, and the yield per recruit as well.

Then this shows the phase plot, and so we start over here, and so the one on the left is -- On the Y-axis, we have fishing mortality, and then the dashed line is FMSY, and then, on the X-axis, we have SSB, and that vertical dashed line is MSST, and then pretty much the plot on the right is the same thing, but rescaled so that the Y-axis is F over FMSY, and the X-axis is SSB over MSST. It shows that the stock has been overfishing for about a decade or so, and it has since fallen into the overfished, in the last five or six years.

We also conducted a likelihood profile over the mean log recruitment value, and this shows that it was informed by the length composition and the age composition, and there is quite a large change in these two likelihoods, and so it seems to be pretty well informed by these data. Then we also conducted a retrospective analysis, where we were removing the last year of the data, back to 2016, and we conducted the Mohn's rho calculation, and the Mohn's rho for the SSB was 0.28, and the Mohn's rho for the apical F was negative-0.27, and these are just barely within the recommended

range of acceptable Mohn's rho. However, the estimates for -- The Mohn's rho for the recruitment and the biomass were outside their recommended range.

Then we move on to the different sensitivities that we conducted, and so the -- These were the high values of natural mortality, and so the red line is a lower value of natural mortality, and it results in a higher F over FMSY, but a lower SSB over MSST, and so this is high value was -- Actually, I am saying that all backwards. I was talking about the low. Sorry. The low has the higher value of fishing mortality and lower SSB over MSST, and that's the red line, and that was a value of 0.22, whereas the opposite happens when you have a higher value of natural mortality of 0.6.

Then, when we look at the discard mortalities, the high discard mortality, we used three-times the value of discard mortality from what the base model is using for each fleet-specific discard mortality rate, whereas the low discard mortality was half of the value used in SEDAR 56, and so using the higher discard mortality results in a higher F over FMSY, and, in the terminal year, a higher SSB over MSST, and so a slightly more optimistic status, but, in general, it doesn't really change the terminal year all that much.

Then we conducted quite a few different sensitivities to the SERFS index, and so the blue-dashed line shows the model with using only the trap index, and so it doesn't include the stereo video index, and this one actually resulted in a change in the F over FMSY throughout the majority of the time series, pre-dating the index before 2010, and then you can also see that there is a higher peak that occurs in the SSB over MSST in 2010. However, in the terminal year, it comes to pretty much the same level as the base model, which combined the trap and the video using the Conn method, and that's the black line, which you can't really see, because all the other ones -- All the other lines are pretty much overlying it.

Then we have the red-dashed line, and that's the model where you have the trap index up until 2010, and then the video index for 2011 and after, and then we have the brown line, the dot-dash brown line, which is using the trap and the video index, but it downweights the likelihood by one-half, and this results in a higher fishing, F over FMSY, in the last two years, compared to the base model, and a more depleted status, but it's only -- It only makes a small difference in the SSB over MSST.

Then we have the weighted selectivity, which used a logistic selectivity for the video trap, and then a domed selectivity estimated by the model for the chevron trap, and then it weighted these by the variance that was estimated in the Conn method, and standard error was estimated in the Conn method, and then this was fixed in the model, and this resulted in selectivity, or a time history, of both the F over FMSY and the SSB over MSST that was pretty much the same for the base model, and then the pink line is the model that uses the logistic selectivity, and, once again, it's pretty similar to the base model.

Then this plot shows the continuity model, and so we used the executable from the BAM model from SEDAR 56, and then we updated all the data sources, including natural mortality and the discard mortality rates, and we ran it through that executable, and it resulted in a slightly higher F over FMSY and a slightly lower SSB and MSST in the terminal year, but, in general, they kind of -- They agree with each other, overall.

Then this plot shows the previous assessments, and so these are the base model that was used in the SEDAR 25 and the SEDAR 25 update, as well as SEDAR 56, and, in general, there's an overall agreement, except for in SEDAR 56, where you have the declining fishing mortality that occurs after 2011, whereas, in SEDAR 76, we see an increase in those years and a more precipitous drop in the SSB over MSST in the more recent years. We'll pause there for questions, and I will take a drink.

DR. BUCKEL: Questions for Matthew? I'm not seeing any. Marcel.

DR. REICHERT: A quick clarifying, and you mentioned that the blackfish trap lengths were upweighted to fit the length better, the length comps better?

DR. VINCENT: Yes, and so that's the Dirichlet multinomial, and it estimates the variance, to allow different fits to the data, and so the variance for the length composition was maximizing the sample sizes, whereas the age composition was downweighting, or it had a higher variance, and so it was downweighting that data source.

DR. REICHERT: Okay, because, normally, when -- Correct me if I'm wrong, but, if we have age data, we tend to use that over the length data, but, in this case, you gave the length data more weight to make -- Because doesn't that automatically mean that your age data fit worse, if you do that?

DR. VINCENT: Yes, and so I didn't do it, and the model did it, and so the model estimates that variance based on the -- Just based on the fit, and like, essentially, it's kind of like an artifact of which data it fits better, and so, yes, a priori, we assume that they are given equal weights, and their sample sizes are based on the sample size of the -- I want to say the number of trips, and then the model reweights it from there, based on the ability to fit the other data sources as well.

DR. REICHERT: So the end result is that your overall fit improves by doing that.

DR. VINCENT: Yes.

DR. REICHERT: Okay. Thanks.

DR. BUCKEL: I don't see any other hands, Matthew, and so -- Chris Dumas.

DR. DUMAS: Thank you for that great presentation, and there's a lot of detail there, and so thank you. In your very last slide, the one that has the BAM-based model versus previous assessments, and so, in the left-hand panel, we were looking at SSB, and the most recent model is the SEDAR 76, and it seems to follow along the previous models pretty well, qualitatively, and, in fact, the most recent model even is a little, I guess, more generous in the assessment of SSB, at least before 2010, and so then we see the most recent model's estimate of SSB really plunge post-2010, and that, to me, would be a worrying indicator, because it was, you know, overestimating SSB relative to the other models before 2010, and so, when you see that SEDAR 76 line plunge, relative to the other lines, that is, to me, worrying.

In the right-hand panel, something that is odd, to me, is that the SEDAR 76 line is kind of following along, roughly, the other lines, until about 2005, and then the SEDAR 76 estimates of F are

increasing, whereas the estimates of F by the other assessments are decreasing, and it's going to go down after 2005, and do you have any sort of qualitative feel for why that difference occurs in the estimates of F, sort of post-2005? The previous models are estimating F as sort of decreasing, but the SEDAR 76 is estimating F as sort of increasing, in terms of general trend since 2005, and any feel for that? Thanks. Or any speculation? It seems like that might be important.

DR. VINCENT: Yes, and I'm going to try some speculation, but I think Erik probably has a better answer, and maybe I should just wait for him to --

DR. WILLIAMS: That's a good question, Chris, and I don't know, for sure, about the SEDAR 56, but I suspect that most of that change is FES. It's the shift to the new MRIP data.

DR. DUMAS: Thank you.

DR. VINCENT: That's a better answer that I was going to --

DR. REICHERT: That's the suggestion that I was having, the FES-MRIP.

DR. BUCKEL: Chip.

DR. COLLIER: Just because I suspect that I will have to explain this in the future, but, if you go back to Slides 48 and 49, looking at the age composition for the private recreational fishery, it's showing an increase in selectivity around age-five, and so this is the discards and so you can see, here, the general rec and the headboat both get lumped together, and you're seeing a decline around age-four, and for the 2013, and it drops very low for ages-five and six, and then, if you go to the previous slide, I think, or maybe to the -- It's one that shows the landed selectivity for the private recreational.

In this one, you're seeing age-five going up, for the private recreational, and then age-six being one of the higher peaks for that, and I'm a little bit concerned about the disconnect between the selectivities between the -- I think you had mentioned that, that age-five kind of comes out as a weird year, but that ends up being one of the modal ages in the private recreational fishery, as being the most common age in it, and I'm just wondering what kind of influence that's going to have on the model, and, because of that, is the charter boat fishery the best one to be using to mirror the selectivity off of for the discards?

DR. VINCENT: So the general recreational includes the private recreational and the charter, and so the one -- I think what you meant to say was the headboat, right?

DR. COLLIER: Yes.

DR. VINCENT: So the -- I think the difference between these two is based on the general recreational fits to the length composition data, and it doesn't have any age composition, and so it seems like it just better fits that there is -- That there is fewer small fish, and like it doesn't account that there might be fast-growing younger fish, whereas the age composition, in the headboat selectivity, forces it to see those age-five, whereas, using the growth curve, the general recreational says they're more likely to be age-six, at that size, and so it seems like it's just a difference between

-- Like probably a misspecification of your growth curve, essentially, where -- Or that it's not allowing enough variability in your growth curve to be accounted for in your assessment model.

DR. COLLIER: Okay, and so, thinking of this, as age-five, kind of being the modal age of the private recreational fishery, it seems to be mis-specified, and what kind of issues would that cause for the stock assessment, I guess is what I am trying to get at and trying to make sure I have an answer to the fishermen, when we're trying to explain it.

DR. VINCENT: I haven't thought this through, but that's a good question. I think it will -- I mean, it will affect your fishing mortality, and push it at an older age, and so those fish will be a larger -- I will have to think it through and give you an answer on the side. How about that?

DR. COLLIER: Sounds good.

DR. VINCENT: Okay.

DR. BUCKEL: Any other questions before Matthew continues on? Alexei.

DR. SHAROV: Since we're on the slide for general recreational selectivity, I mean, there's a huge change in selectivity through time, but it is supported by the changes in management actions, or, specifically, changes in minimum size or anything of that sort, and, sorry, I should have been better prepared for this.

DR. VINCENT: This is the fit to -- This is the different general recreational plots, and so, as you can see, the -- Up here on the top-right is the fit to 1984 to 1998, and you can see that there is kind of a cutoff here at around 200 millimeters, I think that is. Yes, and then, in this plot, it is the fit from 1999 to 2006, and you have your cutoff here at about 250 millimeters, and then, moving on to the next time block, in 2007, we have -- I think the minimum size limit is at about 300 millimeters, and then, in the final one, I think the actual minimum size limit is here at like 325, or something like that, 350, and there is quite a few that are caught below the size limit in this most recent time block, and so there has been a shift for the different years, but, when we go back and look at these -- The age composition for the headboat, you can see that, in 2003 to 2006, it's being fully selected at age-three, and then it's fully selected at age-four, in the 2007 to 2012, but then, in 2013 to 2012, you still have a large number of age-four and age-five, and so it seems like it's shifting a bit. I hope that answered your question. Go ahead.

DR. SHAROV: Just a follow-up, and, well, what you're showing us here is that you're matching what we've observed, in terms of the length distribution and age distribution, but what I was talking about is the estimated selectivity, that graph that we originally had, which suggests that, as we move in time towards more recent years, that the fishery selectivity for the younger ages gets smaller and smaller and smaller, which, obviously, has a direct effect on the estimate of the population size.

Look at this right graph. I mean, these are selectivity curves, right, for the recreational fishery, right, the general recreational fishery, and, obviously, those are shifting more and more to the right, and so this selectivity at age-four, in the most year, is close to zero, and selectivity of the very same, in the green period from 1999, is close to one, and so I was looking for some justification, in terms of the mechanics, or the process, as to what is happening.

The obvious culprit is usually the change in the minimum size, or the size regulations, that shift the -- What is being harvested and then what's available, because we're changing the age and size structure, and so has there been a constant increase in minimum size regulations or something that would support this shift in selectivity-at-age?

DR. VINCENT: Right. Sorry, and so I didn't explain, and so these different time blocks are implemented because of there has been a change in the minimum size limit, and so yes. Each of those are implemented, and so I think -- Let's see. In 1984, I think there was a ten-inch size limit that was implemented, and then, in 1999, it was an eleven-inch, and then 2007 was the twelve-inch, and then 2013, I think, was a thirteen, and so, yes, that is why we're seeing that shift in the general recreational, is due to that shift in the size limit.

DR. SHAROV: Thanks, and so I was looking at the selectivity curves, and we are seeing -- We are making a conclusion that there was a precipitous decline in the population size since after 2010, or 2014, or whatever, and you pick the year, and that is the period where we have the selectivity -- It's most generous, in terms of recalculating the population size, because of the low selectivity of the younger ages, and we're generating more estimated fish present in that year class, and so, in principle -- In the best situation, we're still seeing a significant decline. If we had the selectivity for that period that we've observed in earlier years, like on this graph, the estimates would have been even much, much worse, and is that what I am -- I am trying to find an explanation, a possible explanation, to the precipitous decline, but the selectivity curves are not helping here, and that is they're essentially saying that the worst case out of the possible that we could have had. Thank you.

DR. VINCENT: Are you essentially answering Wally's question for me, saying that, if they were shifted -- If we mirrored them, that it would likely be in a worst state than --

DR. SHAROV: Yes.

DR. VINCENT: Okay.

DR. SHAROV: Yes. Well, based on what we see, clearly yes.

DR. BUCKEL: All right. I don't see any hands, Matthew, and so please -- Okay. Whoever had their hand raised online, if you could re-raise it, because Chip lowered it, but forgot who it was.

DR. COLLIER: I don't see it.

DR. BUCKEL: All right. Well, whoever raised their hand online can do it again after Matthew finishes the last section of his talk. Go ahead, Matthew.

DR. VINCENT: Okay. We did a Monte Carlo Bootstrap Ensemble, or an MCBE, analysis, where we took bootstrapping of the data, and we took a multinomial resampling for our age and length composition, to incorporate uncertainty in our data sources, as well as a multiplicative lognormal error in our indices and our removals, including our landings and discards. We then drew values for parameters that were fixed in the model, but were uncertain, and these included the natural mortality, the discard mortality, and the weight given to the indices, and so I'll talk more about the

natural mortality and discard mortality coming up, and the index was drawn from a uniform distribution between the two values, as was done in SEDAR 56.

We fit 4,000 different models in the MCBE analysis, of which only 2 percent failed to converge or had parameters that were within 2 percent of the bounds, and so a 98 percent convergence is pretty good, and that was the models that were used to describe the uncertainty around the parameters.

As I alluded to earlier, there was a lot of discussion about the discard mortality in the SEDAR webinars, and there was -- So what we decided was to set the 95$^{th}$ percentile confidence interval, and so a lower bound would be set at half the value from SEDAR 56, and the upper bound would be set at three-times the value for each fleet-specific discard mortality from the SEDAR 56, and so, as a result, I decided to fit a gamma distribution, where the mode was set at the value from SEDAR 56, and then the 95$^{th}$ percentile confidence intervals were set at either the half, or three-times, depending on which side it was on the side of the mode.

Then this resulted -- It allowed us to estimate the alpha and beta parameters for the gamma distribution for each fishery, and then we decided that there might be -- If we just used those alpha and beta parameters, we might get very high or very low values, outside this range, and so we then decided to truncate the distribution to be 10 percent lower, or 10 percent higher, of the 95$^{th}$ percentile confidence interval, and this was the distribution that we ended up using.

We drew a value from the truncated gamma distribution for each specific fishery, except for the two-inch pot, which we then set as just multiplying the value from the one-and-a-half-inch pot at 0.483, which was a multiplier that we got from the Rudershausen et al. paper, the 2008 paper, and so, on the right, you can see the distributions of the discard mortalities for the different fisheries that were used.

Then we used -- We also took a look at the uncertainty in natural mortality, and this range we determined from two different sources, and so the upper bound was calculated by doing a resampling of the Hamel and Cope analysis, which used the Then et al. -- I don't remember the year, but the Then et al. database for natural mortality, and so we bootstrapped the databases and then recalculated M based on a maximum age drawn from a normal distribution centered at eleven years, with a standard deviation of one, and this gave us --

The 95$^{th}$ percentile resulted in the value of 0.6, and this gave us our upper bound, and then we decided our lower bound -- I had conducted an MCBE analysis, where I had estimated natural mortality within the BAM model, and so we took the lower 2.5 percentile value from that analysis, and that estimate was 0.2, and so we used that as the lower bound of our uncertainty, to cover the full range of possible values of natural mortality, and, as you can see, there is a slight skew, and so the base model isn't directly centered at 0.38, and so it -- The upper bound is slightly farther away than the lower bound is, and this results in a slight skewed distribution later on, but, also, the skewed gamma distributions from the discard mortality also results in a skew of the resulting parameters. This is the resulting drawn values from the weights of the indices, and, yes, it's a nearly uniform distribution across the range that was specified.

This plot shows the resulting SSB, in terms of one times ten to the tenth in eggs, and, as I previously alluded to, there is that skewed distribution, with the longer tail to the higher side, given those higher values of natural mortality.

Then these plots show the SSB over MSST, on the left, and SSB over SSB MSY, on the right, and it's below the SSB MSST since 2018, in all the model runs, and below the SSB MSY since I think it's 2015, in all of the model runs. Then this plot shows the F over FMSY, and so a large proportion of them are above the overfishing limit, but there are still some that are below it. This plot shows the different -- On the left is the different benchmarks, and so on the top-left is FMSY, and then, going across the top, it's SSB at MSY, and then the mean recruitments, and the median recruitments on the top-right, and then on the bottom-left is the MSY, and then the discard mortality, or the number of discards, at MSY, and then the middle right is the unfished spawner-recruits, and then on the far-right is the standard deviation of log recruitment residuals.

As you can see, most of these are skewed slightly to the right, but there is generally reasonable agreement between the solid line, which is your maximum likelihood estimate, and the dashed line, which is the median from your MCBE analysis, and so this plot shows different phase plots of your -- The one on the left is -- The Y-axis is your SSB in 2021, relative to MSST, and on the X-axis, for both of them, is your average fishing mortality in 2019 through 2021, relative to FMSY, and then on the right is your SSB in 2021, relative to SSB MSY, and both of these plots are less than ideal, where both of them show that you are in an overfished condition, and 84 percent of the MCBE models suggest that you are overfishing, and so less than 16 percent suggest you're not overfishing, but you're still overfished.

This plot shows the distribution for the different indicators, and so on the top is the SSB in the last year, relative to MSST, and the solid line shows the base model, and the dashed line is the median model, and, once again, 100 percent of these are below one, indicating an overfished status. Then, in the middle, you have SSB and the terminal year relative to SSB at MSY, and these are also below one. They're actually all below 0.5, and then, once again, the F over FMSY, and 82 percent of the distribution is above one, indicating overfishing. This is just a table that I took from the report, just for reference, and, if anybody has questions about that, we can go back to it.

In summary, the South Atlantic black sea bass was overfished, and depleted, in 100 percent of the uncertainty replicates, and it was -- Overfishing was occurring, in the terminal three years, in 84 percent of the uncertainty runs, and natural mortality and discard mortality were important sources of uncertainty in these assessments, but the stock status was relatively robust to the range of values that were used.

However, the pattern of low recruitment that occurred since 2014 raises the question of whether a regime shift has occurred or not, and so I took a look at the Klaer et al. 2015 rubric that has been conducted for previous assessments, where a score of seven or greater would support the acceptance of a regime shift, and so, in the first column, the observed change in productivity indicators, we said that there was more than one generation, because a generation was specified as six year, or calculated at six years, for black sea bass, and the time period of which we had the low recruitment has been -- I think it was eight years, something like that, and then, in terms of understanding the assessment model input data, I set that as a value of two. However, the uncertainty model inputs have been characterized, and plausible ranges for uncertainties have been

investigated. You could potentially bump this up to a value of three, but I just kept it at the value of two.

For the next two, I set the scores at a value of zero, where the explanatory hypothesis, or the mechanism, is unknown, and then this then led to our understanding of the assessment model, and we don't really have any key population parameters that are being affected by this regime shift, and they're unknown, and so this -- There is currently some research to try to identify these low recruitments, and there is some evidence of this occurring for multiple species, but it occurs over different years, and so trying to understand the mechanism of this low recruitment is pretty critical to understanding if a regime shift is happening or not. I will pause there and ask for questions about the uncertainty.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: So, if we accept the idea that there's been a regime shift, to me, it means that the productivity of the stock is not what it has been in the past, and, if the productivity of the stock is not what it's been in the past, then the biological reference points that have been determined for this stock are inappropriate, based on a longer time series, and would that be correct, because the stock no longer has the productivity that it once had for most of the period?

DR. VINCENT: There is actually a recent paper by Cody Szuwalski that talks about that, and it actually suggests that trying to change your reference points at lower productivity will actually result -- Like you may increase your yield a little bit, but you actually decrease the amount of standing population, when you have a lower productivity, and so it may be more conservative to use the long-term values of SSB and MSY than to switch to new --

DR. SERCHUK: But a regime shift, and the regime shift -- To me, the regime shifts says that something has affected the productivity of the resource, in a very definite way, not just random variation, and we believe that now it's at a certain point that's very much different than in the past, and, if that is the case, the yields will have to be lower, particularly if recruitment is much lower, and the biological reference points are going to have to be reassessed from the ones that have been used traditionally, when there has not been a regime shift identified, and I'm just wondering what your thoughts are on that.

I mean, it's not going to make a difference in terms of removals from the stock, because they're going to be much lower, but the fact is, if you think that the stock was in this position, but now it's down here, and that's a regime shift, basically, you're saying that something has changed, in terms of stock productivity, or at least that's the way I see it. Thank you.

DR. VINCENT: I will point you to the Szuwalski paper, because it did a better job, but, yes, essentially, even if you have a lower productivity, and you have lower yields, you might end up resulting in a higher fishing mortality than if you maintained the current higher productivity levels, or the reference points from the current productivity levels, at a lower fishing mortality and at a -- Your yield will be less than if you shifted down to the new MSY, but you will have more buffer, in terms of your stock, and so I will point you to that -- I will send you the reference.

DR. CURTIS: Thanks, Fred, and this concept of like the regime shifts has been popping up in several of these different assessments, and I'm kind of jumping ahead now, but, later on in the

agenda, we're going to be forming a workgroup for looking at this very thing, regime shifts, and so keep that in the back of your mind, and maybe you want to chair it.

DR. SERCHUK: No thank you, but it's just that a regime shift is not within the variability that we've seen in the past, but you've moved. When you use that term "regime shift", this is how things were, and they're in a different state now, and that often means that there could have been higher productivity or lower productivity, but the shift means that the state of the resource is outside of the bounds that it was before, in terms of how it operates, and I think it's good that you're going to have a workgroup.

DR. BUCKEL: Thanks, Fred. Alexei.

DR. SHAROV: I agree with the chair of the working group, Fred Serchuk. I wanted to ask something, which we should have asked -- I was on the panel, and participated in all steps of the assessment, which was really -- I should say it was a very detailed and thorough process, but, anyway, I know it's not in the assessment, but maybe you have looked at -- Have you looked at the ratio of the biomass of males and females? This is a protogynous species that changes sex through time, and the proportion of females at age-four is very low, and we're seeing the shift in the selectivity, at least in the recreational fishery, and, at age-four, it's almost zero.

I am not making yet this foregone conclusion, but I am really curious, and I am trying to think differently of what causes the decline in recruitment, given the specifics of the reproductive strategy of this species, and I would curious to see, and I am suspecting that we would see a significant decline in female SSB, but a significant increase, possibly, and I don't mean to speculate, but have you looked at the sex ratio, and has it changed through time?

DR. VINCENT: In terms of the sex ratio, it's fixed across time, and so it hasn't changed, but I did look at like the age composition, like what the model would predict, and like I remember looking at it specifically in relation to like the 2010 decline, and I don't recall that there was anything before that, and like the large recruitment in 2008 to 2010 seemed to make it through into the male population, according to the model, and then they just kind of disappeared after that, but, yes, I should probably remake that plot, and I could have presented it, but, yes, it is definitely a possibility that it could be something, but I kind of looked at it, and I didn't really see much evidence that that would be --

DR. SHAROV: So you didn't see the smoking gun?

DR. VINCENT: No. I tried looking for it, but I couldn't find it. I was looking for males, which would be different from the females.

DR. BUCKEL: Kai.

DR. LORENZEN: Given the same, the hermaphrodism, and it's sort of interesting, to me, that the decline in -- Of course, you're looking just at female egg production, right, and the decline in that is very small, and so, by the time you're at your Fmax, you still have 80 percent of the female egg production, which, to me, is interesting, because mostly the selectivity is on the -- You know, the fishery really acts mostly on the males, apparently, which makes me think is female biomass, or egg production, really the right metric, and I know there's a lot of discussion about what is the best

metric for spawning biomass, and I was trying to see if there's been discussion about that, and there's nothing really in this assessment, or in the previous one, and so I was wondering, you know, when was that last considered, and how did the panel, and I don't know how many assessments ago, land on saying we work with female egg production, or biomass.

DR. VINCENT: I don't recall, and my guess would be that it's -- I wasn't here when SEDAR 25 happened, or even SEDAR 56, but my guess would be that it was SEDAR 25 when they decided that.

DR. LORENZEN: We've often landed on a combined biomass, and so I was just wondering whether we're doing the right thing, and I'm not a reproductive person, and I'm just asking the question.

DR. VINCENT: Actually, I might take that back, because I think they did change what the ogives were in SEDAR 56, because I think there was some new information from Nikolai's work, and I think that was included in SEDAR 56, but I think it's just based on convention that generally it's female. The thought is that the male sperm isn't limiting, in most cases, but whether that's true or not I don't actually know, and I think that's just an assumption that we make, but I guess I would also say that, since we're doing the mean stock-recruitment relationship, it doesn't have as much of an influence on the -- I mean, it will influence the reference points, but it won't influence the recruitment, and so I guess maybe just ignore what I was just saying.

DR. LORENZEN: That may have influenced your fitting, right, of the stock-recruitment relationship, because you would have a different spawner biomass, if you calculated it differently.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: But, if recruitment has been really poor, during the past five or six or seven years, that's -- Isn't it true that that's the recruitment of females? I mean, I'm just asking, because that's the reproductive -- You will need them, and you may not need very many males, but, if there are very few females around, because recruitment is poor, there's nobody to fertilize.

DR. VINCENT: Right, and I think we were hypothesizing that the failure in recruitment in those years was predated by there being a lack of males, because the fishing mortality is on the oldest, largest individuals, and so I think that was the hypothesis, is that we're harvesting the males, or harvesting the large fish, before they're able to turn into the males, and, thus, recruitment has failed. I think that's what the current hypothesis --

DR. SERCHUK: If the smaller fish are females, and the number of recruits coming in has been very poor, that means that the females entering the population have been very poor, and that may be another reason why the stock is not at a higher productivity, because there's just not very many females around the propagate the population.

DR. BUCKEL: Yes, and you see that starting in that one plot where you showed the egg production is on the X-axis, and you see that movement towards those really low egg -- The lowest egg productions that we've seen. Thanks, Fred. Kai.

DR. LORENZEN: But there's no feedback, at the moment, right, between spawner biomass and recruitment, because we're assuming a constant recruitment model, and so my reading was clearly recruitment has declined. Otherwise, we wouldn't be seeing that decline in the trap index and so on, but whether that is because of some environmental shift, or it's because of, you know, low male abundance or anything -- Right now, because we've removed the feedback between the spawner biomass and recruitment, we sort of don't know.

The last time, the last assessment, when the Beverton-Holt was used, and I just looked that up, and I wasn't around when that assessment was made, but that accounts for the beginning of the decline, was the Beverton and Holt relationship, and I think we're getting to now saying, well, it went further down, and that's a recruitment deviation that is probably, you know, environmentally driven, but I'm still puzzled, you know, by this constant recruitment issue, because, to me, what you're saying, and I didn't put that quite right when I first raised that question, is really what you're saying is we have a steepness of one complete compensation, and so nothing we do to the fishery will affect the level of recruitment, you know, in effect, which means that this is the most rosy possible assessment of the situation we're in.

DR. VINCENT: Yes, and so we pretty much -- I pretty much fit this same model up to the end, where I used the mean recruitment and the Beverton-Holt model, and the model that had the Beverton-Holt still had the recruitment deviates in the last -- Since 2014, below the stock-recruitment relationship, and so that change in productivity wasn't being accounted for still for that decrease in recruitment.

It made the recruitment deviates not as bad, or like not as large, and so there was like a tiny bit of better fit to the Beverton-Holt stock recruitment, but not by much, and there was other reasons why we didn't end up using it, but it didn't really -- There wasn't the feedback loop like you were talking about, and like it would make an effect in the projections, for sure, but, in terms of fitting the model, I don't think it had as much of an impact at all as you're suggesting, and then there was a second point, and I forget what --

DR. LORENZEN: Yes, and I don't doubt that we're in a bad situation, and I think, you know, no matter, you know, what you do there, that will not change it, but I think it does -- When you compare your -- Because now you basically have your MSY-based on an assumption of a steepness of one, and you get an FMSY that actually is somewhat higher than what you got in the last assessment, and, you know, I know that, also, selectivities have been re-estimated and so on, but still, I think -- I mean, that's what you would expect, and so you have point-four-something now, and it was point-three-something last time, and so you are sort of giving a more rosy assessment, with this assessment, than you would if you accounted for a more realistic level of compensation, but, you know, no matter what you do, probably, I mean, you're in trouble, and that's the bottom line.

DR. VINCENT: Yes, and, with both the mean recruitment and the Beverton-Holt, you're both overfished and overfishing, at the end of the time series, and that was across both uncertainty analyses as well, and so, yes, switching the recruitment models won't make -- It won't change things, but, yes, I think you're right that it might make it slightly worse, but, I mean, you're still 100 percent overfished.

DR. BUCKEL: Amy and then Marcel.

DR. SCHUELLER: I'm just wondering, and I didn't see it in the report, and so perhaps it's not a hip-pocket item, but were there sensitivities run on the headboat and general rec selectivities?

DR. VINCENT: No.

DR. SCHUELLER: Okay. I am still turning over the question you're going to get back to Fred about, and I just thought that might be useful, if you did have them in your hip pocket somewhere.

DR. VINCENT: No, and that wasn't something that I thought about doing until the ride up here.

DR. BUCKEL: Marcel.

DR. REICHERT: This is related to the recruitment, and maybe you can explain, in your graph, both in the assessment report and your presentation, on the abundance-at-age and biomass. If you look at the last two years, it seems like there's an uptick in biomass in young fish, zero, especially zero and one, and I looked at the age comps, especially in the SERFS, and so I couldn't see that, and so I was wondering -- Correct me if I'm wrong, but the recruitment in 2020 and 2021 was fixed at 2019, and so is that uptick an artifact of that selection, or is that something that you feel is actually happening in the population, because it looks like there's a couple of stronger year classes that may come through the population.

DR. VINCENT: Yes, and I didn't talk about that, like I had originally planned to, and so both the 2020 age-zero and the 2021 age-zero are the average of the recruitment from 2014 through 2019, and so, yes, what looks like an increase in your abundance is an artifact of that assumption, but the alternative assumption was to allow them to be estimated as part of that deviance vector, and, actually, it results in a higher estimate of the recruitment in those years, because that's being pulled towards zero. The deviates are being pulled towards zero, and so a higher estimate of recruitment in those two years, and so we thought this was a more reasonable assumption. Maybe it would be better to use the recruitment from 2019, but we thought, based on the recommendations from like projections forecasts, using the average from recent time periods, we thought that was a reasonable assumption.

DR. REICHERT: Thanks for that clarification, and I agree, but, in terms of our idea of what may happen in the future, I think that's important to take into account, that, you know, this may actually be kind of an artifact of that decision, which is not an unreasonable decision.

If I may, I have another question that is more related to the natural mortality, and I completely agree that the used value of natural mortality is reasonable, but I do want to mention, and I think I mentioned it in one of the webinars also, in the past, this SSC, as well as independent review, and I forgot which assessments those were, have frowned upon using average values of different methodologies, and so I think it's -- I just wanted to have that on the record. Again, I don't disagree with the choice, but, in the past, we have said that maybe we shouldn't do that, and so I realize -- I'm not sure where that leaves us an SSC, and I want to emphasize that I agree with the choice, but I just wanted to mention that, in terms of consistency of our decisions. Thanks.

DR. BUCKEL: Thanks, Marcel. All right. No hands. Please go ahead, Matthew.

DR. VINCENT: Okay, and so, to Marcel's point about those age-zeroes, in those projections, and I don't have it on the slides, but the age-zero, or the recruitments in 2020 and 2021, were just using the average recruitment, and so we didn't include stochasticity in those values in these projections. That is something we could do, if that's a desired element of these projections, but that wasn't what was done, and so the projections that we did do were four different scenarios, the first one being F equals zero, using the long-term average recruitment, or the mean R0, and then the second one was no fishing, with the recent average recruitment, and then we did two others with recent average recruitment, where fishing was the F at the current values and then F at MSY.

Then these new values of fishing mortality start in 2025, given that that's the year that we thought management would be able to be implemented. During the interim period, and so the years 2022 to 2024, we looked at what the average removals were, in terms of landings and discards, from 2019 through 2021, and then we refit them to the model, but then capped the -- What the maximum fishing mortality could be at a value of ten, and so this would allow fishing mortality to increase, trying to meet those landings from previous years, but it would prevent an unrealistically high fishing mortality, and, for the scenarios where we had long-term average recruitment, and so the first one, we allowed that to start in 2023, to allow those higher long-term recruits.

The plot on the left shows your probability of your spawning stock biomass to be greater than your spawning stock biomass at MSY, and you can see that -- So we started the new F starting in 2025, and we can see, after that, there has been an increase in the spawning stock biomass, and you exceed the 50 percent probability here in 2028, and so after three or four years, and then it exceeds 70 percent in 2030, and so the plot on the right, the top panel, shows the fishing mortality over time, and the middle panel is your spawning stock over time, and you can see that it exceeds the base value and the median in those years that we talked about in the probabilities on the left. Then the bottom one shows your uncertainty in your recruits, and you can see that there is quite a wide range in those values.

Then this plot shows the projections, where the F equals zero, and you had recent recruitment using your average -- The recent average recruitment, and you can see that the population -- The probability that it exceeds the spawning stock biomass at MSY is essentially zero, and so there's pretty -- If we assume that these recent average recruitments continue on into the future, there is pretty much no probability of returning to the previous state, which we can -- I mean, that makes sense, but there's not really evidence to support one way or the other, and so we just provided both of these options to the SSC, but I think there is -- Given the analysis from Klaer et al., there's not evidence to show that there is a regime shift, and so I think we need to assume that the stock still has the ability to return to it, but I will leave that to you guys to decide.

Then this is the same plot as previously shown, and then this is the plot where -- Or the projections where we have the F and the F current, using the recent average recruitment, and we can see that, once again, that the fishing mortality goes up really high in these interim periods, and then it goes back lower once this new F current takes place, and then this plot shows the projections for F with FMSY, and you have a slightly higher spawning stock biomass than the previous one, and your F is lower, and I think that's pretty much all I have for this presentation. I think, normally, we would talk about the assumptions that we make, and whether these methods are reasonable, or what changes should be made to it, and so I will open it up to questions.

DR. BUCKEL: Thanks, Matthew. Scott Crosson.

DR. CROSSON: I'm sorry, but, just to clarify, when you have F there, it's both landings and discard estimates, or just landings?

DR. VINCENT: In these plots, it's just F, but we assumed that F had the same proportion of -- Like the F for the landings and the discards retain the same proportion, and so your total mortality also scales with that, relative to what the proportions in the last three years of the -- The average of the last three years was.

DR. CROSSON: I understand that for the second two, but I just wanted to clarify that F equals zero, and does that mean fishing mortality equals zero?

DR. VINCENT: Yes, and so all fishing -- F equals zero, and so both discard mortality and --

DR. CROSSON: The same proportion of zero would be zero.

DR. VINCENT: Yes.

DR. BUCKEL: Other questions for Matthew? Marcel.

DR. REICHERT: Sorry, and so F at zero means no mortality on discards and landings? Okay. Thanks.

DR. CROSSON: Given what we did with red snapper, are we sort of required to commit to using recent recruitment patterns for projections? Is that a reasonable assumption to make? Is that our official policy?

DR. REICHERT: I don't think there is a convention for that, and I think we base that on whatever we expect to be a reasonable path forward, in terms of projections, because I think -- I remember assessments where we assumed the higher recruitment, based on recent patterns, and consistently low recruitment, like on red grouper and some of the others, and that's why I was asking my question about the seemingly higher recruitment in the last couple of years, in terms of whether that was real or the model, a result of the model, because I would argue here, looking at some of the other data streams -- I don't necessarily see the recruitment increase, and I don't see how recruitment could increase in the short-term, based where the population is, and so, whether or not there is a convention about what recruitment to use --

DR. CROSSON: I am thinking specifically in the context of the working group that Amy chaired that we just had, and so, Amy, you're looking at me like you have an answer.

DR. SCHUELLER: I mean, my hope is -- We have been sticking to what that workgroup recommended, and so it would make sense that we continue to do so, and, if we're going to deviate, we should have a valid reason to do so.

DR. BUCKEL: Alexei.

DR. SHAROV: For discussion, although it's a question for -- Given what Dr. Williams presented earlier today, have you thought of any principle violations of the assumptions that we've made in

these projections that result in the predictions that there is no way for a recovery, no matter what we do?

DR. VINCENT: Well, that's assuming that you're not able to return to the long-term average recruitment, if you make that assumption, and so, essentially, by assuming that the recent average recruitment holds on into infinity, essentially, you are implicitly assuming that a regime shift has occurred, and, like I said, there isn't necessarily evidence to suggest that -- Like there's some that might suggest that it is, but it's not strong enough, and like, using the Klaer analysis, we weren't able to show that there is a regime shift, and so I don't -- I don't know, and I'm not sure if you can make that implicit assumption or not.

DR. SHAROV: If I may, what about, for example, the trend in natural mortality, and, I mean, you explored the sensitivity to the variation in natural mortality, just as an envelope, but the specific trend, which would, you know, lead to the same end result as the presumed decline in recruitment, rather than the lack of recruitment, or lower recruitment, series of low-recruitment events, and it's the increased natural mortality, for example, at the younger ages where we're not going to have the Lorenzen curve in the shape that we estimated, but we have a consistent decline in that survivorship, due to predation or other sources, and so could this be considered as an alternative hypothesis that would have explained a reduction in the stock?

DR. VINCENT: I mean, we didn't test it in the model, and so I can't really say, but, I mean, it's something you could potentially test, but it's not something we looked at, and it wasn't a part of the discussions at all during the panel webinars and stuff like that, and so I -- Erik wants to say something.

DR. WILLIAMS: Sure, and, I mean, that's a reasonable hypothesis, but I think, if you look at the age data from the fishery-independent survey, that age structure doesn't change over time, but the index goes down, which would suggest that the culprit is -- The only explanation left is recruitment, and not increasing natural mortality, because you would see a different age structure with that.

DR. BUCKEL: Is that a hand, Amy?

DR. SERCHUK: Well, we have a real dilemma here. What's a manager supposed to do, and, I mean, this is really a very critical question now. If you use the recruitment series that we've used, the stock can't rebuild within ten years, and, in some cases, it can't rebuild in years beyond that, which suggests that the only -- To follow the law, you would have to have no fishing whatsoever, to have the best possibility of restoring the stock, and --

DR. SHAROV: Or change the law.

DR. SERCHUK: Well, I'm not going to change the law. I'm not a lawyer, and maybe Shep can do that, and, I mean, this is really a very important issue that we have to face here, in terms of how we look at whether the stock has any possibility of getting back to above the reference points that we have for it, or do we need new reference points for this stock, given its diminished productivity, and, whatever they would be, they would still be very low, because recruitment has been very poor. Have I summarized the situation correctly in most people's minds?

DR. BUCKEL: Yes, and we have the same situation with scamp, right, and I think that's a longer time period of low recruitment, right, and so, here's it's been -- It's shorter, and so I think, if we haven't changed it for scamp, if we continue down the path that we were headed, one way -- We might want to stay consistent, right, which I think is to Amy's point earlier. Alexei.

DR. SHAROV: If others are still thinking, I will just say something, and so -- Fred is right that we essentially have to conclude that we have no control over the population, assuming that recruitment failure is the primary cause, and what would be the right conclusion, within the framework of this model, and assuming that all of the assumptions in the structure of the model are appropriate, and we're not missing some principal components of population dynamics, and we're just not describing them correctly, and so, if we're certain that we didn't do that, and we did a good job, then, whatever that force of nature is -- Until it changes, well, we can't assist the population with recovering.

Somehow -- My personal opinion, and it's not scientific, but I kind of find it hard to believe that the population will not respond in the absence of a fishery, which, of course, we will not be able to do that, and so, if we close the fishery, it will still be a bycatch and a mortality, but, again, I just wanted to remind you that, yes, given the model that we have, given the assumptions, if we believe that that's our best way of doing this, and, therefore, we are not in control, in terms of bringing it to the level that is currently specified as the target population biomass.

DR. BUCKEL: Thanks, Alexei.

DR. VINCENT: Can I make a comment that, even though we've got a decrease in recruitment over the time series, you're still overfishing, and so, yes, the fishing mortality is still going up, as the stock declines, and so I think you still need to make some actions regarding that.

DR. BUCKEL: Chris.

DR. DUMAS: I have a question about the law, and I guess regarding a hypothetical situation, and so suppose you had a fish species that you knew was on the decline, and, no matter what you did, it was not going to recover, and it was on the way to extinction, and what does the law say that we do in that situation? Do we set F at zero, and do we not fish it, or do we say go get them, boys, and you might as well, and they're on the way out? What is the guidance in that situation? If we set F at zero for black sea bass, then, if it's a multispecies fishery, we're also setting it at zero for all the other co-located species, and what are the implications of that? I like black sea bass, and I don't want them to go away, but what -- And I hope they don't, but what does the law say on that?

DR. BUCKEL: Fred Serchuk, and then Shep is on the line.

DR. SERCHUK: Do we have any information on relative recruitment from the 2021 year class? I think the last two year classes that you have, that were above average, based on that, which you set it down to the mean, and do we have any information on the relative year class strength of the year classes in 2021 or 2022?

DR. BUCKEL: I think the selectivity for SERFS, zeroes and ones, or zeroes, is zero, and so there's nothing from SERFS to give an indication in those years, and it would probably be state surveys and estuaries that might give some indication.

DR. SERCHUK: I guess I'm asking -- Those two last points, which we saw the curve go down and they were above, and the way they've been treated is we're going to use the average recruitment from the descending limb of the curve for those years, and, still, that's going to be higher in the lowest -- It's just going to be the average, but I'm just wondering, because this is such an important issue, if there's any information on more recent recruitment that would substantiate either it's still going to be low or it may be in the realm of those last two data points that we basically averaged, and that might be helpful, before management makes the decision of where to go. I'm just asking.

DR. BUCKEL: Agreed. Wally, to that point?

DR. BUBLEY: With this, we'll have -- The 2021 data, I believe, is included in here, correct, the age composition, and so the problem is that, as Jeff pointed out, we don't have -- The age-zeroes in that are not -- The traps don't catch them well, because they go through the mesh. In 2022, the year we just finished, it potentially could have some, but we haven't looked at it to that extent yet, because we just -- We finished up the sampling season last year, and so it's there, and it's available to be looking at, but all we would be looking at is proportion of age-one or two fish that would give you back to 2020 or 2021.

DR. SERCHUK: I'm just saying that this is such a significant decision that has to be made, and, if we had some corroboration that recruitment is poor, or that it's been in the area of the last two ones that we do have information on, that would be very helpful for our management, basically saying, well, we made a decision based on removing those elevated points, and taking it down to the mean of the last five or six years before that, before I went forward with a management procedure.

DR. BUCKEL: Marcel.

DR. REICHERT: You don't have ages yet, because that takes time, but does your length frequency have any indications, in terms of those smaller fish, for 2021 and 2022, or 2022?

DR. BUBLEY: Offhand, I do know. We actually may have some ages, and our black sea bass age readers are pretty on top of it, and so we may have some ages for 2022, at least a good chunk of them, and so we can look at it. The data are available, but, again, it's only going to go back -- We're going to look at recruitment maybe to 2020 or 2021, which is what you're asking for, and so, I mean, we might have some information for that, because, once you get to two years old and older, the traps catch them fairly well, and so they're there, and we just haven't delved into them at that point.

DR. BUCKEL: Any other fishery-independent surveys that pick up the zeroes, like the SEAMAP trawl? Has that been explored?

DR. BUBLEY: They get very few of them. We can look at it and see where they're at, but that number is relatively low every year, on the range of a dozen or two dozen, I think, when we're talking about that. There's nothing to really anchor it, so much, because it's just a small number, and we don't have the older age classes to go along with it.

There's also -- Last year was the first year that we've started to run the juvenile survey, where we're using smaller mesh traps, smaller openings, in shallower water, to look at this, but, again, that's -- We don't have any reference point with that, and so it's not going to really tell us anything with the age-zero fish that we might have caught last year, and we don't have anything to base it against.

DR. BUCKEL: Thanks, Wally. Erik.

DR. WILLIAMS: Sorry if I'm speaking out of turn, but let's stop that thought process. We have a process, and you're going down the road of there's always a better data point around the corner, and there's another data point around the corner. Stop. You know, this is the process we have, and this is the information we have. Use what we have and move forward. This is going to end up, and I hate to say it, but in a Spanish mackerel, if this conversation continues the way it's going.

DR. BUCKEL: Thanks, Erik, and I think we have Shep to the extinction question.

MR. GRIMES: Thank you. Let's not call it an extinction question, please, and I guess I would start out with, first, to answer I think it was Chris Dumas -- The answer, from a management standpoint, certainly can't be go get them. You know, I think Scott Crosson asked this question, or touched on this question, at the January SSC meeting, and I'm looking at the minutes, and I fumbled it a little bit, and I didn't do a very good job of answering it, and I've been thinking a lot about this since we talked about scamp and yellowmouth at the last meeting.

You know, if the stock never rebuilds, based on the current understanding of the stock and, you know, I will say parameterization, if that's the correct terminology, for the existing models, then it seems, to me, the appropriate response to that is a factual, or scientific, question, right? If something appears to be incorrect in our understanding of stock dynamics, right, whether it's a biological trait or changes in environmental conditions that influence biological traits, but determining what is happening, and why it's not rebuilding, based on our understanding, is factual, or scientific, in nature, and that's how it should be addressed, and it doesn't seem to be a -- You know, I mean, the management question of how to react comes after we have decided that -- The stock must rebuild to some level at some point, right, and that seems to be a basic understanding, and so, you know, when you're looking at a response, I think, regardless of whether it's appropriately characterized as a regime shift, or maybe --

Now, this has occurred to me, hearing Fred Serchuk's comments, and, you know, maybe there are minor adjustments that need to be made to our understanding, to our reference points, right, and does that necessarily constitute a regime shift, or is it just incorporating new information and deciding on the appropriate response, in light of that new information, but, to me, it isn't a question of what a council can do to rebuild, because it isn't a question of lengthening the time to get there and accommodate rebuilding, and, rather, it's a question, it seems to me, of whether we're aiming at the appropriate target, right, and, to use a sports analogy, rather than lengthening the game to achieve more goals, should we be considering whether we need to move the goalpost? Hopefully that's more informative and helpful. Thank you.

DR. BUCKEL: Thanks, Shep, and I think that would be something that -- You know, to Fred's -- The discussion was that, if we had the evidence that we had a regime shift, which, based on the

Klaer et al., we've not found that -- We haven't concluded that there is a regime shift, and so Scott Crosson.

DR. CROSSON: First of all, I would like to thank Erik for his comments, because I very much agree with them, and, to that, once we're done questioning Matt, there's a reason that we have all of these questions laid out in the agenda, and I think, as we go through and fill them out, they will probably help us come to an answer about what we're trying to address right not sort of piecemeal, and thanks, Shep, for your comments as well.

DR. BUCKEL: Yes, and so this time is for questions for Matthew, or discussion amongst the group, and then we will get to the action items. We will -- Judd, given that the greater amberjack has been removed from the agenda, Judd, we'll have time to address the action items tomorrow during that slot of time. Judd, did you want to say anything?

DR. CURTIS: Yes, and I think, just to that point, Jeff, we'll have time, in the right-after-lunch slot, to go through the action items on the overview for this topic, and I don't want to bump everything down, because we have presentations that need to be in the morning tomorrow, because of scheduling issues, but, if your Chair is okay with addressing the action items after lunch tomorrow, with this topic, then that's probably the best time to do it.

DR. BUCKEL: Thanks, Judd. That's certainly -- Particularly the folks that are assigned to different groups, and, you know, when we do the webinars, we have the breakout groups for the different action items that we have to address from stock assessments, and so there's three different groups of folks assigned to those, and so please look at your action items tonight, or tomorrow morning, before we reconvene, so you're ready to fill those action items out tomorrow after lunch. I certainly don't want to -- We can continue any -- We're a little over time, but, if there are questions for Matthew, we want to make sure we get those answered now, and if there's any other discussion that folks would have, would like to have, please raise your hand. Kai, I know you had brought up the question about the FMSY. We said we were going to come back to that, and I want to make sure we have --

DR. LORENZEN: Yes, and we can write about it, and I don't think it's super -- You know, it wouldn't make a difference to the situation we're in with this, or not a big one anyway, and certainly not compared to the uncertainty we have about future recruitment, but I did want to -- This is more of a general comment, I think, and we have to be careful, you know, when we switch from using a stock-recruit relationship that implies some realistic level of compensation to one that has complete compensation and a steepness of one, and then that -- It's more than just a minor change in the model, and I felt that was a little bit lost in -- It's actually quite a substantial change in the dynamics that we assume, and I think we -- To my mind, if you assume a steepness of one, or a constant recruitment, then that does not -- Even if it looks like an FMSY reference point, it actually isn't, because it's not accounting for a realistic level of compensation, and so it's kind of a philosophical thing, in part.

I think there are other situations where that will make actually quite a big difference. In this case, I'm not sure it would, and, if anything, it would tell us that we're in more trouble than -- Without going there, and so I don't want to belabor it, because I think it distracts a little bit from the main thing we need to do, but I think, as a -- You know, as a matter of principle, we should be careful

not to simply switch from a model that has a realistic level of compensation to one that has complete compensation and not then switch to using an SPR-based sort of FMSY proxy.

DR. BUCKEL: Thanks, Kai. Alexei.

DR. SHAROV: This approach is -- Just a minor correction here, and so, as a point of discussion, Kai, this is not a constant recruitment, and this is more like a random variability recruitment around a certain level, right, which is then driven -- On top of the random variability, there could be some functions that we don't have a handle on, which, right now, we're trying to explain it by saying, well, there is the regime shift, which is some sort of forcing function that yields a lower reproduction and poor recruitment, and so it's not necessarily constant recruitment, and I just wanted to make a point on that.

DR. BUCKEL: Thanks for the clarification, Alexei. Other questions for Matthew, or points to discuss? Amy.

DR. SCHUELLER: Are we going to get together in the groups, to fill out those pieces for black sea bass before -- I am just wondering if we're going to have breakout sessions like we have in the past.

DR. BUCKEL: No, and we'll do that as a full -- I asked the individuals that have certain assignments to think about the answers to those action items, or responses to those action items, tonight or tomorrow morning, so then, when we do reconvene as the full group, tomorrow afternoon, and hit those, and we'll just do that as a group, but I would hope that the five or six that are assigned to each of those would have thought about it individually and bring those comments, and so that will make that more efficient, when we do come to them, but there's no plan to break out in the different rooms, like the webinars. Other questions or thoughts? All right. Go ahead, Kai.

DR. LORENZEN: I just wish to thank the analyst for a very thorough job. Thank you.

DR. BUCKEL: Yes. Thank you, Matthew. All right. Seeing no hands, we'll adjourn for the day. Sorry. Judd has got a few housekeeping things.

DR. CURTIS: Just, before we adjourn for the day, I just wanted to let you know that Matthew will be around tomorrow as well, and so he can answer any additional questions, if those come up, and we need to provide a chance for public comment, and we have one person in the room that would like to come give their comments, and so come on up.

## PUBLIC COMMENT

MR. PHILLIPS: It's good to see you all, and it's bad to see that your workload has gotten worse, and harder, than what I remember. You know, back not so very long ago, it seemed like we were getting more assessments that were positive than negative, and now it's the other way around, and that's got to be tough on you all.

Dr. Williams, I appreciate your presentation, and the two words that I remember the most were "uncertainty" and "assumptions", and that doesn't help you all, and so all I can do is tell you some of the things we see on the water. We work with the black sea bass, and we work with the ropeless gear, and we caught some, and the gear worked very well, and, of course, it doesn't look like we'll be catching much for a while now, but we'll see how it shakes out, but something is going on with this regime change.

I don't know if it's anything that we can deal with, or if it's things like water temperatures, food webs, stuff that we just have no control over. I know the things that have changed the most in the last ten or fifteen years is lionfish, and red snapper are everywhere. Even when I'm trying to catch black sea bass, in seventy-five foot of water, I anchor up, and, before I can even drop the weight, I'm catching red snapper on the top of the water, small red snapper, and I'm just waiting on the boat to go straight in the tide, and I tried to go -- I got tired of throwing red snapper back in 120 feet, forty miles offshore, and so I said, okay, I'm going to just troll for king mackerel, and the next two fish I caught were fifteen-pound red snapper, trolling for king mackerel, and I quit trolling for king mackerel, and so do they affect the other species in the ecosystem?

I'm sure they do. How do they affect it, other than them eating the very young, I don't know, but they're -- Something is going on, and scamp don't look good, and gags don't look good. Pinkies, I can't remember when we got a good assessment, and, obviously, the black sea bass look terrible, and so what do we do? What do we look for, and I don't know that we have time to, you know, do a lot of predator-prey, you know, studies, to see who is eating who, and I think we're going to have to do something sooner rather than later, or we're going to be in such a worse place than we already are, and you all are a lot of smart people in the room, and I really enjoy talking to you, but there's some things changed, and I don't know that we'll ever go back to fisheries that we saw forty or fifty years ago.

When I was shrimping, back in the 1970s and 1980s, we had saltwater catfish on the beaches, and they've been gone for thirty years, and I think a virus might have taken them out, and I'm not sure, and there is one or two left, and we used to see lots of pogies, and you don't see them like you used to anymore, and so there's -- I don't know that we can go back to things that used to be, a long time ago.

We may just have to figure out what we want and try to manage for whatever fish we need, if we can, and so, anyway, I'm going to keep it short, because I know you all are ready to go get something to eat, and maybe have a drink, but it's been very nice visiting you all, and thanks for your commitment.

DR. BUCKEL: Thank you, Charlie. I appreciate that.

DR. CURTIS: Just, lastly, upon adjournment, if we could just quickly take a photo, out front of the hotel, and Kim will lead the charge, and then you will be released.

(Whereupon, the meeting recessed on April 18, 2023.)

- - -

APRIL 19, 2023

WEDNESDAY MORNING SESSION

- - -

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Town and Country Inn in Charleston, South Carolina on April 19, 2023, and was called to order by Dr. Jeff Buckel.

DR. BUCKEL: Good morning, everyone. Welcome back to the South Atlantic Fishery Management Council's April 2023 SSC meeting. Just to remind everyone, we've got a change to the agenda today, and the eighth agenda item, the Greater Amberjack Project Update, we will not be receiving that today, and, in the place of that, we'll revisit black sea bass and fill out those action items in the document, but, first off today, we've got Item Number 5, the SEDAR 68 OA, the Atlantic Scamp Complex Operational Assessment, and Dr. Kyle Shertzer, from the Southeast Fisheries Science Center, is going to give us a presentation on the reviewing rebuilding timelines and projections, and our action is to make catch level recommendations based on these, and so, Kyle, if you are there, please take it away.

## SEDAR 68OA: ATLANTIC SCAMP OPERATIONAL ASSESSMENT

DR. SHERTZER: Before I get started, I just wanted to address a couple of topics that came up yesterday, and one was why were dead discards pooled with landings for the scamp assessment, and the rationale that the CIE reviewers gave was that landings were a small -- Or dead discards were a small component of the total removals, and so this was done for parsimony. It simplified the model, and it make it more stable, and you might remember, from reviewing, that every single one of the ensemble model runs converged, which is usual, and so I guess it did achieve that effect of having a stable stock assessment model, but that was the reason that they gave.

The other thing that I wanted to mention was that -- This came up with sea bass, and it also came up with scamp, these stocks that we're seeing with low recruitment, and we do have a research project that's ongoing within the Science Center, and with some folks from outside the Science Center, and we have somebody working on this through SEAMAP, and this is almost their full-time job, and so I hope to have some results from that study to show to you, and maybe I can get on a future -- Get in some time at a future meeting to present those results, and so I guess, when that's mature enough, I'll talk to Judd about getting on your schedule.

DR. BUCKEL: Thanks, Kyle. That will be great.

DR. SHERTZER: So now back to this topic, scamp, and I did want to reiterate that this is not just scamp, but yellowmouth grouper, and it's the complex of these two species that were pooled together for the assessment, and this follow-up analysis is based on -- There was an accompanying report in your briefing materials, and this presentation really describes that report, which was done in response to a couple of requests, and one was that the council requested -- These requests are listed in full in the report, but, here, I just abbreviated them.

The council requests were twofold, and one was a base run where the MSY proxy used 30 percent SPR, and you may remember that, in the assessment, we used 40 percent SPR, which would be a change for the council, and so I think they just wanted to see runs that also used 30 percent, before making that change, and then, also, some guidance on developing a rebuilding scenario for this stock, and, in particular, determining Tmin for the rebuilding timeframe.

Then there was an SSC request in the report, in your last report, for a rebuilding projection to compute F rebuild to allow the stock to rebuild within the ten-year timeframe, assuming long-term average recruitment. Again, this was a stock that had the low recruitment at the end of the time series, the last ten or fifteen years, and so a lot of our discussions, at the last review, were based around the long-term average, versus using the recent average, recruitment.

For this topic of SPR, the assessment recommended 40 percent, and I think 30 percent is what's on the books right now though, and the SSC agreed, and this is language from your last report, and the F 40 percent as the MSY proxy is supported by recent literature, and, also, aspects of scamp life history. F 40 percent is supported by the discard rates and natural mortality, similar to other members of the snapper grouper complex, and so that is the recommendation from the assessment, and from the SSC, that there's this change to the 40 percent SPR, and the council requested a comparison to 30 percent, while they're having these discussions.

Here's the comparison, and this is the SPR curve as a function of fishing rate, and, if you follow it along, SPR equals 0.4, where it intercepts the curve, and you can see the F 40 percent equals 0.28, and, if you do the same thing for SPR equals 0.3, then you see that the curve intersects -- It's intersected at an F value of 0.52, and so F 30 percent is not quite, but almost, twice as high as F 40 percent.

These are the proxies for MSY, and you can compare the time series of F and SSB, you can see that, for F, it's pretty much fluctuating around F 40, for most of the time series, and it never exceeds F 30, for any of the time series. For F 40 in the terminal year is where we use a geometric mean of the last three years to determine overfishing, and, although it was overfishing in 2019, the geometric mean -- The last two values are below F 40, and so the geometric mean itself was below F 40 for the base run, which is what's shown here, and for the majority of the ensemble runs as well.

If you look at SSB, in the bottom panel, pretty much the same result, the time series is above the threshold for the majority of the time, until around 2010, or 2015 or so, and then it's below both of those benchmarks at the end of the time series, and, if it seems strange that, for F 30, that the fishing rate never exceeds F 30, but we still have the overfished status at the end of the time series, that's because of the low recruitment that's occurring at the end of the assessment that's driving the spawning biomass down. That was all I had on SPR. Before I move on to rebuilding, are there any questions about SPR, or comments?

DR. BUCKEL: Chip has one, and he's coming to the table.

DR. COLLIER: So, in the report, there was some discussion of F at --

DR. BUCKEL: Kyle, we're getting feedback, and so I'm not sure if -- I think that fixed it. All right. Chip, go ahead, please.

DR. COLLIER: In the report, there was mention of SPR at 50 percent, and, just thinking along the lines of NEPA, since the council is going to have to -- As this is a choice for them, to go through which proxy to use, just some discussion on F 50 percent would be useful, whether or not that's recommended by the SSC or not, but they will need to at least have some information, or discussion, on it, to really give a bookend on what is a reasonable range of alternatives for the SPR proxy.

DR. BUCKEL: Fred, did you have a comment to that? All right. Thanks, Chip. Erik Williams is coming to the table. Go ahead, Erik.

DR. WILLIAMS: I don't -- I'm pretty sure the Science Center's position on this is the proxy decision is not a council decision, and that is a science-based decision, because what you're determining as a proxy for MSY -- That's a science-based decision.

DR. BUCKEL: Thank you, Erik. Other questions for Kyle related to SPR? Not seeing any hands, Kyle, and so please proceed.

DR. SHERTZER: Okay, and I think, but I'm not certain, that the 50 percent benchmarks might be in the table in the report, but, if not, if those are needed, we can provide those. The rebuilding timeframe, I guess, in the back of our minds, the language in the NS 1 Guidelines that defines how Tmin would be computed, or Tmin is the amount of the time that the stock complex is expected to take to rebuild to its MSY biomass level in the absence of any fishing mortality, and then Tmax would be the maximum time for the rebuilding timeframe.

We're expected to have at least a 50 percent probability of obtaining BMSY, and the starting year for Tmin should be the first year that the rebuilding plan is expected to be implemented, and, if Tmin for the stock complex is ten years or less, then Tmax is ten years, and so that's the case for scamp and yellowmouth grouper. If it were to exceed ten years, then there's a number of options that we can use for Tmax, which is Tmin plus a generation time or the amount of time with a 75 percent MFMT projection, or a Tmin multiplied by two.

The first step is to compute Tmin, and that's the projection with no fishing, and then, here, the new management is assumed to start in 2025, which is based on advice from SERO that the council would have two years to implement a rebuilding from when they're notified of the overfished status, and that was expected to occur this spring, and perhaps it already has by now, and I'm not sure, but the notification should happen, or have happened, in the spring of 2023, and so, giving two years after that, we start it in 2025 for the new management. Then these projections consider two potential probabilities of rebuilding, the 0.5, which was the minimum specified by NS 1, and then 0.7, which is based on kind of the P* of the control rule that the SSC applied.

Then two different assumptions about recruitment, and one is this long-term average, using long-term average recruitment, and so based on the premise that there has not been a regime shift, reduce the long-term average starting in 2023, and so it's really a jump from the low recruitment that we've seen at the end of the assessment to the long-term average, which is a bit higher in 2023, and then we also developed a more gradual return to the long-term average, and I'm emphasizing the word "hypothetical" here, that this is really -- It should be considered a hypothesis, but we give more detail about that.

The way this was implemented was by fitting a sine curve to the assessment values of recruitment, and we continue that sine curve forward in time until it reaches a long-term average, and then fixing recruitment at the long-term average, and so that sine curve would be re-estimated for each of the 4,000 MCBE iterations, and then, also, for the stochastic runs to that sine curve expected value, we would include lognormal deviation, stochasticity in recruitment for those runs, but not for the deterministic base case run, and so I did want to emphasize here that we're not trying to hypothesize that there's this long-term, cyclic pattern to the spawning, but rather just using a sine curve to fit the previous values and use the gradients from the past to predict an increase in recruitment into the future until reaching the long-term average.

That looks like this, where the blue are the recruitment. The blue points are the recruitments from -- This is just the base-case scenario, but the recruitment values from the assessment, and so that blue curve is the fitted sine curve to those values, and then basically just carrying that forward in time, and the green part of that curve is the projection, or the projected value, until it reaches the long-term average, and then it's fixed there, and so, instead of having a jump up in 2023 from these low values, up until the long-term average, all happening all in one year, it's a little bit more of a gradual return.

DR. BUCKEL: Kyle, Fred Serchuk has a question for you.

DR. SERCHUK: Given the discussion we had yesterday about recruitment in black sea bass, I'm just wondering why another run wasn't done looking at the most recent ten years' worth of values. They're the lowest in the series, and just to bound these projections, and it would seem, to me, that one would want to say, look, what if the current string of recruitment, at very low, continues, because you can look at the figure that we just had up here, and you could run almost a linear line between 2010 and 2020, and it would be the lowest in the time series, and use that average, going forward, with just -- I mean, that would be another scenario, I think, that would be helpful to bound the probability of stock rebuilding, and I'm just wondering why that wasn't even considered. Thank you.

DR. BUCKEL: Kyle, you can correct me, but we've seen that one, at our last meeting, and that was -- That's one that I think we talked about using for the ABC, based on Amy's group, the workgroup's recommendation that the recent recruitment, which is low, would be used for ABC setting, but this is for the rebuilding, right, and it's a long-term average, but we weren't comfortable just jumping right up to that long-term average, and so Kyle is providing another potential approach for the rebuilding. What you're asking is for the rebuilding, to see the recent low recruitment, and those projections, for the F 30 percent, or F 40 percent, SPR were provided in a previous document, and, Kyle, correct me if I'm wrong.

DR. SHERTZER: That's right, Jeff. The assessment report has projections that carry forward the recent average, and this report, this current report, has a couple of those as well, and I'll get to that soon, but I redid those, because of the starting year being 2025, and so I think the line of thinking, for the SSC right now, has been that those long recruitment values would be used for projections, to determine ABC, and, if there's a regime shift, then we would carry that forward as well for the benchmarks, and assume the benchmarks are different than the long-term average, but, if we don't conclude that there's a regime shift, then the benchmarks are based on the long-term expectation, and so, for the rebuilding timeframe, which is what I'm trying to convey here, we would somehow

need to get recruitment back to the long-term average, and so these are the two alternatives for doing that. Does that help, Fred?

DR. BUCKEL: Fred said yes. Thanks, Kyle.

DR. SHERTZER: Thanks. These are probabilities of rebuilding, with fishing turned off, and so F equals zero, and this is showing four different cases. On the left is the long-term average recruitment, and so that's the jump back up to long-term average in 2023, and then two different cases. If the rebuilding probability is set at 0.5, then this case rebuilds in 2029, and, if it's 0.7, then it rebuilds by 2030, and so, in both of those cases, it rebuilds within ten years.

On the right is the little bit slower return to the long-term average recruitment, and so following the sine wave, and, in that case, rebuilding would occur, in at least the 0.5 probability, by 2030, and a 0.7 probability by 2031, and so the sine wave approach delays rebuilding by about a year, but, in all of these cases, rebuilding occurs within ten years. Based on that, then Tmin is less than ten years, and, according to NS 1, then Tmax would equal ten years, and so then the target for rebuilding would be 2034, and that is what is used in the subsequent rebuilding projections, and so I'll go on to those, unless there is more questions about what I just showed.

DR. BUCKEL: There's no hands raised here, Kyle.

DR. SHERTZER: Okay. The additional scenarios that we have here are the -- There is four scenarios that are intended to fulfill the SSC request, that basically to compute the F rebuild, or the F that would allow the stock to rebuild within ten years, assuming long-term -- Those four scenarios are basically a two-by-two factorial of the rebuilding probability of 0.5 or 0.7 and then the two assumptions about how recruitment returns to the long-term average.

Then two scenarios address the SSC comment, and this wasn't the specific request, I think because some of these projections were already in the assessment report, but I redid them, because of the 2025 start year that the rebuilding schedule would be based on long-term average recruitment, following -- Patterns following conclusions from the catch level. However, near-term ABC should be determined using recent recruitment estimates, and so I think this gets back to what you were talking about, Fred, and so these scenarios just apply the recent recruitment at a couple of different levels of F.

This is just to define these a little more, but here's the scenarios from the report, and Scenarios 3 through 6 are all these F rebuild scenarios, with either a probability of rebuilding being 0.5 or 0.7 and then either recruitment being the jump to the long-term average or the sine wave more gradual return to the long-term average, and then the two scenarios with the recent low recruitment applied either 75 percent of F 40, or also F current.

All of those are plotted in the report, and I'm just showing a couple of examples here, and these panels -- These are the F rebuild with a probability of 0.5, and the sine wave increase is -- I will jump down to the bottom panel, showing recruitment, so you can see how it increases somewhat more slowly than it would if it were just a jump back to the long-term average, and, then, based on that, the second panel on the left just shows the spawning stock and how it can rebuild within the timeframe, with a probability of 0.5.

On the right-hand side, this is Scenario 7, with the 75 percent F 40, but as the recent average recruitment, and then, jumping down to the bottom-right panel, it shows recruits, and you can see that recruitment stays low throughout the full projection, and, if you look at spawning biomass, the panel just above that, you can see that it never rebuilds to the long-term average, and recruitment stays low.

There's a bunch of numbers on this slide, and the next slide, and I'm going to go through them, but I put these into the presentation, in case you need them for discussion of ABC, and these are the two low-recruitment scenarios that you suggested that we might use for setting ABC, and so this first one is the 75 percent F 40, and the second one is the F current.

This is my last slide, for the discussion that we're having here, and that is that this rebuilding Tmax of ten years is predicated on whatever assumptions we make about returning to the long-term average, and so, here, it's either -- The two that we explored here are there's a jump in 2023, or over the course of a few years, following the sine wave, and I would say, given the trends that we've seen in the past, that the slightly more gradual return is more realistic, but I would say there's not strong evidence, or scientific support, for either one of those, and so I would say that they're hypotheses.

We could easily propose some other trajectory of how recruitment gets back to the long-term average that might be more slow than what the sine wave showed, and we could certainly have Tmin be greater than ten years, and then Tmax could be any one of those three options that I showed earlier from NS 1, Tmax -- Tmin plus a rebuilding plus a generation time, or one of the others, and so the reality of this is that we really don't know when, and we don't know how, and we don't know if recruitment will return to the long-term average, and so these forecasts -- I would say that we could choose one, but we can't say, with really any scientific confidence, what Tmax should be, and so the low recruitment, I think, for short-term catch advice, is reasonable, but I guess -- Maybe this is a question for Shep too, but, if our forecasts -- If Tmax is based on -- More on assumption than on evidence, is this something that science really needs to provide, or is Tmax something that the managers can choose without relying on these forecasts? The end.

DR. BUCKEL: Thank you very much, Kyle. All right. Are there questions for Kyle? Thanks for the excellent presentation. Shep, please go ahead and let us know about Tmax.

MR. GRIMES: Thank you. Well, that's a tough one. You know, I think the guidelines envision -- The National Standard Guidelines envision determination of Tmax being a scientific decision, you know, and it certainly needs to be based on the best available scientific information, and so it's heavily influenced by the science, and, best available, while that ultimately is a policy determination, in approving any management action, there is, obviously, a whole lot of scientific input on that one.

You know, I guess, if the SSC, as supported maybe by the Southeast Fisheries Science Center and others, came in and said, you know, scientifically, you have -- You're making a number of assumptions, or you could make one of a number of assumptions, and, scientifically, those assumptions are equal, in terms of merit, then you're basically saying they're all best available science, and it's kind of a choice between one.

In that context then, you know, I think it probably could be just a management decision among those, but, you know, it seems, to me, that you're going to make that -- Or present that choice to the council, and you should have a very robust discussion of why those alternatives are all best available and be able to support any one of them. Thank you.

DR. BUCKEL: Thank you, Shep. Do others have comments to that point, or other parts of Kyle's presentation? I will throw out a strawman, and I think we have our workgroup report for how to move forward, and that would be for rebuilding, and the choice here is either the long-term, which was recommended by the workgroup, but I think Kyle provides, as he said, an equally plausible, but maybe more realistic -- Perhaps a more realistic recruitment scenario with the sine approach, using the past information to predict forward, and so that's a -- I guess I will put that forward as an SSC, potential SSC, recommendation, and we can get discussion. Chris.

DR. DUMAS: Kyle, I've got a question about the sine wave fit. Did the sine wave fit better than just trying to fit a cubic to it?

DR. SHERTZER: I didn't attempt that. I mean, I guess I could fit a number of different types of curves to it, but I guess the goal would be to do the same thing that we ended up with, which was forecast a return to the long-term average, but, yes, we could fit any number of curves to the previous data.

DR. DUMAS: Right, and the reason why I specifically asked about the cubic is, with a cubic, that third term on the cubic, whether it was significant or not, would give us some basis for trying to decide whether recruitment was turning up in the last few years or not, because, on a cubic function, that third term would -- If the recruitment is turning up in those last few years, that third term should be significant, but, if the recruitment is not turning up in the last few years, then that third term might not be significant, and so we might be able to use that to help us make a decision about whether the evidence we have on recruitment in the last few years supports more the hypothesis that recruitment is turning up, versus the hypothesis that that low recruitment is staying low, or maybe even continuing downward, like Fred alluded to earlier. I don't know the cubic would fit better than the sine, and the sine might fit better, but it might be worth just something looking into. Thanks.

DR. SHERTZER: Thanks for that. I will give that a shot. I think, either way, we're still left with this conundrum of how do we predict the return to long-term average, since we're in this scenario of not assuming that there's a regime shift, and so the underlying function there is that long-term recruitment will return to the long-term average. If we're in a regime shift, then maybe it won't, and I don't think we know which of those two we're in right now, and we just don't have the evidence to conclude that we are in a regime shift, and so, at least for determining Tmax, we would need to specify some rate of return to the long-term average, and so, if the cubic did an upturn at the end of the time series, then we would have to make some other assumption that the upturn happened sometime later.

DR. BUCKEL: Thanks, Kyle. Wally.

DR. BUBLEY: Looking at this, I mean, the advice that we've had from this workgroup was we're looking for rebuilding stuff -- For rebuilding plans, we're looking at the long-term average recruitment. The way Kyle did it is -- I understand trying to gradually get up to that, but, by

pinning it to the long-term recruitment at the end, we're actually looking at below the long-term recruitment for that ten-year period, and so it's a lower average recruitment over that time period, and so does it make sense to have some sort of increasing function that then goes above that long-term recruitment, and so that ten-year period has the average, the long-term average, because we don't know what recruitment is happening, and that's the whole point of using that long-term recruitment, because there could be fluctuating cycles, and so not only can it be lower, but it can also be above that long-term average, and so, by doing it this way, we're actually calculating it off of a lower than the long-term average recruitment.

DR. BUCKEL: Amy.

DR. SCHUELLER: Notwithstanding all these points, we're extremely uncertain, and we're waving our hands around, thinking that these are different, and they're not. I don't think it matters at all which one of these we choose, and so I'm for the keep it simple version, because it's literally not -- It's not different. It's one year different, and I don't think we can probably even call that different, if we actually took into the uncertainty that we have about this topic.

DR. BUCKEL: Good point, Amy. Others? I am seeing some heads nod, and that would fit with the workgroup's recommendation, and we would be consistent. I agree that it's one year difference in the rebuilding, and that's a good point, and remember that Fred Serchuk's sage advice was that these long-term -- They're very uncertain, and the ABC setting is different, and this is not going to impact the catch. Go ahead, Amy.

DR. SCHUELLER: I was just going to add that I worked on trying to project recruitment for a difficult-to-project recruitment species for a long time, and I've done it every which way you can think of, and none of them seem overly better than anything else, and so I hate to see us like, you know, grind on the same wheel, with the same result.

DR. SHERTZER: You don't actually have to choose which of these two scenarios, and they both have the same result, that Tmin is equal to ten years, and so, although there's a one-year difference, that falls within the ten years of the outcome that the Tmin is ten years. My broader point that I was trying to make is I think what Amy was just saying, is that we don't know if it's going, when, how, or if it will return to the long-term average, at this point.

DR. BUCKEL: Thank you, Kyle, and thanks, Amy. Others? Alexei.

DR. SHAROV: I just wanted to make a comment to Kyle that, yes, I agree, and we don't know what is going to happen, but, when discussing whether the recruitment variability is such that the -- Well, you reduce the fishing pressure, but the SSB starts rebuilding, and, once it starts rebuilding, then the recruitment might start coming up, as a function of the SSB, and I'm looking at the plots of fishing mortality and SSB trends, and I just can't help but note that the fishing mortality has been, in general, below SPR 40, or F 40, right, for at least ten years or more, and so, in terms of the exploitation rate, that was a rather low exploitation, and yet we see the precipitous decline in SSB, similar, or even worse, than what we saw yesterday.

I'm not particularly in love with the concept of the regime shift, but, just looking at this, you -- It forces you to make the conclusion that there is a declining recruitment that is driven by something other than the size of the spawning stock, and, therefore, other than the effect of the fishing

mortality, and so I think that -- Well, we haven't identified the driving forces of this, in both cases, but it is more likely that we will see the same low recruitment in the future, as opposed to some return to the former recruitment level, or the variability.

DR. BUCKEL: Thanks, Alexei. So, Judd, maybe pull up the action items for this, please. The first bullet has to do with the rebuilding projections and timelines, and so, based on Amy's workgroup, and Amy's comments here, that would be the -- For rebuilding, going with the long-term recruitment and the Tmin -- That would result in a Tmax of ten years, with the caveat that -- Capturing the discussion that we've had that, as Kyle pointed out, there are other equally plausible scenarios, but we don't have the information to go one way or the other, and so we just have to stress that in the report, about this Tmax value. John Carmichael is coming to the table. Thanks, John.

MR. CARMICHAEL: First, I want to say, Kyle, thanks for the projections and the work you put into this, and, really, thanks for this discussion slide, because I think this really lays out the reality, and, you know, to me, looking back at other things, we seem to be in a lot of situations where we have these stocks that recruitment is going down, and it seems to be going down before you're overfishing, and there is certainly something happening. You know, I think, as Alexei just said, you were below F 40 percent SPR, and yet recruitment has declined.

We just looked at black sea bass, with a decade-long, or longer, steady, slow decline, just -- I mean, not slow, but a steady, marked drop-off in recruitment, and, you know, there's something that is happening there, and it becomes really important when we deal with these rebuilding plans, because we all know the recruitment is critical to rebuilding, and what you assume about recruitment is also critical to what your stock becomes when it is rebuilt, and so, you know, when I look at this one, I just think, if the SSC is to say, you know, Tmax is ten years, based on these couple of runs, well, then does that close the door on any discussion of that final bullet about are there other ways of dealing with Tmax, and I guess I sort of look at this and say, if the SSC, you know, goes through this and then today says, yes, Tmax is ten years, well, then the SSC is saying that you believe it's likely that this stock will perform at that long-term average recruitment over the next ten years, whether it's sudden or whether it's in the sine wave scenario.

You certainly are saying that you assume that's more likely than the stock continuing at the low recruitment that we've seen, and I just wonder, and has that point really been discussed, because, to me, the critical part of this is, you know, what do you think this stock is going to do over time, because that's going to determine the yield that's available from it and what the council has to do, as well as, you know, the rebuilding plan, and so, you know, I just -- I don't feel like I have a good sense of what recruitment might do, and why it's going down, and, when it's gone down before you were overfishing, that's certainly a concern.

There's troubles out there, and we've seen some of the work that the Science Center has done on like the -- I'm trying to think, but like the ecosystem reports and some of the climate, and I'm thinking that like Kevin Craig was working on that, and I know the Center -- Erik, you guys had looked at similar recruitment trends across a group of species, and so I think there's an awareness that something is happening out there in the environment that seems to be affecting certain groups of stocks, and it's affecting their recruitment, and it seems to be affecting their recruitment above and beyond what you would expect, given exploitation rates and harvest.

If that's the case, if we don't deal with that, then we potentially have the council going down another rebuilding plan that's doomed to failure, because the stock is just not going to respond. If recruits dropped while F was not at the overfishing level, what hope do we have that recruits will increase, just because we change F a little bit, and it seems like something else has to happen, and I think we have to -- I hope that the SSC can factor that risk into this, in some way, and maybe, if there's an opportunity, to maybe have some discussion of that final bullet, even if it requires something at the council table or, you know, more GC involvement, and I think that would be helpful, in terms of getting maybe a rebuilding plan and an outlook for the future of the stock that's more realistic.

DR. BUCKEL: Thanks, John, and so this is -- I know the ABC is needed to come out of this meeting, but the Tmax, that can still not -- We can provide that there's really equally plausible ways, and we can't -- I think what the discussion has been so far, and hopefully we can have some more related to that last bullet, but that we don't have a -- Even if we went with the long-term, based on the workgroup, just to be consistent, we would say there is other scenarios that are equally plausible, and we're doing this just to stay consistent, but I'm also happy to -- If we're not required to come out of this meeting with a Tmax, then we can pass that on to the council, that these are all the possible scenarios, and we don't -- There is no scientific way that we can provide one over the other.

MR. CARMICHAEL: Yes, and I think that would be good, because, you know, this SSC has often taken that strategy, of saying here's the long-term, and we have to do that by law, but then you're giving that catch advice based on what you're seeing, that's much more, probably, relevant in the short-term, and I think that's a good approach, and that tends to drive what the catch levels are going to be in the short-term, and so, yes, maybe saying you can't determine Tmax at this time, and you give ABCs based on, you know, preventing overfishing, using the short-term recruitment or whatever you think is appropriate, and then maybe that opens the door to have this bigger discussion, you know, maybe at the agency level, or what do you do when you can't tease out these scenarios for getting a Tmax that you think is robust and appropriate.

DR. SHERTZER: In a sense, the NS 1 Guidelines were not written with this type of scenario in mind, and, really, what the managers are able to control is the fishing rate, and so, if you can prevent overfishing, then I think the council is doing their diligence, and the stock is going to do what the stock does, and, if recruitment is driven more by environmental conditions, then it will return to the long-term average, regardless of what the council does.

I also wanted to comment that the research project that we have going on looking into this is investigating environmental effects on recruitment, and, even if we identified environmental effects, if we're able to identify a mechanism, we still would need to know what that mechanism is. For example, if it's AMO that's driving this, some type of cyclic oceanographic condition, we may be in a low-recruitment phase, and we would expect it to turn, if it's something that's cyclic, versus something that's like sea temperature, the warming temperatures, that we're not expecting to return to cooler temperatures anytime soon, and so that might affect whether we declare a regime shift or not, what the actual mechanism is, if we can identify one.

We mentioned yesterday about the potential for forming a regime shift working grouper, and, if you end up doing that, hopefully you can link-in this research group in some way, to help inform those discussions.

DR. BUCKEL: Thanks for that info, Kyle. Fred Serchuk.

DR. SERCHUK: Thank you, Chair. What did the previous assessment assume, in terms of the stock? I think it was done five or six years ago, and did it use -- How did it look at recruitment? What I'm saying is there's an issue here, in terms of we probably need to do a retrospective, saying, okay, five years ago, okay, did we assume average recruitment, or did we see a declining trend in recruitment and take advantage of that, and we don't want to -- We want to take advantage, it seems to me, of what we've done in the past and project it forward.

If we used -- If we basically return to the average, when we saw a declining trend five years ago, and it didn't, then I think we have to think about, well, wait a second, our assumption was wrong, and we have some credibility here. I'm thinking about learning from what we've done in the past, if it was an evaluation of what was going to happen in the future, and it didn't happen, and so I'm thinking that we could try to take advantage of the advice that we gave last time and see whether it was robust enough to think about, wait a second, things will return to the way they were previously, and has anyone done that? I'm just wondering. Thank you.

MR. CARMICHAEL: This is actually the first assessment, and so we don't have that past, in this case, and I think what you're laying out would be really interesting --

DR. SERCHUK: (Dr. Serchuk's comment is not audible on the recording.)

MR. CARMICHAEL: It is an operational, but it's the operational that's coming on the heels of the first ever research track assessment, and so -- That one, you know, didn't give the management advice, and it carries through forward in the most recent data, and so this is really the first assessment, this operational that you're seeing for scamp, and I think what you laid out would be very useful for black sea bass, because we do have a good history there.

DR. BUCKEL: Thanks, Fred and John. Other comments? Marcel.

DR. REICHERT: I don't think this is going to help us with the decision that we have to make today, but I would be -- I think it would be very helpful for us, if it's ready, to get an update on that research on that potential regime shift, or low recruitment, for multiple species, because that may help us in the future, and I'm not sure where that research project stands, and whether it's ready for an SSC presentation, but I think that would be -- I think it would be very helpful, and that's just an aside, and, again, it doesn't help us with what we need to do today.

DR. BUCKEL: Yes, I agree, Marcel, and so, Kyle, we'll work with you to schedule that for the next SSC meeting, if that's in the summer or in October. Okay, and so it sounds like we do not have to provide a Tmax on that first bullet, and we just have to capture the language, and I think everyone is on the same table that these are all equally plausible, and maybe there's a little more towards it's probably going to stay low, but we also have our being consistent with the long-term, and so I think we'll just say that all of these scenarios for rebuilding have equal merit, and, scientifically, we can't go with one over the other, and so we can't recommend a Tmax, and we would like further discussion with the council and the Science Center, for the reasons that were described by Kyle and others at the table. Then, if that's -- Is that a good summary, and do folks -- Something along those lines for the rebuilding?

Then our next action item is completing the fishing level recommendations table, and so, here, the workgroup's recommendation for setting ABCs is using the recent recruitment, and so we have Kyle's projections, and we also had agreed with the Center's recommendation for the F 40 percent, and so we can look at those projections and work to fill out the table.

Thank you for the email responses on the -- We worked through the ABC Control Rule, and Chip worked through that for us, and I sent that out, and I received emails that everyone was in agreement with the P* of 30 percent, which results in the SSC recommended P rebuild of 70 percent. I think Judd is pulling up the table to help us with this.

DR. SHERTZER: It should be up a few slides, too.

DR. BUCKEL: What was that, Kyle?

DR. SHERTZER: I pasted those tables into this report, or the slides here.

DR. BUCKEL: If everybody can look at Slide 18, and Judd has got that up on the right screen, that Scenario 7, where the F is equal to 75 percent of the FMSY proxy, and then the recent average low recruitment. Thanks for providing that in the PowerPoint, Kyle. Okay, and so Judd is filling that out, but we don't have to -- He can do that while we're talking about the third bullet, which is the third action item related to this, is describe potential methods to develop an ABC for the shallow-water grouper complex that can be developed in the timeline associated with the amendment, and, Chip, could you -- Chip, could you provide some background on this, some direction? Thank you.

DR. COLLIER: When the -- I guess it was Amendment 29 that changed, or added, ORCS into the ABC Control Rule for the Snapper Grouper FMP, and there were some changes to the ABCs for a variety of species, and it identified the shallow-water grouper complex, which included yellowmouth grouper, and so, as that's being removed, the basic method for setting the ABC for the shallow-water grouper complex was simply adding up the ACLs, and then it came up with an ABC for the complex, and so removing an individual species from that would, theoretically, reduce the ABC for that complex.

Looking at the average landings, I think it was around 4,000 pounds, and so it's not a huge change, but it's only a 100,000-pound ABC as well, and so it's a 4 or 5 percent change, I think is what it ended up being, and that's all in CHTS units. If we change over to FES units, which could indicate a change in perception of the stock -- If you remember the ORCS approach, it does use some professional judgment on how the stocks are doing, in order to set your risk scaler for that, and so it could take a little bit more time, or we could just remove that portion of the ABC that's associated with yellowmouth grouper and then just move forward with a shallow-water grouper complex in the continued CHTS units.

That seems like the simplest approach. Otherwise, you would have to go in and adjust all these, and there's been some conversation about using the ORCS approach, whether it's the best scientific information available, whether we should be updating it to FES, and we don't currently -- These are rare-event species, and we don't currently have a good method for estimating catch for some of these species, and so it could be challenging with that, and so there's a lot to consider

as we're trying to develop an ABC for these rare-event species, and then we're also going to have the unassessed species coming forward with a -- We would like a more holistic approach, where it really gets addressed in greater detail.

We do this first cut, is what we're -- What we're suggesting, as staff, is do this first cut, make it easy, and just remove yellowmouth grouper from that ABC, and then we can dive into the unassessed species, and a more deeper look, and have more time to develop those ABCs, making sure that the approach is matching what the best scientific information is at that -- Well, the best methods to develop those at that time, but I don't think it's going to be short, because we don't have estimates of catch right now, and, if you don't have catch, I don't know where we would go.

DR. BUCKEL: Chip, you don't have estimates of catch in FES units for these shallow-water grouper species?

DR. COLLIER: There are estimates that are provided through MRIP, but I suspect they would all be over 50 percent, and so we need different ways to come up with those estimates of catch. There's been the rare-event species working group, but we don't have a final report on the methods that they have recommended to provide those estimates yet, and so we need to get those estimates in the hands of the SSC and then run it through an ABC Control Rule that's been updated or new unassessed data-limited approaches.

DR. BUCKEL: Thanks, Chip. Chip laid out a way forward, and do folks -- Does anyone have heartburn with that, and so it would be removing the -- Chip has heartburn, even though it's his strawman, but does anyone have anything they want to discuss about that? George and Scott and I, and I'm trying to think who else was on the committee doing the third-highest landings, and so we agree that we can't do that here, and it sounds like the FES units aren't even -- So that's got to be done with the workgroup, and so, for now, the approach, with moving forward with the CHTS units, sounds good. Thank you, Chip. All right. Thanks, Judd, for getting some language there. Does anybody else want to build any language related to these three action items? Amy.

DR. SCHUELLER: I mean, we're just assuming that the yellowmouth and scamp are going to be tracked together in the future, right, based on this assessment, and so we're just pulling out whatever portion of the yellowmouth we've attributed, whatever portion of the ABC we've attributed, to this yellowmouth in the past, and it seems reasonable to me. I am just saying this because I'm trying to make sure that I have it right in my head.

DR. BUCKEL: No, that's important. Thank you, Amy. Marcel, did you have something?

DR. REICHERT: Again, these are relatively small numbers, but the reason we have a complex for scamp and yellowmouth is because of ID issues, and so how do we know what the -- How much to take out? Anyway, I was just trying to wrap my head around how to do that, but that may be a complication, a potential complication, here.

DR. COLLIER: I know it seems confusing, but we know how much was put in for the ABC for that, and so I would assume what was put in for yellowmouth could be taken out for yellowmouth.

DR. REICHERT: Thanks for that clarification.

DR. BUCKEL: Thank you, Chip. Fred Scharf.

DR. SCHARF: I should understand this better, because I was on the catch projections working group, but I just want to make sure that I'm clear with what we're doing right now with our short-term -- So our ABC recommendations, and so, using Scenario 7, we're going to recommend an F of 0.21, right, that has a probability of rebuild of zero, assuming recent low recruitment, and so the F that we're going to use in the short-term exceeds the F in the rebuilding timeline that would be necessary, assuming recruitment returns to the long-term average, and I'm just having trouble sort of separating those two things, right, because the long-term rebuilding, assuming that the F -- Assuming that recruitment returns to the long-term average, whichever way it gets there, we still need an F of 0.15 to have a 70 percent chance of rebuilding in ten years, and so our short-term F is going to be 50 percent higher than that, because it assumes the low recruitment, and I'm still trying to understand how those two things merge together.

UNIDENTIFIED: (The comment is not audible on the recording.)

DR. SCHARF: No, I'm talking about the 0.21 starting in 2025 and not the F -- Not the 2030 to 2034, and I'm talking about, starting in 2025 our F is going to be 0.21, and that's the 75 percent at F -- To achieve SPR F 40 percent, the F of 75 percent is 0.21, starting in 2025, and, to have a 70 percent chance of rebuild, assuming recruitment returns to the long-term average, that F was only 0.15, and so our short-term ABC projections are based on an F that's 50 percent higher than that, based on this -- And we're assuming low recruitment, and I'm still -- I don't know, and is anybody else sort of confused by that, or is it just me, that I'm having trouble -- I mean, I'm coming back to, you know, what Fred was saying about how, you know, if we look backwards, and we look at our recruitment, you know, projections, how did we do.

I think we could say, for the most part, pretty lousy, right, and, I mean, especially in cases where we assume long-term, and, I mean, even if you look at scamp -- If you went back into the mid-1990s and looked at the recruitments from the mid-1990s, would we ever expect that we would be here today, where we are, in terms of recruitment, right, and so the recruitment has almost never been at the long-term average, and maybe, in some cases, where we have a reasonable stock-recruitment relationship, and we use that to project future recruitment, maybe we've done a little bit better, but I think, you know -- I mean, given that the one thing that we -- The two things we know are we can't predict recruitment very well, and the others is that, to have a reasonable chance of having good recruitment, we need to have some spawning stock biomass. I am just struggling, a little bit, with our short-term ABC projections, that, if recruitment stays low, we have no probability to rebuild. Is that what we're -- That's what we're doing?

DR. BUCKEL: Go ahead, Anne.

MS. MARKWITH: I guess, to follow-up on Fred's comment, and this is probably where being new -- I am a little confused about some of this, but why are we setting the ABC on what we're setting it at and not the F rebuild? Is there a reason? Like, again, and this is probably being new and not exactly understanding some of the protocols.

DR. BUCKEL: There was a workgroup, SSC workgroup, to address how to deal with recruitment, and related to two different questions, and one for projections, dealing with the time to rebuild, and one with the short-term setting ABC, and the recommendation, at that workgroup, you know,

reading the literature, and what we came to, was that, for the rebuilding, you would use a long-term average, for that longer timeframe, and the expectation would be that you're probably going to get the long-term average over these rebuilding times, but you wouldn't want to do that for the ABC.

Like, if we're at these low recruitments, and, for setting an ABC, it's not going to -- If you're at the low recruitment, you're not going to jump up to that long-term average recruitment, and so to be more cautionary to use the average of recent recruitment for setting ABC, because that's a short-term, right, the three to five years before the next assessment.

MS. MARKWITH: Okay. That makes sense. I guess, when you look at the scenarios that F is -- To Fred's point, that F is lower for those F rebuilds, and so -- I understand the cautionary aspect of it, because, at this point, with scamp being the way it is, and it was just do we want to have a lower F, to hopefully jumpstart that process.

DR. BUCKEL: The stock assessment folks can chime-in, and I think that -- In the longer-term, it's going to -- It's using the long-term average recruitment, which is higher, and so it's more numbers of animals out there, and so then your catch is resulting in a lower F, and I think that's part of that, but stock assessment folks can chime-in, but that's -- I think that's what is going on, but I see the concern there, for sure.

DR. SHERTZER: Another piece to that is that -- Well, two pieces. One is the recent recruitment is a reasonable predictor of the short-term recruitment, and so we're looking -- That's why the SSC recommendation for recent average recruitment. The other is that I wouldn't focus too much on these probability of rebuilds that are zero throughout this, and this was a longer-term projection that we would use for short-term catch advice, and it's really comparing apples to oranges when the recruitment is different here than what was used for the benchmarks. There, it's the long-term average, and, here, it's the low recruitment, and so, in this case, you would actually never get back to the long-term -- Or rebuild to the long-term average, if recruitment stays low, and so the probability of rebuild was included in this table, but I wouldn't focus on those long-term --

DR. BUCKEL: Thank you, Kyle. Fred Scharf.

DR. SCHARF: Again, I guess just a -- I understand that, Kyle, and thanks for that point, and I guess, just coming back to the high level, we just looked at some rebuilding scenarios, where we're assuming, because we don't know anything else, you know, about how recruitment is going to behave, and we're just going to assume that it's going to go back to something near a longer-term average, and how it gets there might be abrupt, or it might be gradual, but we identified an F that it would take to do that rebuild in ten years, and so the disconnect, to me, is, okay, so we're going to use these low-recruitment values for our short-term catch projections, and so, to me, that would indicate, to me, that our F should be even more conservative than the Fs required to rebuild long-term, assuming a return to long-term average recruitment, but, yet, these short-term Fs are actually higher than that, and so that's the disconnect that I'm having trouble with.

DR. BUCKEL: Kyle, do you want to speak to that?

DR. SHERTZER: I mean, it's all in the recruitment assumptions, and so, in this scenario, the F of 0.21 is based on the long-term average, and it's not overfishing, and so we're below the overfishing

rate, and, for the stock to return -- In those other projections, that's dependent upon the higher recruitment values, and so I'm not sure that the comparison is apples-to-apples.

I mean, I guess you could -- If you're concerned about the spawning biomass, and you wanted a lower percentage of F 40, then we could adjust the F here, and there is some response of SSB to F, but the larger driver is recruitment, which, as I said before, is out of our control. If you remember, at the review, we did some projections, where we looked at different values of F and different values of recruitment, to sort of tease out part of what -- How much of an effect the fishing rate has compared to the recruitment value, and there's some effect of fishing rate on the spawning biomass.

DR. BUCKEL: Thank you, Kyle. Any other comments on the scamp complex projections? Alexei.

DR. SHAROV: It's clear that we are not in a position of useful information that would enable us to predict recruitment, whether in the short-term or the long-term either, and it's obvious that we cannot calculate the rebuilding timeframe, because of that, and we're not sure whether actually the SSB targets that we currently have, that are the SSB targets, that actually will reflect the population productivity in the future, right, and, I mean, if we're speculating that there is a regime shift, and there is a new level of recruitment that we're apt to see in the next thirty or fifty years or whatever, our SSB MSY will be totally different, and so we learn this in the future.

There is nothing left, in this case, other than, you know, focusing on the level of fishing mortality that we would allow to apply to the stock that would seem to be conservative, and, in that sense, you know, I feel confident in supporting the 75 percent of FMSY, which tells me that, regardless of what is the current, or future, level of the stock productivity, if I'm applying a fishing mortality rate that, on a per-recruit basis, on a per-female basis, is sufficiently conservative, I am leaving a sufficient amount for reproductive purposes, and then it is a conservative approach, regardless of what is the current SSB or MSY for the stock, whether it's changing or increasing or decreasing, and so I think that's why it's a defensible option in this case, and so I would support what we have here.

DR. BUCKEL: Thank you, Alexei. Others? All right. I'm not seeing any other hands, or perplexed looks, and so let's take a ten-minute break, and then we'll move on to the next agenda item, and so we'll meet back at ten o'clock, 10:00 a.m. Thank you.

(Whereupon, a recess was taken.)

DR. BUCKEL: Okay. Thanks for coming back so quickly. Next up is our SEDAR 78: South Atlantic Spanish Mackerel Operational Assessment, and we're going to lead things off with a presentation from Erik Williams, with a review of issues. Thanks, Erik.

## SEDAR 78: SOUTH ATLANTIC SPANISH MACKEREL OPERATIONAL ASSESSMENT

DR. WILLIAMS: Thank you for the opportunity to address the jelly-of-the-month club gift that keeps giving all year long of Spanish mackerel. Where we are -- Well, before I even get to that,

let me sort of preamble where this presentation is coming from, and I may get a little preachy here, and I apologize for that upfront. It is just partly my opinion, and not necessarily the Center's opinion, but I think we need to be careful.

This is an example where we need to be careful to keep in mind what we are doing with the SEDAR process, the SSC process, and the management process. They are processes, and they have structure in place for a reason, and, when we deviate from that structure, we sort of compromise the whole system, in a way, and I would say keep that in mind.

I understand that we have a tendency, especially as scientists, to want to solve problems, and sometimes the process doesn't let you solve those problems in the most timely way that you would like to have them solved, and so I will just leave it at that, but I will add this, being a government employee of twenty-five years, and this is a government process, and government processes are, by nature, slow, but they're intentionally slow. They're intentionally process heavy. What we are doing here is establishing a record. We're establishing both a scientific record and an administrative record to take legal policy action, and so you have to stick to processes when you have those kind of things in operation, and so I will stop there.

With that, I wanted to sort of, in an attempt to correct, or maybe not correct, but to sort of affirm the scientific record for Spanish mackerel, I wanted to go through some things, because, when I look back at the record, I see some concerns about misunderstandings, perhaps, or even statements that maybe were made without full knowledge of certain things, and so I just want to, again, as part of the establishment of that scientific record, I wanted to get a few things sort of into this presentation, just to put that out there.

Where we left off with Spanish mackerel is an SSC workgroup was established to determine what the SSC wanted to have done with this assessment, in order to use it for ABC recommendations, and the items are bulleted here, straight from the sort of SSC workgroup report. I am going to drill down into some of these and sort of summarize this a little bit.

In a nutshell, the issues that were raised were surrounding the MRIP data, the age sampling, the constraints of an operational assessment, the natural mortality, and the fixed steepness value. Drilling into each of those, the MRIP data -- There was concerns brought up about the uncertainty of those estimates, and there was concern about the 2020 and 2021 data points, in terms of imputation, and there was calls for downweighting the 2020 point in the projections, and there was concerns about high PSEs.

Just for the record, I have, in the table here, those MRIP estimates for Spanish mackerel, and what you see in there is that the PSEs are not what I would consider high, or even of concern, and they're all below 25 percent, including both the discards as well as the kept and accounted-for catch. The imputation is actually quite small, and it only occurred in 2020, and there was no imputation in 2021, and the 2020 year, it was mentioned, was a spike year, which it actually isn't, because the 2021 year was even higher.

The age sampling, there was a lot of discussion that the sampling was insufficient, and I'm just going to say that those sample sizes are actually pretty good, compared to a lot of reef fish species, and this is a shorter-lived species, and so those high sample sizes, in theory, have more information, because you have fewer ages that you're filling in for those ages.

The notion that there were constraints of an operational assessment, I would say that the constraints are actually coming from the TORs and the SOWs, which are developed partly by you, and partly by the council, and maybe this is a case where we need to be very careful about studying those terms of reference and SOWs before we approve them, to make sure that we're getting what we want out of a particular assessment. I will say what we did, in an attempt to sort of balance all the needs, is we are constantly -- When we take on an assessment assignment, we're balancing following the TORs and the SOWs, honoring the benchmark decisions that may have been put in place for that assessment, but also trying to modify the model to the latest advancements and the latest science, and also incorporate reviewer recommendations. You can imagine that those are a lot of moving parts, and there is some nuance to, okay, what is the best way to thread that needle, while balancing all of those needs.

Natural mortality, there was a lot of discussion about the likelihood profile for natural mortality, when we tried to estimate it in the model, all pointing to high numbers, and I just wanted to caution that that is -- There is still research to be done to, frankly, answer what a likelihood profile on M can really tell you. When you estimate M within a model, you're making the assumption that everything else is specified correctly in that model, and that's not necessarily the case.

If you profile, you may -- There may be an indication of a better value, in the case of Spanish mackerel, pointing to a higher value, but it also could equally point to a misspecification in the data sources, and an example that I have here is, you know, if the age comp profile suggests a different M, that could be chocked up to a misspecification of selectivity, and so what I would like to caution is, and what is needed in the research world, is a better understanding of what kind of data does lead to a good estimation of M, and that work still needs to be done.

The other thing that I will add is, and this is where my process speech comes in, and I think it was sort of a process foul, so to speak, to start to bring in estimation of M, or bring in sources of new estimation methods for M, that were after the assessment was completed. We need to be careful about doing that, and that almost circles back to my comments yesterday where I said, hey, we've got to be careful about always looking around the corner for the newest, latest piece of information. We have to put this in the context of the process, and the timing of the process, and, yes, there might be some new information that comes along, but we have to be careful about how we go about incorporating that, if we incorporate it at all.

Fixed steepness, and so we have -- We have gone through several iterations of how to deal with a stock-recruit curve, in our stock assessments, when it's not very well estimated. We have gone from fixing steepness to just going with SPR estimates to using, most recently, a mean recruitment model, and then possibly picking a proxy, if needed, and this has been sort of all over the map, if you look at the history of our assessments, and it is a tough one. It is a challenging one, but I will say, in this case, this is not -- You know, when we fixed steepness for Spanish mackerel, it's not much different from what we've done with other stock assessments in the past. It's just not necessarily where we're headed with our most recent assessments.

I would, at this point, encourage that maybe the SSC needs to have a working group on sort of a rubric, or default methods, for what to do when we don't have any information on the stock-recruit relationship, and what is the preferred sort of backup? Do want to just stick with SPR proxies, or do we want to go with fixed steepness, or do we want to -- You know, what do we want to make

assumptions about, and where do we want to fix values, because we -- I feel like, over the years, we've explored it in many different ways in our assessments, and, each time, nobody seems to be happy with it, and so we keep dancing around and trying different methods and get the same response, and so nobody is happy with this, and I get it. It's a tough subject, and it's a tough thing to decide.

The other issue that came up with the fixed steepness for Spanish mackerel was there was the recommendation that we use a recent average recruitment instead of the model-derived recruitment from the stock-recruitment relationship. Well, that was kind of a silly recommendation, when you look at the actual data, and there's really no difference between the mean recruitment and what you might get from the stock-recruit relationship, in terms of recruitment predictions, and so, again, you know, I hope people are, you know, before they make comments, are sort of doing their homework and making sure that their comment sort of makes sense, and that one just didn't make sense, to me, and why that became an issue.

With that, we were asked to make those recommended changes from the SSC workgroup. It was considered at the Center, in terms of the resources that we have, including time constraints, current workload, et cetera, et cetera, and you have the memo in your briefing book to summarize that, basically, the Center recommended that the SSC develop its ABC based on the assessment and supported analyses completed to-date. and so what I included here, just for these last few slides, just to, again, reference, is some of the projections at FMSY, at 75 percent FMSY, and I included the table information, and I will leave it at that.

DR. BUCKEL: Thank you, Erik. Questions for Erik? Kai.

DR. LORENZEN: It's more a comment than a question. On the big scale, I'm a little concerned about the tone of sort of saying that we are somehow subverting the process by asking for more information and asking for revisions, and so I'm not very happy about that, and it feels not right to me.

The second, and let me drill down to one point that you brought up about the natural mortality, in particular, and, in fact, I think -- I have to go back, and I wasn't at the last SSC meeting, and I have to look through, but, actually, what the SSC requested, I think, was looking at alternative M estimators, and the one that was flagged-out was the Then 2015, which was clearly published before this assessment was conducted, and the Hamel and Cope is just a -- It's sort of a correction to the Then estimator, and, yes, that came out at the end of, or the middle of, the last year, but certainly there were more current estimators available at the time, and so, you know, I'm -- I'm not saying that you have to go with this one or that one, but I don't think it's appropriate to, you know, say, well, there's this one study that came out later that people asked about, and, you know, they actually asked about the Then, which was out at the time, and so that doesn't seem, you know, a good argument, to me.

When I look at the mortality estimates, basically, of course, both the Then and the -- Let me not mention the Hamel and Cope, because that was after, but let me take the Then, and that would give you -- For a Tmax of twelve, it would give you an M of 0.5, and even the Hoenig, as we normally use it for the generalized Hoenig, if you like, gives you 0.42, and so, I mean, what I'm seeing is that, when I do look at accepted estimators, they do point us to higher levels of natural mortality than the base assumption, and so probably -- I mean, the high M assumption that we're using in

this assessment is roughly what should probably be the baseline, according to those, and, you know, given that this does have important implications for, you know, the status of the stock, particularly the projections and the ABC determination, I do think that, you know, the SSC is sort of within its purview to make those considerations, and I will stop here. Thanks.

DR. BUCKEL: Thank you, Kai. Other comments, or other questions, for Erik? For my thoughts, I think, in August, when we received it, there were members of the SSC that do stock assessments and had concerns, and those were raised, right, and there was discussion about, instead of just throwing it out, that -- Throwing out the baby with the bathwater, was to try to do some tweaks to it, and to deal with the concerns, M being one of the big ones, and so we didn't have to just say, well, we need to put a research track on the SEDAR schedule and continue moving forward with a data-limited approach that is currently in place, and so that was the hope, that it wouldn't take a huge amount of time to go with a higher M or deal with -- That's why the workgroup was put together, to deal with some of those.

It sounds like that's not a -- What we're hearing from the Center is the -- You can correct me if I'm wrong, Erik, but that asking for what we consider to be slight tweaks to the assessment, or reruns of the assessment, dealing with some of the issues, that that's not something that we should be doing, and just base our recommendation off of what's presented.

DR. WILLIAMS: So it's all -- I hope my slide hammered the point home that this is a balancing act. You know, I would -- To the point about M, I would circle back to the terms of reference, and the SOWs, for this assessment, and it never mentioned, hey, reevaluate natural mortality, and we have been burned in the past, when we did that, when it wasn't in the terms of reference, and then we've had other cases where it was specifically in the terms of reference, and so that's point one.

Point two is Kai correctly points out that natural mortality is a highly-influential parameter. Unfortunately, because it's so highly influential, if you change it, you basically take the assessment back to square one of having the first base run, and then you basically have to redo all of the diagnostics, and it likely will change some of those diagnostics, and it may actually likely change some of your other decisions that you may have made about selectivity parameterizations, et cetera, et cetera, and so it is -- That particular change is a very heavy workload.

Now, other changes might not be as bad, and so I don't want to curtail the idea of making little tweaks to these assessments. What I would say is, ideally, we have a process where all those little tweaks are considered during the process, so that they don't have to be made at the SSC review stage. I mean, maybe that's the issue at-hand, is the process itself. I don't know, but, yes, I mean, I hear everything everybody is saying. All I'm saying is we did the due diligence we could with what we had in-hand, which included potentially flawed statements of work, which included a process that maybe wasn't open to considering something as big as natural mortality, and maybe we should all step back and rethink about this, and it's like, okay, well, what happened with Spanish, and how can we avoid in the future.

The other thing that I will add, just as a -- I don't know if this is a defense for the Center, but the reality is that the Center is, right now, at a very resource-limited spot, in terms of stock assessment data provision and data analysis, et cetera. We are struggling, and we have a high workload, and so that was the other factor that played in on this. I would say, under better conditions, we probably could have accommodated this change.

DR. BUCKEL: Thanks for that extra information, Erik. That's helpful. Kai.

DR. LORENZEN: I want to say, you know, on the positive side, you have looked at a lot of the questions were asked, and, you know, there was -- You did look at the MRIP data, and the additional year, and, you know, how the 2020 data were produced and everything, and so it seems, to me, you know, of the list, the only really significant thing that is left, to me, appears to be the natural mortality question, and I'm wondering whether we are aggravating each other, more than is maybe necessary, over the natural mortality question, because it is -- I mean, it is important, and you obviously did do a run with a higher natural mortality rate, and that's not the base run, and so I guess, you know, all the other diagnostics that you provided are for the base run, but it seems that you have that run in your back pocket, and, you know, I'm wondering, you know, whether this is really something where you have to go back to square one, or you're actually much closer to an answer, if that's what you wanted to pursue.

I totally agree that it's not -- You know, it's not useful, if you have a fairly full-blown, data-rich assessment, to go back to a stone age sort of data-poor method, and I totally agree, but I do think, at the same time, you know, it's important that, you know, we can review, and, where necessary, tweak the analysis that was done, in the data-rich context, but, you know, I'm just wondering whether maybe there is a fairly low-hanging fruit here, and that is, you know, going with something like your upper M estimate, which seems quite reasonable, and, you know, something that would not require a complete redo of the assessment, but would satisfy the concern about the natural mortality rate. Thanks.

DR. BUCKEL: Thanks, Kai. Kai has given us an option to move forward with the data-rich assessment. What do folks -- That's an M of -- The upper M was 0.42, versus the base, which was 0.35. Fred Scharf.

DR. SCHARF: Just to sort of add to what Kai was saying about evidence for supporting the potential for higher natural mortality, you know, and I appreciate the comments that Erik laid out in his slide about how hard it is to interpret those likelihood profiles, right, and so the likelihood profiles pointed to potentially a higher M, but, beyond those, there was the simple life history models, based just on maximum age, that would suggest a higher M, and we also talked about the fact that, just based on the life history strategy of a pelagic species, you know, relative to some of the demersal species that we deal with, in general, there's an expectation that those species have a higher natural mortality than some of the demersal.

Then there was also some empirical evidence, from a closely-related scombrid, that had estimated M, from empirical data, of above 0.5, and so there were lots of pieces of information that were pointing to the fact that Spanish mackerel likely have a higher natural mortality than the base run, which was all reflected in our concerns.

DR. BUCKEL: Thanks, Fred. Others? If there is no other questions for Erik, or comments, we'll address the action items that Judd has up on the left. The first is determine whether the current SEDAR 78 stock assessment is sufficient for providing management advice. You know, the SSC meeting from August, and then the workgroup's -- What the workgroup put together, we've built evidence where we -- Or built advice, right, or recommendations, for improvements to SEDAR 78 that we wanted to see done to provide management advice, and those -- As Erik just pointed out,

the Center is not able to do those, and so I guess there is the current SEDAR 78, as just Erik just provided those.

We have the assessment, and we have the projections in their current form, from the base, and the alternative approach that Kai has put on the table is using the upper sensitivity run, the M equals 0.42, instead of the base M equals 0.35, and so I would like to get some discussion on that, and, Judd, did you have some slides that you wanted to --

DR. CURTIS: Yes, and I wanted to go through just a couple of slides, just to kind of rehash where we're at, to help frame this discussion, I think, and so we've got -- The timeline that Erik just provided of what the Science Center action was, and we came up with the recommendations from the working group, and so I presented a little bit of this, kind of thinking ahead, in our January webinar, and I just wanted to rehash a couple of slides and tell you where we're at right now.

As far as what the current ABC is for Spanish mackerel, and so this is coming still out of SEDAR 28, which was last accomplished in 2012, using the ABC Control Rule from CMP Amendment 18, developed in 2011, is how we generated ABCs for Spanish right now, and, in this case, with the assessment, the SSC deviated from the ABC Control Rule and did recommend using the third-highest landings from 1999 to 2008 as the ABC. Note that these are still in MRIP-CHTS units.

Since then, we've had some discussion stating that, you know, the third-highest landings are not necessarily considered BSIA, and we've gotten the letter from the Center as well, indicating that, as well as some other data-limited methods would not be sufficient, in lieu of the stock assessment, in its current form, as consistent with BSIA.

We went through the operational assessment, and so we are charged with still setting an ABC, however the committee decides to pursue this, and so the three options -- Really, that was laid out in January, and they still apply now, except we don't have a revised assessment, as was anticipated, and so we have just the old SEDAR 78 that could be accepted, using stock status from the assessment, apply the ABC Control Rule, and use the projections coming out of the assessment for generating ABCs.

A second option would be we could partially accept the assessment, and so, again, this is not throwing the baby out with the bathwater, but you can use the stock for -- Or use the assessment for a determination of stock status, and the second step would be a deviation from the ABC Control Rule, where you're using an alternate method to set ABCs, and that might include something like the third-highest landings, equilibrium optimum yield, or the yield at 75 percent FMSY, which are outputs, model outputs, from the assessment, or, if there's enough concern with the assessment, in its current form, the current assessment could be rejected, in which case we would fall back to NOAA-NMFS Procedure 01-101-11, which is included in your briefing book, on what the procedure would be when an assessment gets rejected, and it falls back to the previous assessment.

If that's determined to be not suitable, then our stock status could possibly become -- We would still need to come up with an ABC, through an alternate method, which would be a deviation from the ABC Control Rule as well, and so these are kind of the three options that I just wanted to put on the table, to help frame the discussion, and so keep this in mind, as well as Erik's presentation as well, as we kind of formulate our discussions and determine our action items, which are in the overview.

DR. BUCKEL: Thanks for that, Judd. That's helpful, and so some other options than what I had laid out for that first bullet. If you could keep that -- The previous one, and we've got the actions on the left, but those different ways of setting ABCs. Added into this list would be Kai's recommendation, or option, of accepting the stock status from SEDAR 78, but developing an ABC from that sensitivity run with the higher M. I would like to get some discussion on how folks are feeling, or thinking, on these ways to move forward with Spanish mackerel. Marcel.

DR. REICHERT: I would like to talk a little bit more about Kai's recommendation, and so your suggestion was to use a different M for the projections or -- Maybe I misunderstood what you're proposing.

DR. LORENZEN: No, and I was proposing to basically -- Well, I hadn't thought about in that -- What I was essentially proposing is that we use the high sensitivity run as the base, which would mean, you know, that should be the basis for both the stock status determination and for the projections, which would mean you would -- It would involve a revision, in a sense, but it would be a revision where the run has already been produced, and so you would say, well, that's -- There may be some additional, you know, analyses that have to be done on that run, but at least -- I mean, in principle, that run has been done.

I wasn't thinking of splitting this up, and I think it would maybe be a strange precedent to say that, you know, we're using one M for the stock status determination and a different M for the projections, but it was -- The thought was that the 0.42 is still sort of at the lower end of what you would get out of the Then and the Hamel and Cope, but it's not that much lower, and it's actually what would you would get out of the traditional Hoenig, if you don't do the fish-only version, and so it would be quite consistent with what we've done in other assessments, and I think it's more realistic than the base run value, and that's the thinking.

DR. REICHERT: But that would require some additional work, and maybe not a lot, and the reason that I'm very specific about this is because -- Although I realize that it's not changing the decision we have to make, but I was part of the working group, and I think, when we had discussions, we -- I think we were very careful, in terms of potential workload, and so, you know, the letter clearly indicated that it was very difficult, or impossible, to add those analyses, and so I'm wondering if that is still the case, if we are recommending -- Or if we are following your recommendation, and so that may be a question for Erik, in terms of what that would require, because, potentially, we've been down this path with the working group, and so that's -- Anyway.

DR. LORENZEN: Yes, and so the idea was, I mean, to shoot for that particular run, is that it's already been run, right, and so you probably need to do the simulation thing, about the stock status, and you need to produce new projections, but it seems less arduous than exploring other natural mortality rates, and so that was my thinking. Thanks.

DR. BUCKEL: Thanks. Go ahead, Erik.

DR. WILLIAMS: Just to clarify, a sensitivity run is not an alternate run, and a sensitivity run is where we just run the base model with no stochasticity, no MCBE analysis, no projections, none of that stuff, and we don't even examine the diagnostics, and so that's the difference. It's not an alternate run, and it's not like we could pull it off the shelf, and it would literally be the same thing

as taking -- As rerunning the whole assessment with a new M value, because you still want to look at the diagnostics, and you wouldn't want to not look at those, and we would still have to then run the MCBE, and we would have to make new decisions about the variability around M that we would apply in that MCBE process. Then we would have to run the projection analyses off of those MCBEs, and I hate to say it, but it's a lengthy process, and that's why these assessments take a lot of time.

DR. BUCKEL: Marcel.

DR. REICHERT: I was afraid that that was going to be the case, based on what we discussed during the working group, and then the resulting letter from the Science Center, and that's where we are now, and I was trying to think back where we ended up in the previous SSC meeting, because, basically, in essence, other than some clarification that Erik provided, and I appreciated that, as well as his efforts to put things in perspective, we are basically back to where we were in terms of the information at the last meeting, because we don't have additional information. I like Kai's idea, but that was exactly one of the recommendations, or one of the suggestions, that came out of the working group, but I'm struggling with where we are and where to move from here.

DR. BUCKEL: Amy.

DR. SCHUELLER: I also just wanted to note that the MCBE analysis that was done for the base run does include uncertainty in the natural mortality, and I was trying to remember what it looks like, and so I pulled up the assessment report document, and it's a truncated normal distribution with a range from 0.30 to 0.42, with a mean equal to the point estimate, which is what we would expect, and so, I mean, there is some acknowledgment of uncertainty in natural mortality, given the range that was specified, and I'm just putting that on the table.

DR. REICHERT: Can you remind us, since you looked that up, what the PDF --

DR. SCHUELLER: It is A06b, from our briefing book, and I'm on PDF page 78, under Section 3.29, for natural mortality under the MCBE.

DR. REICHERT: Thank you.

DR. BUCKEL: Fred Scharf.

DR. SCHARF: We also talked, last time, right, about the option of -- You know, the stock status from the assessment is not overfished, and not overfishing, and so we talked about using, you know, the assessment results for stock status, but not using the projections to set ABCs, and is that -- Am I recalling that correctly, that we don't have to use the projections to set ABCs?

UNIDENTIFIED: (The comment is not audible on the recording.)

DR. SCHARF: Right, and those alternative options, where we set the yield at 75 percent of FMSY, based on the stock status at the terminal year of the assessment, and is that what that would refer to?

DR. CURTIS: Fred, yes, that's correct, and one of the guidance documents coming from NOAA specifies how the termination of being consistent with BSIA is applied, and it is appropriate, and outlined in that document, that you can have stock status be consistent with BSIA, but not necessarily have to use the projections that come with -- Use derived ABCs from an alternate method.

DR. BUCKEL: John Carmichael is coming to the table. Thanks, John.

MR. CARMICHAEL: Thanks, Jeff, and the question I think is for Erik, and so, if you went with what's in the green box, is there enough information in the sensitivity table with the high M run to basically determine status and then set -- You certainly can set the FMSY, and you can determine status, and then you would have to maybe use the equilibrium OY, or 75 percent of FMSY, to set for an ABC level, which you may do until the next assessment, and that would probably take some sort of calculation, but I would assume, if you have an FMSY calculation, can you also do the 75 percent without going through the full MCBE and all the other inputs, because, you know, I feel like, with that information being in there, and this being an option, it is something that I anticipate we would be asked.

DR. WILLIAMS: The answer is, again, a sensitivity run is not an alternate run, and it does not have -- We don't examine the diagnostics on those sensitivity runs, and we don't look at whether there were fit characteristics that we would deem unreasonable or not, and it's just to see the model's sort of reaction to a change in a particular feature, right, and so I would hate to see us then basically blindly assume, which is I think what you're asking, is use that run without looking at the diagnostics, without doing the due diligence of confirming that the run, you know, is a solid run, and that's -- Yes, that's risky.

MR. CARMICHAEL: Right, and so you're saying there could be things in there that are kind of -- If you looked at it as a candidate, and went through all the evaluations, you would say, oh, this is a blowup, and it's not really looking right, and you're just looking at it to say is status sensitive to this, and how does this affect say the estimate of yield, like the MSY, and it's sort of directionality in what you think it's doing, but there is a concern that there could be things lurking in that that create other problems that you're just kind of blind to, just by looking at that table.

DR. WILLIAMS: Correct.

DR. BUCKEL: Thanks, John, and thanks, Erik, and so that leaves us with the left box, right, to accept it for stock status and use for projections, to set our ABC, and all the boxes that are up there are still on the table. Alexei, you had your hand up earlier. No? Okay. Fred Scharf.

DR. SCHARF: So do we know what the -- If we opted for the middle box, where we're not using the projections, right, and so, you know, the projections end up, you know, lowering -- If we go with FMSY, for instance, or 75 percent of FMSY, you know, the F goes from 0.18, or one, down to 0.3 or 0.4, but, if we don't use the projections, and we just look at the terminal year, and look at F of 75 percent of FMSY, what does the ABC look like? Can you do that?

DR. CURTIS: I'm going to bring that one up right now.

DR. BUCKEL: Amy, to that point?

DR. SCHUELLER: I don't understand how that solves the concern about natural mortality, and so natural mortality, under both the red or green option in the base run, is going to be the same. I think we've had a discussion that we're not using this higher M value, because we don't actually know if that run would, you know, pass the kick-the-tire test, and sometimes those sensitivity runs, like the Hessian inverts with a convergence criteria, aren't great, or whatever, and we haven't investigated that enough to say yes, and so, I mean, basically, if we choose the red box, and we use the projections, we're saying we're sticking with the natural mortality, as much as we're uncertain and uncomfortable about that, but we're acknowledging some uncertainty in natural mortality, through the MCBE runs, which are then reflected in the projections, but, if we take the green box, we're saying, no, we're going to use 0.35, and then we're going to use some other metric that doesn't include any uncertainty in natural mortality, and so it just seems -- I guess I'm confused about the logic with that choice.

DR. SCHARF: Let me address that, and other people that were here can correct me if I'm wrong, but the concern about the using the projections didn't have anything to do with M, and it had to do with those MRIP landings, right, and so the MRIP landings, in the projections, caused the F to go off the charts, and, despite all of the diagnostics that Erik presented that the MRIP folks provided, I remember, from our last meeting, that we asked them several specific questions, particularly about those landings coming from the shore-based mode, and, if I recall correctly, we didn't feel that those answers were very satisfactory, and we still weren't comfortable with where those numbers were coming from. That was when we discussed the idea of potentially setting the ABCs not using the projections, and it wasn't based on the M. It was based on those MRIP data.

DR. BUCKEL: That's correct.

DR. LORENZEN: So it reduces the influence of those landings on the ABC, right?

DR. SCHUELLER: So do we still feel that way, given the information on Slide 4 on the PSEs associated with those values and the addition of the 2022 value?

DR. BUCKEL: That goes to all SSC members and not just Fred. Thanks, Amy, for that question. Go ahead, Fred Scharf.

DR. SCHARF: Just my thought is I think, one, I think that the 2022 -- It's nice to see that extra year of data, and see the landings estimates sort of returning to sort of pre-COVID levels, and so I do think that the 2020 and 2021 data are accurate in reflecting an uptick related to COVID, and we see that across-the-board everywhere, and so I don't doubt that there is some increase there in the Spanish mackerel catch, but I still have some heartburn about all of it being -- Almost all of that increase is in the shore-based mode, which doesn't match what you see when we talk to folks on the water about where they're catching Spanish mackerel.

DR. BUCKEL: Chip or Judd can chime-in, but I think the PSEs, when you break down to those levels, and like that PSE on the shore was really -- That was high, and it was part of the discussion with the high PSEs, but I could be remembering that incorrectly, and so if Chip or Judd -- Chip says he hasn't looked at it recently, and so -- Okay. I would like to get more members of the SSC to weigh-in on this. It's an important decision, and we've just heard from a couple of folks. There seems to be a good indication -- Go ahead, Marcel.

DR. REICHERT: Well, I agree with Amy. Irrespective of what box we're choosing, I think we need to be very careful, in terms of justifying why we're doing that, and I agree that, you know, the source of the shore mode -- There may still be concern, but, in terms of the overall patterns in landings, that seems like, you know, it's reasonable, in terms of our belief in that particular data point, or at least that's my opinion.

I think what I -- That goes back to probably our previous conversations, or previous discussions, in terms of what were our main concerns for the stock assessment, and we laid it out in the working group, and Erik has the bullet points in his presentation, and so my question is, and I'm struggling with that a little bit, is are those points still concerning enough to say that we need to move from the red box to the green box, and I think that may be a helpful starting point for our discussions. Anyway, that's just to get us maybe off the kind of a stalling point at the moment.

DR. BUCKEL: All right, and so Marcel would like some discussion on the moving from red to green, and I will throw out another one for discussion, which is it seems there is -- Several members have pointed out that the M seems -- The M in the base is biased low, and that M is affecting both the projections in the red box, and it's also affecting equilibrium OY, or yield at 75 percent FMSY in the green box, and so, if we -- If folks feel strongly about the M being biased low, it has a big effect on this assessment, if you look at the sensitivity, and that may cross out the red and the green box. Alexei.

DR. SHAROV: Well, I understand the request that the consideration of what is the likely level of natural mortality is important, particularly if there is some indication that it might be higher than what was used in the assessment as the base run. It is an important decision, and I think there is a difference between -- There is some indication, by applying the most recent methods, the methods that are considered to be sort of the most popular, or most frequently used, or continue the most recent information, whatever you term them, and it's important to have a clear decision whether we are convinced that there is sufficient evidence that the natural mortality is higher than what is used, and, therefore, we're confident that the calculations should be redone using the alternative, or, at least in this case, updating the estimate, and I would like to ask the SSC if we believe so, and that is I don't think that we have any discussion, or analysis, specifically with looking into this in detail, that would allow us to conclude that, yes, the natural mortality for Spanish mackerel is more likely to be higher, and we will accept the such-and-such estimate that comes out of such-and-such analysis.

Right now, based on what we have, it's too preliminary to switch to the high level of natural mortality, which I agree that it is likely that that's the case, but we have not explored this sufficiently to make that decision. Therefore, I would agree with Dr. Williams that what we have in the current assessment is the best information, best scientific information, because what's done will provide rigor and detail, and so we shouldn't be running up to every single potential advancement that has happened since the assessment has been completed, and so I guess I am arguing using the assessment results as they stand.

DR. BUCKEL: Thank you, Alexei. Others? Anne.

MS. LANGE: I agree with Alexei, and I think we can just state, you know, that we hope that more exploration will be done on the issues with M in the future, but I think that, you know, again, due

diligence was done by the Center. We had questions, but I don't think -- As he said, we don't have enough specifics on why we're concerned about M, and so I think we can go forward with what we have, would be my suggestion.

DR. BUCKEL: Thanks, Anne, and members of the workgroup can provide -- I think that workgroup did do research on M, and so they can provide a response to Alexei and Anne, if they would like. Eric.

DR. JOHNSON: Right, and so the workgroup did do a fair amount of looking into M, based on congeners to a variety of other ways of doing that, all sorts of things, including the Hamel and Cope, which came up with, you know, a bit higher of an estimate as well. I guess the question being is, if the assessment was run today, would we use Hamel and Cope, or would we use another one, and I guess you can't always go backwards and be redoing things, but that's sort of where we stand. There is, I think, sufficient evidence that supports the fact that it might be higher, but, again, you know, we don't have all that information.

DR. BUCKEL: Thanks, Eric. Marcel.

DR. REICHERT: In the report, we had the table that shows the natural mortalities, and that included the Hamel and Cope, but I completely agree that, at some point, you have an endpoint, and you -- Yes, for next time, you add new information, but, otherwise, you are continuously adding new information that were not available previously, and so there is some information there, and I am reading from that report, because I think that's going back to the decision that we need to make today.

In SEDAR 78, there is concern that M is not estimable, and reasonable likelihood profiles show that M wants to be higher, and then hits the bounds, and so my question, for the SSC, is, at the time, we extensively discussed this, and there was concern about the used estimate of M, and what I'm hearing now is that perhaps the value that was used in the stock assessment is acceptable for the SSC, which I'm comfortable with, but I think it's important to indicate that the concern that we raised, and extensively discussed earlier, that we are currently comfortable with that, and that it's an issue that potentially should be explored in the next assessment, because, at some point, we were concerned, and now we are not, and so I think it's important, for the justification, and for the reporting, for me, and I am making notes, to get some clarification, in terms of whether that is indeed correct. We were concerned, and, with a little extra information, or whatnot, we are -- That concern is no longer severe enough for us to move from the red to the green column.

DR. BUCKEL: Kai.

DR. LORENZEN: I am just wondering if you can explain that a bit more, why is your concern alleviated.

DR. REICHERT: Well, because the reason we are where we are is because natural mortality was one of the concerns that -- It was significant enough to form a working group that then discussed with, I think, careful consideration of potential workloads that we understood at the time, hoping that we would get some additional information that would alleviate some of those concerns, and so, if we are accepting the assessment, that means that there may still be some of those concerns,

but they are not severe enough for us to move our verdict on the assessment from the red to the green or to the purple. Do you know what I am trying to say here?

DR. LORENZEN: No.

DR. REICHERT: At some point, we were all concerned enough to form a working group, and now we are not.

DR. LORENZEN: But it seems to me that what has happened is not that your concern has been alleviated, but you are begrudgingly accepting the workload constraint, which is different.

DR. REICHERT: I think it's important that we say that that's the case.

DR. BUCKEL: Yes, and the alternative is we had issues, and we were not willing to accept it, and we asked for changes, and those weren't made, and so we could go back to that it hasn't been changed, and so we still have those issues with the assessment, and not, as Kai used the word, begrudgingly. Go ahead, Kai.

DR. LORENZEN: So, if we accept that we cannot get a revision on this assessment, then the concern about the natural mortality rate is that it implies that our projections are going to be very sensitive to, you know, those high catches in the last years, whereas, if we were using the natural mortality rate, or a natural mortality rate, that we feel is more appropriate, those catches would not have the same level of impact.

Now we are told we cannot get a revision of the assessment, and, to my mind, that would put us into the green box, because I think we -- You know, it's not quite the right thing to do, but it's -- You know, it's a workaround, really, to address the concern that we have, without being able to actually get projections that we feel would be more appropriate.

DR. BUCKEL: Thanks, Kai. Amy.

DR. SCHUELLER: So I've been turning this, in my head, around basically the scientific certainty, and so we're basically acknowledging that we have two scientific uncertainties here, natural mortality and then the MRIP, or the recreational, landings towards the end of the time period. In -- Because we keep using red box and green box, but, in the red box, we are doing some MCBE analyses, which are then used in the projections that acknowledge both the uncertainty in the natural mortality and the uncertainty in the landings, given the way it's configured.

If we move to the green box, we are saying we are not using the uncertainty in either of those, and we're saying we know the natural mortality is 0.35, right, which is like what we're saying we are pretty uncertain about, and then we're going to use some other metric, because we're extremely worried about the landings values at the end of the time series, and so, for me, I'm like which one is acknowledging our scientific uncertainty better, and I know which one I think that is, but I'm just, you know, putting this on the table for people to think about, because it isn't as straightforward as I think we might be thinking about it, because the methods are different, and the acknowledgements are different for the uncertainty levels.

DR. BUCKEL: So, Amy, the uncertainty in the M is not captured in like the yield at 75 percent FMSY calculation?

DR. SCHUELLER: Not if we're just using the base run, and then we're going to get one number for 75 percent of FMSY. If that's what the proposal is on the table, no. We're saying M is 0.35, and we have a problem with the MRIP landings, and so we're going to just pick this number.

DR. BUCKEL: Others? Anne.

MS. MARKWITH: So this kind of goes to the issue with the MRIP landings, and I just dumped some data from our database, looking at our gillnet program, and we actually saw increases in Spanish the same years that the shore-based mode went up, and I think something we need to keep in mind is, during those years -- 2020 is probably an artifact more of COVID than anything else, but 2021, and even 2022, if we see an increased landings there, the salinity regime has been much different, because we've been in drought years in the South Atlantic, and so we're seeing higher salinities in the river systems, and we're seeing mackerel where they may not necessarily have occurred before, and so those landings could actually be true of the fishery right now, and so I'm not sure that's as big of a concern as we're making it. It's still slightly concerning, but it may not be as big of a concern, and so that's kind of all I wanted to say about that.

DR. BUCKEL: Thanks, Anne. Others? Alexei.

DR. SHAROV: Just one -- I don't know if it's going to help in any way, but I'm still thinking, and we're mostly focused on alternative values of natural mortality in this discussion, and we haven't spent much time on the uncertainty with the MRIP estimates for the two years, but the difference between using the M in the base run and the higher level is -- Just for discussion, there is some indication that the M would be higher, and, therefore, there is a suggestion of using the higher value, but we're not totally certain about this, and so, whether there is -- Going with the lower level of fishing mortality, if we are wrong, we are going to end up with some foregone yield.

Turning it in the other direction, if we are going with an M of 0.42, but it's actually lower, then we're being more risk-prone, rather than risk-averse, right, and so, considering that the current level used in the assessment sort of contributed to all elements of the assessment, and that is that everything that's been done has been analyzed assuming that this value, and the level of uncertainty around it, that -- The results of the assessment would at least lead to the more risk-averse calculations of ABC, right, and we have two choices, the lower and the higher M, and so it would seem to have a more -- If we want to stay risk-averse, right, and we have more justification, because we have an analysis for the M that was used in the base run, as opposed to the alternative higher M, for which the results have not been analyzed in detail, and the only risk that it carries is some foregone yield, right, and so those are the two choices that we have to make for this.

DR. BUCKEL: Related to that, we've been working with third-highest landings, and that's been what's in place in SEDAR 28, and the stock status has remained in good shape, and, if we go with these projections, it's going to take these landings and drop them quite a bit, and I think it was a 40 percent reduction, and is that right? So that's another thing to -- You know, it would definitely be risk-averse, Alexei, but is it warranted, given that we've been at this third-highest landings, and we haven't seen a change in stock status? Marcel.

DR. REICHERT: Wasn't that method deemed not best science?

DR. BUCKEL: I'm just saying that if -- I am not saying to use that, moving forward, but that's what has been in place, that ABC level, and it's going to change.

DR. LORENZEN: Yes, that's not best science, but we were also told that we cannot do best science, because of workload considerations.

DR. BUCKEL: Fred Scharf.

DR. SCHARF: I still -- You know, I keep trying to come back to the spirit of what this committee is supposed to do, and what it's supposed to represent, you know, and so I understand the operational assessment, and the terms of reference, and what was done, and I don't have any questions about any of that, you know, and the assessment was done well, and we have uncertainty and all of these things, but, at the same time, you know, we're -- I'm not an assessment scientist, right, and, I mean, I have a basic understanding of how they function, and I'm learning more all the time, mostly being a member of this committee, but, as a biologist, as someone who has studied natural mortality in fish populations, and also knowing, you know, how that fleet has behaved, it's hard for me to accept the assessment moving forward, when we have information -- You know, we're about to say this assessment is BSIA, when it includes a natural morality rate for Spanish mackerel rate that's lower than the natural mortality rate that we're about to accept for black sea bass, right, and, as a fisheries ecologist, that just doesn't make any sense to me.

There's just so much information that points to a higher M for scombrids, and so -- Again, you know, despite the good point that Anne brought up about some increasing, you know, salinity in the rivers, and the coastal zones, I still have a hard time sort of swallowing the MRIP increase in the shore-based landings in 2020 and 2021, at the magnitude that they're at, and we're about to make a decision to say we're going to accept this and base our ABCs on projections that are going to lower the harvest rate by 40 percent, when we -- When the stock currently is not overfished, and overfishing isn't occurring, and so, yes, I don't know what else to say.

DR. LORENZEN: I continue to have an issue with this idea that we cannot do anything more, because of the workload limitations, and, I mean, I can see that there are workload limitations, but I also feel that -- I mean, we are charged with reviewing these assessments, and, you know, looking at revisions, and certainly most of my experience has been in the Gulf, and not in the South Atlantic, and, you know, we had lots of assessments that got kicked back and forth, sort of multiple times, and sometimes you need that, and you cannot possibly anticipate all the issues that may come up at the time when you set the terms of reference for an assessment, for example.

Yes, in hindsight, I think it would have been a good idea to say, well, should we, you know, review information on the natural mortality rate, but then, also, probably, at that stage, people would have said, yes, but this is an operational, and you shouldn't be, you know, looking at all of these things, and, I mean, we're doing our best, I think, to grapple with the information that we have in front of us, and it does concern me that then we're basically told that, no, but you can't ask for anything more, because we just don't have the capacity, and I think it's a fundamental problem, and, if I look at that, you know, into the future, then the question is so what is the role of the SSC?

Do we just have to take whatever we're given and say, okay, now let's determine the ABC, and so I don't know what the answer is, but I'm concerned, and I think, you know, the council looks to us to exercise independent critical review of these things, and it seems, to me, that we're being constrained in how much of that we can do, and I think that is a problem.

DR. BUCKEL: Thank you, Kai. So we've got different things. Alexei and Anne have weighed-in that they would be okay with moving forward with accepting the stock status from SEDAR 78, and determine an ABC from the projections, and others are concerned about the initial things that were brought up in the August meeting, that that's still an issue, and it's hard to move forward with SEDAR 78 to set ABCs, or determine stock status, given that. We need to hear from some others, so we can develop a consensus. Did I see a hand? Please, others that haven't weighed-in.

DR. FLOWERS: I think I'm kind of in the boat with Fred and Kai. I mean, we kind of identified issues, and asked for addressing, but these issues still haven't been addressed, or concerns, and so, I mean, in a very strict sense, it kind of leads down maybe a pathway of non-acceptance, but, you know, I get trying to get something out of it. The one thing I think of is, if we do assume that natural mortality is higher, you know, much higher, and it's mis-specified, that this is a stable model that's mis-specified, then, you know, what changes could actually occur, you know, if mortality is higher and corrected, and that model is stable? It's almost like you have a steady state in this one low-mortality phase, but is it going to be drastically different at a higher phase, and, I mean, that's also kind of something to think about.

DR. BUCKEL: Thanks, Jared. We need to hear from some others, please. Eric Johnson and then Fred Scharf.

DR. JOHNSON: Thank you. You know, as part of the workgroup, we did consider a lot of the workload issues, as we went through all of the things, what would make a large difference versus the workload, and we got rid of a number of things, and natural mortality was not one of those, and I think there's -- I have a fair amount of concern that natural mortality is higher, that at least that's where it's going.

I don't know -- You know, like I said, if this assessment was run today, would they use a different estimate of M, knowing what we know now, and I know you can't always go back, and you will never get anywhere forward, if you're continually trying to revise based on the newest information that's out there that are there, but I think, given the concerns that I had last time, obviously, moving forward with that estimate would have been the best-case scenario, and we didn't get it, and so where are standing now, and I'm not sure that I'm --

DR. BUCKEL: I mean, you were the one that brought that up in August, and had the congeners, other mackerels, that had the higher M, and so, yes, that was August of last year. Fred Scharf.

DR. SCHARF: Just a plea that we settle this today, and I woke up at four o'clock in the morning with Spanish mackerel swimming around my hotel room, and I just don't want to have Spanish mackerel dreams anymore, and so we've been talking about this for a long time, and, again, if the consensus of the committee is to accept SEDAR 78, and use those projections to make ABCs, I'm okay to go along with that, but I just would like to hear from other folks, just which way they're leaning.

DR. CURTIS: Just to reemphasize what Fred just stated, the council really needs an ABC recommendation, and a stock status recommendation, from the SSC coming out of this meeting for their June council meeting.

DR. BUCKEL: Alexei.

DR. SHAROV: It seems to me that maybe first the SSC can try to see if there is a consensus about the higher level of natural mortality to be accepted and compared to what was used in SEDAR 78. If there is a consensus that the natural mortality is higher, and it is important, then -- If you reach consensus on this, then the next step is how do you do the projections, or do you have to rerun the assessment, and ask specifically the analysts to rerun it just with this new number, or what else, and maybe that will help, as a starting point.

DR. BUCKEL: Yes, and we've done that, right, and we had a workgroup that recommended that a higher M be used, and the Center said that, due to workload issues, they can't do that, Alexei, and then we asked about using the higher sensitivity value, and Erik -- That's also -- It still is the same workload, because they have to check all the model diagnostics, and so that's not going to happen, from the Center's response. Kai.

DR. LORENZEN: Which, again, lands me in the green box, because we said, well, we believe the natural mortality rate is probably higher, and that should be implemented, and we were told we cannot do that, and so the green box is sort of taking care of the concern we have about the sensitivity of the assessment to those high catches that we cannot -- If we cannot revise the natural mortality rate, then, you know, the only way to sort of account for that issue is to go to a different projection approach, or, well, ABC determination approach, which I cringe mightily at doing that, but I also cannot, for the life of me, go to the red box.

DR. BUCKEL: Thanks, Kai, and several others have -- I am in agreement with that, and going to the red box is a hard one for me, but we have had others say that they're okay with that, and so we just need to -- The SSC, our SSC, works on consensus, and so we all need to figure out the way forward, so Fred isn't dreaming about Spanish mackerel tonight. Dustin.

MR. ADDIS: I have pretty much agreed with everything that Kai has said today about Spanish mackerel. I cringe equally about each box, the red and the green, but I tend to find myself in the green box, and I'm not happy about it, but that's where I'm at.

DR. BUCKEL: Thanks, Dustin. Anne.

MS. MARKWITH: So I think I'm kind of along the same lines as Dustin, and I'm not sure this is a -- It's a hard choice, regardless of how you look at it, but I think, because the assessment is BSIA, for what it was, but knowing that there might be some issues with the projections, I think, particularly because of the high M, I'm probably more along the green box, solidly in the green box, than the red, to accept the assessment for what it is, but understanding that we need to do something else for the ABCs.

DR. BUCKEL: Yes, accept it for the stock status determination.

MS. MARKWITH: Yes.

DR. BUCKEL: Got it. Thanks, Anne. Fred Scharf.

DR. SCHARF: I also think that, if we do move toward using an approach in the green box for this, it helps -- It acknowledges some of the things that Eric said about issues that we're going to have to deal with moving forward, about how to make sure that, if we do an operational assessment, that we remove some of those constraints, and that's not an easy thing to do, it seems like, right, because it's easy to open that box, and then the box gets really big, right, and it's not an operational anymore, and but I think that, in the future, just -- I don't know when we're going to get to that, to those discussions more broadly about how to set up those terms of reference for an operational assessment, to make sure that we can include some new information, but I think the use of the green box sort of highlights many of the things that Eric already brought up.

DR. BUCKEL: Thanks, Fred.

MR. GRIMES: Can I chime-in, real quick, please, with a question?

DR. BUCKEL: Please, Shep. Chime-in.

MR. GRIMES: Okay, and so, just looking at this -- I mean, putting aside the assessment, the accept or reject the assessment, right, and then looking at the different boxes, and the tittle of the slide, right, is "Setting ABCs", and so, regardless of whatever issues you've identified with the assessment, when you're moving forward to set ABCs, what's the better approach to set the ABC? If you're going to use the third-highest landings, and I can remember discussion, at a lot of past SSC meetings, that some of these alternatives methods that are in the control rule, and have been used, have not done well, performed well, in analysis looking at those, and so part of, it seems to me, the best available decision with this will be deciding what the best means of recommending ABC is, focusing on that, if it's possible to, a little bit separate from the issues that may lie in the assessment. Thank you, and I just wanted to raise that for consideration, and maybe some discussion. Thank you.

DR. BUCKEL: Thanks, Shep. If we go with the green box, we'll definitely have discussion on that. Chris.

DR. DUMAS: I would just like to say that I think that the operational assessment was done very well, and I agree with Amy's points on that, but I feel like the role of the operational assessment is to help inform the SSC, but that's not necessarily the only form of information that we can consider, and that there was significant concern, by members of the SSC, who hold the most knowledge about natural mortality -- That there was a concern with that in the operational assessment, and then, also, we formed a workgroup, and, after the workgroup's work, they also continued to have concern about natural mortality, and so I think that that's something that -- That would put me in the green box.

Another reason for that is that I can well envision a situation where, perhaps for a different species, a different point in time, we had an operational assessment, and there are always going to be some uncertainties within the operational assessment, but they would not rise to the level that would cause us to question the results to the extent that we are at this point in time, for this particular operational assessment.

I can see, you know, thinking that, yes, there's always some uncertainty in natural mortality, but I can envision there would be other operational assessments where we wouldn't have the biologists, who have the most knowledge of that, rising to say we have a serious concern about what we found in the operational assessment, and that's what is happening here today, and so, given that my background is not as a biologist about natural mortality, but as an economist, and a stats person, I would defer to those folks on the SSC who have the most knowledge about that, and I hear them when they say they've got a lot of concern, based on their experience, and their knowledge, and so that would put me in the green box. Thank you.

DR. BUCKEL: Amy.

DR. SCHUELLER: I actually have no idea where I'm at, in the boxes or anything, and I have a question. What is the current ABC? I know we keep saying it's the third-highest landings, but what's the number? It's not that I want to pick ABCs based on numbers, but it's not comparable, and so the statement of we're reducing 40 percent -- I mean, we need to be talking about apples and apples, and not apples and oranges, and so I get concerned when there's statements like we're reducing landings by 40 percent, and can you explain?

DR. COLLIER: Well, I think what Fred is looking at, as far as comparing landings of 40 percent, that is current catch value that was like earlier in the projections, or in the recent time series, and not necessarily the ACL values. The ACL values are in the Coastal Household Telephone Survey, which are not necessarily comparable to FES units.

DR. SCHUELLER: But don't we have an FES time series that we would then compute the third-highest landings value for, and what would that number be?

DR. COLLIER: If you were to convert using the 1999 to 2008, from the previous -- Using FES values, that comes out to be, I think, 7,80,006 pounds, somewhere in there, and I think it was a 2021 catch estimate, is what it would -- Sorry. The 2001 catch estimate is what would be used in the third-highest, and that's in the SEDAR 78 assessment.

DR. BUCKEL: That's just recreational, right, and the ABC was developed for the combined?

DR. COLLIER: That would be the combined value. I added all the landings that were in that table to get the 2001.

DR. BUCKEL: So FES plus commercial?

DR. COLLIER: Yes.

DR. BUCKEL: Thanks.

DR. SCHUELLER: So 7,806,000 approximately? Okay. I am staring at a briefing book A06b, PDF page 109, which is Table 22, which is the status indicators, benchmarks, and related quantities for the base run of the assessment, and that's why I wanted that number, if it's 7,806,000, and we're looking at equilibrium landings at 85 percent MSY, 75 percent MSY, and 65 percent MSY, they range from 8149 to 7807, and so just -- I was turning over, in my head, this statement of a 40

percent reduction in landings, but that's not actually valid, if we choose the green box, and I'm just trying to make sure that we're all talking about the same numbers.

DR. BUCKEL: It was the projections, and so, if you look at the projection tables, and Erik has them in his -- It goes from ten-million to four-million.

DR. SCHUELLER: I think I know what I think now then, maybe.

DR. BUCKEL: Tell us, Amy.

DR. SCHUELLER: I can always change my mind, right, based on new evidence, but, I mean, this stock status -- I mean, I think where we're sort of settling in, as a group, if I'm reading the room correctly, is we're landing in the sort of green box, where we're saying we will accept the stock status for this assessment as the best available science, but then we're going to use something else to pick the ABC, and I feel like I'm comfortable with that, because I do think probably the stock is in okay shape, and, you know, we're like super agonizing about this, and I just -- I don't think that we're in like grave danger here anywhere, and so I think that any choice we make is reasonable. What I'm saying is I could buy about anything anybody is selling right now, if they have really good a statement, but I think the stock status is acceptable.

DR. BUCKEL: Thanks, Amy. Marcel.

DR. REICHERT: I agree with Amy, and I was looking at fishing mortality trends, the biomass trends, relative to that, and a clarifying question is though, if we accept the stock status, the overfishing and overfished status, that does heavily rely on the value of M you select, and so, if M is one of the primary concerns -- Do you know what I'm trying to wrap my head around?

DR. BUCKEL: I think so, Marcel. If you go to PDF page 166, where it has the sensitivity, you can see how the stock status -- It's A06b, PDF page 166. I just wanted to point out that, if you went with the higher M, the stock status just gets better, right, and so it's -- The green box, for those that feel that M is higher, the stock status would stay not overfished and overfishing not occurring. Wally.

DR. BUBLEY: Just touching on that, the concerns that this group is having with natural mortality and those catch rates, it's not -- The adjustments they're concerned about wouldn't be pushing it towards the overfished or overfishing status, and so, I mean, as everyone here has been saying, I think we're comfortable with saying the status is -- We're good with that, coming from the assessment, and I think it's just where we stand with projections, moving forward, and I'm glad that Amy came up with that table, because I was basing it off of the same thing that Fred was looking at, where you're talking about a 50 percent reduction, or more, based on those numbers, but, looking at these numbers, by using an alternate ABC approach, it's more palatable.

DR. BUCKEL: Thank you, Wally. It seems that's a direction the group is comfortable with, but Anne.

MS. LANGE: I concur.

DR. BUCKEL: Thank you, Anne, and so then, if that is the direction -- Feel free to chime-in if you're not comfortable with that, but, if it is, then we need to talk about these alternatives for setting ABC, and Judd is bringing up a table, and Chip is coming to the table. Chip, please enlighten us.

DR. COLLIER: Well, I don't know if it's going to be enlightening at all, but we had sent a request to the Science Center, following the SSC's ABC Control Rule, and so, in that ABC Control Rule, it's the older version, and it never adopted ORCS, and so under your first tier is your stock assessment, and the next one under that is DBSRA, the depletion-based -- I can't remember all the acronyms, and then it goes to DCAC, and then the third-highest, and so we had requested those analyses be done.

At the March council meeting, it was presented that the DBSRA and the DCAC would not be provided, and they would not be considered BSIA, in comparison to the stock assessment, the age-based stock assessment, and so that's why we had the third-highest listed, and that was in the ABC Control Rule as a potential option to consider, and that's where we came up with some of those list of options that were there, just providing some background guidance and how we worked through it as staff, trying to get some other ways to get an estimate of ABC for this stock.

DR. BUCKEL: Thanks for working on that in advance, Chip and others. Marcel.

DR. REICHERT: Correct me if I'm wrong, but wasn't the third-highest also deemed being not BSIA?

DR. COLLIER: That's what you guys had said.

DR. BUCKEL: There's been discussion in the SSC, and it's not in a formal document, but just discussion within the SSC that there have been recent analyses that have shown, through simulation, that the third-highest landings isn't --

DR. REICHERT: Okay. I just want to make sure we're not --

DR. BUCKEL: But it has been working for Spanish mackerel, and maybe just by luck. Go ahead, Amy.

DR. SCHUELLER: That's just what I was going to say. I mean, there's been some simulation analyses, that were reviewed, that suggest that that's not a good choice, but that doesn't mean that, on a species basis, that it might not work out for us luckily, because of where we're at, but it just means, in general, that's not the best thing to be doing, if you have no other information. That value, that 7,806,000, I mean -- Chip, are you trying to say that we need to comport with the ABC Control Rule for Spanish mackerel, and, therefore, legally, 7,806,000 would be our number, or are you saying that's just one option that you guys looked at, given what the control rule says?

DR. COLLIER: Yes, and we're just trying to follow the control rule and give values that we could do associated with those. You do not have to follow it. You know, it's up to you guys on when you deviate from the control rule. You just need to justify why you're deviating from it.

DR. BUCKEL: Thank you, Chip, and thanks, Amy, and so the options that were in the green box were yield at 75 percent FMSY, which Judd has in the table there, and I think that's the, and we had it highlighted before, the 8024, and then the other one in the green box was the third-highest landings, and, Chip, thank you for calculating that, and that's the 7806.

DR. LORENZEN: Both are nice numbers.

DR. BUCKEL: Fortunately, they're very similar, and then was there -- I think the other one was the equilibrium optimal yield. Is that -- It's not on this table, right? So we have two in front of us that are very similar, and, Alexei, did you --

DR. SHAROV: Where is this table? I just wanted to look at it in the document, and which document is it in?

DR. CURTIS: It's Table 22 in the stock assessment report.

DR. SHAROV: Thank you.

DR. BUCKEL: It's Attachment 6b. Fred Serchuk.

DR. SERCHUK: This may be a very naïve question, and I know the letter that was sent to John Carmichael said that the analyses can't be done in a timely fashion, but what does that mean? Could they be done in three months, in four months, and what is the need to provide the information now? Could it be done in three or four months, if that would help us out with the higher natural mortality and -- I'm a little bit perplexed about that, and I understand they said it couldn't be done in a timely fashion, and I don't know what it means, and I don't know what it means to our process and providing management advice.

DR. BUCKEL: Fred, that's a good question, and I think, in addition to the workload, as Erik mentioned, and, Erik, please correct me if I'm wrong, it's just the process that the Center -- That asking for tweaks to the assessment is not considered appropriate by the Center, and so that's what Erik was telling us in the presentation, and so I think workload is part of it, but then there's also the setting a precedent for these types of requests.

DR. SERCHUK: Sorry to beg the issue, but I still don't know what a timely manner is. I mean, the fact is -- Could we wait six months for it, and the provide -- Have a better basis to provide our advice? You know, I understand that there are a lot of things going on in the Center, and, on the other hand, if we had that analysis, with the different M in it, I think we would be better off, and could the management system wait six months before we provide it? I just don't know those answers, and I haven't seen anyone talk about it yet.

DR. BUCKEL: John Carmichael.

MR. CARMICHAEL: Fred, that's a good question, and I'll try to bring in sort of my impression on that, based on discussion of this at the council, as well as, you know, dealing with the SEDAR process and the scheduling. I took that, and I think it was kind of implied at the council, that that means that, to do this work, it's putting this back into the SEDAR schedule framework, which means it probably wouldn't be -- Because of the timing of that, and things that are already

underway, you would be talking about maybe late 2024-ish, or 2025, before you really started having an opportunity to get it in there, and so that's what the council's impression is.

As far as the council's position, the council has said they want an ABC recommendation now, and they want you to do the best you can with the information that you have to give an ABC, and I think you've made outstanding progress here today, and I'm definitely encouraged by, you know, you taking what you can from the assessment, and recognizing issues with the projections, and trying to come up with a fallback, and so I think what you're doing so far is consistent with what the council has asked, and the council is not interested in waiting, you know, a couple more years to get this, because this assessment has already been delayed, due to various things related to COVID and the FES change, and it's been one that's been on the horizon for a while, and so we really need the best that you can do today.

DR. BUCKEL: Thank you, John. Kai.

DR. LORENZEN: To that point, and this is not about this assessment, but, generally, and I think, if the assumption is that, by the time the assessment arrives at the SSC, if we are asking for any modifications, it has to be put back into the SEDAR schedule, for some time years down the line, I think that's not a good position to be in. I think then it really means that we more or less have to eat whatever is put on our plate, and I don't think that's a good situation, and so I think -- I mean, there should be an allowance in the SEDAR schedule that, quite likely, after it's been presented to the SSC, there might have to be some revisions, and that's the -- To my mind, it's what we've always worked on, and so I would hate to see that change to, by the time we get it, this is it.

DR. BUCKEL: Thanks, Kai. John, to that point?

MR. CARMICHAEL: Kai, that's an excellent point, and that is really something that we are grappling with at the SEDAR Steering Committee, particularly with this process, with the operational, and, you know, Erik mentioned the statements of work, and the terms of reference, and those things being done in advance, and then these groups, you know, increasingly being focused on a single issue, without necessarily having this look at the broader assessment overall and how things are fitting together.

To some of us at least, it's partially to blame for these problems that we're seeing pop-up, and we need to make sure that the process does allow that flexibility, for the analyst and the SSC to deal with the things that come up, and there's an ability to adjust the model, even if it wasn't foreseen two years ago, that something was an issue when we did the terms of reference, that we still stay true to that principle of the best, most timely assessment that we can do.

I think, if you guys have some discussion, you know, maybe at the end of this meeting, kind of wrapping up impressions from these few assessments, along that line of what you think you really need to be able to avoid situations like this Spanish thing, I think that would really be helpful, as we go to the Steering Committee and try to, you know, improve this process further.

DR. BUCKEL: Thanks, John, and it seems like there were just several perfect-storm events for Spanish, in particular, with the COVID delay -- Because I was surprised we were getting this that we need this estimate now, and I wondered where that was coming from, because it's not been a year, and we got the presentation in August, and so that's helpful, that that was an issue, and so

we would make some notes, and we'll definitely revisit that, and hopefully we'll have time on Thursday. All right, and so we've gotten our marching orders from the council. Alexei, did you have a --

DR. SHAROV: I maybe wanted to go back to Fred's question, and I am just -- Looking at the alternatives that we have, potentially, in the table and defining ABC, and so I have a difficulty in understanding what else needs to be done, in order to say, for example, do the projections using the assessment results that have been completed, and so we have the -- Now that it seems that the SSC is convinced that a higher estimate of M should be used, there is a sensitivity run of M equal to 0.42, and my understanding is the sensitivity run constitutes the base run where the M value has been substituted from 0.35 to 0.42.

As an outcome of this, we have estimated numbers of age for the terminal year, and we have estimated biomass, et cetera, et cetera, and it is waiting for the projection forward, and whatever has not been done, or should have been done for like a full, complete modeling with this, I think this supersedes any alternatives or like third-highest value of the catch, and that is that what we're putting against the analytical assessment that synthesizes all information about the stock that we put so much effort into, and we have a stock assessment and the run that uses the higher M of 0.42, which could be used for projections, versus all these ad hoc historical approaches, which were based on the fact that we didn't know much about the stock, and now we have so much that we know, and we're not going to even try to -- That's my question, is what else needs to be done in order to just simply make projections based on the run that used the M of 0.42? Would that be a significant amount of work that is not possible to do within a certain amount of time, like Fred had suggested, because all the alternatives are so poor, and they're going to be of such poor quality that, given what we have already, we have to ask the question.

DR. BUCKEL: That's a great question, Alexei, and I think Erik has answered that one before, but he's welcome to come back to the table, and I think that was still a heavy lift, but Erik is coming to the table and can comment directly.

DR. WILLIAMS: So, you know, I'm not going to get into details of personnel and resource issues within the Center, and I hope it suffices that, when we say we can't do it, we can't do it, unless we're asked to justify those reasons, and I guess we could, but, you know, we make an assessment of the total workload, and the staffing we have, and that's the decision we make.

In terms of what you just asked, again, I would highly recommend that you guys put this in the context of the total process and what we're trying to produce here. Any little request -- It might be a simple sort of mechanical calculation, but it involves writing it up, getting it injected in the appropriate place in the record, and in the process, so that it's documented, and that takes time as well, and so it's not -- I would say the last thing we should be doing is actually running an assessment model on the floor of an SSC meeting, unless we have the time set aside to do that, and we're planning to document it all afterwards, and, you know, that's -- I feel like that's what is being asked here, and that's just not doable, and it probably shouldn't be done that way. Again, I would say think about this in the whole context. I understand this seems like there's something, an easy fix here, but there really isn't, and I will just leave it at that.

DR. BUCKEL: Thank you, Erik. Fred Scharf.

DR. SCHARF: Again, just the point you brought up before, that the stock status has remained stable, and we've been using the third-highest landings, you know, for a long time, and it seemed to me like using the yield at 75 percent FMSY, from the base run, would be probably a more conservative approach, and so I would toss that out there as sort of our preferred alternative, is just to set the, you know, ABC at 75 percent and FMSY from the base run.

DR. BUCKEL: Kai.

DR. LORENZEN: I tend to land on the same, and it's actually a slightly larger number, and so I guess it's not more conservative, but it makes sense, in the context of the assessment that we have, when you use that assessment to produce an ABC, and it's one that I can live with.

DR. BUCKEL: Thank you, Kai. We're just in time. It's 12:02. Do we have consensus on Fred Scharf and Kai's recommendation to move forward with an ABC -- We've already talked about stock status, and so this would be the ABC value for Spanish mackerel, and that's the 8024, Judd, and is that right? The median is -- I don't see any heads shaking, or steam coming out of anyone's ears, and so --

DR. CURTIS: (Dr. Curtis's comment is not audible on the recording.)

DR. BUCKEL: Yes, Judd, and so that -- Copy-and-paste that one down. All right, and so thanks, everyone. That was, as John mentioned, a very good discussion on this, and it's consistent with our earlier record, which I was concerned about, and so that's good. Before we break for lunch, just to ask if there is any public comment on this.

DR. CURTIS: If there is any public comment online, please go ahead and raise your hand. We've got Ben Hartig.

DR. BUCKEL: Ben, please go ahead.

**PUBLIC COMMENT**

MR. HARTIG: Thanks, Jeff. Thanks for your extensive discussions on SEDAR 78. I am very happy with the outcome, and I'm very happy that you stuck to your scientific character in making your decisions, and, for me, this is really a validation of your role as reviewers in this process, and I'm not going to -- You guys are ready to go lunch, and I will say one thing about M, and I should have raised my hand earlier.

Sometimes you get lost in the mathematics so far that you can't see the forest for the trees. I mean, basically, this assessment cried out for a re-estimation of M. I mean, you had the re-estimations of all the recreational statistics, which, you know, in many cases, put this two-times higher than they were originally, and so that points to a more productive stock.

You have higher recreational landings than you've ever had, going forward from those re-estimations, and that points to a more productive stock, and you've got a commercial fishery busting at the seams, you know, catching their allocations earlier and earlier, which also points to a productive stock, a much more productive stock, basically, and I wish I had said that earlier, and

I wish I had raised my hand before you got into M, but those are just my thoughts. Sometimes just go outside the box, please, and look at some of the other characteristics of what you're examining in the face of M, because this definitely -- All those things definitely support the reinvestigation of M, and a higher M, for sure, and so thank you. Thanks again for your decisions, and thanks for a great morning.

DR. BUCKEL: Thanks for your comment, Ben. Any others online or here for public comment?

DR. CURTIS: Next up, have Tim Griner online. Go ahead, Tim.

MR. GRINER: Thank you, and I just wanted to thank Ben for those comments. I think he's spot-on with those comments. This is a healthy fishery, and, to that end, just to pile onto what Ben was saying, I think it's important, you know, as you guys move forward with what you need to do here, and I think it's really important to understand that this is a fishery that's not overfished, and not experiencing overfishing, and so, you know, I think, in the back of your mind, I would just like for you guys to think about that and to understand that this is not a fishery that is in bad shape, from that standpoint. It is not overfished, and it's not experiencing overfishing. Thank you.

DR. BUCKEL: Thanks, Tim. Any others, Judd? It's five after twelve, and let's meet back here at 1:30, and so we'll take a lunchbreak. Thanks, everyone.

(Whereupon, a recess was taken.)

## SEDAR 76: BLACK SEA BASS OPERATIONAL ASSESSMENT (CONT.)

DR. BUCKEL: Okay. Welcome back, everyone. The coral distribution presentation that was scheduled for this morning, we didn't get to it, because we took that time on Spanish, which was important to do. Unfortunately, the person making that presentation is unavailable this afternoon and tomorrow morning, but Judd has them scheduled for one o'clock tomorrow, and so we'll fit that in then, and so we're going to, as promised this morning, we're going to go to black sea bass and start filling in and addressing our action items, and so, Judd, if you could pull those up. Matthew is still here, if we have questions for him.

Thanks, Judd, and so the first action item is the review of the assessment, and so, folks that were charged with that action item, if you could help us with starting to fill out those questions that are there in the sub-bullets, and so the first one is does the assessment address the TORs to the SSC's satisfaction? Alexei and then Marcel.

DR. SHAROV: Can I suggest that we say yes?

DR. BUCKEL: I like that. Maybe we'll be a little more, as my fourth grade teacher -- Yes, the assessment addresses the TORs to the SSC's satisfaction. Marcel.

DR. REICHERT: I concur.

DR. BUCKEL: Thanks. Next, is the assessment consistent with BSIA guidance and practices?

DR. REICHERT: I would say yes.

DR. BUCKEL: If folks disagree, just raise your hand with these. All right. I am not seeing any hands raised, and we'll move on to the next sub-bullet. Does the assessment reliably capture past trends in the fishery and population? Matthew provided those -- Not only the SEDAR 76 patterns, but also compared that to the previous assessments, and those trends were very similar, and so that was encouraging, and so I think that would also be a yes.

I think one -- Maybe this might be a place to put this, and, if not, we can add it somewhere else, but the point about the -- I think it's the abundance plot, that, in the last few years, it suggests a leveling-off, or an increase. Yes, the biomass levels off, and the abundance pops up, but that's not a -- That's not based on any observed data, and that's assuming an average recruitment for that 2014 to 2019 period, I think were the years, and so maybe that's the numbers, and was it 2020 to 2021? Those numbers-at-age are influenced by the assumption of average recruitment, using average recruitment, from 2014 to 2019, because the assessment didn't have information to estimate those recruitments in those years, based on the likelihood profiles. Any other additions or edits to that? All right. I don't see any hands. Amy has got her hand up. Go ahead, Amy.

DR. SCHUELLER: I'm sorry, but can we clarify that? Abundance numbers-at-age in the years 2020 and 2021 use the average estimates, and that's -- That's at age-zero, right?

DR. BUCKEL: I guess the zero in 2020 would influence the ones in 2021.

DR. SCHUELLER: Sure, and it goes out from there, but, the way we had it written before, it made it seem like all the ages were the average, and that's not true. Thank you.

DR. BUCKEL: Thanks for that. Go ahead, Amy. Take out the "and one", because, in 2020, it's not the and one, and so abundance of age-zero, and I think that captures it. Abundance of age-zero in the years 2020 and 2021 use estimates -- Are based on -- As Amy said, if you're going to add that 2021, you can, but it's --

DR. SCHUELLER: Well, I mean, it's not necessarily that the age-one is an average of it, but it's that the age-one is the -- Age-one in 2021 is the resultant number based on the average of age-zeroes in 2020, given the expected Fs and catches, et cetera, et cetera, and so it's not -- If you're going to include the age-one in any way, write a separate sentence, is what I'm trying to say, because, otherwise, it's confusing.

DR. BUCKEL: Or similarly affected, or something like that, and we can come back to that. All right. The next sub-bullet is does the assessment provide a reliable quantitative estimate of current stock status? I am seeing heads nod, and so a yes for that one, Judd. Thanks. Then the -- Chip, please.

DR. COLLIER: For future catches, and this is probably a question for Matt, and I noticed, in the discards, in the full report, it states dead discards, and then, in the projections, it transitions to just discards, or are those dead discards that are included in Table 22 to 25? If those are dead discards, we might want to pull up those tables, because that's much higher than the current level of discards. I am just thinking it might be a good idea to pull up those tables, just to take a look at them, real

quick, maybe 24 and 25, just so you guys can see what the catches levels are for black sea bass, and I know you saw the plots of them, of F and spawning stock biomass.

DR. BUCKEL: Judd, if you can maybe make that a -- We're looking at PDF page 109 in Attachment 4a, from the black sea bass stock assessment, and, Chip, your question was on the discard estimates in the projections?

DR. COLLIER: Yes, looking at the D.b, and, if you -- If you look in the tables for 2021, the total number of discards are around 800,000, and then this is showing that 2.6 million, and so I'm just checking to make sure that, in the main body of the assessment, that is dead discards, and making sure that this is discards, and not dead discards, because, otherwise, it's a pretty dramatic change in the number of dead fish.

DR. BUCKEL: It's labeled as discards, and not dead discards, and Matthew is looking into that, and so we can come back to that. Matthew, let us know when you've got that, and you can let us know. In the meantime, I did have another one on the stock status, that we just said yes, and this was a -- Let me find the figure. This was in relation to the conversation that we had yesterday on the FMSY that's being estimated from the equilibrium landings, if folks can pull that figure up. Matthew is at the table. Go ahead, Matthew.

DR. VINCENT: In this table, it's the dead discards, because we don't project total discards at all, and so which one is it different from, in which table, in the rest of the assessment, because those might be live discards. If it's an input into the assessment, the input into the assessment is live discards.

DR. COLLIER: So Table 18 has -- In the last three years, it has just over a thousand fish, 800,000 fish -- Or just over a million fish, followed by 800,000, followed by another 800,000 number, that were inputs into the model, and now the projections are estimating 2.6 million coming out of this, which seems a very high increase in the number of discards without management changing and reducing fish in the population, and 99 percent of the fish that are released in the black sea bass fishery, at least on the recreational side, that's coming from size-limit releases, which would be young fish, and so, if we're having crashes in the juveniles and recruits, it seems like the number of discards would also decrease.

DR. BUCKEL: Thanks, Chip, and thanks, Matthew. Matthew is going to continue checking that out, and I was on that previous bullet, and I wanted to go back to the figure that shows the FMSY from the equilibrium landings, and I'm looking for the figure, and, if anyone has found it, please let me know the --

DR. REICHERT: I think, under this bullet point, and it will probably come back to uncertainties, in terms of the reliable projections, and we discussed, at length, that recruitment -- It's kind of difficult to predict recruitment, and so that's probably a factor that may affect the reliability of the future conditions to support fishing level recommendations, and I'm not sure if we capture that under here or under uncertainties.

DR. BUCKEL: Let's -- I think that would fall better under uncertainties, Marcel, if folks agree with that. Matthew is back.

DR. VINCENT: So those projections are made based on -- We tried to fit the landings from the recent average period, and so the F that's estimated is much higher in those interim periods, in the first three years of the projections, and then the discards are pretty much just proportional to whatever that F is, and so, as F goes up, then the discards go up, and, because F is so high, and some of them reach the upper bound of ten, and so, actually, most of them do it by that third year, and so your discards are much higher, and that's why there is the difference between the projections and the observations in the model.

DR. BUCKEL: So the caption in Table 21 should be dead discards?

DR. VINCENT: Yes.

DR. BUCKEL: Okay. Thank you. Go ahead, Chip.

DR. COLLIER: Thanks for clarifying that, and that just leads me to a little bit of concern with the projections. It crashes the population, similar to what happened to Spanish mackerel, and this one is going down to a 2,000-pound -- At least in the projections for Table 25, and that's looking at FMSY, I believe, and so it's dropping the catch level down to 2,000 pounds, because of this at least four-times the normal rate of discards, or normal times the number that's observed in the fishery, and so it's a little bit concerning that the discards are driving it down, and it's not really picked up in any of the observations of the data, and so it just seems a bit out of bounds, and it doesn't necessarily match with how the population is doing. The population is crashing at a pretty hard level, and we're looking at fairly young fish in the -- Fairly young fish that are caught and discarded, especially in the recreational fleet.

DR. BUCKEL: Any SSC comments to Chip's point about the projections? Chip.

DR. COLLIER: Just to throw out another strawman, in Erik's presentation that he gave yesterday, there's the possibility to condition the projections off of catch, and I'm wondering if catch would be a more appropriate metric for this, just use average catch over the last three years, in place of the average F that was used. Sorry. Switch them? Okay. Or switch it, the way Erik said.

DR. BUCKEL: So the -- Just so we're all on the same page, Erik, and Matthew, the landings are being used, and then that's leading to these high Fs that you had to bound at ten, right, and is that correct? Erik, what you were just saying is that maybe it should be using the F. Help us out.

DR. WILLIAMS: Yes, and I think we could switch, which we've done it both ways, and, honestly, I can't even remember why we decided to go with average landings in the interim years, and we just could go with average F, and that would, obviously, keep those Fs at a moderate level, at least, and they're still high in those last few years, obviously, but, you know, the other solution to this, again, just to throw options out on the table -- I mean, I don't know how pressed you guys are to produce an ABC at this particular meeting, but this is a species that seems to be in such a state that it probably warrants some extra attention, let's say. This might be one where it might be worth trying to gather the interim year data and then actually fold that into the projection analyses, just to get it that much better, but, of course, that comes with a timing issue.

DR. BUCKEL: Thanks, Erik. So a couple of different options there, and I don't think we have worked through everything, and we're not required to come out with an ABC, but I think

recommendations on projections, or other approaches to get to ABC, need to come out of this, and so there's a couple of options that we've -- Using either average F, from those last three years in the interim, or, as Erik mentioned, maybe looking at the interim data, or, actually, the observed landings, or other information. Go ahead, Chip.

DR. COLLIER: Just as far as the timing for this one, you know, it's a little bit different than Spanish mackerel, and the council has been working on that one, or waiting for an assessment on that species, I think since 2017, and it's been a long time, but, for black sea bass, you know, this is the first time that they're getting it, since the last assessment, and then we'll likely get a letter of the status, and that we need to address overfishing immediately, and end overfishing within two years, and so that's going to come in June, and so it's not absolutely pressing, but, yes, by the October meeting, it would probably be really good to have an ABC for this stock.

DR. BUCKEL: Thanks, Chip. Scott Crosson.

DR. CROSSON: Just an additional comment. Because this is a species that's encountered so widely on the coast, from so many other bottom-fishing trips, I just would urge the committee to be cautious and take a more conservative approach on discards, and how we estimate discards, because I don't imagine that they're going to -- Even if there is a very low ABC for retained catch that comes out of this committee eventually, I would worry that discards are still going to continue at a pretty high rate, because black sea bass are everywhere, and aggressive everywhere.

DR. BUCKEL: Thanks, Scott. Judd, thank you for capturing some of that underneath that sub-bullet. Any edits to what Judd has up there, or additions? I don't see any hands raised. I wanted to revisit the previous bullet that had to do with stock status, and that had to do with the FMSY. Judd has got the plot on the right, Figure 48, and this was -- Matthew provided it in the PowerPoint presentation, as a slide, and you can see it there as well, that this is where the FMSY was estimated, from the equilibrium landings, versus the fishing mortality rate, and so that's an FMSY for landings, and I was asking Matthew and Erik about that this morning, and so that's the reference point, but it's in FMSY landings, but the assessment is F removals, because it's landings plus the dead discards, and so I don't know if those are --

I didn't have a chance to finish my conversation, but I wanted to bring that to the SSC's attention, and maybe it's not an issue, but there is folks on the committee that are assessment scientists and know what this means, if we could have discussion on that, because that's to this point of current stock status. I think it doesn't change, or my guess is, if it -- The equilibrium landings, and this is an FMSY based on equilibrium landings and not equilibrium removals. Jie, you look like you were getting ready to comment.

DR. CAO: I was trying to understand this MSY, and it seems, to me, that it's calculated based on the yield-per-recruit analysis, and there's no stock-recruitment relationship assumed, and, if that's the case, I think that's the Fmax, which can be considered as a proxy for MSY, if I am understanding this correctly, but, yes, I'm just trying to make it clear.

DR. BUCKEL: So what do folks -- Do we want to capture that, with this current stock status, that the fishing mortality that's being estimated is being compared to an FMSY that's based on a yield-per-recruit Fmax, and just to point that out, and I think that's what Kai was getting at yesterday. Go ahead, Marcel.

DR. REICHERT: I agree, because that's -- That comes to bear when we are looking at our ABC Control Rule.

DR. BUCKEL: So Figure 47 is the yield per recruit, versus fishing mortality rate, and then the plot under that is the -- The one on the same page is spawning potential ratio that provides -- That's what we've used in the past for proxies, right, but it looks like that -- Erik and Matthew mentioned this morning that that was not providing realistic values, and so I had -- Kai, go ahead.

DR. LORENZEN: I think it's -- To my mind, it's enough to note that here, and I don't think we necessarily need to do something about it. Of course, the normal procedure would be to then base our MSY proxy, or FMSY proxy, on an SPR, but the SPR here is weird, as you can see, because we are at 80 percent SPR, at what we think is the MSY proxy, and I think it's because of the use of female egg production in a protogynous species, and so there's no easy way of getting an SPR proxy for this, and so, if we wanted to go down that route, it would create more -- What's it called, workload? I think it's enough, given that I think we all agree that we're in a somewhat precarious situation here, and so I'm not super concerned about the fact that actually our FMSY proxy is kind of generous.

DR. BUCKEL: Thanks, Kai. Are folks good? All right. Jie.

DR. CAO: So it's pretty well known that Fmax is likely to overestimate FMSY, if a stock-recruitment relationship had been applied, and so that's why that point would stick out.

DR. LORENZEN: We could do that, and then it would require us to calculate that and redo the projections, and it would cause workload.

DR. BUCKEL: So how do folks feel? Jie just -- Alexei.

DR. SHAROV: Just to follow on this discussion, I guess we're not questioning the SPR calculation for the equilibrium condition, and so, if the MSY is at point-four-something, and the SPR, which I assume calculated this appropriately, the corresponding maturity schedule, et cetera, this provides an SPR of 80 percent, which is -- Well, it's generous, but it is a very safe high level of productivity SPR ratio, or are we saying that this is overestimated as well, which is a point of discussion.

DR. BUCKEL: Kai.

DR. LORENZEN: I think so the issue is with the SPR reference point, and I think the SPR reference points that we use are calculated for species that don't change sex, and so, you know, you would have something like a 40 percent, or sometimes 50, and I have never seen someone suggest an 80 percent SPR as a reference point, and, for any normal -- Any of the species we usually deal with, it wouldn't make any sense, and probably -- I mean, if we switch this to using male and female mature biomass, for example, I think it would give us something that we could look at with one of the normal SPR reference points, but, since this is female egg production SPR -- There is no off-the-shelf reference point that we can use for that, and so one would have to define what an appropriate SPR reference point is, because, if we went with 50 percent or so, you would fish them right down, right?

DR. SHAROV: If I could, and so it's important, and I actually -- I didn't think it through, and so, in this SPR calculation, actually, the disappearance of females with age is not modeled, and is that correct?

UNIDENTIFIED: (The comment is not audible on the recording.)

DR. SHAROV: Okay. We're looking at the spawning potential ratio calculation, that graph over there, and Kai correctly pointed out, or I assume correctly, that females change their sex with age, and, therefore, they are removing themselves from the pool of SSB, and you probably did not account for this in this SPR calculation, right, for the equilibrium conditions, and, essentially, we would have to model them as like dying, you know, for the -- They are removed, in terms of the reproductive contribution, and they are not contributing anymore, and they are turning into males, and that is they are disappearing from the spawning stock, and is this accounted for in this SPR calculation, and, if it's not, this is a probable explanation of why we have an SPR of 80 percent at the Fmax.

DR. LORENZEN: No, I think it is accounted for, right, because you do have them turn into males and leave the -- That's my understanding, right, and so this is based on the female egg production, and they are moving out of being female and into being male, and I think the reason why the reduction is so small is that virtually all -- Most of the fishing mortality is on the males, and so you get very little reduction in the female egg production, or the SPR based on that, because most of the fishing only hits the males, once they've transitioned, and so it's a very unusual SPR measure, and it's not incorrect, but it's unusual.

DR. BUCKEL: Fred.

DR. SCHARF: Just a question for the assessment folks, and does it -- I am just looking back at what you guys incorporated for the reproductive biology, and how you dealt with female egg production, and you said it included, from SEDAR 56, some of Nikolai's work that showed that egg production sort of peaks before sex transition occurs, and do you recall if the model accounts for a reduction in the size at sex transition related to, you know, harvest, and so, if you reduce the males to below a certain level of biomass, there is evidence that suggests that the females will start to transition to males at a smaller size, which would impact their egg production, right, which would then lower their SPR, but I don't think that's incorporated in there, probably.

DR. LORENZEN: I will add that, I think, if I had a wish, I would say that I would want to see this with also a male and a female combined spawner biomass. I don't think it's necessary at this stage, but I mean that -- That would be consistent with what we're doing with the other protogynous species.

DR. BUCKEL: Mike Schmidtke.

DR. SCHMIDTKE: Just a quick question related to Kai's previous point, and, at the later part of the time series for black sea bass, the mortality is mostly from the dead discards, more so than the landings, and, with what Chip noted earlier, that the discards -- Most of the fish are discarded due to size, and so that would indicate that most of your mortality, towards the more recent years, is probably on the females, rather than the males.

DR. LORENZEN: Yes, and I got confused about that too, and I'm assuming -- So there was a combined discard, and, you know, the picture with the dip, and there was a combined sort of discard mortality, and sort of landings selectivity thing, which still has most of the mortality happening on the larger, older -- So it touches the females some, and you can see that the females do go down by, you know, 20 percent, but it still seems that the biggest pressure is on the males, from that curve, but I will admit that I also got a little confused about that.

DR. VINCENT: (Dr. Vincent's comment is not audible on the recording.)

DR. LORENZEN: That is true, but the overall mortality curve, which is a combination of discards and landings, still basically increases, and only reaches the top, really, where they're already male, and that was my -- It's complicated, but I think that's roughly correct.

DR. BUCKEL: Thanks, Mike, and thanks, Kai. Back to Jie's question of how do folks feel about the Fmax as a proxy for FMSY, or do they want to see F of 0.1, which would be lower?

DR. LORENZEN: My thinking is that -- I mean, this is correct. At the same time, I don't think, in the grand scheme of things, it makes much of a difference, in this case, just because, you know, we're looking at quite dramatic catch reductions, one way or other, and then the big question is what recruitment will do when it comes to the future, and so, you know, I agree, in principle, but I think an F of 0.1 would be more consistent with FMSY, but it would still be, you know, a rule-of-thumb type of thing, and I'm not sure that it makes a really big difference at this stage.

DR. BUCKEL: Thanks, Kai. Are others okay with that, moving forward with -- Kai was saying that the F of 0.1 would be more consistent with FMSY, but it's not going to make that much of a difference, given where things are with the biomass and the recruitment. Alexei.

DR. SHAROV: Well, at least we should know, and, I mean, if we're not changing that, and we should know, and I agree with the previous statements that, generally, the Fmax is an estimation of MSY, and the F of 0.1 probably would be, you know -- Therefore, it's -- But, again, are we redoing the assessment or just making a judgement?

DR. LORENZEN: That's why I am doing the Center's work here, and I am saying we can let this one go, but, you know, we should -- We should mention it, right, so that we have that in the record, that we've discussed it, and, as we move to other assessments, I think we don't want to see Fmax creeping in as a normal proxy for FMSY, and, in this case, my sense is, well, we can let that go.

DR. BUCKEL: Amy.

DR. SCHUELLER: I think that we need to use F 0.1, because, on the grounds of the scientific weights of evidence, that's more appropriate. I think that, while it might not make a big difference, there is -- As you just said, you don't want to see things sneaking in, and I don't want to set some precedent that we're going to use some value that, later on, we're going to say, well, we only did that in that one special case, and I just -- I would prefer to not do that now, and like let's not dip our toe in that water, and let's go ahead and ask for that value.

DR. LORENZEN: I agree, and I have never seen Amy look at me with so much shock, and so let's go with F of 0.1.

DR. BUCKEL: All right. Thanks, Alexei, for pushing that point, and so, Judd, you had language from Kai, I think, up there, but now we're going to -- I think capturing the discussion related to F 0.1, versus Fmax, and the consensus was to ask for F 0.1, for the reason you already have up there, that the Fmax has a tendency to overestimate FMSY.

All right. Thanks, Judd, for capturing that, and good discussion on the stock status and our reference points, and so, okay. Moving on, I think that's -- We've hit the sub-bullets for the review assessment, and now we're on to identify, summarize, and discuss assessment uncertainties. Chris Dumas.

DR. DUMAS: Jeff, I was the lead on taking notes for this, and I sent you an email with a bunch of strawman language, and so we can edit that, if it seems appropriate.

DR. BUCKEL: Thanks, Chris, and I will forward that to Judd.

DR. DUMAS: I gave some strawman language, some for each bullet, and there might be more than is necessary, and so we can edit it down for some of the bullets, and, if others have other points that I missed, please speak up. Thanks. I just had my first morning coffee for the day, and so watch out.

DR. BUCKEL: Chris is trying for the gold-star SSC member award. Okay. Judd has pasted in Chris's response to these sub-bullets, and thank you very much, Chris, for having this done ahead of time. The first sub-bullet is review, summarize, and discuss the factors of this assessment that affect the reliability of estimates of stock status and fishing level recommendations, and this is under the -- If you could scroll up, Judd, to the overall bullet of identify, summarize, and discuss assessment uncertainties.

DR. DUMAS: That bullet is repeated just above the answer, or the strawman text.

DR. BUCKEL: That's a good list of the things that we saw in the presentation yesterday, and do folks have additions, or are there any ones that they don't feel -- Any that are on the list that should be removed?

DR. SCHARF: Chris, when you say, "discard rates and mortality", do you mean discard rates and discard mortality?

DR. DUMAS: Right.

DR. SCHARF: Then maybe we should add "discard" in there, just to clarify.

DR. BUCKEL: All right. Raise your hand if you have any issues with that. Otherwise, we'll move on to the next sub-bullet. Amy.

DR. SCHUELLER: I think some folks around the table mentioned whether or not female egg production was the best metric of SSB, and so maybe we should reflect that in here somewhere.

DR. BUCKEL: Good point. Marcel.

DR. REICHERT: Perhaps, in addition, "for the reasons of the protogynous nature of this species".

DR. BUCKEL: Maybe go one more sentence, and I have a note that Kai recommended to provide male and female spawner biomass.

DR. LORENZEN: Yes, and that is consistent with, you know, the normal practices that we have for other protogynous species, and, obviously, it means that, if there is some level of sperm limitation, that it gets somehow accounted for, and, I mean, not perfectly, but there is some accounting for that, whereas, if that is not an issue, then you could argue that, you know, female is more conservative, but, since we don't really know the answer, and I think, if we did the combined, then we're back in the sort of normal, when it comes to SPRs and so on, and so it makes it easier to then, for example, use an SPR proxy, because -- Anyway, I think it should be explored.

DR. BUCKEL: That would be for future, right, and we want to make sure we capture that, and we're not asking for that for the -- We're going to be asking for projections, but we're not asking for those.

DR. LORENZEN: Well, they're saying that I can ask for it.

DR. BUCKEL: Okay.

DR. LORENZEN: I wouldn't get it, but I can ask for it, and, you know, apart from the philosophical questions, or sort of biological questions, around that, I think it would bring -- It would sort of generate a different relationship between spawner biomass and recruitment as well, and it could -- You know, for example, a Beverton and Holt might, again, be a better fit than just the mean recruitment, because the relationship would look different, and it might change our perspective of how much of the recruitment decline is to do with decline in spawner biomass, versus how much is environmentally driven, but it might not.

DR. BUCKEL: Thanks, Kai. Fred Serchuk.

DR. SERCHUK: I have a question, and it may not be exactly relevant, but, you know, there are distributional shifts going on in other portions of the range for black sea bass, and we're seeing black sea bass in areas further north, that typically haven't been prime habitat for black sea bass, and I'm just wondering. Are all the distributions that are in the South Atlantic basically the same as they've been in the past, or have there been any changes in the distributions, that people are aware of?

DR. BUCKEL: Jie.

DR. CAO: We have done a multispecies modeling, and so, basically, it's a joint species distribution model, and the model includes twenty-eight species, and black sea bass was one of them, and we found that the center of gravity of black sea bass population shifted northeast, significantly, but we don't know the underlying mechanisms driving that change, and it could be a distribution shift, or it could be the spatial decline in productivity, and so you have spatial heterogeneity in productivity, and we just don't know the underlying mechanism, but I know the

Mid-Atlantic stock is going through the benchmark, the research track assessment, and so they do have two separate stocks, and the reason is that there's a difference in productivity spatially.

DR. SERCHUK: Okay, and I just mention it because maybe, if there is evidence of changes in distribution, that would be another thing that would be caused by either a regime shift or animals moving out of their traditional habitats.

DR. BUCKEL: Thanks, Fred. Kai.

DR. LORENZEN: One thing that bothers me a little about the assessment is the reliance on just one index, and so the one index we have is from that trap sampling, and I was wondering whether, you know, there may be attributes of how that is done that -- You know, is this a reliable index of overall population abundance, or can we think of reasons why they may have shifted distributions, and I really don't know enough about the species to know that, but I just know there is sort of just one abundance index with a very particular way of -- You know, based on a very particular --

Fisheries-independent, but, nonetheless, a very particular way of monitoring these things, and I was wondering, you know, people who know more about the species, are there any reasons why we might think that that may not be a really good index of overall population abundance, if there are range shifts or anything, and it's really just a question, and I am used to assessments where we have plentiful indices from this and that and the other, and, here, we really -- It obviously tracks that index really well, particularly in the last few years, but my question is could that be not a good index of abundance?

DR. BUCKEL: I think it's a good question, and I think we should -- So two points. We should include that that's -- Make that point, that that's part of the uncertainty, and I'm not sure if, Chris, you captured that in one of the other sub-bullets, and so we definitely want to capture that as the model -- That's the only -- In the latter parts of the time series, that's the only index of abundance, and then Wally is looking at me, because I think he can comment on how that survey tracks black sea bass abundance. Go ahead, Wally.

DR. BUBLEY: Right, and I think the only concern would be if these are moving out of the region, I mean, if they're going to Cape Hatteras north, and that's the only component of this Southeast Region that aren't covered by that survey, from there to the Virginia border, and so it's a relatively small area, but, if they're moving out of the region, or into that region, then it might not be tracking it as well. In terms of depth, that's well covered, and the depth that is sampled by the chevron traps well exceeds any catches that they've seen with it, and anyone who has fished for black sea bass knows that they are very voracious, and so this gear works well for them.

DR. BUCKEL: Thanks, Wally. Marcel.

DR. REICHERT: In addition to that, the changes that were made to the survey were in 2009 and 2010, and so, in particular, the last years -- The sampling was pretty consistent throughout the region.

DR. DUMAS: Jeff, I did not capture that point about the single index in my comments.

DR. BUCKEL: Thanks, Chris. Have you had a chance to capture that, Judd? Does anyone have it open, where we use other time series, other indices, and I think, for now, just the latter part of the time series -- The model is relying on a single index of abundance. I think we -- We had similar language in scamp. Scamp was a similar situation, and, you know, I think we added that, although it is relying on a single index of abundance, we feel that index of abundance is -- We don't have any reason to think that it's not a robust one. Anne.

MS. MARKWITH: This is just a question for Wally, to clarify something in my head. In terms of the trap index, the CVID index, the only thing it wouldn't be good for though is young-of-the-year and age-zeroes, and, to an extent, age-ones, just because of the trap size, the mesh size?

DR. BUBLEY: Yes. Correct, and it's basically one to two years, is when they start to come into that gear.

MS. MARKWITH: Okay. Thank you. I was just thinking that's probably more of a research recommendation, but I just wanted to make that clear in my head.

DR. BUCKEL: Thanks, Anne. Good point. This index is -- There's no reason to think this index is not robust for the sizes that it selects. Then we can copy-and-paste Chris's response up there, and the next one is -- The next sub-bullet is describe the risks and consequences of the assessment uncertainties with regard to status and fishing level recommendation. Do folks have edits to Chris's text that's up here as a first draft? All right. I don't see any hands, and so I assume that folks are good with what Chris has for this sub-bullet. Thanks, Chris. Moving on to the next -- Alexei.

DR. SHAROV: Just a minor correction to the text that I would suggest, and uncertainty in recruitment remains a key factor, and uncertainty in recruitment in developing catch advice is a key factor, and it's not that it's a key factor to the assessment, per se, but that is -- Right?

DR. BUCKEL: Alexei, Judd just edited that sentence, and does that capture what you're looking for? Thanks. Okay. The next sub-bullet is are methods of addressing uncertainty consistent with SSC expectations and the available information?

DR. DUMAS: It does start with "yes".

DR. CURTIS: Just so you know, I moved the overview document over to the webinar, so you can see that, and you can zoom-in on the screen as well, and I'm just trying to get it all on one page.

DR. BUCKEL: Okay. I'm a slow reader, and I got through it, and so I didn't see anything that -- That was very well done, Chris. Thank you. Do others have any edits that they would like made, or additions?

DR. DUMAS: If you all want to edit it down, feel free. I have no ego, and so edit away. Chop, chop, if you want, or you can leave it.

DR. BUCKEL: There might be some of that when it goes back and forth in email, but I think what I see now captures the discussion yesterday, and it captures well how the uncertainty was handled in the stock assessment modeling.

DR. DUMAS: I said a little bit extra about MCBE, but I just wanted to put that in there to really commend and encourage the staff for their use of that method, and I think it provides so much useful information to us, the SSC, to see those distributions that come out of the MCBEs, and so that was very much appreciated.

DR. BUCKEL: I agree, and thanks for making that point, Chris. Scott.

DR. CROSSON: I didn't write this, and so I'm not criticizing it, but you used the words "appears to" a few times, and so are those things that we should make a decision on? I think the last sentence in there is there's other things that appear, and so this is Chris interpreting what we discussed in the room, and so should we confirm or deny what Chris perceived?

DR. BUCKEL: In the last sentence, the SSC agreed that this difference -- Fred Serchuk.

DR. SERCHUK: I have a question about the uncertainty regarding recruitment in the assessment. From what I see, we have a pattern where recruitment has declined to very low levels in recent years, and are we uncertain about that?

UNIDENTIFIED: No.

DR. SERCHUK: I just wanted to make sure that we characterize recruitment in the proper fashion here. It seems that, since, I don't know, 2010, we've had a significant decline in recruitment. I think that's real, and it's not uncertain, and so I'm wondering about the language there that says that the SSC agreed that it did not appear to make a difference -- That, either way, there is large uncertainty regarding recruitment in the assessment, and why is that statement in there?

DR. DUMAS: That was focused on sort of what was the best methodology to model recruitment, and we had a discussion of uncertainty about that, but, Fred, I agree with you that, whether or not there's been a decline in recruitment, it seems to be clear, and so I think we should revise the wording along the lines of --

DR. SERCHUK: Okay. That's my point. We have high assurance that that decline is real, and I just want to make sure that we have the right language up there for people that -- For the layperson, for the managers, to understand what we're talking about. Thank you.

DR. BUCKEL: I think the first part of that sentence captures that, and then it would be, after the "either way". "Either way, there is large uncertainty regarding how to model recruitment", and is that -- Alexei.

DR. SHAROV: It's the same comment that I made just previously, and it's the uncertainty in predicting future recruitment, and that's what I assume that we're talking about here, and it's not the uncertainty in recruitment that we estimated for the past events, and it's how we predict recruitment for the TAC calculation or the stock trend.

DR. DUMAS: So maybe, "either way, there's been a significant decline in recruitment". That might be a better way to end that sentence, instead of saying, "either way, there's large uncertainty

regarding recruitment, and, instead, say, “either way, there’s been a decline in recruitment” or “a large decline in recruitment”.

DR. BUCKEL: I like that edit, Chris. Folks, read what Judd has highlighted, to address Fred Serchuk and Alexei’s -- All right. I don’t see any hands, and so we’ll move forward. Anne. There’s a hand.

MS. LANGE: To the point that I think Scott, and I’m not sure, but someone else made about “appears to agree” and that type of thing, will that be made consistent? It was changed in one spot, but there’s few others where “the SSC appears” -- “The opinion of the SSC appeared to be divided”, and I think there was one other spot, too.

DR. BUCKEL: Later in that sentence, it says, “but the SSC agreed that it did not” -- “But the SSC agreed that it did not make a difference”, and maybe we should say that.

DR. SCHARF: Judd is changing that first sentence, the first part of that, to just say “the SSC discussed whether it would be better, in theory”, and then continue to say, “but, for this assessment, it didn’t appear to matter” or “it didn’t matter”.

DR. BUCKEL: Great. Thank you. Thanks, Anne. Marcel.

DR. REICHERT: Well, in general, I think we try to be very concise, and I really like, especially in this case, where we’ve had extensive discussions, I really like the fact that we added some language to basically justify our decisions, or at least reflect the discussion, and so I like that a lot, rather than one or two sentences, and, especially, I was looking back at some of the conversation that we had earlier in our reports, and then the only way to find out more detail is reading through the minutes, which is, of course, a beast, and so I like this a lot.

DR. CROSSON: We were warned about that by General Counsel before, about we tend to rip everything apart, and then you just see these little quiet comments at the end, but, yes, we need to better document our decision-making process.

DR. BUCKEL: Thanks, Marcel and Scott. Okay. Moving on to the next sub-bullet, list, in order of the greatest contribution of risk and overall assessment uncertainty, and comment on the effects of those assessment factors that most contribute to risk and impact status determinations and future yield predictions. Alexei.

DR. SHAROV: I would probably disagree with the order, the factors that are described here, because, and correct me if I’m wrong, but the discard mortality -- It was a very significant range of discard mortalities that were considered, but the particular values were selected based on consensus, but, overall, the estimates of discard mortality are highly uncertain, and, therefore, because discard mortality is the key factor in overall mortality here, therefore, it overrides the recruitment variability, and I think it’s the most uncertain element that comes into the assessment, but I would like to hear your opinions.

DR. BUCKEL: Chris.

DR. DUMAS: Based on Fred Serchuk's comments earlier, I would change my factors as "recruitment" to "low recruitment", and I would argue against Alexei, in that I would say that we should keep recruitment number one, because, if recruitment remains low, then, even if the fishing is at zero, we've got the stock declining to zero, right, effectively, and going very low, and so, if that occurs, it doesn't matter what discard mortality is, because we're not going to have any discards, because we're not going to have any fish, if the recruitment remains that low, right, because the scenarios that were run even when F equals zero -- The stock just eventually goes to nothing, right, essentially, and so that's why I would put the low recruitment as maybe the number-one concern, although, to argue Alexei's side, maybe the discard mortality is the thing we could perhaps control the most, have control, perhaps, over, if we think we cannot control recruitment, and we cannot control natural mortality. Thanks.

DR. BUCKEL: Alexei, Figure 59 on PDF page 170 has the sensitivity of the model to high and low discards, in Attachment 04a. I am just pointing that out to show the discard mortality within that low and high, between that low and high, and it doesn't have as -- The model is not as sensitive to discard mortality, particularly for SSB, and more so for F, and then, when you look at that for natural mortality, it seems to be more sensitive to that, and so I don't know if that weighs-in on anyone's decisions on how to rank those two, discard and natural mortality. Chip.

DR. COLLIER: I know it's focused on recreational discards there, but Matt did go over the changes in the logbook program that they've been observing through time, and so commercial discards might be a source of uncertainty as well, and it changed substantially through time. Well, not only did it change substantially through time, but also with the new estimates, and they were very different from where they were in the past, and so I think commercial should be included in that as well.

DR. BUCKEL: Chip, those were changes -- The point that Matthew was making about there was an increase in zero observations of discards, and so -- Thanks. So the figures that I was pointing out was the sensitivity to discard mortality rate, and the other part of getting dead discards is the numbers of live releases, and so, if those aren't being captured, that may be an argument for having discard mortality as two. Any -- Folks raise your hand if you have issues with the ranking, or if there's another factor that you would like to add to the list. All right. I'm not seeing any hands raised. Are folks okay to move on?

The next bullet is provide fishing level recommendations, and so one thing that I failed to do at the last meeting was applying the ABC Control Rule, and so we'll make sure that we do that here for black sea bass, in this assessment, and then we can make recommendations on what projections we want to see, if there are some that differ from what have already been provided. Did any of those that were assigned this provide fishing levels and work through the ABC Control Rule? Judd, if you could pull that document up. Tier 1 for assessment information, it's a proxy reference point, correct, and so Tier 1 would be a 2.5 percent. Tier 1, Level 2. Marcel.

DR. REICHERT: Tier 2, 2.

DR. BUCKEL: Are folks good with that? That matches what we did for scamp, and I agree with that, a 2.5, and so Tier 2, Level 2, high, 2.5 percent. All right. Tier 3. That is Level 4, stock is both overfished and overfishing, and so an adjustment of 7.5 percent. Marcel.

DR. REICHERT: I think MRAG gives us a 3, high, and I think, if I remember correctly, that's what we used in previous assessments, but someone please correct me if we deviated from that MRAG assignment.

DR. BUCKEL: For Tier 4?

DR. REICHERT: For Tier 3, high risk, and I think that had mostly to do with the accessibility and the desirability of black sea bass, I believe.

DR. BUCKEL: Chip, do you know what we used for Tier 4 for black sea bass in the last -- Thanks. We're all pretty sure it's high risk, but we just want to stay consistent.

DR. REICHERT: For reference, it's page 35 on the MRAG document.

DR. BUCKEL: Thanks, Marcel. Alexei.

DR. SHAROV: Can I ask why? I mean, I certainly believe that that's how it's characterized in MRAG, but, thinking of black sea bass in general, given the life history parameters, I personally wouldn't characterize it as high risk and low productivity, but I'm curious.

DR. BUCKEL: Marcel.

DR. REICHERT: I think it's mostly because of the -- I am looking at the table right now, and the productivity, the trophic level, is a score of high, and then all of the susceptibility, which includes availability, encounterability, selectivity, and post-capture mortality, and they're all high, and so post-capture mortality -- We could possibly adjust that, but I still think, if you add up the scores, it would fall in the high category, and it doesn't mean that we can't adjust that, if we can justify why, but I think that's why black sea bass is in that high category, and it's mostly the total susceptibility score that moves it up to that category.

DR. SHAROV: Thank you.

UNIDENTIFIED: (The comment is not audible on the recording.)

DR. REICHERT: I have no problem with that, but it would be good to -- We can probably look and see what the justification was for the deviation of the MRAG document, and I think this is also mostly Gulf of Mexico, and so that may be another -- That's where the information originates from the MRAG document, but, yes, I have no problem with Number 2.

DR. BUCKEL: I agree, for the reasons that Alexei mentioned before, and so it's the productivity that I think is trumping the susceptibility, and so, Judd, Tier 4 was a 2, medium risk, and that's what we used in the past, and so folks seem to be comfortable with staying with the Level 2 for Tier 4. Marcel.

DR. REICHERT: I think, you know, that's always the discussion, and, for instance, productivity, are we talking about the ideal stock, or, right now, the stock is not very productive, and so --

DR. CROSSON: I would actually move to move it into the high category, given the situation we have with low productivity and low recruitment, and I would still consider this to be -- Given its life characteristics, and what do you keep calling it? How do you say it?

DR. SCHARF: Protogynous.

DR. CROSSON: Protogynous. Thank you. The protogynous lifestyle and general aggressiveness, and so I would think that it would be in under the high category this time.

DR. BUCKEL: Alexei.

DR. SHAROV: I am not familiar, unfortunately, with the MRAG document, and I need to familiarize myself, but, thinking of high risk and low productivity, I am thinking, in general, of like long-lived species, right, that have like fifty or a hundred age classes, and very low natural mortality, and they're really susceptible to even modest fishing pressure, plus, you know, on top of some other characteristics, like, for example, high discard mortality, et cetera. Black sea bass, the discard mortality probably classifies it as high risk, but -- I am not arguing with the MRAG, but, well, I see good reasons to think of this as a medium risk, but, again, that's a collective decision.

DR. BUCKEL: Wally.

DR. BUBLEY: I agree with what Alexei was saying beforehand. I mean, yes, it might not appear to be very productive now, in terms of the recruitment, but that potential is still there. It's a relatively short-lived fish, for the species we're dealing with, and it matures at a young age, and, even when it's transitioning, it's still transitioning relatively early too, and so, I mean, it's still getting all those life stages, and so, even though it might technically not be right this second, I still would consider it a little higher productivity.

DR. BUCKEL: Thanks, Wally, and I think that's the spirit of this Tier 4, is that the species -- What its capable of, and that's an important point, Scott, that we are in this low-productivity regime, and so I appreciate that. So Tier 4, Level 2, and are folks -- Okay.

DR. REICHERT: That is consistent with our previous recommendation, and so that's good, too.

DR. BUCKEL: Yes. Good point, Marcel. Thank you. Okay, and so do we -- The other part of that sub-bullet had to do with projections, discuss and make recommendations on the probability of rebuilding projections, and so the probability of rebuild would be 67.5, and it's one minus the P*. Go ahead, Fred.

DR. SCHARF: Well, I was just -- I don't know what that means, and like discuss the probability of rebuilding projections, and aren't the rebuilding projections probability-based? I'm not sure what that means. Aren't they just probability-based projection, and so what are we discussing?

DR. BUCKEL: Alexei.

DR. SHAROV: I guess, the way I would understand that, we have to calculate what fishing mortality we have to apply, the probability of rebuilding by whatever time it is, at least 67.5 percent.

DR. BUCKEL: Right, and so that horizontal line would be on the -- Provided on the projections, in addition to the standard of probability of rebuild of 50 percent. Do you need anything else on that one, Judd? Okay, and so the next sub-bullet is comment on any difficulties encountered in applying the control rule, including any required information that is not available, and so I think there was discussion on Tier 4. Marcel.

DR. REICHERT: But I don't think we were missing information to come up with that, because, basically, what we -- In terms of our best scientific judgment, we assumed what susceptibility was, and I don't think there was any information missing.

DR. BUCKEL: Okay. I'm hearing that that's not a difficulty, and so we can just say none. Great. All right. Okay. The next bullet is provide advice on monitoring the stock until the next assessment. The sub-bullet is what indicators, or metrics, should be included in the SAFE report to monitor and evaluate the stock until the next assessment, and Chip and Judd have provided current data that will be included, and those are provided there. Are there others that folks would like to add or delete? Anne.

MS. MARKWITH: I think the one thing that would be useful, from a manager standpoint, would be discard information, and I know, Chip, yesterday you had something about commercial discards, not being able to get them in a timely manner, necessarily, but, at the very least, showing the recreational discards, because they do make up such a large percentage of the dead discards. I think it just gives us a broader picture on the total removals from the fishery, and, from a manager standpoint, I think that's going to be important, particularly considering the stock status.

DR. BUCKEL: Marcel.

DR. REICHERT: I think it would be useful to include the one and only fishery-independent index that was used, the recent index that was used, in the stock assessment, and so the SERFS index, whether it's the trap or the -- Which usually is available a little earlier than the video, and I think monitoring those trends would be extremely useful.

DR. BUCKEL: I think that's the third bullet.

DR. COLLIER: I do want to point out the one that's going to be there is going to be the trap index, as opposed to the combined CVID, that is usually used in the stock assessment, and so there are a little bit of differences, and what I will try to do is make sure to go back in time, so you guys can compare the trap-only to the trap-video index, to see if there's pretty large deviations between those two, but we'll do our best to make it so it's understandable.

DR. BUCKEL: Jeff, to that point, I agree that it's included, and I think it's very -- It's important for us to say that -- To mention the SERFS index, because it's a fishery-independent index, rather than abundance indices are included in the SEDAR, and name them, is my recommendation.

DR. BUCKEL: Go ahead, Anne.

MS. MARKWITH: Sorry. I have one more addition, and, Chip, this is probably going to require a comment from you, but, under social trends, you have observations of closures, and is there a way to get observations for the rec fishery, in terms of usage of descending devices and that sort of thing, because I know that's a big issue with compliance.

DR. COLLIER: I don't know if we would be able to get usage of descending devices, especially on an annual basis. That's going to be more of a research project, but we'll look into it, and, if that data is available, we'll try to put it in there, and, with black sea bass, it's probably not only usage of descending devices, but it seems to be effective to use either descending devices or venting tools on that species, and they seem to be pretty effective, based on some literature, but Jeff could probably speak better to that.

MS. MARKWITH: Right and either/or, even if it's not an annual, and even if it's on whatever timeline you all figure out, and I think it would be, if nothing else, interesting information just to have.

DR. BUCKEL: Another thing that we talked about was getting an initial indication of recruitment, and so I don't -- Maybe that's more of a research recommendation, is a recruitment index, but I know Wally has got some research going on, but -- Wally.

DR. BUBLEY: Not completely to that aspect of this, collecting recruitment data, but weren't we discussing potentially looking at ways to compare to the projections that we have ongoing? I mean, recruitment, right now, I think is one of the few things that we might actually be able to look at, at least in general trends, along with the indices of abundance, but I know, at some point, just having discussions with Erik in the past, about wanting to project out the indices of abundance, and so we can't do that right now, with this one, but potentially is there something that we can try to compare with the projections, moving forward, to give us an idea.

DR. BUCKEL: Yes, and so, for scamp, that was done, right, and we have the projection of the SERFS index, and so that was a recommendation that we made for monitoring, was to compare the projection of the SERFS index to the actual observation, and so, Erik and Matthew, is that something that can be provided? Great. Was it in the document? Okay. Thanks. Judd, when you're back up and running --

DR. CURTIS: Sorry. We're having some technical difficulties right now, and I'm trying to get us back up and running.

DR. BUCKEL: Okay. Marcel and then Alexei.

DR. REICHERT: Can I ask a question in the meantime? Erik mentioned the interim, and I keep messing up the terminologies, but the interim analyses, and is there any plan to kind of look at particular species in the near future? Then I will wait for the next presentation.

DR. BUCKEL: Wally.

DR. BUBLEY: I had a couple more, and I'm not sure if these would be research recommendations or fit in this category, but things like sex ratio proportion, if there's concerns of the population, or

distribution changes within the catches, or even looking at the age and size compositions of catches as well. Sex and age or size comps. As of right now, we're not collecting it, this year, because we've had to alternate species that we're taking reproduction from, and so, this year, it's the red species, and so we've got vermilion snapper, red snapper, and red porgy. Then next year is when we switch over to our monochromatic species, which are white grunt, gray triggerfish, and black sea bass.

DR. BUCKEL: So compare projections of the SERFS index to actual observations, and Matthew is going to provide a projection of the SERFS index to actual observations. Compare projections of SERFS index. Great. Now Alexei. Sorry.

DR. SHAROV: Just, first, along this, I don't understand what are the actual observations, and I though the SERFS index is actual observations, and what are we comparing here?

DR. BUCKEL: If you remember the scamp projections that Kyle provided for us, he projected forward what the predictions of the SERFS index would be, given that abundance.

DR. SHAROV: Okay. All right. Now back to what I wanted to say, and I was trying to recall if the assessment panel did discuss the recreational CPUE, the MRIP-based CPUE, but I do not recall if we had this discussion or not, but I would like to throw it in here, in terms of, you know, what the trends -- If the committee would entertain the idea of the recreational CPUE as an additional checkmark on the status of the stock. For a number of species in the ASMFC arena, we are using an index quite often, or sometimes.

DR. BUCKEL: Would that go under the second bullet, Alexei? Is that what you're --

DR. SHAROV: Well, if we are not currently calculating this, this essentially falls into a research recommendation, and I will go with it is relatively easy to do, plus the methodology that is being used in other stock assessments is already out there and available.

DR. BUCKEL: Erik, to that point?

DR. WILLIAMS: Yes, to that point, and Alexei is right that it gets used in other regions, but that's where the fisheries are very well defined in the MRIP dataset. In our case, we have situations where you can't define the effort well enough for it to ever produce a useful CPUE, because you can have a private boat that literally can go out and fish on four different -- Enter into what I would call four different types of fishing in a single day, and you have no way of capturing how much time, how much effort, was spent in each one of those, and so a boat could go offshore and troll for dolphin, deepwater drop, move into the shelf, catch shelf bottom species, and then go into the coastal and catch coastal pelagics, all in one day, and it shows up in the MRIP data. A perfect example is when you do sort of a Stephens and McCall, or an association analysis, and you see mackerel show up with bottom fish.

DR. BUCKEL: Thanks, Erik. Alexei.

DR. SHAROV: I don't want to argue too much, but, still, when the interview is being recorded, they do record as to which areas they fished, right, at least coastal or EEZ, which were the primary species, and which was the primary two species, et cetera, and Erik probably is right. I mean, they

have done much more than my current thinking, but I still wouldn't give up, at this point, the possibility, unless it's been really, you know, covered and concluded that it's not practical, but I don't see that, and so, anyway, I thought it was worth mentioning, and it's the judgment of the group.

DR. BUCKEL: Others? Erik, that's the paper that you mentioned, and you guys did do that. You did the analysis, and that's a published paper, where it showed the -- There was an attempt, right, to say, Erik, that these efforts are on this complex, but -- I guess I'm wondering if we should add it here as a research recommendation, maybe, since years have gone by that -- I think that was -- There was some analyses related to that, but those are dated, and so I think it's adding a research recommendation related to that. Alexei.

DR. SHAROV: Just the last thing on this, and, in the end, it's a boat trip, right, and you could have used different fishing techniques through the day, and you could have visited different areas, but, in the end, it's a boat trip, and it's the number of anglers on the boat, and it's the number of fish being caught, and, for the black sea bass being, well, one of the prime targets, right, and, I mean, they are frequently caught, and you have thousands of records, and that's the MRIP -- MRIP CPUE, potentially, compared to any fishery-independent indices, and so that's the last time you will hear from me arguing for the MRIP, but, yes, and so there we are.

DR. BUCKEL: Thanks, Alexei. Anne.

MS. MARKWITH: I just wanted to follow-up on Alexei's question, because it falls along research recommendations, but it was something that I was thinking about, because of the recruitment issues and not really having age-zero fish, but it has to do with the MRIP, and using the MRIP CPUE, as much as I don't like fisheries-dependent indices, but, if you look at the inland waters for MRIP, the bulk of these fish are discarded, and, if you're ever fished in inland waters, you know what you're catching are the young-of-the-year, age-zero and age-ones, and so I guess my question, for Erik then, is, if you know the effort is going to be more -- It's not going to be spread out, where you could be trolling, and you could be bottom-fishing, that sort of thing. Would that be a more acceptable way to use MRIP, to look at the inshore portion of the MRIP data as a recruitment indices, potentially, without violating any assumptions for the index?

DR. WILLIAMS: I would say you run into just a sort of subset of the same problems, and so, in the inshore, those black sea bass are limited to certain habitats, generally, oyster shells and things like that, and so, you know, they have to be -- What other species would they be fishing for? I don't think people are targeting black sea bass in the inshore, and so it is a bycatch, and so what are those other species they're targeting? I don't know, and I think they pick them up more randomly, you know, and they could even be flounder fishing near an oyster bed, and so then you've got the same issues of, you know, what they're devoting their effort to is not black sea bass.

MS. MARKWITH: Right, and so I was going to say, just to follow-up on that, at least, when we see them, we see them sheepshead fishing, flounder fishing, maybe drum fishing, on the inshore side, and you're right that you're not targeting them, and they're more of a bycatch species, and so I don't know how that would affect the index, but it was a just a thought, in terms of -- Because that is one of the things that we're missing, is that recruitment aspect of it, because, while we have a great survey with the SERFS stuff, we just don't pick up those young fish.

DR. WILLIAMS: The other thing I will add is the other thing that sort of -- The data starts to run out of usefulness. If you look at the average number of species recorded on a trip, for private boats, and it's 1.5, and so they don't even report multiple species, and so you have really no discriminating factors to try and separate out that effort, and so it's a mess, frankly, and I just think there's no hope to recoup anything there.

DR. BUCKEL: Good discussion, Anne and Erik. Chip.

DR. COLLIER: The other thing to consider with black sea bass is usually they're going to be interacted with from a shore-based angler. That has a much higher variance that most of the other catch estimates that we deal with, and so it -- There will be certain years that that could be ten-times what it normally is observed, and knowing whether or not that's just a sampling variation, or a true index of what's going on in the population, could be difficult to decipher.

DR. BUCKEL: Okay. Chris.

DR. DUMAS: But, on the other hand, if whatever they're doing from year to year, even if it's a mess, and even if it has high variability, if whatever they're doing from year to year stays the same, then it could be a good index, possibly, but, if what they're doing from year to year does not stay the same, perhaps, and I don't -- I know, doing inland fishing, I've caught black sea bass all over the place, and not just over oyster beds or whatever, but, anyway, thanks.

DR. BUCKEL: Alexei.

DR. SHAROV: The last time, I promise. We're using MRIP estimates for the recreational harvest, the direct catch and retained fish and discards, the most important element in this fishery, and so guess what MRIP is using to calculate those numbers? It's the CPUE based on the intercept and the effort. If they are using it, that means that they are assuming, and we are assuming, after them, that it's useful information, and so, at this point, I guess this would be a research recommendation, and it never hurts to put it in. If somebody picks up on it, we win. If not, then we'll be in the same boat as before.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: I just would like to ask a terminology question. Would we consider this black sea bass stock collapsed? I am just saying, and the reason I mention that is I understand, from speaking with some of the staff, that regulations won't be able to go into effect until 2025. Maybe that's the structure we have to deal with, and the F in the projections goes to zero in 2025, but is there any way that we can communicate that, if the stock is in a collapsed condition, or near a collapsed condition, any efforts to avoid the capture of black sea bass would be advisable, or would, you know, prevent further deterioration of the stock. That's just a question, Chair.

DR. BUCKEL: Council staff? Good question, Fred. Everybody is pointing to Chip. Mike. Mike gets it. Mike Schmidtke is coming to the table. Thanks, Mike.

DR. SCHMIDTKE: I think the question of collapsed or not -- I am not touching that at all, but I think, in regard to the advice for folks that are fishing for black sea bass, or catching them, that would really -- I mean, there is still some pretty critical decisions to be made by the SSC, in terms

of your ABC recommendation, and some of it has to do with some of the things that Matt said, and he's going to come back on, the interim years discards, the issue of how, you know, projections are going to be addressed moving forward, and so a lot of that will affect what the catch projections would be coming out of this, and I don't know that -- That would probably affect how NMFS would interpret the short-term outlook for black sea bass, in the interim of, you know, the rebuilding plan being developed into an amendment that goes into the management plan. I don't have a definitive answer for that, but I am just trying to lay out some of the factors that are still up in the air that would affect how that would be perceived, moving forward.

DR. BUCKEL: Thanks, Mike. Anne.

MS. LANGE: Well, would PSAs, or something like that, to the council, all the people on the mailing list, you know, to watch out for black sea bass and avoid -- To Fred's suggestion.

DR. BUCKEL: Scott Crosson.

DR. CROSSON: Let me say a piece here first, and this is not just a black sea bass situation. We've got red porgy, red snapper that is still undergoing overfishing, no matter what we do on retained catch regulations, and we've got gag grouper, scamp, red porgy, the entire fishery, and most of these species are concurrently caught on trips.

The entire fishery is nearing, or potentially nearing, a tipping point, and the entire weight of the management structure has been failing to address this issue, and it's cause for serious concern, and I don't object to seeing something like that being put in the record, because I think this is just -- You know, this is not an isolated species, even though we keep seeing the stock assessments as isolated species. These species are part of a complex, and we all know they're caught together, and they're all going down together, at the same time, and, if this isn't cause for serious concern, by both the agency and by the management council, and the SSC, then I'm not sure what else we could say.

DR. BUCKEL: Thanks, Scott. Chip.

DR. COLLIER: I think two things that the council has been doing, trying to address this discard issue holistically, is, one, they're developing -- They contracted with Blue Matter Science, who has presented to you guys, on developing an MSE to address how to deal with discards and potential mechanisms on what can be done to impact some of the species.

The other piece is the council has hired Ashley Oliver, and she was here yesterday, and she's not here today, unfortunately, but she is doing best fishing practices outreach. She's going to tackle shops and really trying to get the word out there on some of the best fishing practices. There has been some focus on descending devices, and the improvements that that can make for certain species, but, you know, as we're thinking about other species, like black sea bass, you know, different techniques might work for that, and there's always the avoidance one that works the best.

The fewer fish you catch -- If you don't catch the fish, it definitely survives that interaction, and so that always works the best, but she is getting out there and getting the word around, and Meg Withers has also been working on that, not necessarily for black sea bass, but also for the shallow-water grouper and red snapper, with Release, trying to get better information on the size of released

fish, and also how they're treating the fish when they go back in the water, and so we'll have some of that information.

DR. BUCKEL: Thanks, Chip. Others? Marcel.

DR. REICHERT: Well, I think it would be good for us, if we have consensus to highlight what Scott just said, you know, because we made a remark earlier that even an F of zero may not result in a reasonable rebuilding for black sea bass, and if we, as a committee, are concerned, and I think we are, then I think it would be good for us, somewhere in our report, to state that, because Scott is right that, you know, red grouper, and the whole suite of species, we've seen similar patterns, and so I think it's important for us, in our report somewhere, to highlight that.

DR. BUCKEL: Scott.

DR. CROSSON: I support, you know, improvements in best fishing practices and education and the continual use of devices that may mitigate some of the bycatch mortality, but it's also a question of the amount of access, and the council really needs to look at the amount of access that's being allowed to this fishery, because the human population pressure that's being put onto these fisheries populations is unsustainable.

DR. BUCKEL: Right. If you remember back to last April, when we were making recommendations on how to reduce F on red snapper, we said it's spatial and temporal closures, and the council -- It's difficult for them, with a species that -- Which was red snapper, that they're more numerous than they've ever been, right, and so we're going to put in temporal and spatial closures for a fish that's -- You know, it's at its highest abundance that it's ever been, or to the highest abundance it ever was, but there's all these other species that are in decline, and so, instead of waiting for some of the research that Chip was talking about, the SSC can make a strong -- Again, that statement about -- To Scott's point about that the effort has to be reduced somehow, for species beyond red snapper.

I think we need a cookie break. We'll come back to the table at five of four, 3:55, and we'll be ready to -- We'll draft some language to address Scott's point and make sure that we've got the other items finished up for black sea bass. A ten-minute break.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. Let's start making our way back, folks. Okay, Judd, if you can bring the action items back up, and so a couple -- I think we still have a few bullets to deal with for black sea bass, but, before we finish that up, we wanted to capture some language that Scott had provided, and where would that go?

DR. CURTIS: We could put that down in the overall SSC recommendations section here.

DR. BUCKEL: Yes, I agree, Judd. Others? Okay.

DR. CROSSON: I think -- You all can held edit this, and wordsmith, but the SSC is deeply concerned, not just with the status and recruitment trends of black sea bass, but also concurrently-caught species, including red porgy, gag grouper, red snapper, red grouper, scamp, and we've got

red porgy, red snapper, and we've got scamp. What else? God, there are so many right now that are in a bad -- Red snapper is a little bit different, in that recent recruitment -- I don't know how to put in red snapper.

I mean, red snapper has had good recent recruitment, but the stock is still undergoing overfishing, even if you don't allow targeted red snapper recruitment, and so I don't know how you want to put red snapper into that, but it's concurrently caught, and it's undergoing overfishing, and it's overfished, and so I am concerned about red snapper, even though I'm happy to see some positive recruitment, and so I would say -- That's different, and, I mean, I'm concerned with snowy grouper too, but snowy grouper is a deepwater thing that's not caught with these commonly, and I worry about snowy with other things in the deepwater complex. How do we want to put it? Do we want to say something like sort of the shallow-water complex is potentially in a state of collapse, and I don't know, and is that too strong of a phrase for the committee? Go ahead, Marcel, please. Help me out.

DR. REICHERT: In this respect, I would perhaps leave red snapper out, because red snapper, currently, is a different issue.

DR. CROSSON: Okay.

DR. REICHERT: Because especially we're talking about the low-recruitment trends, in particular, that we have talked about, and we can add red snapper maybe under specific problems, but, you know, it was my understanding, from your earlier comment, that this was more our collective concern about the low recruitment that we've seen in all those species.

DR. CROSSON: Then how about something along the lines of the SSC supports increased education and the use of discard mortality mitigation devices, but the council, and the agency, need to consider restricting access to limit the overfishing -- I am running out of words. Needs to consider restricting access, or consider strategies to restrict access to reverse these trends and stop overfishing and allow some of these species to recover. That's my strawman. If you want to help edit it, please so.

DR. BUCKEL: Marcel.

DR. REICHERT: No, I think this is good. The only caveat is the regime shift that we've been discussing back and forth, in terms of -- Whether even -- We don't know whether restricting access is --

DR. CROSSON: I agree with you, but part of what I'm trying to capture here is, if there is a regime shift, you still need to address the fact that you have overcapacity, okay, and the unlimited access, or relatively unrestricted access, is allowing overcapacity, and so, even if it's a biological, or geological, or whatever cause that's limiting the productivity of these stocks, you still can't -- That's not an excuse for allowing overfishing. You're going to have to change the management system.

DR. REICHERT: No, I agree. Thanks.

DR. BUCKEL: So it needs to consider strategies, and I think the council would say, well, we have the Blue Matters working on this MSE, and so that's -- We're going to have that, and so the answer, from them, would be we're working on it, and my question, to you, Scott, and others, is do you want something to happen -- Is the recommendation for something to happen before there is results from that?

DR. CROSSON: Yes, and I don't know what, and so --

DR. BUCKEL: Chip.

DR. COLLIER: I mean, this is just a technical point, but, in the report to Congress, some of these species that are listed as overfishing are not listed as overfishing in that report to Congress, and so I would caution on saying that these species are -- That overfishing is occurring, and the last stock assessment indicated that overfishing was occurring, but, as things are updated in the report to Congress, it quite often changes that overfishing determination, whether or not you're below the OFL level, or whether or not the stocks are below that OFL level.

DR. BUCKEL: Chris.

DR. DUMAS: Maybe, instead of "restrict access", maybe, instead, "reduce access", because restricted access, to some, might imply zero access, and it might not necessarily require zero access, but just reduced access in some way, where there are a lot of possibilities and options for how to reduce access.

DR. CROSSON: Could you please put -- I like that, and thank you, Chris. "To reverse these trends of overfishing", and I would also put "and discarding", because that's an essential part of what I'm trying to capture here.

DR. REICHERT: Perhaps biomass status, or just -- Because that's what we're talking about, because, if there's no fish, then overfishing may not be occurring, because there is no fish.

DR. BUCKEL: To reverse these trends of declining biomass?

DR. REICHERT: Yes, or, in the first sentence, concerned not just with the biomass status and low-recruitment trends, blah, blah, blah, but, if you add it to the second bullet, that's fine, too. It's just to address the overfishing comment earlier.

DR. BUCKEL: Judd, I think it was -- We wanted to, in the line above, get rid of the "trends of overfishing", and is that --

DR. REICHERT: "The SSC is deeply concerned not just with the biomass status", and that takes out the overfishing.

DR. LORENZEN: Do we want to be explicit and say that the increased usage of descending devices is unlikely to be sufficient to reduce discard mortality, because that's why we need those other things, because I think people are in cloud-cookoo land a little about the descending devices, and they think that that's the answer, when it almost certainly will not be enough.

DR. BUCKEL: Okay. Thanks, Kai. Judd has got that, and then, Judd, I think that last sentence was getting rid of the trends of overfishing. Then I've got --

DR. LORENZEN: Discard mortality, specifically.

DR. BUCKEL: Then I've got Fred Serchuk and then Jennifer.

DR. SERCHUK: Taking into account that presumably these stocks are overfished, and, whether overfishing is occurring or not, they're overfished, and so I would say "reduce discarding and promote rebuilding of these stocks", and that would mean that it would get at the same thing, without getting into overfishing.

DR. BUCKEL: Judd, "to reduce discarding and promote rebuilding". Thank you, Fred. Jennifer.

DR. SWEENEY-TOOKES: While I completely understand, and agree, that we're using descending devices as sort of a band-aid, by simply saying they're insufficient, we're probably undermining the use, and, really, human nature is such that people are going to stop even trying, stop even using them at all, if they hear that this is -- You know, it's not going to do anything, after all, and so why bother, and so I don't know if we want to just think about that as we make our recommendations.

DR. BUCKEL: Thank you. Marcel.

DR. REICHERT: I agree, and I thought about that, and so perhaps, if we delete that sentence and say the council needs to consider additional strategies to reduce -- I agree that we want to do everything we can not to discourage or telling people that, yes, it doesn't matter what you're doing, and it's going to be downhill anyway, and so I agree.

DR. BUCKEL: Kai, to that point, and then Anne.

DR. LORENZEN: We can maybe change it, and so we have it's not sufficient, and we can say "may not be sufficient", so that it's a little -- There's a chance that it might be enough.

MS. MARKWITH: Chip was waiting to speak, and then I can make my comment, if you still needed to say something, Chip.

DR. COLLIER: I did want to point out that many of these species have OY attached with ACLs that are set based on the ABC, and they are well below their ACL levels, and so the catch levels are also well below where they need to be, and so I'm not certain on what to do with that, but, you know, it's an overall issue in this fishery, that we're not achieving OY, and that's a negative as well, and something that should be considered. It's good that you got rid of the language of overfishing, and just focus on the discards, but it is a little bit concerning that the OY is not being achieved for most species in the fishery.

MS. MARKWITH: I was just going to say that I don't disagree with this, and what we're trying to do, but I think the bigger question, and this is -- This comes from the management side of things, and so it may be out of bounds here, but, really, what we're talking about is changing people's behavior, because you can talk to a number of guys who are like, oh, I ran into the reds, and I just

kept fishing on them, and I discarded like forty, and so it's also -- There's an educational component of changing people's behavior to make this even something the council may want to touch, and I don't -- We struggle with that, and that's just a struggle that you have in fisheries management. I don't know how to deal with it, but I do think -- I don't know if we need to address this here or something, but we need to acknowledge that, even if it's just on the record.

DR. CROSSON: Let me answer that, real quick, and we did actually -- Because of the council's MSE project, and there's also one that I'm working on with some other folks from the agency, and also from the SSC, and this issue came up during the SEP discussion yesterday, and so we did actually mention this, and Jennifer had some very good points about this, but I think that it's not an easy change, and the management does have to lead a lot of it.

As an economist, I'm not looking to anything that I think is going to lessen sort of the utility, or the value, of a fishery, and I want to increase the value of the fishery, and so it's going to require changing the way that people approach it, and there are ways to do that, and that have been done in other wildlife management situations, and I think that's all I can say right now, but I will mention a bit of this when we go to the SEP report.

DR. BUCKEL: Thanks, Scott. Anne Lange.

MS. LANGE: To Anne's point also, the first line there, where it says, "support increased education", I thought we were talking about overall education and not just on the use of descender devices, and, related to the descender devices, whoever initiated that comment, they didn't say just descender devices, and they said other means of increasing survival, and so are there other things, like dehooking devices, or should we focus only on descender, because they're deepwater, or are there other -- You know, the education part could be, you know, if you're starting to catch a lot of small black sea bass, move on.

DR. CROSSON: Again, I support all these things, but the council -- I listen to the council meetings, and the council spends plenty enough time discussing education and descender devices and all the perceived benefits from them, and I don't want to water this down any more than that. This is, to my mind, certainly an issue of the type of access, and the amount of access, that's being allowed to the fishery, and the discarding that we see -- Again, we took red snapper off of there, and I understand why, but red snapper is sort of a job for that as well, because it's just the constant access is causing discarding, to the point that you can't even allow the fishery to open for targeted retention anymore, and so this is -- I don't want to go any further into the descending devices and other mitigation, but I just wanted to make a comment about the fact that the biomass -- Especially that first bullet point is a really important one, to me, that the biomass for a lot of these species are going in a negative direction, and they're all sort of intertwined, and I think that they need to be allowed some sort of opportunity to recover.

DR. BUCKEL: Anne, I do agree with your point that the SSC supports the use of increased education to reduce discards, and, for example, descenders.

DR. LORENZEN: I agree with that, because it's really, you know, better release practices, and the descenders, or venting, is only one of the elements of that, and I also agree that, you know, no matter how hard we try, it probably is not going to be enough.

DR. BUCKEL: Right, and so another way to reduce discards is reducing effort, and that's what that last sentence is getting at, right, Scott, which we don't -- We're not explicit, and we say consider additional strategies. Are you good with that?

DR. CROSSON: Yes, and, actually, I would like -- I don't want to see taking the reducing effort out of there, because I think that's a key part of this.

DR. BUCKEL: So changing "discarding" to --

DR. CROSSON: You can leave "to reduce discarding by reducing" -- Wait. "To reduce discarding through effort reduction", or actually -- I'm sorry. Now it's getting really kind of complicated, and how about "to reduce discarding and promote rebuilding through effort reduction".

DR. LORENZEN: Now, because you're not saying "access", it's not going to be as dramatic.

DR. CROSSON: There is lots of ways to reduce effort, you know, and, as an economist, I can come up with a number of them, and so --

DR. BUCKEL: Anne Lange.

MS. LANGE: Should that second sentence come out altogether, because it's just on descending devices, the "However, despite the benefit of descending devices", and, in general, we're looking at whatever can be done to reduce effort and discards.

DR. LORENZEN: Despite the benefits of improved release practices or something.

DR. BUCKEL: The usage of them alone. Then you can take out the sentence that you're on. "However, improved release practices may not be sufficient". Okay. I think we've got the main points, and we can deal with wordsmithing when you guys review this. Any other items that you wanted to add? All right. I don't see any hands, and so we'll move back up into our -- There were a few sub-bullets that I don't think that we addressed, one of which is that we need to provide projection requests, correct?

We have projections that were presented to us yesterday, and we've already made one recommendation for the projections, given the issue of the jump in fishing mortality rate leading to those really high levels of dead discards, and so that's -- We need to provide -- I don't think we've put the language in for that, correct, that moving to a projection that's -- Instead of catch, it would be an F, a fixed F, for the interim years, and is that what we talked about? That would be based on an average F, the average F from the last three years, and is that usually, for those projections -- That's another way that you -- Okay. Thanks. So fixed F for the interim years, with F being the average F for the last three years of the time series.

Then F 0.1, and is that -- So we talked about, instead of the Fmax is -- In the assessment, it's currently being used as a proxy for FMSY, and we asked for F 0.1, as the FMSY proxy, and so the projections would use -- Okay. Other F scenarios that folks want to see? Matthew provided F equals zero with long-term average recruitment and F equals zero with recent average recruitment, and those would be redone with doing the interim F. Erik, go ahead.

DR. WILLIAMS: I was just going to say, during this discussion, and so, piggybacking on my very presentation to the SSC about projections, is think about -- I had proposed that maybe we should reconsider the default assumptions that we make for some of these projections, in particular whether managers are likely to even address discards, and, if they're not, then what does that say about how we should set that up in the projections? For instance, one thing we might consider doing is leaving discards the same, on the same level of F going forward, but only adjust the landed catch F.

DR. CROSSON: I'm sorry, and I don't understand. What would be the level that you would be moving forward, the actual recent discard levels from --

DR. WILLIAMS: Right. Something like that, and that's probably a better assumption than assuming that the discards are going to get reduced proportional to the landings. Probably an even better assumption would be that they're actually going to go up.

DR. CROSSON: I agree that a better assumption would be that they are going to go up, looking at what you did with vermilion and looking at it logically, that, yes, if you restrict active fishing, you're going to result in more discards.

DR. WILLIAMS: Yes, and all I'm asking is for any guidance on that, and we can work with that, and we can -- Something to get us at least one step closer to reality than what we've been doing.

DR. BUCKEL: Thanks, Erik. Yes, we definitely want -- We do not want to have the reduction that's going to happen in the F landing to apply to the F discard. Marcel.

DR. REICHERT: So how would you estimate that, or add that to your projections, I mean, in terms of picking what your discards are going to be?

DR. LORENZEN: You have like a discard fleet, right, basically, which is really -- Because it's a discard fleet, and so you can just leave it as it is, but that took me -- Because it's different from what we do in SS, right, but you have discards as a separate fleet, and so you just let them fish the way they always fished and discarded.

DR. BUCKEL: Go ahead, Kai.

DR. LORENZEN: I am just thinking about it makes a lot of sense that, like with red snapper, if you have a fishery that -- Where for almost all of the people go and discard, exclusively, it makes sense to have a discard fleet and a little bit of a harvest fleet.

DR. BUCKEL: Allow the discard fleet to remain constant, or even increase, and that could be --

DR. LORENZEN: I think it makes perfect sense, yes.

DR. BUCKEL: Thanks, Erik. We want to move forward with that new approach. These would be we want these for both the recent average recruitment and long-term average, to fill out the matrix. With black sea bass, it didn't appear -- With scamp, we had the upper trend, starting with recruitment, but black sea bass did not have that, and so the -- Probably we don't need to explore the sine approach that Kyle used for scamp. How do folks feel about that? I think we -- In terms

of the two rebuilding options, right, it was long-term average or the sine-wave approach that Kyle provided, and I think the conclusion was that, for scamp anyway, those were very close, and do we want to see that, some kind of exploration, or just go with the long-term average recruitment?

DR. SCHARF: I would say yes. I mean, it certainly makes -- It makes sense to have a gradual increase the mirrors the decrease, as opposed to an abrupt return to the long-term average. It didn't -- It delayed the rebuilding by a year or so, but it could be more, and it could be a couple of years, you know, and so --

DR. BUCKEL: Anne.

MS. MARKWITH: I would agree with Fred, and I think -- Because I think, even in Kyle's presentation, he said it was probably more of a realistic rebuild, even if it's not ultimately what we use for our rebuild, and I think being able to see that is important, to make a decision on recommendations.

DR. BUCKEL: Thanks, Anne. Fred Serchuk.

DR. SERCHUK: I just have a question about the fixed F for the interim years, and the interim years are generally the years that -- For example, now the ones we looked at, our recommendations, let's say for zero, or for very low, begin in 2025, because the interim years have already been set by the previous -- Previously, and so what interim F are you talking about here to be applied to the interim years? I'm not sure how that works.

DR. BUCKEL: Assessment folks can correct me if I'm wrong, but it used, I think, the mean landings from the last three years in those interim years, and that led to these Fs that were very high, that they had to put a bound on, and so the recommendation was to -- Instead of fixing catch, to fix F at what the F was in those last three years of the assessment.

DR. SERCHUK: But maybe it was too high. Just help me out. I'm not --

DR. BUCKEL: I am looking to other SSC members, if they have thoughts on -- It's a good question, Fred. Amy.

DR. SCHUELLER: I think another recommendation that we made, further up, is that we should have the landings for 2022 and put the actual landings in, instead of predicted, and so I just wanted to make sure that was noted here.

DR. BUCKEL: Yes, and Erik had mentioned that, that this would be one where -- Because those are so important, that getting the actual values, and using those in the interim. Mike Schmidtke.

DR. SCHMIDTKE: I guess, kind of addressing some of Fred's question, and the issue that's trying to be dealt with in these interim years, and so, if you look at Tables 21 through 25, and look at the years for 2022 through 2024, under the dead discards column, and so that would be D.b, and I'm looking at the N, the number of fish, but it could probably apply to weight as well, but you will notice that the numbers that are in those three years for your dead discards are much, much higher than any dead discards numbers that we've observed in the fishery in recent times, and this is like several times higher.

In the case of the F equals zero run, in Table 22, by 2024, we're talking about -- The median number is fourteen-million, and we're talking about eight-million dead discards, when, if you look higher in the time series, the removals from dead discards are in the high hundred-thousands, maybe up to one-million, and so there's a very large discrepancy there, and that may -- That may be affecting what the projections look like in the long-term, because, if you have discards multiplied by several times, for three years in a row, that could affect -- Dead discards, particularly, multiplied by several times, for three years in a row, that could affect your stock outlook.

DR. BUCKEL: I think that's -- We discussed this one before, I think, Mike, and you can correct me if I'm wrong, but this is where the F is going to -- It's the F equals to ten, and so we're trying to deal with that by, instead of using constant landings, using a constant F.

DR. SCHMIDTKE: Right, and I was just responding to Fred's question of why -- Like what the impact of this would potentially be and pointing to where that fits in with the numbers that we have in the assessment right now.

DR. BUCKEL: Thanks, Mike.

DR. SERCHUK: But my point, Chair, was the numbers in the interim years are based on the catches that have been set for those years, the ABCs that have been set for those years, and is that correct, before the new assessment can be -- In other words, we're talking now that it will take two years for our recommendations to go into effect in 2025, and so the existing regulatory regime will go into the interim years, correct?

DR. BUCKEL: Correct.

DR. SERCHUK: So I don't know how you can change that. I was told, before, that it takes two years to get things evolved through the process.

DR. BUCKEL: The fixed F for the interim years would be coming from what has happened in the last three years, right, and so we're assuming that's going to move into the interim, because that's what we saw in the last three years, the last three years of the assessment, under that regulatory and recent population conditions, and we're assuming that's going to be in those interim years and not some new F that we're going to --

DR. SERCHUK: I understand, but I just don't understand the process here. When we have -- Generally, we have catch quotas that are set, and they're going to be set for 2023 and 2024 already, and, whatever they are, that's going to result in a certain amount of catch and discarding, correct, and we can't apply a new F for that, because those have already been through the regulatory process, and maybe I'm wrong. If I am, maybe I'm not understanding it.

DR. BUCKEL: Mike.

DR. SCHMIDTKE: In the case of black sea bass, the limits that are set are very likely not going to affect the catch, because we're not catching anywhere near the limit. The catches, in recent times, have been maybe 50 percent of the annual catch limit, or often lower, and so that's likely going to continue in the interim years, before new management is put into place, but, in terms of

how this is -- You know, how this is playing into the projections, I guess the question that is being addressed, through these adjustments, is do you think that it's realistic that, within the two to three years of interim that are being projected forward, those first few years that are being projected forward, that the mortality from dead discards is going to multiply by eight or nine-times, within three years? Do you think that's an effect, if management is held consistent, that that would be carried forward, and this is addressing that, because it's holding the fishing mortality more towards what it's been, as opposed to allowing it to increase in a way that may not be -- That may not be reasonable.

DR. BUCKEL: Alexei.

DR. SHAROV: Maybe it's worth looking at the assessment results for the last years and see what was more stable, the fishing mortality or the catch, and, therefore, make a decision of what do we use for the projections for the interim, and would it be the average F for the last three years, and we think that that would be sort of -- That's what is likely to happen within the next three years, because the trend in SSB is declining, and so the SSB is declining quite precipitously, and so what's going to happen in the next two years?

If the trend continues, the SSB declines, but the fishery, and the fishermen, will be able to maintain the catch, at least at the current level, because they are willing to, and are able to, and then the F will be increasing, rather than staying stable, right, or, if the F is going to stay above the same level as in the previous years, then the catches should be declining, and all I'm saying is that the history, the most recent history, may give us some advice as to what is likely to happen, whether the catch rates, or the exploitation rates, will be stable or the catch will be stable, and that will help with the choice of projections.

DR. BUCKEL: Judd, if you could maybe pull that up, to address Alexei's question. Anne.

MS. MARKWITH: I guess this was kind of to Fred, but more to Mike Schmidtke's comment, and I think using that interim F is more realistic of the fishery, and what the fishery is right now, than the landings, and I don't foresee that changing in the interim years, until management, additional management, can occur, and I think it's going to give us a more realistic expectation of what the stock may do, with the projection, and so -- Because an F of 10 just, for sea bass, seems ridiculous. Like I understand that it needed to be bounded, and that's what the choice was, but I think we'll probably get a more realistic projection using those interim Fs, since they are based on the fishery as it is.

DR. BUCKEL: Fred Scharf.

DR. SCHARF: Fred, can I ask if you were at -- Are you kind of getting at the possibility if we're able to set an interim ABC? Is that sort of what you're sort of driving at, like why are we using these fixed Fs from the -- When the stock has an overfishing status, and why don't we set an interim ABC? No? Okay. You're not getting at that.

DR. SERCHUK: Perhaps I don't understand the process as well as I should. What I'm saying is you take an assessment, and it goes through the last year you have data, but then you know that there are management regulations that are already set for 2023 and 2024, and that implies a certain catch in those years, because they're following whatever previous recommendations are from the

last assessment, and are we suggesting that we're going to change that somehow? Okay, and so I don't understand where the interim F comes from and how it can be applied to those interim years. The interim years are the years between the end of the assessment and the beginning of the next regulatory cycle in which the assessment can be applied to, and is that correct?

DR. BUCKEL: That's my understanding, yes, and, if the interim years are 2022 and 2023, these Fs would be coming from 2021, 2020, and 2019. Judd can zoom-in on -- Alexei had the question of if they were stable, and so I don't see evidence of a decline, and it's kind of bouncing around in that last four or five years. Fred, does that help? Alexei, you had a question about how stable it was.

DR. SHAROV: Looking at this scale, just because of that spike, and, I mean, it's very compressed, but, on my end, I'm looking at the MRIP estimates of black sea bass, A plus B1 and B2, and so A plus B1, for the last several years, was -- There was very little difference, and so it was pretty consistent, like almost constant, and B2, in the most recent year, increased, but, otherwise, you know, again, not too much variability, and I don't know. I don't know how the scale in F changes would look compared to that, but, to answer Fred's question, I guess, for these two years, we're just simply trying to predict what is going to happen and whether the fishery, in general, will generate the average level of fishing mortality that we've had over the last three years.

My addition to this was only that, well, maybe they will -- They will be more successful in maintaining the level of the catch, consistent with the last three years, and, therefore, the F will vary accordingly, and so either/or, and, until it happens, and a few years later, we'll find out which one will prevail, or we'll see that maybe it's worth looking at the past years and then decide to project forward or project forward using the absolute removals. The more frequent approach is using the rate, right, and just taking the average F, and that's all.

DR. BUCKEL: Others that want to chime-in on the -- Do you have thoughts on what to use in the interim years? Erik.

DR. JOHNSON: I would just say, I mean, if you're using landings, and the Fs come out to be above ten, that doesn't seem particularly realistic, relative to using what's been going on for the last -- I mean, it bounces around one to 1.5 for the last six or seven years, the F.

DR. BUCKEL: Thank you. Okay. Judd, do you want to pull the action items back up, and so projections -- We want to make sure that we get our projection requests in, and we don't want to have those come back and then we say, oh, well, what about Projection A, B, and C, when we only asked for X, Y, and Z, and so think about these carefully, and are there projections that you would like to see for black sea bass that we don't have captured? Marcel.

DR. REICHERT: On the use of actual landings, that includes discards for 2022, I assume, if we have that information, and not just landings?

DR. BUCKEL: Correct, and I guess that's maybe a consider or -- What's the right -- Chip.

DR. COLLIER: Consider partial information, or consider all information that's available, and it might be partial, and so we definitely have the recreational discards, and those are available, and

we'll have recreational and commercial catch. If we can get commercial discards, that would be great, but maybe that would be the one block that we have to fill in differently.

DR. BUCKEL: Thanks, Chip. Erik.

DR. WILLIAMS: I don't know, and maybe you guys can't answer this yet, because you do want to see the like suite of options and projections, but to narrow down what is the scenario that you're focused on for ABC determination, and what is the core set of assumptions that you would want to see. If there was only one run that you could get and you had to set ABC, what configuration would it look like? I understand if you can't answer that completely.

DR. BUCKEL: I think, based on the workgroup, right, for ABC, it would be recent average recruitment, and we had a discussion about the FMSY proxy, and that would be -- So is that F zero 75 percent F 0.1? What are folks' thoughts on that, to address Erik's question? If we could get one for ABC, is that the -- Judd, if you could capture that, and I'm seeing nodding heads. Recent average recruitment and then the guidance on what recent is. So recent, and then, in parentheses, after the word "recent", 2014 to 2019, and then there were some hands over here. Chris.

DR. DUMAS: If we use sort of a projection analysis based on average recruitment, recent recruitment, long-term average, short-term average, last three years, any of those is an assumed projection model, it's an assumed time series projection model, and just if you just say, hey, let's just make it simple and keep the long run, just based on the long-run average, right, if that's the only thing we've got, and, well, if that's an assumed model, what that is assuming is that, you know, each additional year is being averaged for all the previous years, according to the formula of an average, taking an average.

That's very restrictive, and it may not be the best use of the data. We might just want to do a run, a time series model, for example a vector autoregressive model, and use that, and then, if that model says the best thing to do is use an average, the average of the prior data points, or the average of the last three years, the average of the last five years, that's what it will say. That's what that outcome will be, but, if there's a way to get a better estimate, a better projection, then it will tell you that, and so it seems like that would be, you know, a better way to go.

Some folks say, well, you know, there have been some studies of time series models, and they don't do very well, right, and, well, using an average is a time series model, and so, if you say we're just going to use that average, that's saying we're going to use a time series model, and we're going to use a very specific one, right, rather than using a time series model that's been --

The one that's best estimated based on your data, and so, if I were going to give some guidance for projections, I would say let's use some of these -- Some types of, you know, time series type of analysis that makes the best use of the data that we have and makes the best projection possible, and, if that turns out to be a simple average from the past, well, fine, but, if it's something better, fine, and, if it turns out that you do the time series analysis, and, basically, you have no confidence at all in your projections, well, you would have that same lack of confidence if you just used a long-term average, because, if no time series models help form projections, then that includes using an average that's not helpful in a projection, and so it seems like you could do no worse, and perhaps do better, by using some of the methods that have been -- Statistical methods that have been developed specifically for making projections and forecasts.

DR. BUCKEL: Amy.

DR. SCHUELLER: In the catch levels projections working group, we reviewed the Van Beveren paper, and that paper showed that those methods didn't perform any better than using the average in these types of projections, and so, I mean, the workgroup did talk about that, did review this paper and this work, and then made a recommendation, given that, and I don't know that there's been any new papers that would suggest otherwise, and so I disagree, I guess, just based on that paper and what the workgroup has already reviewed.

DR. DUMAS: Right, and I made that same point, you know, as part of the workgroup, and I made that point that I just made, and I made it again, and so, if we want to use long-term average, or average of the last few years or whatever, that's fine, but all you're saying is we're choosing to use a very specific time series model, namely the average, as our time series model, and that's how we're going to combine together all the data points that we have from the past, and we're going to use that specific -- What formula are we going to use? The formula of the average, and we're picking an average. That's it.

DR. BUCKEL: To link this back to one of Fred Serchuk's comments yesterday, it was we need to -- Are we doing any checks on how we do, and so one thing we could -- That's an additional thing that we could check, is using this -- The recent average, and how does it look compared to -- But that's a research recommendation, and I don't know if -- We're talking about the response variables recruitment, right, and so you're going to try to predict recruitment into the future with this modeling approach, and to see how well it does, that does, compared to the recent average for our species, and that would take some work, and maybe that goes under a research recommendation.

DR. DUMAS: Yes.

DR. BUCKEL: Thanks, Chris. That may have been captured in some language. Amy.

DR. SCHUELLER: I just want to make the comment that, in that workgroup report on the projections, there was a list of recommendations in there, and requests, for certain figures to be included in the stock assessment documents, the documentation, and I went back and looked at that, and so it would be nice if we could start including those things in the future, because I think that they will help with some of these discussions, and we did provide a pretty pointed list of things that we were looking for, and so I'm just bringing that back up for the group's attention and memory, because I had to remember it myself.

DR. BUCKEL: So, Judd, if you could have a bullet to go back to the workgroup report and request the -- Request the model output. Amy, was it tables or graphs that you had or -- I can't remember, and I haven't looked at that in a while.

DR. SCHUELLER: It was just a bulleted list of items, and so some of them were figures, and I would have to review it, and clearly we're not going to get that now, but just trying to, you know, dredge up everybody's memory that we have these requests, and hopefully we will start seeing them, as we continue to get new assessment documentation and new assessments.

DR. BUCKEL: Right now, we've got -- For projections, it's going to be the 75 percent F 0.1, recent average recruitment for ABC, and then that same 75 percent F 0.1 with long-term recruitment for the rebuilding, and then also the sine wave, and so those would be -- Is that three? Chip.

DR. COLLIER: I think you covered it there, and I just wanted to make sure that the rebuilding projections were in there, and I saw that it was mentioned, and just making sure that it was covered well, and the other -- To Amy's point, about making sure that we get those requests from the workgroup in there, they are in the recent terms of reference, and so we are working on it, but it just takes a little while to get it through the system.

DR. BUCKEL: Thank you, Chip. Judd, when you're done there, I want to just make sure we've hit all the bullets, and I think we've got them all, but if you could scroll up, just so we can -- We've got several different new research -- I don't think we addressed the question on the research recommendations that are in the assessment, and do folks that were on that action item -- Review the included research recommendations and indicate those most likely to reduce risk and uncertainty in the next assessment. Did anyone have any -- From those that were assigned that -- Go ahead, Wally.

DR. BUBLEY: Based on what we've been talking about -- I mean, there were a couple that involved natural mortality, and getting a firmer grasp on that, which I think is, obviously, for everything, and it would reduce uncertainty, if we have a little better understanding of that. Then there was also some regarding discard mortality, with discard and discard mortality, potentially, both of them, here as well, which, again, I think that is one of the big talking points that we've been discussing with these.

DR. BUCKEL: So that's sex ratios, distribution changes, and age-zero comps, and I don't think those were -- That would be providing the additional, and so, to Wally's -- Of the research recommendations that were included in the assessment, the ones that would most likely reduce risk and uncertainty in the future are research related to natural mortality and discards and discard mortality. Do others have input? Kai.

DR. LORENZEN: The question of how best to measure spawner biomass for the female, or male and female, or female and sex ratio, or I don't know, but just the best measure of spawner biomass.

DR. BUCKEL: Marcel and then Anne. Go ahead, Anne.

MS. MARKWITH: I agree with what Wally had, particularly on the discards, because I think that is -- In all stock assessments, that's an issue, and, if we can get length information on the discards, whether it's through commercial observing or the Release app, and I don't know if sea bass is on the Release app or not, but it would be worth exploring, and maybe not for the next assessment, but just in general. I also think we need to add in there the recreational fishery, and getting better biological samples from the rec fishery, whether it's through carcass collection or something, so that we can actually have some age comps for the recreational fishery.

DR. BUCKEL: Thanks, Anne. Marcel.

DR. REICHERT: Those last two, are those -- Were those in the original report, or are those two additional ones?

MS. MARKWITH: At least for the rec fishery, that's in the report.

DR. REICHERT: Okay. I forgot.

DR. BUCKEL: I am just wading through them, and, Kai, that was your point, about the measuring spawning biomass, and was that in the list of research recommendations that were in the assessment report?

DR. BUBLEY: It was. It was actually, I think, from the previous assessment, and it was one of the ones that carried over. I think it was one of the ones that carried over from the previous assessment to this most recent one.

DR. BUCKEL: The part about the investigate methods for incorporating the dynamics, yes, of sexual transition. Others? Wally.

DR. BUBLEY: This one I missed, and the research is needed for causes of low recruitment that's ongoing currently, and that's one of the ones that was listed here.

DR. BUCKEL: So that's a good priority list, and then the second bullet -- We've got a few additional research recommendations there, but then there's other comments that were captured, and those are, I think, from Chris's email, and that can be put up there, or we can deal with that -- I will give folks a couple of minutes to read Chris's summary of future research from the discussion yesterday.

DR. DUMAS: Those last two are points that I already made, and so we already discussed them, and the first two points were just placeholders for other folks, just so -- Those are things that were points that were made while we were discussing uncertainty, and that was when I was taking notes, and so the first one was from Kai, and one was from Wally, and I'm not sure if I captured what you said, and they were just placeholders to remind me to bring up those points at this point in the discussion.

DR. BUCKEL: Thanks, Chris. Are there other research recommendations for that second bullet? We'll go with Alexei and then Wally.

DR. SHAROV: I just wanted to come back, for a moment, on the sex ratios and what is the best way of measuring spawning stock biomass, and I thought that was pretty much the same, or almost the same, and, well, at the very least, the how to measure spawning stock biomass was articulated well, but just saying "sex ratios", and I don't understand what do we mean here, and so are we just saying that we want to calculate the sex ratios within the assessment for each year of the analysis, whether this is the ratio in numbers or ratio in biomass, and I think we need to be more specific, and, in order to be more specific, I wanted to bring an example up, and Fred made a very important comment today, which certainly should be investigated, and that is that the effect of the fishing mortality on changes in the sex ratios in the specific --

And in the female spawning stock biomass, and that is the idea for the increased fishing pressure, given the regulatory minimum size, and we are removing males -- Females get triggered to turn into males, and, by doing so, we are increasingly -- We are increasing the rate of the turning from females into males, and then we are reducing spawning stock biomass, and we're currently not accounting for this process, and this could be a significant issue, probably, and answer to when we have this precipitous decline. It's a total speculation, but it is a subject for research, and thank you, Fred, for the idea.

DR. BUCKEL: Judd, looking at the --

DR. SCHARF: Judd, it would be the effects on the size at sex transition.

DR. BUCKEL: To Alexei's point, before we go to Wally, and I will let Judd get this captured, and so the bullet above, those three items, we had initially put into monitoring, things to monitor, but we realized that we're not going to have sex ratios that -- It's not something that Chip is going to be able to get immediately, and so we put it down under the research recommendations, and so that would be monitoring annual estimates of sex ratios, to your point, Alexei, about what exactly are we asking for, and it could also be the age-dependent proportions, to address the second bullet, and so, for sex ratios, monitoring annual -- Then that can be its own. Wally.

DR. BUBLEY: All right, and so, in regard to that one, I don't think it was age-zero comps, because I don't think we have any age-zero comps, and I think it was just age or length compositions, when we brought it up. In regard to Alexei's points, one of the previous research recommendations was to investigate the sexual transition for temporal patterns, considering possible mechanistic explanations, and so that would be in one of the previous research recommendations that were included.

DR. BUCKEL: Thanks, Wally.

DR. BUBLEY: I think we would probably be remiss if we don't put additional research recommendations for something with a regime change, since we've talked about that a lot, with multiple species at this point, and I don't know exactly what it is, but some sort of exploration that we can try to get a firmer grasp on what might be happening.

DR. BUCKEL: Great. George.

DR. SEDBERRY: Along those same lines of a regime change, somehow getting a handle on predation by and competition with lionfish and red snapper. I know there's some work being done there, but I haven't seen any of it coming out, but I think we could maybe enhance that.

DR. BUCKEL: Thanks, George, and that was brought up by Charlie Phillips yesterday, and so thanks for getting that on the SSC record. Anne Markwith and then Jennifer.

MS. MARKWITH: Would it be appropriate to add here the development of a recruitment index, and like, even if MRIP is out, knowing that the age-zero and the age-one fish, young-of-the-year, are occurring more in inland waters, and the possibility of creating a sampling program that could be used is higher at the state level, or the federal level, because it's a lot easier to sample inshore

than it is off, and so it might be beneficial to at least put that thought there, so that people can start thinking about it, if there's not somebody already thinking about it or has a pilot program going.

DR. BUCKEL: I don't know of anyone, and I do know that there is some research out of UNC Chapel Hill, some otolith microchemistry analyses, that showed that -- For black sea bass, they're a little different than gag, right, and the gag larvae actually recruit into the estuary, whereas, for black sea bass, they recruit to the shelf, and then age-zeroes move in, but the analysis that was done by UNC Chapel Hill showed that, for the adults that you get offshore, a large proportion was from age -- They spent their age-zero life offshore, and so then it's hard to know if that signal you see in the estuary is -- Are you getting the full age-zero recruitment, and so -- But I think it's worth continuing to research, but I just wanted to make that point, that the age-zeroes in the estuary aren't the whole story. Jennifer.

DR. SWEENEY-TOOKES: I'm not sure if this is the right time, or the right place, but, in light of conversations we've been having about all of the unknowns, and all of the things that are uncertain, and also in light of the increased efforts on behalf of council staff to enlist people in citizen science efforts, I wonder if this is a place to say something about looking for information more broadly, and not necessarily the same types of data that we've always used, but maybe being open to new types of information and what that could look like.

DR. BUCKEL: Judd is capturing that, and so please, Jennifer, if you want to help with the wordsmithing. George.

DR. SEDBERRY: I was wondering if there's any state monitoring of bycatch in blue crab traps, either in the estuary or, you know, now they're fishing just offshore, just along the beach, and they catch black sea bass, and I don't know what the retention is, with the mesh size and everything, but there might be some opportunity there to get a recruitment index.

DR. BUCKEL: I am not aware of any, and Anne is shaking her head for North Carolina.

MS. MARKWITH: We don't have an observer program for blue crab.

DR. BUCKEL: Marcel.

DR. REICHERT: But, to make a link to Jennifer, there's a lot of people that catch blue crabs in blue crab traps that are not commercial fishermen, and, anyway, I think there's potential -- It's worthwhile seeing if and where we could potentially get some information from other sources, like the one you mentioned, and, in addition to that, I think, adding the development of a juvenile index in our research recommendations, whether or not it's inshore or offshore, or building on what's happening at South Carolina DNR right now, because I think that's, in particular for black sea bass, and it's good for other species too, and it may be important information for future stock assessments.

DR. BUCKEL: Good. That's a nice way to capture that discussion, Marcel. Thanks. Others? Good discussion, and good recommendations, everyone. The last bullet is provide guidance on the next assessment, addressing its timing and type. Marcel.

DR. REICHERT: That goes back to my earlier comment on interim analysis, and I think it would be very useful if, you know, if we could use that mechanism with black sea bass, and Erik mentioned that he may address it in the upcoming presentation, but, in particular for black sea bass, because I'm not sure that any full-blown stock assessment in the next couple of years is going to give us a different answer, but at least interim analysis, or similar analyses, can tell us a little bit about what the stock is doing, in particular in term of potential recruitment.

In terms of the next full assessment, I think five years is usually what we recommend, and, again, given all the other assessments that are on the schedule, how realistic that is, but I think, for us, monitoring, or seeing, what's happening with the stock, in general, would be very good, and helpful, in terms of a recommendation of the next full-fledged stock assessment.

DR. BUCKEL: I agree, Marcel, and this is -- I was looking at how we responded to this question for scamp, because we had similar language, and so, in there, we had the timing, a minimum of five years, and then the recommendation was to examine the CVID index, landings, and discards, to determine if substantial changes have occurred to inform if a new assessment is warranted.

DR. REICHERT: I suggest that we basically copy that language to the black sea bass.

DR. BUCKEL: I agree. Okay, and so Fred Serchuk.

DR. SERCHUK: I am not clear what an interim analysis is, and if we could be more specific, and are you talking about a survey index, or are you talking about catch rates, or are you talking about -- What exactly are we talking about? I mean, it's really important. I mean, if you do have a pop survey, and you can get an annual index, that might be something worth looking at. If you do have catch rates of -- I think it's important to talk about what you're talking about relative to how much that information can be used with respect to are we on target or are we not on target.

DR. BUCKEL: I think Erik is going to enlighten us on the interim analysis, or we can -- I just sent the language of the specific things that we would monitor, and we can just take out "interim analysis", because we know we can monitor the -- Matthew is going to provide the projected -- In addition to the projections for SSB, he's going to provide projections for the SERFS index, what would be expected, given abundance, and we can compare that, and that's one thing that we can compare, that SERFS index projection to the observed SERFS index.

DR. SERCHUK: An interim analysis suggests that it's not going to be a lot of work, and it's going to be something either a routine survey output or routine information that's collected, and that could be useful to say are we on track or are we not on track.

DR. BUCKEL: Yes. Agreed. Chip, did you have something?

DR. COLLIER: Yes, and I was just going to say the terminal year of the previous assessment was 2016, and the terminal year for this one was 2015, and there are dramatic changes between those two different time periods, and I think it might be good to at least use that as an upper bound on what you think is a good timing for this, and probably even a shorter time period, given how dramatically the stock changed, and it went from not overfished and not overfishing to really bad news, and so just to keep that on mind on when to put this -- When you guys would like to see a schedule for this again.

DR. SCHARF: Chip, can you clarify, and what was the terminal year in SEDAR 56?

DR. COLLIER: 2016.

DR. SCHARF: This one was 2021? Okay.

DR. BUCKEL: So we had the timing as a minimum of five years, and that's -- We took that from the response to this sub-bullet from scamp, and are folks comfortable with that for black sea bass, or, given Chip's comment, did -- Marcel.

DR. REICHERT: I think -- I don't think we have done that, but the minimum of five years from the terminal year of data, or a minimum of five years from now, and I think that -- Especially since we are -- You know, we're talking about two years since the terminal year of the assessment.

DR. BUCKEL: Wally.

DR. BUBLEY: In regard to Chip's point, I think things can go downhill a lot faster than they can go back up, and so I don't know if we need -- If that's as much of a concern, because of where the status is right now.

DR. BUCKEL: Anne Lange.

MS. LANGE: Should it be a maximum of five years, instead of a minimum? Do we want to make sure we have an assessment with --

DR. BUCKEL: Fred was saying that too, and, yes, and it's a little different than what we were getting at with scamp, and so yes. Dustin.

MR. ADDIS: I mean, presumably, we would have the interim analysis within the next two years or something, between the next assessment.

DR. BUCKEL: Marcel.

DR. REICHERT: Still, do we mean within five years from the terminal year or within five years from now? I would say within the terminal year, but that comes up really, really quickly, and I think that schedule is pretty much set, at the moment. I think we need to be very specific, in terms of our recommendations here.

DR. SCHARF: If we use that, then we would -- If we did five from the next terminal year, then we could specify that the terminal year of the next assessment would be 2026, at the latest.

DR. BUCKEL: Did you catch that, Judd? With a new terminal year --

DR. SCHARF: Yes, a new terminal year of 2026, and, off the record, I don't think this is going to matter much, because Erik has a whole set of fantastic interim analyses that he's going to share with us.

DR. BUCKEL: Wally.

DR. BUBLEY: Aren't the last two bullet points kind of at odds with each other, because isn't that the point of what we were talking about with scamp, was where we were just going to kind of leave it pseudo open-ended, to see if there was a need for it, and so, I mean, I don't know, and I think two of those bullets in there, at the same time, is kind of confusing.

DR. BUCKEL: You're talking about the within five years and then which -- The interim analysis bullet or the --

DR. BUBLEY: Well, those last two, because the timing of it -- With the scamp, what we put in was it was a minimum of five years, but that was based on sort of interim analyses that we were dealing with, and so, if we have interim analyses, and then we're also setting a time point, it doesn't -- I mean, the last part of that is inform if a new assessment is warranted, and then, right after that, we're saying by 2026.

DR. BUCKEL: I agree. I think, if the monitoring alone, or the interim analyses, show that recruitment has continued to be super low, then there's probably -- We know what the answer is going to be, and we may not want to go down that path of all of the work of an assessment. Marcel.

DR. REICHERT: We can basically say, "or to be adjusted based on the results of interim analyses", or something like that, but, anyway, we've made these recommendations before, and I don't think it ever happened according to our recommended schedule anyway, and I don't want to be too negative, but I think, again, the interim analysis really, I think, is going to provide us information to provide additional recommendations relative to stock assessment schedules.

DR. BUCKEL: Thanks. Fred Serchuk.

DR. SERCHUK: Do we need to specify the next assessment as a research track assessment, or do we have to specify it as, you know, continuing the same model, and I think this is an important issue, quite frankly. You know, I think, in some cases, we haven't been specific enough, and so we use an existing model that may be ten years old, from a previous research track, and things change over that time, and so I think we need to give some thought to this, of how many years should pass before we think, wait a second, enough years have passed, or maybe the science has changed, and maybe we want to look at modeling efforts different than they were before, as opposed to, okay, five years, and we're going to use the same modeling structure, more or less, that we had in the previous assessment, and so I think we need to make that differentiation. Thank you.

DR. BUCKEL: Thanks, Fred, and we're asked to provide guidance on that, and so we have research or operational to discuss. Kai.

DR. LORENZEN: I heard, over lunch, that the next big thing is a foundation assessment, but, yes, some -- I mean, has this thing had a research track assessment, black sea bass?

DR. BUCKEL: It's had benchmark.

DR. LORENZEN: Benchmark, which we no longer do.

DR. BUCKEL: Right, and so it has not -- Under the new terminology, and methodology, it has not had a research track. Amy.

DR. SCHUELLER: I was just going to make the comment that, regardless of what we're calling these different assessments -- Even with operational assessments, there are improvements to the modeling choices that are being made as these new operational assessments are coming about, and so it isn't like we're still using the 2005 black sea bass model, and we're using an updated version, based on all of the stock assessment method improvements that have occurred between now and then, and I don't know what we're calling these things as we move forward anyway, and so --

DR. BUCKEL: I think Amy's recommendation is an operational here. We can put that up as a strawman and let others comment.

DR. LORENZEN: An operational benchmark.

DR. BUCKEL: Foundational operational. Anne.

MS. MARKWITH: If my understanding is correct, the research track is more like a benchmark, and the operational is more like an update, just in terms of how I think. Based on the research recommendations we made, do we honestly think we're going to have new data streams to go into the assessment to warrant a research track, or should we just stay with the operational, knowing that some of those data streams are going to take us a while to vet and come up with and have a long enough time series? If the answer is they're going to take us a while, I would say operational would probably be the better option.

DR. BUCKEL: Kai.

DR. LORENZEN: It's not just the new data, and so, for example, the question of would we use female biomass or combined male or female, and you could argue that that's not -- That would take it out of the realm of the operational, because it would be a structural change, and, you know, whether or not that is still seen that way, I don't know, but, yes, operational, with the flexibility to explore structural changes. Then who knows what this will be called by the time we get there.

DR. BUCKEL: Thanks. Are folks comfortable with that? All right. Judd, how did we do? Did we hit all the bullets?

DR. CURTIS: I think we've got all the bullets.

DR. BUCKEL: All right. Do you have any other -- Before we adjourn, Judd is just going to pull up the agenda, and we'll see what we -- We missed a few things today.

DR. CURTIS: All right, and so I think the better part of the afternoon was our black sea bass, and so we tackled that, and so we've got a few agenda items that we had to pass over this afternoon, namely the vermilion snapper interim analysis, and we need to form some workgroups, and then do an SEP report summary. Some of these things we can probably -- We can push off.

Starting tomorrow, we have Dr. Jason Link and Steve Cadrin at our 8:30 slot, and that is fixed, and so we need to start right away with that, and then Tracey can come in and do the SERFS report, and so we'll try to get through as many agenda items as we can, and we do have the option for some of these things, and like I'm thinking about the research and monitoring plan, and that might be something that might be just like kind of a take-home exercise that we can do via email, as well as some of those others, and so that's kind of where we're at right now.

DR. BUCKEL: One o'clock tomorrow is the coral distribution?

DR. CURTIS: Yes. At one o'clock tomorrow, we have Matthew Poti talking about the coral distribution model, which we had to postpone from this morning, and he was unavailable this afternoon, and so he'll be presenting tomorrow at 1:00 p.m.

DR. BUCKEL: Scott Crosson, it's 5:30, and is your SEP report a half-hour or ten minutes?

DR. CROSSON: I can be briefer than that.

DR. BUCKEL: Are folks willing to --

DR. CROSSON: It's up to you.

DR. BUCKEL: I am seeing some nodding heads.

## SEP REPORT SUMMARY

DR. CROSSON: This is not a presentation, and so I'll just briefly go over the SEP report, and I don't know -- The agenda for the SEP is available on the council's website, but I will just briefly go through there, and I don't know if Judd wants to pull it up while I'm talking.

We met on Monday afternoon and Tuesday morning, and so, other than the informational stuff, we had some more stuff on citizen science, which we are kind of -- It's almost like a constant dialogue with the council staff about citizen science and what we think about different projects. Our own Dr. Tookes is involved with some of these measures, and so she was an active participant, and she actually presented some stuff as well, and so I can go into detail, but that will be in the SEP report, and there is probably quite a lot of comments.

We saw a presentation on the impact of COVID on the commercial and recreational fisheries data streams, and the biggest discussion question that we had was whether that should be -- How to account for that when analyzing the potential impacts of management proposals in FMPs, and so the question was that 2020, and then also 2021, were kind of unusual years, and so should they be excluded from the data stream, and the general consensus of the committee was that, no, they should not be excluded, because we're not back to a new normal.

Some of the things that did affect fisheries, including the disruption to the supply chain for gear, or labor shortages, are still -- I mean, that one is especially still ongoing, with all the different labor issues that we're having in the country right now, and the relatively low unemployment rates, and so we kind of discussed that, but we just said just keep going and include the years into the data

stream for management, and so don't take anything differently. They did affect recreational and commercial fisheries somewhat differently, but things have kind of gotten back from a normal, or a new normal, at any rate.

You're going to see a presentation on the portfolio theory from Jason Link and Steve Cadrin and company tomorrow morning, and I'm not quite sure what to tell the rest of the SSC. We kind of gave them the econ seminar treatment yesterday, which I don't know that they were fully prepared for, but I think the gist of it was -- It was mostly the conversation was pretty much dominated by the economists on the SEP, and the economists on the SEP didn't -- They were critical of the underlying theory, and they were critical of the use of the data stream, and they were critical of the model, and the way that they handled the different variables, and they were critical of conclusions, and they thought it had no utility for management, and so, other than that, they thought it was fine. That was the summation of it. There was extreme skepticism from the economists, and so --

DR. BUCKEL: Fred Serchuk has his hand up.

DR. CROSSON: Go ahead.

DR. SERCHUK: Exactly the same reception was given at the New England Council, by the economists and social scientists, and so I'm a little bit surprised that it's being presented here, because it's based on sort of economic approaches, and the economists zoomed right in on it, and so I don't think we're going to get very much out of it, if we don't have an economic background, quite frankly, because they are used to this type of approach, for things that they are very familiar with, but it has very little bearing on our work, and, particularly, the most critical thing that I got out of it, as a layperson, was they're using prices, rather than -- They're not considering costs, and, from an economist's point of view, basically, you're dead in the water if you don't include costs in your portfolio, and would that be correct?

DR. CROSSON: That's exactly -- That was one of the first things that was picked up on, and latched onto, and just shaken around, was the fact that you wouldn't -- You would not consider it an investment portfolio if you didn't have some idea of the underlying costs of what you were investing it, and so that was -- I have to give it to the crew, and they persevered, but, yes, they had an interesting treatment.

DR. SERCHUK: I'm surprised that we have it on our agenda tomorrow, after hearing --

DR. CROSSON: I am as well, and I'm actually now going to go dig up the New England SSC report and see what they said, because I'm curious. I'm not going to go over what we said about the research recommendations, and you can see those in the report, but Chip went over some of the different things that have been kind of existing, from the council's perspective, and so we commented on those.

The socioeconomic components of the council's management strategy evaluation, we were asked some very specific technical questions about how to handle -- How to measure outputs, and the economists on the committee, I think probably led by myself, but thought that we should be using the existing measures that we have for angler and commercial fisheries utility, since we actually have some pretty good ones in the South Atlantic region, and it's available. It's not something new that you have to generate, and it's already used in a lot of the management plans.

There was some discussion about angler welfare, but it was somewhat vague, and so it wasn't like we really -- Usually, with angler welfare, you're talking about human welfare and not the welfare of fisheries, and so weren't really sure how we could quantify that and include that in the MSE.

The Southeast Fisheries Science Center research on recreational discards of red snapper and other snapper grouper species, that's a continuation, and the SEP had not seen what this committee saw last October, and so that's the project with Kyle Shertzer and Erik and myself and Genny and Chris Dumas, and a number of other crew, and so, you know, we've been kind of continually developing the model, but I basically gave the SEP an overview of the model, what the model is intended for, what the model can help project, the different potential management systems that you could impose on the fishery, and how that might -- How the different rebuilding plans, or the different spawning stock biomasses, might react to different area closures, time closures, effort reduction, or whatever.

I did let them know that -- A number of people are maybe aware of this already, and Andy Strelcheck probably will be telling the council more about this, but there's going to be a request for proposals coming out of the Regional Office to experiment with recreational fishing tags, as a way of controlling effort, and it's also looking at some biological data that we need for the biological modeling, looking at different catch portfolios, or catch distribution, or catch composition, I guess is the correct term, and so that's going to be coming out later this spring, but I don't have any more information about that, because that's a Regional-Office-led proposal.

Then the last thing, and, next week, in Tampa, at the Gulf Council, but this is a nationwide meeting, there's going to be a discussion about the economic analysis of recreational fisheries, and the way the agency handles that, and, actually, like half of the SEP are going to be there. Chris is going to be there, in real life, right?

DR. DUMAS: Zoom.

DR. CROSSON: You're Zooming in? Okay. Well, John Whitehead is going to be there, and I'll be there, and Adam will be there, and so a lot of us are going to be there, and there will be folks coming in from different regions of the country, and from Headquarters, and John Hadley is going to be there, and so he and I are going to talk about the way that the South Atlantic handles it, and I'll talk a little bit about my perspective as an SSC member, on the way that we deal with economic recreational fisheries data streams, and so we kind of solicited feedback from the committee.

The one that sticks in my head, more than anything, was that NMFS does these -- Every three or four years, and I think it's every three years is the goal, and they do these recreational fisheries expenditure surveys, and it's like kind of a regular-time thing, and it's very useful, and the people on the SEP thought it was a great thing to have, and so there was a question about why we don't do something like that for a lot of our contingent evaluation studies for recreational fisheries, and so there was -- You know, whether that could be something that would be structured, so that things were being updated more regularly, and so that's something that I will probably talk about in Tampa, but that was the SEP report, and I will be nice to Jason and Steve tomorrow, I promise.

DR. BUCKEL: Thank you, Scott. I appreciate you doing that at the end of the day, and were there action items for that, Judd? Okay. Any questions for Scott? We'll all be nice to Jason and Steve. All right. If there's nothing else, we'll adjourn for the day, and we'll see everybody back here at

8:30 for the portfolio theory presentation. Thanks, everyone, for a great day, and I appreciate all your hard work.

(Whereupon, the meeting recessed on April 19, 2023.)

- - -

APRIL 20, 2023

THURSDAY MORNING SESSION

- - -

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Town and Country Inn in Charleston, South Carolina on April 20, 2023, and was called to order by Dr. Jeff Buckel.

DR. BUCKEL: Good morning, everyone, and welcome back to the South Atlantic Fishery Management Council's April 2023 SSC meeting. First up, Judd is going to walk us through the revised agenda, and then we will receive a presentation on portfolio theory from Jason Link and Steve Cadrin.

DR. CURTIS: Good morning. We've got a little bit of rearrangements in our agenda. First thing this morning, we're going to hear from Dr. Jason Link and Dr. Steve Cadrin and Lauren Brewster and Fiona Edwards on the portfolio theory. Then we'll have Erik Williams talk about the vermilion snapper interim analysis, followed by Tracey and the SERFS report updates from 2022, followed by Chip giving a brief overview of the SAFE reports, and this one is going to be more of a desk exercise. We'll just introduce it and then get some feedback from you just via email. We've got some workgroups to fill, and I'll go over those briefly, and, again, this can be kind of a desk exercise, where you can think about if you want to participate in any of these workgroups that we're going form and then email me, just as confirmation, myself and Jeff, so we can get you on those workgroups.

Then, lastly, this morning, and hopefully we can cram it in, is we have just a quick review of an FWC gear type analysis, and this is another one-hook, versus two-hook, gear study, and we just need some feedback from the SSC that this does indeed reduce fishing effort, by restricting the gear type, and so, after lunch -- We're going to try to take an early lunchbreak, at around 11:30, because, at one o'clock we have Matthew Poti, who is going to talk about the deepwater coral distribution model, and then, lastly, just the South Atlantic research and monitoring plan, which we'll briefly go over, and it will be a desk exercise as well here, and we'll just get some information from -- I'll give you some information on the research and monitoring plan that's going to go up to the council for review in June, and so if you can review this independently and just send some feedback, and maybe some priority topics that you think are important out of that document, and then we can compile those and present those to the council in June.

DR. BUCKEL: Thanks, Judd. All right, and so next us is a presentation, and I believe our presenters are online and ready to go. Judd is bringing up the presentation.

**USING PORTFOLIO THEORY TO IMPROVE MANAGEMENT OF LIVING MARINE RESOURCES**

DR. CADRIN: Thanks, Chair, and thanks to the entire SSC for your time, and I see you have a busy agenda. I wish I could be there in person, and I remember the South Atlantic SSC meetings fondly, and you've got a great group, and we've also got a great group here, and so I want to give credit to the co-authors here.

I will start with the last one, and Jason Link has really been our fearless leader from NOAA. He was -- This has been his brainchild, to try to advance the application of portfolio theory, throughout the country, and internationally, and so he was helpful in getting those funds. Fiona Edwards is a graduate student in my lab, and she led the data analysis for this project. Lauren Brewster is a post-doc in my lab, and she led the analyses, the frontier analyses, for these, and so I am just presenting today, but I will be happy to give all the tough questions to Fiona and Lauren.

In the larger context, our portfolio analyses are transitioned toward ecosystem approaches. This schematic from Tara Dolan and Jason and others portrays kind of our current approaches as single-species approaches where we have a single-species-targeted management plan, and we have some ecosystem approaches, where we consider several species in the plans, like you do in the South Atlantic, but also some ecological impacts, habitat impacts, and so forth, and then moving all the way up to the chain to the ecosystem-based fishery management, which is what we think this tool can help to promote, and even further to integrate science and management through multiple human uses.

This tool is one of many in the multispecies toolbox where we can evaluate the expected benefits from multispecies approaches to management, and this uses efficiency frontiers and the analogy to financial investment, and so, in that analogy, we have an expected return, and we have a risk of not achieving that return, and so this return could be for your investment of a stock dividend. In fisheries, this could be revenue, profit, or larger-sense value. For any target return, we have a risk of not achieving it, and we have kind of an unoptimized risk, which you have a fairly large risk of not achieving that return, and we have an optimized risk, and this could be the single-stock approach, where you can mitigate your risk a bit, and you can further mitigate that risk if you allow -- If you invest in a portfolio and if you allow for -- Take advantage of the interactions among those stocks.

Our project was to try to use publicly-available data to promote the use of this evaluation throughout the country, and we focused on two regions, New England and the South Atlantic, with thanks to a steering committee that includes people from Headquarters, throughout the country and in these regions, and particularly your chair, Jeff, Chip, Scott, and Chris, and they were really helpful to us, and so we used this publicly-available data. For this demonstration, we selected commercial data from 1950 on in the South Atlantic region for all species.

This was a fairly large data file that came down, and it had the recordings, the landings and revenue statistics for all catch in the South Atlantic, at least for commercial fisheries, and so this goes back to 1950, and we can see that these were the top thirty contributors to the total catch, and there is actually more than this, and there was a general increase in the 1950s through the 1970s and then

a general decrease in revenue since the 1980s, and, actually, in the last decade or so, fairly stable revenue in the region.

In working with our steering committee, we think it was best to focus on a more constrained portfolio that the council has jurisdiction over, and we thought the snapper grouper fishery was a prime example for this analysis, and so these are, as you know better than I, the species in the snapper grouper fishery management plan. When we look at those landings over time, we see several things, and see that same general increase in landings now, and this is not revenue, and this is just landings and biomass, and so that was peaking now, in the early 1980s, and then we have a general decline in the snapper grouper complex.

We see that, historically, species like sea bass, black sea bass, were dominating the landings, and followed by vermilion snapper and gag grouper, but then we soon get up into these aggregated groups, and so we have aggregated groupers, which historically made up a substantial part of the landings, but that diminished not because landings of groupers diminished, but because they were broken out into species, which is exactly the multispecies portfolio and risk mitigation that we want to get into, and so we started our analyses at 1991, to try to avoid some of these historical aggregations of species.

This is now revenue of those same species, and we can see that gag grouper, since the 1980s, has been fairly dominant, followed by vermilion snapper, black sea bass, and red snapper here a bit, but most of that contribution was historical, and tilefish is another contributor here, and we have a lot of minor players that become very important in this process, to try to maximize the revenue and minimize the risk from this complex.

The efficiency frontier really operates on the covariance in revenue among species, and even more so than negative covariance among species, and so you see that some of those major players, like gag, is highly positively correlated with many of the other snappers and groupers. You can see intermediate here is sea bass, and it's still generally positively correlated with others, and we start to get into some negative correlations with golden tilefish, and red grouper, and then there's a lot of other species that have very asynchronous trends with the rest of the snapper grouper complex, and these become very important for trying to mitigate risk, essentially to try to take advantage of productive stocks when they're productive and to move off of stocks that are less productive.

These are the results, the annual results, from the frontier analyses, and I'm actually going to start at the end of the series, 2021, where we have the entire time series of landings and revenue since 1991, and we have the single species optimal frontier, and we have the multispecies optimal frontier, and we have the realized revenue and variability in revenue, and you can see that, in 2021, the realized revenue was very close to the single species optimum, but, in all these cases, there is a risk gap here in which the multispecies optimum would have had lower risk at that target revenue, and you can see the same patterns as we take off 2021, and 2020 is the last year, and they're very similar.

In fact, there, the realized was almost exactly the single-species optimum, and we even get some years where it's slightly inside, and I think the interpretation here is that the South Atlantic Council already allows quite a bit of flexibility for fishermen to move among these snappers and groupers and to, even if they're targeting one, to retain another, to take advantage of those negative covariances, and so we have the same general patterns over time.

From these annual results, we have this risk gap, and so this is the difference in risk, at target revenues, for obtaining that revenue, and so this is the risk of not attaining the target revenue, and you can see that it generally increases to a peak in 2008, and our report says that's from a number of factors. Digging into that a little bit, that was the peak -- A year of peak revenue for red grouper, and a bit of a spike in gag grouper, and so that seems to be driving some of this spike, and then it really flattened out. We have a fairly stable risk in the last year that we could have reduced risk a bit more if we had allowed more flexibility of fishermen to catch productive species when they're productive.

This is just an overlay, a different way of looking at this, with the frontiers from single-species and multispecies and all the data and the realized revenue and variability in revenue, or the risk of not achieving revenue, and you actually can see some periods of management here, in that the early parts of the plan, where we had relatively high revenue, and, for that high revenue, a fairly intermediate risk, but, as the fishery management plan was amended in 1997 and 1999, to have revised input controls, that reduced the revenue, really maintaining about the same amount of risk for a lower revenue, and then we have this cloud of data since then that includes the annual catch limit period, where there's been lower revenue and relatively high risk for that revenue, and moving further and further away from the multispecies optimum.

The results we have is that this portfolio diversity really relies on coordinated management, allowing fishermen to target multiple snapper and grouper species within the complex, and the optima for these frontiers are driven by covariants, and we've had, for this group of species, a fairly larger cluster, that have a lot of the same similar trends in revenue, but, fortunately, we have other species that are kind of bucking that trend, and those are the jacks, triggerfish, blueline, red grouper, silk snapper, and spadefish, that are driving that covariates.

In general, we're seeing, as expected with multispecies, that we're getting some mitigation of risk, and we're seeing that in the snapper grouper complex, that we could achieve the same revenue with less risk and demonstrate that some flexibility of harvesting abundant species, when they're abundant, and considering constraints -- I understand that, in the U.S. system of avoiding overfishing, we need to impose constraints, but, as much as possible, if those constraints can be limited, it will allow the most flexibility for achieving the optimal revenue with little risk.

This is entirely a demonstration project, and we deliberately used publicly-available data, so that we could promote these types of demonstrations throughout the country, but there were things that Fiona really had to deal with, in terms of inconsistent taxa labels, and, for some of those, we phased-out some species aggregations, to try to take advantage of the disaggregation. We had some years with no landings or revenue, and some records were masked for confidentiality, but the big one here is that we limit our analyses to commercial landings and revenue.

This database did have the landings for the for-hire recreational fleet, but, of course, there is no ex-vessel revenue from that, and so we couldn't use that, and, also, the other modes of recreational fishing are not available, and so, really, ideally what we have is all of the removals, and all of the value from this fishery in the analysis, and that would take a much deeper dive. That would take using the disaggregated data you have, your regional recreational catch statistics, trying to estimate the value of those recreational landings, for a more comprehensive analysis, and, thanks to

feedback from your Socioeconomic Panel on Tuesday, we could also consider costs in this, for a more comprehensive analysis.

We feel that this is a valuable demonstration that could guide future work, and we're wide open to your technical suggestions. We received a lot of good feedback, both positive and critical, from the Socioeconomic Panel on Tuesday, and, more broadly, how might the SSC, and the council, consider these analyses for catch advice and other management actions, and, with that, I will just thank our funding from Lenfest, and we've got a great steering committee, and I've got to really credit Jason with putting together a really diverse steering committee to help us in these analyses, and a special thanks to Howard Townsend and Garet DePiper, who helped, and then the local team of Jeff, Chip, Chris, and Scott, for their local expertise and helping us with some of these data decisions, some of the big decisions of what portfolio to focus on, but also reconciling some of these data decisions. With that, Chair, I will thank you again for your time, and I will be happy to answer any questions.

DR. BUCKEL: Thanks very much for the excellent presentation, Steve, and I will open the floor up to questions for you and your team. Chris Dumas.

DR. DUMAS: Thank you for the great presentation. I think this is a really interesting idea, and it's got some potential, and it seems, to me, that you get the most gain from this idea when your landings, or your revenue, or your profit, across species are negatively correlated, like you suggested, and so that leads me to think that the best application for this idea would not be, for example, within the snapper grouper fishery, where a lot of the species are positively correlated, as you noted, as you pointed out, but, instead, it would best be used for across very different types of species, and so like snapper grouper would be one group, and flounder could be another group, and shrimp another group, and a crab another group, and then highly-migratory species could be another group, like dolphin, mahi.

It would be better if, you know, your different species groups that you were trading between, or thinking to make a portfolio from, were very different, and so if fishermen could -- On the commercial side, commercial fishermen could, for example, buy catch permits, or quota, in those different fisheries, and build a portfolio of a little bit of quota, or a little bit of permits, in all those different fisheries, rather than specializing in one, or, if it's difficult, practically, for a fishermen to do that, if different fishermen are specialized by fishery, according to their fishing gear, for example, and their vessel, then, if they could buy shares in each other's businesses, then they could achieve the same thing. They could mix -- They could get a mix of across species, and get that mix of returns that would reduce their risk for a given expected return.

On the recreational side, if an angler -- If we had a program where the recreational -- For example, if we had catch tags for the catch of different species, and you bought, or allocated, catch tags, then you could build a portfolio of catch tags across these different species of snapper grouper, flounder, crab, and I don't know if you were recreational, but I guess there would be recreational with HMS, and let's go snapper grouper, flounder, HMS. Then you could build a portfolio of tags across that that could also help achieve some of the results.

You know, if you had these catch permits and quota on commercial, and tags on recreational, and then you let them trade, then you could achieve these same results without the councils necessarily being involved, and you could have a decentralized -- You know, a decentralized kind of result

and achieve some of these gains that you guys are talking about. I think you're right that there is definitely gains to be made, achieving the same expected return with lower risk, even if you just focused on landings, and so, anyway, I commend you, and those are my suggestions, and thanks a lot for this presentation.

DR. CADRIN: Thanks, Chris, for that feedback, and it's really too bad that Jason couldn't be with us, because he would be jumping up and down at your suggestion, because he's been pushing us to go whole-hog on all of these analyses, to include everything, and we thought that the step toward this might be within plans where there are already some coordination, because I think you're absolutely right, is, the more negative covariance we build in, the more the risk will be greater, and I think, you know, the spirt of it is also correct, is that that would also have a greater revenue for the region.

You do start to confront some challenges there, and so, you know, some of the large revenues here are outside the council's jurisdiction, some of the invertebrates, and so coordination with state management would be needed there, but there are several levels that this analogy holds to, as you said, the individual fishermen that might be able to switch off snapper groupers and target some of those state-managed invertebrate species.

There are also some technical limitations. If we were to try to use, you know, all those top thirty that I showed, we would have some modeling challenges as well, and I would invite Lauren to step in there, if she has anything on this, but there would be some challenges there, but there would definitely be some advantages, as you said, to including more species, with more negative covariance, and more revenue. Thanks.

DR. BUCKEL: Thanks, Chris, and thanks, Steve, for the response. Other members of the SSC have questions?

DR. DUMAS: Just a quick follow-up?

DR. BUCKEL: Yes, Chris. Go ahead.

DR. DUMAS: Maybe focus not so much on individual species, but species groups that are caught together, and so maybe do an analysis with just three species groupers, snapper grouper, flounder, and HMS for charter guys, and I don't know, or for commercial, and you want to pick species groups that are caught differently, or by different gear, so that they're highly negatively correlated.

DR. CADRIN: Thanks, Chris.

DR. DUMAS: Don't group things together that are caught together, because they probably won't -- It will be difficult for them to separate out and focus on different species, because they're caught together. Thanks.

DR. BUCKEL: Maybe coastal pelagics, like Spanish, or in addition to. Other members of the SSC have questions for Steve and his group? Fred Serchuk.

DR. SERCHUK: With respect to recreational fisheries, part of recreational fisheries is the experience of going out on a headboat, for example, as much as it is catching fish, and you hope

to catch fish, but many people go for the experience of being out on the water, and those costs, or those revenues, that accrue to headboats, particularly, are not so much -- Are not reflected -- That revenue is not reflected in the landings, so much as it is in the value, the costs, associated with the experience of getting on a headboat, and I'm just wondering, and is there any way to include that type of revenue, when you're talking about recreational fisheries?

DR. CADRIN: Thanks, Fred, and I think that's an excellent question. It's something we've discussed in the group, and in the steering committee, quite a bit, and so, as I said, we do have for-hire landings in this database, but not value, and, as you said, the value is not simply in ex-vessel sales, and the value -- It may be much greater, but it's more difficult to measure, and there are methods that have been used to evaluate recreational fisheries, willingness to buy, and those could be applied to this, and I guess I would put it another way, is that, if we want to include total catch in these analyses, we would have to estimate the economic value of recreational fisheries, and that would be an important next step for a fishery like snapper grouper, that has a large recreational component. Thanks.

DR. BUCKEL: Chris Dumas.

DR. DUMAS: I would like to follow-up on that response, and so, you know, Fred, this technique is to try to get the same average of something, with lower variance, by mixing together things that are negatively corelated, and so your Y variable could be catch, just pounds, trying to keep the same average pounds, with a lower variance in pounds, and that could be a Y variable, or your Y variable could be profits, if you're commercial, or your Y variable could be revenues, if you don't have information on cost, or it could be profits, or, in the recreational fishery, it could be consumer surplus, as you say, which you can use consumer surplus to measure the value of the fishing experience, separate from catch, and economists have done that for recreational fisheries.

You would be talking about trying to get the same average consumer surplus, but with a lower variance, and doing that by mixing together different types of experiences, in a way that reduces the -- The variance reduces the risk, and so that Y variable could be consumer surplus, and that could include the recreational value of fishing to a recreational fisherman, using estimates of consumer surplus that -- Per trip, and per species, and per catch of additional fish per trip, all kinds of different estimates of consumer surplus for the recreational fishery, and so that's a great comment, Fred, but there could be ways of using this in recreational, with using consumer surplus. Thanks.

DR. BUCKEL: Thanks, Fred and Chris, for those comments. Other members of the SSC? I will just -- Given this discussion of bringing recreational into the analyses, and, Steve, I understand that's outside the scope of the current project, but I guess, to provide advice for the future, and so Fred and Chris had good suggestions there, and I'm curious. In that analysis, does it have to -- I am trying to think of something that is a common Y, across all of them, and does the analysis -- Would that analysis, where you bring in recreational, have commercial and recreational combined, or would they be done separately, given the potentially different response variable?

DR. CADRIN: Thanks, Jeff, and I think Doug Lipton was probably the -- He had the loudest voice on the steering committee here, really promoting that the entire return, and whatever metric of return that is, should be included in these frontier analyses, and so I think Chris's suggestion of using landings, in pounds, of -- That would probably be the easiest common metric among

recreational, for all modes of recreational and commercial, and so I think that's a great suggestion, and, even though it is, you know, kind of beyond the scope of this project, Chip has been advising us that, you know, you have your local regional recreational statistics program that we could use.

We can make recommendations here to Lenfest, potentially, for a second phase, and a deeper dive, and so I think that's really our next steps here, our debriefing from the regional demonstrations and what would be the next steps, either within the regions or in other regions, and, for this one, really diving into the recreational value would be appropriate, and so, first of all, we'll compile all of these suggestions, and I think Chris's suggestion of having a common currency of landed pounds would be an appropriate next step that we can recommend. Thanks.

DR. BUCKEL: Thanks, Steve. Fred Serchuk.

DR. SERCHUK: One additional question, Chair. I know that the analysis is based on landings, and not catch, and we know that, in a number of fisheries, we have considerable dead discards, and is there any way to take account of that in any of these analyses, because, in some cases, the amount of dead discards exceeds that of the landings for a particular species.

DR. CADRIN: Thanks, Fred, and I was prepared for that, because you asked a similar question at the New England SSC, about unaccounted for catch, and I will go back to the similar guidance that we had, is that, ideally, we have all of removals of -- Dead discards are not necessarily a return, but they are certainly a removal, and here is where we would want to go into the regional recreational database and consider the kept portion of recreational catch, and the dead discards as well, because those are off the table. They are basically production that had no value, or at least no value to people, and so that is already on our list of missing components to returns and missing components to removals, but, ideally, they should be in there. Thanks.

DR. BUCKEL: Thanks, Fred. Others? Chris Dumas.

DR. DUMAS: Just to follow-up, but, in theory, your Y variable could be dead discards, and you would have a mean, mean value, of dead discards, and you would have a variance of dead discards. You would have that mean and variance for each species, and you could put together a portfolio of catch that, you know, minimizes the variance of your dead discards for a given mean, or it, you know, minimizes the mean for a given variance of dead discards, and so, basically, it's the same idea, but it's just that your Y variable is something negative, and so you're trying to minimize it. You're trying to minimize a bad thing, rather than trying to maximize a good thing, and so it's the same basic graph, but you just flip it left to right, or flip it upside down, and you're trying to -- You've still got two frontiers, and you're trying to get to that efficiency frontier, but it's just you're minimizing, rather than trying to maximize, but you could do the same idea.

DR. CADRIN: Great suggestions. Thanks.

DR. BUCKEL: Other questions for Steve? Steve, I am not seeing any hands raised here. Do you have any --

DR. CADRIN: I will give Lauren and Fiona a second, to see if they have any closing thoughts, but, with that, again, thanks for your time. There was excellent feedback, both today and Tuesday, that will really help us to decide the next steps of this and how we can refine it, and so thanks to

everybody, and good luck with the rest of your agenda, but, Lauren and Fiona, any parting thoughts?

MS. BREWSTER: Thank you for giving us the time to present this today, and, also, thank you for the suggestions in running the frontier analysis by groups, by looking at HMS, snapper grouper, et cetera, at the species level, and that is something that we did for New England, but we'll move that across the South Atlantic as well. Thank you.

MS. EDWARDS: Just echoing everything that Lauren said, and, again, thank you so much for the wonderful feedback.

DR. CADRIN: All right. Well, Chair, thank you very much for your time, and best wishes with the rest of your agenda.

DR. BUCKEL: Thanks very much, Steve, and thanks, Lauren and Fiona. Have a great day. Okay. Moving on from portfolio theory, the next agenda item is Erik Williams' presentation on interim analysis for vermilion snapper. This is one of our items that we have action items, and there's an assignment, and so, if you haven't looked at the Excel spreadsheet since yesterday, please take a look, to see if you're assigned to this topic, and, if you are, please take notes, to help with filling out the response to the action items.

## UPDATE ON THE APPROACH FOR THE VERMILION SNAPPER INTERIM ANALYSIS

DR. WILLIAMS: Thank you, everybody. This should be pretty quick. Most of this work has actually been done by one of my team members, Nikolai Klibansky, and so he deserves most of the credit for most of this, and I'm just presenting, and this is our sort of attempt, our first attempt, at interim analysis, one particular method of interim analysis, and this is not the end-all-be-all of flavors of interim analyses, but this is sort of an index-based approach that we planned to present to you in October.

Just some background, and you have heard about this before, and Nikolai gave a presentation evaluating procedures for updating catch advice before, and that's in one of your previous briefing books, and there was a presentation provided in October of 2022.

For vermilion snapper, sort of the adjustment process is that, you know, we would do a scientific analysis at the Center, sort of compute a proposed adjusted catch, and the SSC would review that catch adjustment and then, in theory, make recommendations for a new ABC to the council, and then the council implements this new adjusted catch. The data that's required for this particular method is quite simple, and we just need the original BAM assessment, or SEDAR assessment, and then an updated standardized index.

The math is quite simple for it. It's essentially just taking your current catch and a reference value, or a suggested reference value, and an adjustment to that. I mean, the reference is the current catch, and then an adjustment value to get a new catch. Here's more details on that, and it's based on the index value, the standard deviation around that index, and then a buffering constant, and that buffering constant is sort of how much you want to allow the standard deviation to affect your

adjustment. If you make that B value go to infinity, essentially, the adjustment will say -- It will tell you to make no adjustment, and it goes to one, and so the A goes to one, which would say no adjustment is needed, but the math here is quite simple.

For that reason, we can give you an example of what that might look like, and so here's vermilion snapper. As the slide shows, it sounds easy enough, and let's try it, and this is just with data through 2021, and so how that would play out for vermilion snapper is as follows. The current reference catch, or the current ABC, is 1,269 -- Well, it's 1.2 million pounds, essentially, and then the index geometric mean comes out to 0.9. Following through all the math, the standard deviation is 0.61, and, depending on which buffer value you choose, either zero or one, in this case, as shown, the adjustment is either 0.981 or 0.989, and so then your new adjusted catch would be 1.245 million pounds or 1.255 million pounds, compared to the current 1.269 million pounds, and so not much of a change, in this particular example.

What our next steps were to provide, and what we had sort of promised the council, was we would provide a sort of official version, and this was sort of a preliminary with 2021 data, and we hopefully will get the 2022 index value, and then we will be coming back to you in October with, you know, the full-blown -- The sort of final analysis for your consideration for a possible adjustment to the ABC, and that's it. Very brief, and so probably more details in October, but I would be glad to start entertaining questions, issues, concerns, with the time we have at this meeting.

DR. BUCKEL: Thank you very much, Erik. Are there questions on the vermilion snapper interim analysis? Marcel.

DR. REICHERT: Thanks, Erik. Repeating a question I had during the black sea bass, are there plans to do this for other species, including black sea bass, or are you guys just still trying to work the kinks out and focus on vermilion snapper, at the moment?

DR. WILLIAMS: That's a good question, and I don't think there's any kinks to be worked out. This really just does come to is the SSC comfortable with using say an index-based method to adjust ABC, and does the council want adjusted ABCs coming to their table on a regular basis, and the only concern, from the Center, is, depending on which method you choose, and which species, the workload will depend, and so it does come down to work constraints, because we have to compute the index, and we'll collect the data and do the analysis of the index, and then, as you saw, the math for actually computing the adjustment is quite simple, but, yes, what it really comes down to is what's the desire to actually do these interim adjustments between assessment years, and, you know, I think Nikolai's paper demonstrated sort of the performance of these methods, and so you kind of get a sense of how well they work, et cetera, et cetera.

DR. BUCKEL: I've got Scott Crosson, Kai, and then Fred Scharf.

DR. CROSSON: I guess this is a question for council staff, and is something that the council has discussed yet? Is this something that's on their agenda? I know they have plenty of other things to do, but is this a high priority for them or what?

DR. CURTIS: I know that's been discussed as an option for potentially adjusting ABCs up or down, or merely as a health check for how the status of the stock is doing, and so that's something

that the council will discuss, and we wanted to get some feedback from the SSC as well, and I think Chip can elaborate further.

DR. COLLIER: Interim approaches are -- The council is ready to get more information, and, I mean, it's hard right now, as we're changing from CHTS to FES, and that leads to challenges in the management system, because it has a whole suite of different things that we have to do in management.

If it is just continuing on with the same accounting system, like we're vermilion snapper, and it was done in CHTS, and it's going to stay in CHTS, those adjustments can be done in a very quick amount of time, and one of the questions that the council wants to know, from the SSC, is to make sure that, if you are willing to change the ABC based on this interim approach, it goes both directions, and it's not just a reduction, because that's a concern that we were hearing from the Gulf of Mexico SSC, is they were willing to cut, but less willing to go up, and that's a concern.

DR. CROSSON: Just, real quick, to follow-up, I was thinking of it from actually the opposite perspective, which is that the council -- From our perspective, the council has got to be willing for the numbers to go down, and not just to take the positive information, when they get it, and ask for a revised ABC, but actually look at the negative stuff as well.

DR. BUCKEL: I think Kai was next, and then Marcel.

DR. LORENZEN: One thing just came to mind, and that is that, often, the stakeholders are looking for more stability, and this would sort of provide less stability, and sometimes they might like, you know, whatever comes out, and sometimes they don't, but my question is more about the workload, and so can you give us an idea of what the workload is to do an interim assessment, and I know that's mostly compiling the index, relative to, you know, a full assessment? In other words, how many full assessments are we foregoing if we are doing interim analyses on multiple stocks?

DR. WILLIAMS: I don't know that there's a direct tradeoff with other full assessments. I think the workload is not just with, obviously, the stock assessment group, which does the analysis and writes the report, but it's actually the index generation itself too, and there is time constraints on that, depending on whether it uses the video data or just the trap data, et cetera, et cetera.

While I have the mic, I was going to say that one of the things that came up, and I think Fred Serchuk mentioned it yesterday, is, you know, what is an interim analysis, and, well, what I put up on the screen is sort of an interim analysis can be almost anything. What makes it an analysis is that you're doing some computation, and what makes it sort of effective is whether you actually take that information and act on it and change the ABC.

With that in mind, I put together this table here, to sort of illustrate that it can range from anything to just a simple visual analysis of data, as we've talked about, something like a health check, all the way up to, you know, just short of an update stock assessment, and what I tried to map out here, in this matrix, is sort of what it takes to do those different flavors of interim analysis, in terms of computation time, in terms of data compilation, what sort of data it takes, and whether it requires any estimation, and so, some of the methods, you can get up into where you start actually estimating recruitment values, new recruitment values, in the future.

I would offer this as well, to recognize that the one method we just happened to pick was an index-adjusted method, only because there's some published literature on that, and it seems to be the easy sort of low-hanging-fruit type projection analysis, or an interim analysis, but there are many other flavors that, if we were to test, sort of in a full MSE type environment, we might find that there's actually a bigger bang for the buck for maybe a doing a different, maybe not using the index-adjusted method, and maybe adding updated landings and discards might actually be just as powerful, and just redoing the projection analysis that was done off of the base assessment.

DR. BUCKEL: Thanks, Erik. Fred. I skipped over Fred, and then Marcel.

DR. SCHARF: It's okay. I'm used to it. Erik, I just had a question, just on this particular one, and, you know, I like the -- I like the idea of the simpler approach, and I think I like -- I don't know, and I think, me personally, I like using an index-based approach, and I think I would feel -- I would feel a little more comfortable if there was some additional indicators that would then push you to use something like this, and so like, if there was a positive bump-up in the index, that you also saw maybe some change in the age structure, and not necessarily that it would add to the analysis, but just some other pieces of information, to say, yes, things are looking good, or bad, and so then you could apply a simple approach like this.

I was curious about the choice of the buffering effect, you know, and so, if you have a really high level of variability around the index, right, and you just have the buffering at one, so it goes away, just a really high variability around the index could sort of make A close to one, right, regardless of any difference in the mean, and so I guess two questions related to B.

What goes into how you make a selection about what B is, whether it's very small or very large, and, two, when you calculate the variation around the index, what if it's not constant, right, and what if you have -- What if the index, early on, is really noisy, or it's very tight, or vice versa, and how do you -- Do you do just the long-term noise or if the index has improved?

DR. WILLIAMS: Both good questions, and, yes, I think you would want to -- You know, SERFS, or fishery-independent data, is a perfect example of where you might want to just use the variability from the recent years, because we had a great expansion of that survey occur in 2010, and so, yes, certainly variability before 2010 is, I'm sure, greater than the variability after 2010, and, in terms of buffering, this almost circles back to Kai's comment about, yes, I think it's sort of a choice of how much do you want to be chasing the index values, going up and down, and changing your catch really frequently, and that's more of a sort of management question, really.

DR. BUCKEL: Kai.

DR. LORENZEN: I have a bit of experience with that from the Gulf, and I think, you know, in principle, it works fairly well, but I think we want to be cognizant of the workload involved, and, of course, it can be manipulated, and so people will be asking for frequent updates to assessments where they don't like the answer, and, also, then you can push -- You know, once you establish having interim assessments, then, you know, you might ask for more and more to go into that, because you want it, and so I think some ground rules have to be established for when and how one does that, and, ideally -- You know, I can see situations where say there is obvious change happening, be it, you know, a decline, or some big increase, and so one might say, well, yes, this is one that we should regularly, you know, update, and maybe not others, and, if I look at your

example, then that small change probably isn't worth the workload going in, and so I think, you know, the council also needs to weigh-in, I think, on the -- You know, sort of find a policy for this.

DR. BUCKEL: Marcel.

DR. REICHERT: A couple of things, and I was going to make similar points that Kai just made. Erik, this may be available, but would you be comfortable sharing this table with us?

DR. WILLIAMS: Yes, absolutely.

DR. REICHERT: I think that would be helpful in discussions, in terms of our potential choices. The other thing, and that's I think more a question for council staff, and we can discuss this more in October, but, obviously, this is meant to provide more timely information between stock assessments.

If we provide an adjusted ABC Control Rule, I assume that, if the council -- That the council would need an amendment to a fisheries management plan, in order to make that happen, and that may -- In terms of timeliness, that can take a long time, and so I was wondering if the council, and council staff, have discussed potential mechanisms to make sure that not just the available information is timely, but then, if the council feels that that's an appropriate action, then that's a timely process, too. I am struggling a little bit with, you know -- I am hoping that, ultimately, this will create a more timely decision, but I also understand the constraints of what's possible within the management framework. Thanks.

DR. BUCKEL: Chip.

DR. COLLIER: This wouldn't necessarily need to go through the ABC Control Rule, because that's really looking at the difference between the overfishing level and the ABC, and so what the SSC could be recommending is modifications to the ABC, and they would not be changing the OFL, and so, when you're doing that, and adjusting the ACLs, that can be adjusted in a framework amendment, and I believe we've gone from the SSC's recommendation, at a June meeting, to a following December -- I believe those catch levels have been put in place, and so it is a fairly quick approach when it's simply just adjusting the ACL.

Now, if we're talking huge adjustments, where it's changes to ACL, which is likely going to change the season length, and maybe bag limits, that all leads to very different approaches, and it takes a lot more time.

DR. REICHERT: Thanks for that clarification, Chip.

DR. BUCKEL: Scott Crosson.

DR. CROSSON: Don't do anything to delay the implementation of the ABC Control Rule revision, because that amendment has been banging around I think for like three or four years, and I don't want -- I'm glad to hear that won't slow that down. The species that it actually strikes me that this would have been really useful for is actually not vermilion, and it's black sea bass, because we went through a really healthy kind of assessment to this extremely dire situation, and it wasn't -- I don't think -- The extent of the decline may have been a surprise, but the fact that there was a

serious decline was not, because we've been hearing it for years, from different sources, by people on the water and from the different fisheries-independent data streams, and so this was something that would have been helpful, so that we're not in the situation that we now find ourselves in, where the fishery has declined so dramatically over the past decade-plus.

DR. BUCKEL: Thanks, Scott. Erik.

DR. WILLIAMS: I was just going to add one more thing, since this is sort of -- This table is going to go into your record, and that is, and I think Kai mentioned this, about whether you would necessarily want to compute the index-based adjustment all the time or if you want to have first a leading indicator, or leading visual analysis, to trigger that, and that's something to consider as well, because I do think there's value in that as well, and so, if we get -- If we can get to a space where you guys are getting more regular updates on things like index values and how they compare to our projections of landings and discards and how they're comparing to what we projected was going to happen, that, I think, is where we really will get the bigger bang for the buck, because then you can start to even map out that, okay, these species look like they're doing this, and these species look like they're doing that, and we should do this for this, and this for that, et cetera.

DR. BUCKEL: Yes, and so somewhat related to Fred's point about looking at something else besides -- Having some other information. Great. Wally.

DR. BUBLEY: With this, it is definitely worth noting, with some of these species that obviously have to -- It's kind of species specific, I think, in terms of what sort of analysis that we're using here as well, because Tracey just mentioned to me something like red snapper, where the issue isn't the number of the fish, and it's the age structure of the population, and so you would have to include other information like that to truly make it useful, I think.

DR. BUCKEL: Good point. Amy.

DR. SCHUELLER: I just wanted to add that we reviewed an analysis of these types of methods in our October report quite thoroughly, and so it might be good to just reference that report in this report, and then I just wanted to make the comment that it sounds like we're getting a vermilion snapper interim analysis, and I do think that, as we move forward, the species that are selected for this should be very purposeful, based on which ones performed well, or which ones did not, in the analysis that Nikolai provided to us.

DR. BUCKEL: Thanks, Amy. Other questions or comments for Erik? Chris.

DR. DUMAS: Thanks. Erik, how is this just different from Bayesian updating, and is it different, and, if so, would it be better than just doing Bayesian updating, using the index information streams, or using whatever information streams you want, and that could also be a relatively -- In its reduced form, that could be a relatively simple equation, and update, also.

DR. WILLIAMS: Yes, and that's interesting, and it is essentially that. Yes, it's essentially what it's doing, yes, and it's a boiled-down kind of Bayesian updating process.

DR. DUMAS: I'm wondering is it equivalent to it, or, if it's not -- If it's not, then a comparison of the two would be interesting to see, just because the Bayesian updating has, you know, fleshed-

out theoretical properties, and what situations it has advantages in and stuff like that, and so it would be interesting to see how this compares to that, for the purpose of doing interim updating, just to see.

DR. BUCKEL: Other questions for Erik? I've got one on Slide 6, Erik, if you can go back to the PowerPoint, or you can do Slide 8. I've got a question about the Is that are -- So the index values, and so $I_{rcn}$ is using the geometric mean to get the recent index, but then the index that's a reference, related to the ABC, that comes out of SEDAR, is from a single year, and I was just curious if -- I don't remember Nikolai's presentation, and I'm sure he covered this, but if you could comment on why a single year versus an average of the index, over an average of multiple years.

DR. WILLIAMS: I think the reason for the single year is that is sort of the -- You would expect to see this change from year to year, and you could chase individual year, from year to year, and so that -- I think that catch is tied to that last index value, and the catch isn't really tied to an average index value over the last three years, and particularly if you had a trend in those last three years, and I think that would pose some issues, and so you do have to sort of anchor it with, okay, here's where you left off, and then, going forward, here's what the index is doing, and then you're adjusting based on what the index is doing, going forward. Maybe that explains it?

DR. BUCKEL: Yes, and just you know how these can bounce around.

DR. WILLIAMS: No, I get that.

DR. BUCKEL: Okay. Thank you. Chip.

DR. COLLIER: Along those lines, the index value that's coming out, is it the index value that's coming out of the model, where it has all the information, like age-based information, that's included in it, or would it have been essentially the model input into the model?

DR. WILLIAMS: It's just the standardized index as it would go into the model, just updated, yes.

DR. BUCKEL: All right. Good discussion on this. Any other questions or comments for Erik? We will see this again in October, for vermilion, but a good broader conversation on using this for other species, and so I appreciate that. I don't see any hands, Erik. Thank you. Okay, Judd. I have already forgotten what's next. Tracey. Excellent. Related to -- A good segue into Tracey Smart's presentation on indices.

Thanks for getting the presentation up, Judd, and so the next presentation comes from Dr. Tracey Smart, and Tracey is going to cover the trends report from the Southeast Reef Fish Survey, and so related to what we were just talking about. If you see some species that things are changing, that may be some that we want to discuss later for an interim analysis, and so thanks, Tracey.

## SERFS 2022 TRENDS REPORT

DR. SMART: Thanks, Jeff. Thank you all for having us this week, and I know you've been really busy, and I just want to start off with introducing myself, and so I'm the head of our Coastal Resource Section at the Marine Resources Division at South Carolina DNR, and so this is an

update from one of our primary fishery-independent surveys, and I want to acknowledge that there were a lot of folks that contributed to this, that actually did the vast majority of the analyses that I will show today, and so that includes Wally, Julie Vecchio, who just joined our group last summer, and then, from the Science Center, Christina Schobernd and Nate Bacheler, with the SEFIS program, and Rob Cheshire and Brandan Runde, when he was there, and those folks helped out with providing the video indices that I will show as well, whereas the DNR folks have mostly done the work with the data analysis for the trap catches.

The things that I want to touch on today are just a little overview of our survey design, our 2022 activities, go into some more details on abundance, length, and distribution for selected species, and then our planned activities for 2023.

The Southeast Reef Fish Survey, or SERFS, historically, it was funded through the MARMAP program, and so you'll hear a lot of folks still refer to it as the MARMAP index, the MARMAP trap, et cetera, but, currently, we're supported by the MARMAP program, the SEAMAP South Atlantic program, and the SEFIS program at the Science Center. Our primary vessels that we use include one from South Carolina DNR, the Palmetto, one from Skidaway, the Savannah, and then the NOAA Ship Pisces. All three vessels have adopted identical sampling methods, and so the data is really comparable across all ships.

Our chevron video trap, or CVT, and so the crux of the survey is that we target low to medium-relief, live or hardbottom habitats, and so it's a very focused survey within the region. We cover depths from about fifteen to 110 meters, and the trap has been used consistently and standardized since 1990, and we've included -- We've changed, over time, in terms of our spatial distribution, as well as our effort levels, and that's really been based on funding, and, in particular, as Erik mentioned, in 2010, with SEAMAP and SEFIS coming along, we've been able to really expand the survey region-wide.

These are baited traps, and they soak for about an hour-and-a-half on the bottom, and then they're retrieved, and the catches worked up, and, since 2011, all traps have had two video cameras, one facing over the mouth and one facing away from the mouth, in order to get both habitat and fish counts, for the things that don't go into the traps.

The chevron trap universe is sitting right now -- It's from about Port St. Lucie, Florida to Cape Hatteras, North Carolina. We've got about 4,300 trap stations, and we select about 1,500 randomly, in most years, and we did a little modification in 2021, because of some leftover sea days from COVID, and we're back to sort of normal effort in 2022, and this is a simple random design, and so there's no stratification in the survey. However, in practice, we do try to spread out our efforts throughout all of our stations that are sampled.

Our sampling can begin as early as mid-October, and end as late as -- Sorry. Mid-April and end as late as mid-October. Hopefully, we'll be starting in the next week or so, and the Palmetto is trying to get out right now, and we're just waiting for our open house this weekend, at SC DNR, and then for the weather to calm down a little bit, and so MARMAP and SEAMAP are mostly through SC DNR, and, as I mentioned before, they are primarily responsible for creating the trap catch indices, as well as for processing samples for life history, and SEFIS, at the Science Center, heads up the video indices, and data related to the video, including habitat data. We do provide

publicly-available data housed through seamap.org, if anyone is interested in taking a look themselves.

In 2022, we had a fairly normal year, and we were able to complete eighty-six days at-sea, and we did just over 1,900 gear deployments related to the SERFS specifically, and so this was just over 1,600 chevron video traps deployed, and 278 CTD casts, for example for getting bottom temperature at each sampling location. Our chevron video traps collected just over 28,000 fish, from fifty-nine different species, which were all measured and weighed, and about 9,000 or so fish, from twenty-five species, were retained for some sort of life history sampling, including age, reproduction, and DNA.

What I will show you today is focused on our indices of relative abundance. For the chevron index, we will present indices from 1990 to 2022, and the video index, for most of our species we'll show today, is from 2011 to 2021. We're able to turn around the chevron index faster than the video index, because we literally have the fish in-hand, and so the data comes off the boat more or less ready to go at the end of the season, whereas the videos have to be brought back to the lab and then read and processed, and so, you know, it could be somewhere during the off-season, and so several months before that video data is ready to go.

I do want to remind everybody, as Erik mentioned, there was no sampling in 2020, and so there's a gap in the indices, and so these were primarily done, standardized, through zero-inflated negative binomial models, which has been the more common way that we've done things for assessments in recent years.

The traps are in terms of number of fish, and it accounts for trap soak time. The videos are through the mean count method, which is started ten minutes after the trap lands on the bottom, and it's one snapshot every thirty seconds for twenty minutes. Both indices account for things like depth and location and temperature, and the video index can account for a few more things besides that.

All right, and so I will also present some information on distributions of our species from the survey, and these are based purely on the chevron trap catch, and it's presented in quintiles, and so this is a very relative abundance, where anywhere where we have sampling is going to be colored in. If it's cool colors, it's low abundance, or low trap catch, and anywhere red is high trap catch, and these are averaged over the five most recent years. This is different from what was in your briefing book, because we literally just finished these last Friday. Then anywhere it's white is no sampling, and the colors are expanded a bit, over the actual footprint of the traps, because it makes it a lot easier to see.

What our indices will look like on the slides, we'll have our chevron trap -- The catch index in the upper-left-hand corner, and the index itself will be a black line, and the confidence intervals will be gray shading, and the nominal values are red dots. One thing to note with these is they're normalized to one for the long-term average, and so anything above the line is on a different scale than anything below the line, where two is twice as much as long-term average, whereas below the line is half of the long-term average, and so there's a bit of a skew, in terms of what it visually looks like.

The video index is also normalized to the long-term mean at one, and, in this case, the index itself is a red line, and the confidence intervals are dotted lines, and the nominal values are black dots.

We'll try to make it more consistent next year. You will also have that box on where they overlap in time. As I mentioned, the video index doesn't start until 2011, and then we only have indices through 2021, compared to the catch index, which is through 2022.

We're additionally throwing in some length compositions for each of the species. Again, this is based on the catch only, and these are maximum total length, in centimeters, presented in one-centimeter length bins, and the bubble size is proportional to the number of fish in that bin, compared to the overall, with the red line representing the average over time. You will notice some gaps in the early part of the time series, and these are artifacts, and it's not really missing data, or missing length bins, and it's just an artifact of converting between fork length into total length and rounding.

A couple of caveats, before I get into the details, and so just a reminder that this is one input into a whole assessment of stock status, and we may not be completely identical to how the indices were developed for assessments. There might be some variation. We have species that haven't been assessed yet, and so we haven't even had those discussions, from an assessment framework. The video index actually is pretty similar, if not identical, to what's been used for SEDAR in the last few years.

We have pulled out just a selection of species, instead of all fifty-nine, to talk about today, and so this is our eight most common, or most encountered, species. Tomtate, because I like them, whether or not anyone else does, vermilion snapper, black sea bass, red snapper, scup, or stenotomus, gray triggerfish, red porgy, and white grunt, and then also a couple of species of interest, like scamp grouper, gag grouper, and red grouper, that are not -- They're not our common species, but we do get enough of them to create indices, and I'm guessing, with conversations this week, they are of interest.

For tomtate, it's a pretty broadly-distributed species throughout the survey, and it tends to be more inner and middle shelf than in deeper water, and so we do have really decent data and coverage for tomtate, and we only have the trap catch index for now for tomtate, and, basically, it's been pretty variable over time, and the last four to five years have been sort of bouncing right around that average, that long-term average. Tomtate is also very consistent, in terms of their lengths that we collect within the survey, and there's not a lot of variation over time, and no real trend over time.

Vermilion snapper is another one of our relatively broadly-distributed species that we have really good coverage for the survey, throughout the region, and they tend to be, you know, a little bit more mid-shelf, but they are really widely distributed and widely caught. The catch index, the last couple of years have been -- At least in 2021, which is what Erik had, it was below the long-term average, and it has since bounced back above the long-term average, but it's been sort of floating in that range for the last five to six years. The video index is also seeing that kind of general trend, with some increases into the late 2010s, and then 2021 was just a little bit below average, and so my guess is the video index will come back up as well.

We have seen a little bit of a pattern in the length compositions in vermilion snapper over time, with a lot more smaller fish encountered by the survey, and it has varied historically, in that that average length has increased over time, kind of becoming stable in the last fifteen years or so, as well as during that time when the survey really expanded.

Black sea bass is a little bit more limited, in terms of their distribution, and they tend to be a much more shallow-water species for the region, and, in the last five years, we have seen them less frequently off of Florida than we have in the past, and that's reflected in this distribution. Our trap index, I think it's no surprise to anyone that we have not seen a major rebound in 2022, and they're very similar values to 2021. The video index is also seeing that decline, since 2010 or so, and it's been pretty stable, and low, for the last three to four years.

Again, there is a little bit of a pattern in the length compositions over time, with a little bit of an increase in that average total length over the survey, and you can kind of see that decrease in the encounters of smaller fish in the most recent ten to fifteen years.

Red snapper is a more southerly species for the survey, with that area of highest abundance really centered off of central northern Florida and into Georgia. We get a fair number off of North Carolina popping up as well now. Their index is the opposite of black sea bass, more or less, and quite a few of our other species, and so the trap catches have definitely taken off over the last fifteen years, and they've been pretty high in the last three to four years, and the video index reflects that as well.

Reflective of the catches and the encounters in the historical, the length compositions were very variable, and very noisy, in the early time period, because we just didn't have that many fish to work with, and those compositions have since really filled out for the species, and you can see that sort of big pulse of fish coming into the system in 2010, and growing up in it, and then there's been quite a bit of addition of small fish into the survey, over the last ten to fifteen years.

For scup, it's another more shallow-water species for the survey, and we tend to get them from about northern Florida through North Carolina. Their index has been quite low in the last ten to fifteen years, compared to the historical time period, and, currently, we do not have a video index for scup right now. We do have a little bit of a pattern in their length composition, with that average increasing over time, and there are fewer small fish being encountered, relative, and more larger fish being encountered.

For gray triggerfish, they're another really widely-distributed species, and we get them throughout the range of the survey. Their index, over the last say ten to fifteen years, has bounced around that long-term mean, and the last couple of years have been below it, but 2022 was back to a little bit of an increasing trend, and so we'll see if that continues. The video index really reflects that, and they're very consistent between the two, with that little bit of downward at the end, in 2021, and my guess is that's going to come back up, once they finish the video index, but don't hold me to that.

This is another species where we do see a bit of an increase in the overall length compositions, and the average lengths over time, and it's not as extreme as some of the others, and you can see that we just have a lot more gray triggerfish encountered to inform these compositions in the most recent years.

Red porgy is -- They have historically been a very widely-distributed species within the survey, widely encountered, and we do mostly see them now more in that sort of deeper portion of the survey, mostly northern Florida through southern North Carolina, rather than the full extreme, and

our index has been down, based on catches for red porgy, since about the mid-2000s, and the video index has seen that as well, with that moving to below the long-term mean, starting in about 2015 or 2016. Red porgy is another one where we've sort of seen a disappearance in the smaller fish in the age compositions, more representation of the larger fish, and that's driving that average length to increase over time.

White grunt is our more northerly species within the survey, and we really don't catch them off of Florida, hardly at all, and low catches off of Georgia, and our index, based on catches, has been bouncing around the long-term mean in the last ten years, and it's been below it for the last two years, and then the video index -- It's a little bit noisy, with a high variation between years, because it's really just sort of bouncing around that flat line.

White grunt, there's not much of a pattern, in terms of length compositions or average lengths, and it just sort of bounces around between the two, and we do see more fish to inform these in the most recent years, with the extra sampling effort.

Scamp grouper, they're pretty patchy, in terms of the survey catch, mostly sort of mid to outer shelf, a little bit of a tendency toward more seeing them in North Carolina in the most recent years, and our catch index has been very low since the mid-2000s, and the video index, and so scamp is kind of an interesting one, where the video index has really been more or less flat. It has gone below the long-term average in about 2017, or 2018, but that's because -- Probably why it looks so flat is because it really -- The video index didn't start until we already sort of hit that lower sort of level in the trap index. We are seeing a little bit of an increase in the length compositions, but we do see a pretty wide variety of sizes for scamp, and there's not really much of a pattern in the most recent couple of years.

For gag, they're even more sporadic for the survey than scamp is, and we tend to see them a little bit more off of North Carolina than other areas, and our index has been below the long-term average for about the last ten years now, but it's been pretty sort of low, but flat, during that time, and the video index kind of reflects that as well, with the most recent five or so years being low, but flat, after a little bit of a bump in 2011 that both gears were able to capture. Length compositions for gag are really quite noisy, because we don't have a ton of fish to inform them, and so they tend to bounce around from year to year.

Red grouper are even more sporadic than gag, and we get them a bit off of North Carolina, and a bit off of Florida, and it's really not a major component of our catches, in the most recent years, and that's reflected in the catch index, where the historical time period, before the survey expansion -- We did catch red grouper quite a bit, and their abundance was higher, and then we've been below average for about the last fifteen years. This is another one where that sort of historical perspective is really important, for red grouper, because, according to the video index, they're just sort of bouncing around the long-term mean, and it's really flat, but it's also really noisy, and it's because we've already sort of moved into that time period when they were already low, by the time the videos came in. Again, there's not a lot of fish to inform the length composition, and so they do tend to be pretty noisy.

Moving into what we have planned for 2023, we should be starting in the next week or so, and we're finishing outfitting the Palmetto right now, and the Savannah heads out in May, for their first cruise, and we're anticipating somewhere between seventy-five and eighty-five days-at-sea,

and we're still waiting to hear, from MARMAP and SEAMAP, on what our allotments are, to inform the second-half of the season, on our sea days. We are planning to use all three vessels, the Palmetto, the Savannah, and the Pisces, for chevron video trap work, back to a complete scientific crew on all of our vessels, and we're doing what I'm kind of calling our balanced life history sampling this year, and that's sort of based on where our funding levels are for processing and reading.

It's balanced, because it's a balance of what we need, what data we need, what fish we have in-hand, versus what funding we have available, and I think Wally touched on this a little bit yesterday, that we've had to make some hard decisions, in the last, you know, seven to ten years, about what we're bringing back from fish on the boat, and so some of the ways that we've been trying to become more cost-effective, and still balance getting the things that we need, is we have not been collecting samples for male maturity for our common gonochorists, like gray triggerfish, red and vermilion snapper, and white grunt. We generally are using the female data a lot more frequently than the male. We are recording male and female, and so at least we have a macro sex for sex ratios for those species each year.

Additionally, and so especially for histology, we can, you know, conserve our funding by not reading samples, but we also -- Anything that comes back from the boat, we have to process to a certain point, for it to be shelf stable for storage long-term, and so, by not bringing back those male tissues, we're not having to utilize any of our funds for processing those.

Additionally, we instituted a three-year rotation on collecting maturity for some of our red species and our monochromatic species. We had been doing vermilion and red porgy, traded off with black sea bass and gray triggerfish, and we are going to be adding red snapper and white grunt into that rotation, and so this will be our last year of collecting histology for vermilion, red porgy, and red snapper, and then we'll start three years of collecting histology for black sea bass, gray triggerfish, and white grunt.

Some other activities that we have going on at SC DNR that are related to the SERFS efforts, we have a couple of MARFIN-funded projects, and one was an expansion of our deepwater short bottom longline gear sampling that we had historically, and lost funding for, and so we just finished up the field sampling for that, and we're working on samples and data analysis, including we had added deepwater cameras, to be able to characterize habitats, and that's mostly efforts that collect things like blueline tilefish and snowy grouper and several jacks.

We're also working with Florida to expand on their efforts, looking at gear selectivity, using stereo cameras, a standardized hook-and-line, and then the chevron trap catches, doing that region-wide, and so we're going into our second year of field sampling for that project, and then, additionally,, we're doing our second year of field sampling for trying to collect juvenile snapper grouper, and so we're doing a gear comparison study, looking at small-mesh traps versus a standardized small hook hook-and-line, for juvenile snapper grouper, as well as equipping all of our gear with cameras and characterizing habitat, and we're sampling natural hard bottom, artificial reefs, and soft bottom, to be able to look at distribution amongst different habitats.

With that, I just want to acknowledge that this is years and years and years of support from NOAA, support from SC DNR, as well as a huge number of people that have worked on all of the various

boats, past and present, and have been processing fish for a long, long time to provide this data, and, with that, I will take questions.

DR. BUCKEL: Thanks for the great presentation, Tracey. I will open it up to SSC members, if you have any questions. Fred Scharf.

DR. SCHARF: So how do things look early on with the juvenile snapper grouper survey? Does it seem like it could be promising?

DR. SMART: Yes, and so we -- We presented at the South Carolina American Fisheries Society, on sort of our first year of data, and so I would be happy to send that along, and so we did catch juveniles in traps. We caught two juvenile gag grouper in a trap, and that was super exciting. Black sea bass was definitely in there, and we caught some small vermilion snapper, small red porgy, and, if anyone really wants juvenile pinfish, we have juvenile pinfish, but I think it is promising. We are kind of finding that things like jacks tend to be more likely to be collected on our hook-and-line, and they do not go into the traps. Black sea bass are being collected on both, and so, in terms of proof of concept, we found some juveniles, and so that was really exciting.

DR. BUCKEL: Alexei.

DR. SHAROV: I don't remember, and maybe I have asked this question earlier, when we had a similar presentation, but, still, has stratification ever been considered for the survey, because, obviously, I mean, it's clear that a number of species indices would have really benefitted from stratification, because there is a small portion of the total sampling area, and, related to this, are all species -- Do they all have lots of zero observations, at certain stations, or are there some where you probably wouldn't need a zero-inflated model to be used, and so I understand that sort of -- It seems to be best to have a single methodology for index calculation, but, at the same time, if we are trying to get the best index for a particular species, we might look at variations. Thank you.

DR. SMART: Back when we used to run delta GLM, we would often post -- Well, so we've always sort of post-stratified the survey, and I guess I'll talk about stratification first, and so we've been using the standardization to effectively post-stratify the survey, by incorporating the things that we would have stratified into the models, and we did that back when we used to do delta GLM, and then we've continued that with the zero-inflated models.

We've had many discussions about stratification, and the big struggle has been defining our universe and the distribution of habitats, because we don't have a really good understanding, and I think we're getting there, of where hardbottom habitats are in the region and whether or not we're sufficiently sampling them now with our survey, are we missing locations, et cetera, and so we keep sort of ending up in this sort of circular logic of stratification, where we're using our own universe to look at the distribution and the allocation of stations amongst potential strata, based on say depth and latitude.

I think it's something that we could certainly look at again. I think, the last time we had a conversation, it basically came out to our chief scientists on the boats are really good at making decisions about trying to spread out our effort, and so we do tend to at least hit places across the full range, across the full depth range, the full latitudinal range, by just using common sense. Whether or not that's good enough, I don't know, and we've had many discussions about where

do I go this trip, and, well, this area hasn't been tackled yet, and so let's make sure we have that coverage there.

We are definitely open to suggestions and open to assistance in looking at how to stratify. So far, we've been lucky, in the last ten to fifteen years, that we haven't seen any major cuts that have affected our ability to sample all the regions, but that's definitely where it's probably going to be most useful, is if we're looking at having to sacrifice stations, and having to sacrifice sea days, and where do we put that effort that we have left over, and so --

Then the second part, about zero-inflated versus not, black sea bass might be one that I would certainly have considered not needing zero-inflated, especially if we could truncate what were included in the model, because they do tend to be shallow, and so we could get rid of, you know, everything outside of a depth that we've never seen black sea bass, and so basically beyond seventy meters. Ten years ago, I might have said.

In the most recent years though, they're in a zero-inflated sort of overall abundance, for the most five or six years, and so I think it does give us a little bit of a leeway, that, you know, maybe in a good, high abundance sort of -- I don't want to say "regime", because I know that -- I don't want to say "regime", but, if we're sort of in a high-abundance phase, I think there are some species that we wouldn't necessarily need the zero inflation for, but the problem would be then, if they do see a decrease, then we're left with a lot of zero encounters. White grunt might be another one, because we can probably truncate the index to just South Carolina and North Carolina pretty easily.

DR. BUCKEL: Wally.

DR. BUBLEY: I do want to add that so, when all of these indices are being run, multiple model structures are being looked at initially, and it's being chosen based on the best fit, and zero-inflated negative binomial almost exclusively comes out with these species that we have, and partially due to, possibly, what Tracey was talking about, because we're using the whole entire sampling range, and so some of these are having some difference in distribution patterns, and so, by having those areas where they're not typically, you're getting a lot of those zeroes that are added into it, and so, if we truncated to the distribution range, it might come out differently, but, as of right now, that standardized approach is how we've been going forward with it.

DR. BUCKEL: Thanks. Other questions for Tracey? Chris.

DR. DUMAS: First of all, thanks. I think this is a really cool program. To me, as not a biologist, as an economist, it's amazing that you've been able to sustain the funding and the effort and the data collection, and I just think of all those people, and all those labs, and all those boats, for all those years, collecting all this data, and that's amazing that you guys have this much data for this program, and it's great.

What I wanted to ask about is you had talked about how you have a -- You don't stratify, pre-stratify, your sampling, and you randomly sample, but then you said we try to spread out our effort, and so what does that mean? Are you randomly sampling, or are you doing something different?

DR. SMART: We are randomly selecting stations, and so, basically, what I mean is, if I am about to head out on a cruise, there is a huge cluster of potential stations, with fifteen selected stations

right off of Charleston, called Charleston Inshore, and I can choose to stop the boat at Charleston Inshore, but, if I see that somebody already did it last week, I'm going to go to another area that hasn't been sampled yet, and so it's those kind of decisions, but, once I get to a given area, then I am sampling only the selected stations.

DR. DUMAS: Okay. All right. Thanks. Then my other question is, or comment, would be on the graphs, where you were showing the trends over time, in the trap index and the video index, and I don't know about everybody else, but I would prefer to see non-standardized graphs, just so I can get a better -- Not standardized to one, but just have the mean line on there, and then just have the raw data points, just so I can get a better feeling, you know, just visually, for the variation above and below, and I don't know about the rest of you folks, but that would be interesting to me, and so that's all. Thanks.

DR. SMART: If you all have a preference, we can make that adjustment.

DR. REICHERT: To that point, I think we initially did that, so it was easy to compare species, and you're absolutely right, and we struggled with the fact that, you know, there's a different -- The values are different below and above, and so I think the actual index data is probably informative, and so I would support that suggestion.

DR. BUCKEL: Other questions? Alexei.

DR. SHAROV: Just one more, if I could, and so what are the predictors that are used in the model? It seems that, for most of the species, there's not much of a collection relative to the --

DR. SMART: That's a really good point, and so the nominal values were on all of those graphs, and, for the most part, the nominal values fall within the confidence intervals of the index. There might be a few exceptions to that, here and there, but I think, for the most part, most of the nominals do fall within.

DR. BUCKEL: Thanks, Alexei. Others? All right. Seeing no hands, we're going to take a ten-minute break, and you can catch Tracey during the break, if you have other questions for her. Thanks very much, Tracey.

(Whereupon, a recess was taken.)

DR. BUCKEL: Welcome back, everyone. We are going to try to hit four different agenda items before we break for lunch. We've got the SAFE reports, the gear type study, the SSC workgroups, and the research and monitoring plan, and so Chip is coming to the table, and he's going to do the first two of those, the SAFE and the gear type study. Chip, whenever you're ready, take it away.

## SAFE REPORTS UPDATE FOR SNAPPER GROUPER

DR. COLLIER: It's nice to follow Tracey, because we do incorporate some of the trends report into the SAFE report. It hasn't been completed yet, and we're going to be adding some more items in there, and I will be checking to make sure it all got added in there properly, and I did put all the

values in there, but I just want to make sure that my code interpreted the values properly, but we'll see what happens.

As you can see, it was just updated on Monday, and so it's hot off the presses. We're trying to get this so it's going to be a finalized version, ready to present to the council in June. We're not necessarily asking for approval from the SSC. What we're asking for is just guidance on what information should be included, and is it missing certain pieces of information, and then also some -- I have some additional questions for the SSC, as we get into this.

When you last saw this, and I think it was in October, it was only for the overfished and overfishing species, and now this includes every other species, with the exception of the complex species, and so the deepwater complex, the grunts, the porgies, and also the snappers, and red snapper is in here, yellowtail snapper, species that have single-species ABCs are in here, and the other thing to note, in this, is what we have done, as staff, is interpreted the -- When we're looking at incorporating the results of a stock assessment, that is going to be incorporated, and I'm trying to be consistent on it. It's going to be incorporated after the council approves the amendment for submission to the Secretary, and so that's just giving you guys an idea of when a stock assessment would be included into the SAFE report.

Going into this first little table, I just wanted to provide the readers a little bit of guidance on how different species are doing, and so we came up with a suite of metrics here. This isn't the full suite that we originally wanted to incorporate, and we want to incorporate some of the social information in there, as well as some of the economic information, and so that hasn't been done yet. I just didn't have time to put the coding together, to get all that information together, but what you can see up there are the little icons indicating what direction that a species is going, and we have -- It can either -- We have four different categories of a better, a good, a bad, and a worse.

We're just trying to give some relative indication of how a stock is doing, and so a dark green with a larger bar, such as this black grouper, based on the overfishing status, and that is the better category. This lighter green, with a small arrow going up, that's black sea bass, indicating it's in a good condition, and I know you guys just got a stock assessment that did not say that, but that's why I also made that previous comment that it's a stock assessment that has been incorporated into management that has been submitted to the Secretary.

A little arrow going down, such as hogfish over here, and that is also in red, and that indicates that it's bad condition, and then you have this darker red, with a larger arrow going down, indicating that it's in worse condition, and just trying to get a relative idea in there, and then we have the question-marks, and those are the unknowns, indicating that we don't have any information on that at this current time.

I think where the SSC could really hit me on this, and I am up for ideas, and we came up with some of these metrics, as staff, and so, for overfishing, the way we've defined a better condition, it was the stock biomass was greater than 90 percent BMSY. For a good condition, it was greater than MSST. For a bad condition, it was in between 50 percent MSST and MSST, and then, for a worse condition, it was less than 50 percent MSST. Is that a good starting point, and, just to let you guys know, after we get done with this first round, and I start to grow my hair back, I am going to dive into it and try to evaluate some of these metrics, to see if they're actually meaningful, in comparison to recent stock assessments, and so, if we have ten or eleven species, we can go

backwards in time and say, all right, based on what this would have been prior to the last stock assessment, how would this metric have performed, and it would give an idea of is this meaningful, and then I'll come back to you guys with some more input in two years, on, you know, what we think are valuable metrics for the snapper grouper fishery.

DR. SCHARF: Chip, shouldn't the rating be flipped, and overfished should be the top one, and that's biomass, and overfishing should be the second one, that's F-based? It's just a typo in the table, like it got flipped.

DR. COLLIER: Thanks. Yes. That was my rushing, trying to get things done. Then, for what I have defined as overfished, although it's overfishing, it's good condition is less than 0.6, and these were just kind of numbers that I pulled, and there's no real science behind it, and so, if there's any guidance on that, it would be useful for where to start with, and I think that would be very good, and then, going into the ACL relative to landings, what we're trying to look at this -- Typically, what the council has done is set the ACL and the optimum yield equal to each other, and not everyone is happy with that, but that's how the council has been doing it, and so we're evaluating it in two different ways, even though it's the exact same value.

If you're exceeding the ACL, that's viewed as a negative, and so, if you exceed it more than two years out of five years, we need to look at that for management, to make sure that we're following the National Standards and we're not potentially incurring overfishing on a stock, and so that's why, in two years, we have that worse condition, but we also have a bad condition, where, in one year, if it's greater than 120 percent of the ACL, and that was an arbitrary number that I put in there, and I think we can evaluate it, based on some of the recreational data, and we have a little bit more variance in there, and so we're just trying to look at that.

Then, going backwards from there, less than 100 percent in one year, because, if you're greater than -- I just had to put in something basically for the good condition, and I didn't really have anything that I could think of to put in there, and so, if you guys have ideas, we can think of something in the future, or come up with some new ideas today, and then, obviously, for the better condition, it's less than 100 percent for two years. However, going back down to the one right below that, optimum yield, you're trying to reach that ACL value, and so less than 90 percent is -- 90 percent to greater than 100 percent would be a good thing for optimum yield, and then going down from there.

It's looking at two different things. You know, you can envision that, in a lot of our recreational fisheries, it's based on availability of the catch. If the fish are there, we're going to catch them, and that's a good sign. If the fish aren't there, they'll never reach the ACL, and it's going to look like a positive thing. However, it could be very negative. We're looking at black sea bass, where they're getting to less than 50 percent of the ACL, and we felt that it was important to note that in these SAFE reports, that you're not getting anywhere close to your ACL, and management has been the same. We're thinking that's a warning sign.

DR. BUCKEL: Marcel.

DR. REICHERT: Perhaps the solution is to make it conditional to some of the other indices, like, if your index is below this, then it's -- That category is a bad sign, and, if it's above it, it's a good

sign, and, I mean, as a potential solution, because I completely agree, and black sea bass is a prime example of that.

DR. COLLIER: Then we have -- After that, we have trends in landings, where we're looking at average landings is -- The last two years, if they're greater than the average landings, and there's been an increasing trend, we think that's a fairly positive, although, you know, once again, we have to make sure that it's below the ACL, and then, for a good condition, it's just an increasing trend, and you could be less than the average, but at least the population is potentially showing signs of recovery. A decreasing trend could be a negative here, and then the worse condition is you're less than the average, and you have a decreasing trend. That one seems like it's fits the best for a trend in landings, but I think this could be another conditional, where management hasn't changed.

DR. REICHERT: I remember we had some discussions, when we were initially discussing the new ABC Control Rule, in terms of what your trends are, and one of the things we discussed at the time is that, and that may be true for both trends in landings and index of abundance, is sometimes stable is good too, if you are above a certain -- So, in this case, you're talking about decreasing or increasing, but, in some instances, it's stable, and then that could either be indicating a good or a bad situation also, because that's sometimes what you want to see. Thank you.

DR. BUCKEL: Alexei.

DR. SHAROV: I have a quick question, and is there a definition of the time period for which we define the presence of a trend? You could look at three or four years of the last period, right, versus the full time series.

DR. COLLIER: What we were thinking about for this -- I originally had a long time series and then a short time series, and so the long time series was going to be a twenty-year, and the short time series was going to be a ten-year, and, as staff, we kind of thought that a ten-year represents the most recent, and we're going to be bringing these to you every two years, and so it should be a little bit more frequent, and so we were thinking that the overall long time series might not be as informative, and we're really looking at short-term changes. This first one, I know, is a shock to the system, but, as we move forward, it's going to be updated on a much more regular basis. I hope I've made it easy enough for myself in the future. Do you guys think a ten-year time block for computing the average is good, and then having the last two years be compared to that, or the most recent two years?

DR. BUCKEL: Alexei.

DR. SHAROV: Well, it certainly should be a good discussion, but I think that really depends on the species, the longevity, the other potential reasons for the variability in the catch, right, and, I mean, some were much more stable than others, and I think you would learn this by experience, by looking through and then, visually, we identify a trend, by looking at those graphs, and, in one case, it could be a concern over the last four years, and, in another case, twenty years would probably not be enough, and so generating just a universal timeframe is difficult, right, and so I wonder what the others will say.

DR. BUCKEL: Marcel.

DR. REICHERT: To that point, generation time may be something, and so you vary it by species, because I agree with Alexei. If you're talking about wreckfish, you may want to look at a longer trend than black sea bass, and so generation time may be a way to approach it, and I know that makes your life a little more difficult, because you need -- You're looking at different timeframes, but --

DR. COLLIER: No, and I don't think -- That's really where I'm a little bit nervous, is we don't have generation time for many of these species, and we don't even have maximum age for some of them.

DR. REICHERT: So it does complicate your life a little bit.

DR. COLLIER: But I think I can use best judgement, and species like snowy grouper, wreckfish, things that we know have a very long -- Have a high longevity, we can put a longer time series in that, and make it a twenty-year time block, and, with that, I would be thinking some of the assessed grouper species, red snapper, the deepwater species, and those tend to all have a longer lifespan than some of the species like black sea bass, vermilion snapper, red porgy, and those would all have a shorter time span, and so I can definitely do that.

DR. BUCKEL: Chris.

DR. DUMAS: Thanks, Chip. I've just got a -- I've got a couple of questions. The first is about the purpose and intent of these SAFE documents and how it differs from the purpose and intent of say an interim analysis, or a fishery information document, FID, and so what's unique about SAFE, relative to other things that will come out between benchmark assessments?

DR. COLLIER: Well, I would say one thing is required by MSA. The other is it does have a bit of a formula, for pieces of information that are supposed to be included in it, and so I have that listed up here in the introduction, and I apologize for not going into that in a little bit more detail. I've been diving into these very deeply, and so I figured that everybody was just as aware of SAFE reports as I am, and I forget that you're not as involved with this.

Each fishery management plan is required to have a Stock Assessment and Fishery Evaluation report, and so some of the information that's useful in those are the annual catch limits, documenting changes in trends, or changes in the resource, changes in the ecosystem, and changes in the fishery. We also want to include information on success of relevant state and federal FMPs for species, and so, in our SAFE reports, we're including information on stock status, catch level recommendations, projections, when available, landings and releases, by sector, where available, and socioeconomic trends by sector. Then we provide a link to the essential fish habitat for this FMP.

DR. DUMAS: Right, and that sounds great, and, if Erik comes up with a super interim prediction model, would the results of that go into this? Would this be the outlet? Would this be an outlet for the interim analysis type of thing or --

DR. COLLIER: No, and I think this is an overall look at the fishery, as opposed to a targeted look for an individual species, and so what Erik is talking about is a targeted look at an individual

species with greater detail, and this one is more of a -- It could be used as a health check, I would think, where you can look at a bunch of different stocks at one time, and, if you become concerned with one, then that can be brought up to either the SSC, and you guys agree that it needs to go to the council as a, you know, we need to do something for this species, a change in ABC, or potentially consider an amendment to address something that is going on for the stock.

DR. DUMAS: For me, one question I have is who is the likely audience for these, and, to me, it seems like no one probably will read these, except for people who are really interested in the fishery, and so fishermen and SSC scientists, and perhaps the -- At least for me, having the colored buttons is not useful to me, and I would rather see numbers and tables, and then maybe graphs of trends.

I mean, if it was for the public, I could see the colored buttons could be really -- I understand why that could be really useful, communicating, you know, qualitative information to the public on changes, maybe on a website or something, like the website for the SAFEs, and I don't know, or something, but, I mean, if I see a red button, or a green button, I want to know, okay, what's the number behind that button, and is it increasing or decreasing, and how much.

What I would like to have, for me personally, would be tables, or at least an appendices at the end, and here's the key, easily cutable and pasteable tables, right, and so the cardinal sin of a PDF report is make it non-copiable, at least the table parts, so that you could copy that table of numbers out, paste it in your spreadsheet, and then do whatever, you know, quick averaging, over whatever time period you wanted to yourself, and is Joe Public going to do that? No, but is Joe Public going to read this report? Probably not. It's probably going to be scientists and fishermen who are interested in, you know, quantitative stuff, and they might be able to run a spreadsheet, stuff like that, and so those are -- I'm not sure if everyone else feels the same way, but, as far as what would make this type of report most useful for me, and maybe the SSC, at least, would be making sure we have ready access to the numbers.

DR. COLLIER: So, yes, the audience is broad, and it's hard to write something like this, and it's meant to be for the public, but it's also meant to be for the SSC, as well as the council, and it's basically a source document, and so it is long. I would imagine it's very painful to read, and I only read it in code, and it makes my eyes bleed, and so I hear you on that.

As far as a PDF, a PDF is not really going to be available for this. One of the conditions of a SAFE report is it's supposed to be available online, and so this is going to be an online version, and, if you want to see individual graphs, or figures, you know, you go into the individual species, and we have much more detailed information for each individual species, and we have tables of the fishing level recommendations, the stock status criteria, and so all that is provided. It is copiable, and so hopefully can get the information out of it that you need to pull out of it.

DR. DUMAS: That sounds great. That looks great. So, in the past, I have used a lot of information from SAFE reports, and I've downloaded them as PDFs, and sometimes it's easy to use information, and sometimes not, and so the format you're thinking of, that's going to be web-based, and not a single downloadable document, and could there be a link where you could download the information as a PDF, if you wanted to? For example, you're going to be on a plane, and you want to look at the information, but, you know, your Wi-Fi might be going out, or I don't know.

DR. COLLIER: The short answer is, the way that this program, and the way I've been working in this program right now, is I've been setting it up as an HTML document, and that HTML document can be downloaded, and you will have some impacts on trying to get some of the tables, such as a table like this, of where we have all the species and it has different options in here, where you can go to -- You can look at thirty species at once, or just ten species, and that table might get truncated, as you change to a PDF, and so the way I have it set up right now, and it's set up to be an HTML.

If I were to convert it over, I would lose a ton of functionality of some of these tables, and I thought that the searchability in these tables was a key thing, given that we have fifty-one species, fifty-two complexes, in the FMP, and then we have some additional ecosystem species. I thought a table that wasn't all fifty-five species was -- A sortable table was going to work out better, and so I will think more on making it a PDF, but it will not look pretty. The pictures won't come out as well, and I can't guarantee what the figures would look like. There is a lot of issues with changing it over from an HTML to a PDF.

DR. BUCKEL: I have Kai and then Anne.

DR. LORENZEN: I just wanted to say that I really like this, and the SAFE reports have escaped my attention, and I did not know we had these things, but I really liked it, when I saw it yesterday, because I think it brings so much information together in one place, and I often have people who ask me of where do I find out this, and I say, well, you go to SEDAR to find the stock assessment report, and then you go somewhere else to find that landings, and then you dig around in the SSC minutes to find something else, and so I think this is great.

I think, you know, we probably should spend a little bit of time, and not now, but sometime, to review whether -- You know, how those buttons are assigned, but I really like the buttons too, because I think it's a great sort of visual overview, and then you can go and dig into the details, and I'm just very excited that this exists. Thank you.

DR. BUCKEL: Anne.

MS. LANGE: I think this is a great job. SAFE reports were required by the original MSA, back in the 1970s, and, you know, they weren't done very often, and, I mean, a lot of councils sort of forgot about them for a while, and it's just more recently that they're starting to do more of them, and trying to keep up with what's supposed to be going on, and my understanding is they're supposed to be something fairly simple and straightforward.

I mean, not simple in that -- You know, it's a lot of work to put them together, to collect as much information that goes into the assessments and the results, the status of the stocks, but not so much having all the detail in an actual assessment, or every piece of data, and it's more of the trends and the status, overall status, and do you have references in there for like the stock assessments for the different species, or at least a link to somewhere, like to the council, if you're looking for more information on this particular stock, and, you know, you can find the assessment here.

I think, rather than having any more information, with detailed data in tables, aside from just the general trend, it makes it much more cumbersome for anyone who might want to read it, although I'm not sure what the audience really is either, who actually does go look at it, but I think having

it online, and having it, you know, as an HTML, is a lot more useful than handing out the original paperback books that we used to do decades ago, and excuse me for that, but, yes, decades ago. I think -- I mean, to Chris's point, I think having a location where you can find the data, find the analyses, is better than trying to cram it all into what's supposed to be more of a summary report, I think.

DR. BUCKEL: Thanks, Anne. All right, Chip. You got some good feedback.

DR. COLLIER: Yes, and, just to Anne's point, if you look at a species like gag grouper, we do have a link, and that's one of the nice things about having it as an HTML, is the linkability in all these, and so we do have the recent stock assessment, SEDAR 71, for gag grouper, and we have links to ongoing amendments, and then we've put together what's called a fishery overview, that does have that detailed information that you're talking about. This is really -- We're talking fairly summarized data, for the most part, that's included in this.

The one exception that I have not incorporated in this is Christina has been working on sentiment analysis for species that we've done a fishery performance report on, and so the sentiment analysis will be included in that, and thanks to the staff from the Gulf of Mexico, and they developed the code that's useable for some fisheries analysis, and so that's going to be added in, in a future version of this. The other thing I heard you guys talk about was having a table of the ABCs, and the catch levels relative to those, not only the landed catch, but also the discards, and so I'll incorporate that into this as well. That way, it's going to be updated and provided to you all on a more regular basis.

DR. BUCKEL: Great. Thanks. That will be helpful for monitoring those, relative to projections. Amy.

DR. SCHUELLER: So the second table in here, Table 2.1, has, if I counted right, fifteen assessments, and then there's twenty-four species in that table with the buttons, and I am just -- My thought was all of the twenty-four species should be in Table 2.1, and, if there's no assessment, it should say, "no assessment", because I think it's useful for people to know that we have however many unassessed stocks we have, if that makes sense.

DR. COLLIER: I haven't gotten to this one yet, and what I was thinking was doing a pie chart for that, and, that way, it would not be incorporated into that table, and it would just be a pie chart of overfished, overfishing, and unassessed, or unknown.

DR. SCHUELLER: My thought about that is I want to know which species are unassessed, and not necessarily just the number, and so -- Plus, I'm not a huge fan of pie charts, but, yes, for people -- For whoever the readership is of this, which it sounds like it's a broad audience, from my perspective, I want to know which species do not have an assessment.

DR. LORENZEN: I am with Amy on that, but also because I think it's good if you can find your species, and so, otherwise, you don't know why the species you're looking for is not in that table, and then you can look, and maybe it doesn't have an assessment, but I think it's good to have them all in there.

DR. COLLIER: Yes, and I was hoping that -- If you go up to Table 1, it does list "unknown" for that, or it has a question-mark, but, yes, it would be more explicit in that other table as well, hitting the point pretty hard. Okay.

DR. BUCKEL: Marcel.

DR. REICHERT: Yes, I agree, because it's my experience that sometimes, although there is an ACL, people assume that, at some point, that species was assessed, and that's not always the case, because we had to set ABCs for species that were not assessed, and so I think that I agree that that's probably very useful information.

DR. BUCKEL: Other questions or comments for Chip on SAFE? Chip has got one more question for us. Go ahead, Chip.

DR. COLLIER: As was just mentioned, we do have several stocks that are unassessed, and my thought was to include the index from the trends report as the index of abundance for that species. I don't have those included right now, and they haven't been evaluated, as far as the SEDAR perspective, but I think it is one of our best sources of information, and so, if you guys are comfortable with that being included in there, I will add that to the species that do have -- That are included in the trends report.

DR. LORENZEN: I think that's a great idea, and, also, you know, circling back to the interim analysis discussion we had and so on, this not only -- I mean, it's good information, and it's also very current, and so I'm absolutely for including those.

DR. BUCKEL: Marcel.

DR. REICHERT: To that point, I think Tracey had some of the caveats in her presentation, and I think it would be good, if you do that, to make sure that you list the caveats, that that is indeed something that has not gone through a SEDAR stock assessment, and the reason I'm mentioning this is because, as Tracey mentioned, because sometimes the index that is used in the SEDAR stock assessment is slightly different than the one that we provide, because the methodology, or some of the other -- The way the data was analyzed, and, in the past, we've had some questions, like, okay, you provided this, but then the SEDAR is different, and so it would be good to add those caveats, just to make sure that people understand that.

DR. COLLIER: Yes, and I will have to add the caveats for all the landings data, because, yes, it's not the final numbers that go into a stock assessment, and I'm using the ALS database, because it's convenient, and I can pull the data from there. Unfortunately, it doesn't have the last two years of data, and so I'm -- When you're looking at a lot of the landings data, you're looking at it truncated at 2020. We do have information for 2021 and 2022, but it's just not incorporated into this. For one, I was trying to get all the coding done, to make sure that I could get all the tables pumped out, but I think we can start looking at some of the information from other data sources, to make sure we're getting more recent landings information in there.

DR. BUCKEL: Thanks, Chip. Amy.

DR. SCHUELLER: I was just going to agree with what Marcel said with the caveats, and then one other non-scientific data visualization comment, which is a quarter of the male population is red-green color blind, and I know red and green is like our go-to choice, and it has some like implied, you know, stop-and-go type of statements, but perhaps some thought about that might be useful.

DR. COLLIER: So, yes, we did consider that, and that's why it's not only a color, but it's also a shape difference, and so -- I realize that, as I'm saying that, we're on a plot of a species that does not have that, and so I need to add shapes into the trends, the index of abundance trends, in order to accommodate that as well, but, yes, I tried to use some color palettes that are color-blind friendly, for the most part, and I've got make sure that I've incorporated it into all graphs, but, yes, we've definitely been thinking about that. In the original version, I had different sizes as well, for what direction it was going, and that did not go over well. People did not like the different sizes, and so it came up as a uniform size, and what I can try to do is make those size -- Make the icons a little bit larger, so they're easier to see.

DR. BUCKEL: Great comments. Anything else for Chip? All right. Then we will move on to the next Chip presentation, which is the gear. I apologize. We're going to do workgroups, and then we'll have Chip come back for the gear. Thank you, Chip. All right. Judd is going to walk us through our workgroups.

## SSC WORKGROUPS

DR. CURTIS: All right. Thanks, Jeff. This is Agenda Item Number 10 in your overview, and there's a couple of attachments that I included in the briefing book, and it's just the current membership of the SSC workgroups and then, also, those appointed to various SEDAR panels. I'm not going to bring that up now, but the purpose here is we need to formulate several different workgroups, due to some topics of interest.

We discussed a little bit of this earlier, and so, all said and done, we've got five workgroups that we need to form some membership for, and I think, probably, just in the interest of time, let's kind of discuss these a little bit. If anyone is jumping at the bit, they can volunteer in the room, but think about it, kind of process things by your workloads and your involvement in the other groups, and then just send either myself or Jeff an email with your interest in participating in any of these workgroups.

Just briefly, you know, we've been talking a lot about these low-recruitment issues for a number of stocks this week, and in meetings previously, and this concept of regime shifts, how stationarity affects stock status determination and criteria, and so forming a workgroup that will be looking more in-depth, and probably with some Science Center representation as well, since they've been looking at this topic already, and so a regime shifts workgroup there. I guess, if anyone is interested, and wants to jump at it, just raise your hand, as I'm going through these, and we can add you here into these workgroups. If not, I can go through all of them, and you can kind of determine which ones you want to enter into.

The second workgroup is going to serve as just a standing review body for various scopes of work, and so this is to make things more efficient. Previously, we had been reviewing them as an entire

SSC body, and they would go back and forth between the Science Center, between the council, and between the staff, and so this should help increase the efficiency of this process, if we get a standing group that can just review these, instead of having to come to the full SSC, during one of these meetings.

The third is we have an existing workgroup, and that's the Ecopath with Ecosim workgroup, and the EwE model has been reviewed by the full SSC before, at a previous meeting, and that is continuing to be developed, and they're going to be including an Ecospace component into the existing South Atlantic EwE model, and so, if there's any additional interest for members of that workgroup, we do need to replace our chair, and Yan Li, who, as we mentioned, has moved on to a new job, and is no longer with the SSC, and she was chairing that workgroup, and so we need someone else to chair that workgroup, and, in addition, if anyone has interest in participating in that workgroup, they can join as well.

Then, lastly, SEDAR 24, the hogfish benchmark assessment, planning team has requested that one South Atlantic SSC member and a Gulf SSC member join the planning team. This assessment is going to be conducted by FWC, and so we need to find a single member that could join that workgroup.

Lastly, we have formed the South Atlantic deepwater longline workgroup, and we have been working with the Science Center to develop some terms of reference, or a scope of work, for that -- For the review of this longline survey, and so we've been meeting several times, and the workgroup has given input to the Science Center on how to develop -- How the review of the SADL survey should take place, and, primarily, the document that's included there is the terms of reference, and we need to get just some feedback from the SSC, hopefully.

The main goal for the workgroup, and this review, is that we can include -- We can include this review of the SADL survey in all of these upcoming stock assessments, without the need for a topical working group for each single one, and so, previously, we had recommended that these SADL survey be incorporated as a topical working group into the stock assessment process, and this will hopefully then make it more efficient, where we've just got a review in place from the SSC that approves that the SADL survey is valid for use as an index into these assessments and does not need a topical working group for every single assessment.

Then, lastly, from talking earlier about black sea bass and scamp, we decided that a potential discard projections and ABC setting workgroup would be useful, so that they can dig more into some of these issues with discard projections and what's going on with these assessments, and so those are the five workgroups that we're looking to form. I will stop there, if anyone has any questions on the different workgroups, before soliciting some potential members for each of them.

DR. BUCKEL: I don't see any hands, Judd. Alexei and then Scott.

DR. SHAROV: I wonder if there is some sort of scope of work, or terms of reference, as defined, for each of them, and, I guess, for some, it's easier than others. Looking at the regime shift, you can institute like 1,500 employees for the next twenty years.

DR. CURTIS: Thanks, Alexei, and we do not currently have the scopes of work set for each of these. Some of them we do, and, obviously, the Ecopath and Ecosim, since that is an extant

working group right now, and I have the terms of reference, and I haven't provided them, and so perhaps that would be helpful, to circulate what we do have, as far as terms of reference, or scopes of work, for these workgroups. That would assist in helping people make their decisions.

DR. BUCKEL: Scott and then Marcel and Kai.

DR. CROSSON: I will volunteer for the discard projections and ABC setting.

DR. BUCKEL: Thanks, Scott. Marcel.

DR. REICHERT: In the same vein about scopes of work, I think it would be helpful for us to kind of look at some of the timelines and recent activities, because some of these are basically standing working groups that have been in place, and I've been a member of the Ecopath with Ecosim before my resignation earlier, and that's been -- We've been working with that working group for a while, and so I think it would be good to figure out whether that's a defined timeline or whether this is a standing working group that is expected to be active for a long time, and I think, for our workload, that would at least help me to either volunteer, or not, for other working groups, if I know that work on one working group is going to end soon. In addition to that, I'm interested in the regime shift working group, and I'm happy to volunteer for that.

DR. BUCKEL: Thanks, Marcel. Kai.

DR. LORENZEN: Well, I was going to volunteer for the hogfish, but I also noticed that I'm actually the chair of the largest workgroup that we have, and we have not been particularly active, and so I was going to ask, you know, and should we start convening this, and making progress, or is this just on the books until we are being asked to do something?

DR. CURTIS: The unassessed stocks workgroup is the one you're referring to, and so that's -- The council is going to discuss the approach, later on this fall, at their meetings, and, from there, we'll convene these, but Chip and I have been talking about getting that workgroup together, just before any of those decisions are made at the council table, to know what kind of expectations are going to be laid out for that workgroup, but, yes, stay tuned, and that's been kind of on a little bit of a hiatus, and there was issues with waiting for the ABC Control Rule, when that finally got approved, and then, from there, working down to some of the unassessed stocks, but, yes, that's coming down on the horizon, for sure.

DR. LORENZEN: No, that's good, and I just wanted to make sure that I'm not not doing something that I'm meant to be doing, and I'm waiting for marching orders then.

DR. CURTIS: Did I hear that you were volunteering for the hogfish planning team as well? Great. Thank you, Kai.

DR. BUCKEL: Chris

DR. DUMAS: I will volunteer for regime shifts.

DR. BUCKEL: Thanks, Chris, and thanks, Kai. George.

DR. SEDBERRY: I will also volunteer for regime shifts.

DR. BUCKEL: Thanks, George. That's a popular workgroup. Marcel, you had volunteered for regime shifts? Yes. Chip.

DR. COLLIER: Just a bit of a sales pitch for the Ecopath with Ecosim. What we're looking at doing with that one is it's going to be incorporating Ecospace into it, and, looking into black sea bass, with a little bit more detail, can we detect changes in that species with that kind of model? Is it moving north-south, is it being truncated in a region, or is it going to deeper waters, like Tracey had indicated, and so what can Ecospace do for us, in order to help us describe what's going on with some of these populations. You know, it's -- We want to also keep this going, because we're certain that we're going to be hearing that black sea bass are eaten by red snapper, and so that's going to be -- At least this report will provide some indication on what's going to be going on with black sea bass.

DR. BUCKEL: Thanks, Chip. Alexei.

DR. SHAROV: I'm a member of the Ecopath and Ecosim working group, and I just wanted to also plead for volunteers. Obviously, there is a very limited number of people that have experience, actual experience, with Ecospace, but it's not that particularly hard to learn at least the principles, but, in addition, a good a biologist who knows the species, the ecosystem aspects and whatever elements, would have been greatly beneficial for the modeler, and necessarily the Ecopath and Ecosim modeler, or user, but, you know, somebody familiar with, obviously, the -- This group will really benefit from somebody like that.

DR. BUCKEL: Thanks, Alexei, and, just to let others know, besides Alexei, the other members of that are Eric Johnson and George Sedberry, and so two calls for volunteers for the EwE workgroup. Any takers? I'm not seeing any hands right now, Judd, and so folks can think about that and get your arms twisted by others.

DR. CURTIS: For some of these workgroups, where we do have, you know, terms of reference, or a scope, outlined already, we'll circulate those, to help you -- To help drum up support and interest for you all to volunteer for them. Then, just lastly, as we touched upon, the SADL survey scope that we've got drafted already, please -- In the interest of time, I won't go through this right now, but please take a look at this and provide any feedback.

What we're really looking for is this review of the project is going to be sufficient, in order to provide any kind of guidance for these, when considering the survey in these operational assessments, and alleviate the need for having a topical working group for each of these assessments, for the SADL survey, and so I will circulate this around. After the meeting, if you can just provide some comments, and some feedback, towards the scope, we would appreciate that.

DR. BUCKEL: Thanks, Judd, and so be looking in your email box for the SADL document for our feedback, the SSC's feedback. Anything else on workgroups?

DR. CURTIS: No, and that's it for workgroups. Just check your inboxes.

DR. BUCKEL: All right. Now we've got Chip back for the gear type, the gear study, presentation.

## FWC GEAR TYPE ANALYSIS

DR. COLLIER: All right. This one is Attachment 15a of the briefing book, and what we did was we utilized a fishery-independent study that was done by FWC, in the Gulf of Mexico, on the West Florida Shelf, and we asked to add on to what they had done, to basically investigate the catch rates of the single-hook Carolina rig versus the double-hook chicken rig, and they just so happened to have a study that they did back in 2010, where they compared --

They went out on fishing boats, and they fished equal time, using different gears, and the four different gear setups that they used were two chicken rigs, and so both of them were double-hooked, and one of the gears, and let's go down to where it is, and the methods, were 8/0 and 11/0 circle hooks, and then the larger gear for the chicken rig were 11/0 and 13/0 circle hook rigs. For the Carolina rigs, they, once again, used two different configurations. One was an 11/0 hook, and the other was a 13/0 hook. They used consistent bait types among these, and then they -- Obviously, they were fishing off the same vessel, and they would alternate during the -- They would be randomly selected, the survey strata and region, and so it was a really well-designed study to get at the idea of a single-hook versus double-hook rig on catch rates.

We dug into the data a little bit more, but, just to give you a summarized version of this, if you look at Table -- It should be Table 2, I think, and Table 2 has everything that was caught on the survey. Up top, it shows you which rig it was, and so, if it has the "rig0811", that was indicating that it was a chicken rig with the two hooks, and "rig11" is a single-hook Carolina rig, and going on over to the right.

Down below, you can see the number of fish caught, and, when we did detailed analyses of all these, what we did was we looked at fish with over a hundred fish caught and dug a little bit more into details on that, and so the fish with over a hundred fish being caught on that were red grouper, red snapper, and gag grouper, and we didn't analyze any of the other ones. Just we felt like it was a fairly low sample size. The other thing to note is the overall number of samples from this, and there were 211 stations that were sampled.

Up top, in Table 3, you get an idea of what was caught, once again, by hook type, and then, going into a little bit more information, when you look at Table 6, this is -- We developed models using several different parameters. We originally wanted to nest a sampling site within the model. However, due to sample size issues -- Even though there were 211 stations sampled, there weren't a sufficient number of samples for the models to converge, and so we weren't able to use a nested model for this.

What we did do was we incorporated several different models and then looked at a bunch of different configurations of those models, whether or not there was interaction between hook type, angler type, and depth, the rig type, the hook size, the hook category, a bunch of items that were put in there, and, basically, red snapper had four different potential models that, based on AIC, were less than two -- Or less than four degrees different, and so those could be considered plausible models. However, if you look at the weight of the AIC, it's really indicating that the top model was probably the preferred model.

If you look at the other three species, or other two species, red grouper and gag grouper, neither one of those really had a top-performing model, and so we went to some more basic statistics for those, but what I do want to point out, in the top models for red snapper, is all of these had either a hook type used, or a rig type, as a significant interaction, indicating that, if it is a single-hook rig, versus a double-hook rig, you are more likely to catch less red snapper on a single-hook rig, versus a double-hook rig.

That's the biggest thing of why we analyzed this data, and we wanted to see if that was true, and this confirms what we have observed in the other reports that we presented to you all in October, and that indicated single-hook rigs do catch less fish, for some species, compared to double-hook rigs, and so there is potentially some benefit of requiring single-hook rigs for red snapper, to reduce catches.

The big elephant in the room is how often are single-hook, versus double-hook, rigs used now, and that is still unknown, but we felt like this was a really good study, in order to -- I think it highlights things a little bit better than the other studies that we presented to you, and it was highlighted in Reg Amendment 35, and we wanted to make sure that you guys were comfortable with the conclusions of this report, in order to incorporate it into Reg Amendment 35, which is the red snapper amendment, as well as it has an action in there to require single-hook rigs,

DR. BUCKEL: Marcel.

DR. REICHERT: I think it's a really cool study, and I have no problem with the red snapper. One of the things that struck me, or two, were the relatively high numbers of red grouper and gag, which, if we look at the stock assessments, they are at real low abundance, and they were caught in much higher numbers, relative to the other species, like, you know -- Although we know black sea bass is relatively low, but black sea bass, gray triggerfish, and some of the other species. Is there any indication why that may have been the case?

DR. COLLIER: Yes, and they did this on the West Florida Shelf back in 2010.

DR. REICHERT: So it is because of the location, and that kind of gets to my next question, in terms of do you guys feel that this could be pretty representative of a larger area, and I think, again, for red snapper, because that's where the center of the -- Where the biggest center of the distribution is, and that may not be so relevant, if it's not true for other areas too, but I was just wondering, because of the location and the species distribution, whether this can be transferred to other regions.

DR. COLLIER: You know, I think, if this was done in the South Atlantic region in 2010 -- I don't know if we would be able to use it, because red snapper just weren't that common. If we did it now, red snapper would be that common, and you would get sample sizes like this, and you might be able to detect a difference, and so I don't feel like red snapper catch rates would necessarily change between the two regions, and I do feel like gag grouper and red grouper might change between the two different regions, just because they are fished differently among the areas. Current has an influence on gag grouper, and then red grouper tend to be a little bit shallower in the Gulf of Mexico than in the South Atlantic, and it's a shift in the species distribution between the two different areas, which is really interesting.

DR. REICHERT: Thank you.

DR. COLLIER: That's also why you don't see many black sea bass, is because they were doing it in the Gulf of Mexico.

DR. BUCKEL: Other questions for Chip? Wally.

DR. BUBLEY: With this, would it be possible that there's some kind of confounding factor, because, right now, I think the highest species caught was red grouper, correct, and that was typically on a single-hook rig, and so is there a possibility that, because they're fairly aggressive as well, that their preference is for single-hook rigs, and so, once they get caught, you're obviously not catching something like red snapper, on a single-hook rig, if that's already occupied by a red grouper, and I don't know how you would tease that out, but is that something to be concerned about?

DR. COLLIER: I guess so, and, I mean, I would think there's other aggressive species in the South Atlantic, and the one we just talked about, black sea bass, is pretty aggressive to the hook, and, you know, there's always a confounding factor of, when you fish with a single-hook rig, versus a double-hook rig, you are fishing differently, or at least I fish differently between the two. When I have a single-hook rig, it really is trying to catch a grouper, and the double-hook chicken rigs -- I feel like I fish differently, and I wait for a different style of bite, but I was not on these trips, and so I don't know exactly how everything worked out, and they were professional fishermen that were fishing some of the drops, and they didn't fish all the drops. They seemed to be fishing more of the offshore, and so there are some other confounding factors in there as well.

DR. BUCKEL: Anne.

MS. MARKWITH: It's just a comment to Wally's question about the single-hook rig, and if -- I don't know the abundance of what red snapper were on the Gulf coast, but, if it's like it is here now, with single-hook rigs, you may not even get that rig down, and like it will get hit by a red snapper before it gets hit by a grouper, and so I think it depends on where they were fishing, if it's confounding or not, because, if you have a lot of snapper there, you're going to hit -- The snappers are going to hit it before it even gets down to the bottom to get the grouper. Whether it makes a difference or not, I don't know, but just something to think about.

DR. BUCKEL: Thanks, Anne. Chris.

DR. DUMAS: Maybe this has already been looked into, and excuse my ignorance, but has anyone done just a general study on the different types of hooks and rigs and their, you know, relative selectivity across species, but also across sizes, of a given fish, and so could we use different, you know, hook types to target catch to different species, or target catch to different size classes of fish? I assume that's been done, but --

DR. COLLIER: We did try to do that a little bit in this, and I did not detect a difference in size categories. If you look at Figure -- This was done by the FWC staff, and I do need to give credit to Brent Winter, Ted Switzer, and Heather Christiansen. They helped me a lot on this paper, putting it together, and Brent was the PI on the project, and so, because of all his hard work, we

had this information, but this first graph here is for red snapper, looking at the size differences in catch among the different gear types, and so there is some of this information for the Gulf of Mexico, and we have put in a grant, and it hasn't been accepted yet, but we put it into NMFS, trying to do a similar project on the east coast, and hopefully we can get some gear configuration studies done, trying to figure out exactly what might happen over here. Given that we have a little bit more current, things might be a little bit different, as far as the structure, which could influence your catch rates.

DR. BUCKEL: Amy.

DR. SCHUELLER: I will be honest, and I have a hard time providing feedback on this, because it seems like the question is, is this okay to include in the management document, but, without seeing how it's written up in the management document, I don't know what to say exactly, if that makes sense, because I'm all for -- You know, data are what they are, but, at the same time, we need to caveat appropriately, and you already mentioned the elephant in the room, which is, you know, in our region, what proportion of anglers are using what types of gears, and, if there is a change implemented, what does that mean. If 100 percent of people are using two hooks, perhaps this is important, but, if 2 percent are, who cares, and so I really -- I don't know what to say, or what to comment on this, because I don't know what the document looks like that you guys are putting together.

DR. BUCKEL: Mike Schmidtke.

DR. SCHMIDTKE: I am the lead staff for the document, and so, in regard to the information that we have included there, so this would be included as an appendix, just referencing, when we get to the hook action, this is the scientific information that we do have. There are caveats that are written into that discussion, noting that we don't have, you know, kind of a comprehensive survey of what the hook usage is throughout the region, and we do have some information, at least from a limited, or a qualitative level, from our advisory panel.

Our advisory panel weighed-in on what types of hooks they use, and it seems, from their feedback, that the use of double hooks is not rare. At minimum, it's not rare, and, in some areas, it's the preferred method. In other areas, it's not, and it depends on your target. The tendency is, if you are going for a wider variety of species, or if you're going for potentially smaller target species, then you would use multiple smaller hooks, kind of like a double-hook chicken rig, something like that. If you're going for grouper, if that's your target species, then you would tend more so to use a single hook, and so it depends on the target, and it depends on the area, that type of thing, but it doesn't seem to be that it's a rare occurrence in the snapper grouper fishery as a whole, that a double-hook -- We've heard of more than two hooks, but a multi-hook rig doesn't seem to be a rare occurrence in that fishery.

DR. BUCKEL: Scott Crosson.

DR. CROSSON: I agree with what Amy said, of course, which is the big question is what is the actual usage rates in different regions of the South Atlantic, because, if you don't have that, you can't really make a good estimate of what the impact would be of changing the requirements from allowing double hooks to requiring a single hook, but I just -- I kind of buy what's happening with the red snapper.

I think that the numbers are sufficient here that I can probably believe that. I'm not sure if I buy everything that's going on with the groupers, but the fact that it's going in a different direction than the red snapper means that there is no magic solution here, right, and, if you do have -- If there is a change in selectivity that's different, and, actually, in opposite directions between the gag and the red snapper, or potentially other grouper species, then you may have some unintended consequences if you change the selectivity by changing people's hook requirements. You know, you might actually increase the problems that you have for some of the other species that are also undergoing overfishing, and so, yes, that's all.

DR. BUCKEL: Chip, go ahead, and then I had a question.

DR. COLLIER: Just to build on a little bit of what Mike said, when I was setting up some of our gear, when we were doing the single-hook versus double-hook comparisons, or multi-hook rig comparisons, there were hundreds of videos on how to set up a chicken hook rig for fishing for red snapper. I mean, YouTube videos are all over the place, and so it's not uncommon. If people are making videos, obviously, people are watching the videos, and just trying to use kind of that social media side of things of they're not doing it just to waste time, and it was helpful to use those videos as well.

DR. BUCKEL: Apologies if this is in the report, but the mechanism -- There was a question about maybe the grouper getting on the single hooks, and then they're not -- That hook is no longer available for the red snapper, but the mechanism for the red snapper catch being higher on the double hook -- Did you look at the number of -- When there were two red snapper caught on the same drop, and is that a potential mechanism for the result? If you provided that in the report, I'm sorry if I missed it.

DR. COLLIER: I cannot -- I know we provided it in one report, but I don't know if it's in this report. Give me a second to look at that. I don't think I looked at that, and I will have to dig into that a little bit more, to see if that's a potential mechanism.

DR. BUCKEL: If that's a -- You know, if that's a mechanism, then that might go against the grouper, or maybe it's a combination of those, but yes. Thanks, Chip. Other question for Chip, before we move on? All right. Seeing no hands, I mentioned that we were going to tackle research monitoring before lunch, but, given that it's 11:30, and we're going to be back at 1:00 for the coral distribution presentation, we're going to move the research monitoring plan to the afternoon, and we will also -- We haven't been taking public comment this morning, but we'll get public comment this afternoon as well, and so we're going to break for lunch, and please be ready to start back up at one o'clock, for the coral presentation. Thanks, everyone.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. Welcome back to our afternoon session of the South Atlantic Council's April 2023 SSC meeting. Judd is going to run through the plan for the afternoon, for the next couple of hours, and then we'll start with the coral presentation. Go ahead, Judd.

DR. CURTIS: First up this afternoon, we've got Matthew Poti, with the deepwater coral distribution model presentation and some feedback from the SSC. We're going to briefly cover

the South Atlantic research and monitoring plan, talk about a little bit of other business, and then take public comment and then launch into our consensus statements and recommendations review. I did send around some emails, from various SSC members, to circulate for discussion, and they're not consensus statements, and so please check your inboxes and read those, and we'll discuss those later this afternoon.

DR. BUCKEL: Now Chip is going to introduce the coral presentation. Thanks, Chip.

## DEEPWATER CORAL DISTRIBUTION MODEL

DR. COLLIER: I think it was in 2019, is when the original model came before the SSC for initial review, trying to figure out if this was going to be a good way to identify important habitat for coral and other species, and so, since then, Matt and Heather Arliss and Holly, and that entire group, have been putting together this model to describe deep-sea coral habitats, and it's important, when we think about how we've described coral habitat in the past. Some of the CHAPCs were pretty much -- They were drawn with expert knowledge, and so these modeling approaches might be able to get us beyond that expert knowledge and have some of the modeling type approaches, getting to beyond Stage 1, thinking about EFH, and maybe getting to Stage 2, or even Stage 3, and so it's important to think about this in this context, exactly what we're including in our habitat descriptions of EFH and HAPCs.

DR. BUCKEL: Thank you, Chip. All right. Matthew, please proceed when you're ready.

DR. POTI: Thanks for the introduction, Chip, and thanks for inviting us to present. As Chip said, we visited, back in 2019, to present on early stages of this work, and, at that time, we were using these modeling approaches in the Gulf of Mexico, but we knew that we would be beginning models, using an occupancy modeling approach, in the South Atlantic, and so we were, at that time, giving you all sort of an introduction, but, at this point, we've completed our study for BOEM. We have modeled the distributions of about -- Just over twenty deep-sea coral species, offshore of the southeastern U.S., and this, again, was funded BOEM and their efforts to guide efficient discovery and protection of sensitive habitats.

I will be speaking today, and my colleague, Arliss Winship, is here with me, and we worked as well with folks in Peter Etnoyer's lab, for those of you that know the Deep Coral Ecology Lab there in Charleston, as well as Heather and Tom, from the Deep-Sea Coral Program.

BOEM, as I said, identified a need for information on spatial distributions of sensitive benthic habitats, including deep-sea corals, which have been designated by BOEM. The reason for that is because they can form complex 3-D structures, and they increase local biodiversity, and that allows other animals to live within them, crabs and things of that sort. Exposed hard substrate is often where those deep-sea corals are attached, and it provides surface for the animals to attach, and it can be associated by itself, even when animals aren't attached, with increased diversity and abundance of fishes.

Just in context of the sort of regimes of hardbottom, where deep-sea corals are found in the region, in the 2017 State of the Deep-Sea Corals Report, there are four major concentrations of hardbottom habitats within this region that were described, and the one to the south are the Miami and Pourtales

Terraces, the Oculina mounds off of Florida, the broader continental shelf and shelf break, and the slope, including the Blake Plateau, and partly within our domain, but perhaps of less interest here today, are the Submarine Canyons, which begin at Hatteras and then extend all the way up into Canada.

Why do we need predictive models to know something about deep-sea coral distribution? You can see, in the map here, a whole variety of surveys that have taken place in the last two decades, and there's a variety of technologies, submersibles, AUVs, ROVs. Even in spite of all of that work, much of the region has been unexplored, and much of it is unmapped. There have been recent campaigns to increase mapping data, by the NOAA Ship Okeanos Explorer, for example, but there are still major areas that haven't really been characterized, and field surveys in the deep sea, with ROVs and similar equipment, are very expensive, very logistically challenging, and so modeling is a way to sort of fill that void.

We can use statistical models to track the estimated occurrence of animals like deep-sea corals, and BOEM uses this information for siting of things like offshore energy and for environmental assessments. We've also had work used to inform conservation and management decisions, and we use the information to help select targets for future mapping exploration, for efficiently discovering --

Prior to our work, and so our work began around 2019 for this region, and we had, prior to that, been working in the Gulf of Mexico. At that point, in the South Atlantic, there were some existing predictive models that had used a similar, but bit more simple, approach. There were some unpublished models, and Andy Davies had created some for structure-forming stony corals, and we had NCOS had created regional-scale models, that were fairly coarse, for three specific species and one genus of structure-forming stony corals, as well as several other groups of corals.

There were two regional-scale models from the NSL that were developed for lophelia, and, most recently, Ryan Gasparro, who is in Eric Cortes's lab at Temple, created models using information from the Deep Search program, and he created models at a few different scales for lophelia, using a lot of the recently-mapped information in the Blake Plateau.

The question, perhaps then, is why did we create these new models, and so the earlier models that I just described, with the exception of Ryan Gasparro's recent work, used the environmental predictors primarily derived from a regional bathymetry that, of course, didn't characterize things like the coral mounds, and there were very large differences across -- It didn't do a great job of capturing the relief at the edge of the Blake Plateau, and to the escarpment, and so those models had a harder time capturing areas where we suspect deep-sea corals might exist. A lot of the earlier models were also created for broad taxonomic groups, in some cases as broad as black corals, as entire group, or stony corals, as an entire group, and, within those groups, there are animals with very different habitat requirements, and so it's preferable to model closer to the species level, if possible. In some cases, when you have to model it, the genus level, or the family level, because it's hard to get identification on our annotations at the species level, but that's our aim.

Most importantly, all of those existing models that I mentioned were presence background models, many of them maximum entropy models that were fit using presence data and randomly-selected background locations, and they didn't use absence data.

There are some limitations of those presence background models, key things like the fact that those models can confound your sampling effort with the actual distribution of the animal, so that we don't actually have a map that characterizes the distribution, and it really just shows you where you've looked, and so our intent was incorporate the existing absence data that we could compile into new kinds of models.

Our first objective actually involved compilation of data. Peter Etnoyer's team spent quite a while, in recent years, compiling data from a variety of surveys that I showed earlier, ranging from just at the turn of the century to later years, focusing on surveys for which we knew about the effort, and we could quantify for associated measures of sampling effort. We then developed predictive models to relate those occurrence information to spatial environmental predictors, including things derived from a synthesis of available multibeam bathymetry that we created, as well as some oceanographic variables, to predict and map the potential distributions of a variety of deep-sea corals across the study area.

That inventory that I mentioned of available data, you can see here all of the different things that went into that. Really, we focused on -- For each database record, we assigned a spatial position, an estimate of the survey area to use as -- The deep-sea corals that were observed, and we also were creating a model for BOEM of hardbottom occurrence, and it was -- This data was focused on hardbottom areas, but that's why we described the bottom type at each location in the dataset as well. Here's just a reference in our report, if you want to --

DR. CURTIS: Matt, your audio keeps coming and going in and out a little bit, and so I don't know if you're turning away from the microphone or something, but your voice is cutting out a little bit.

DR. POTI: Sorry about that. We're actually visiting the NOAA Beaufort Lab today, and we're squatting in someone's office, and so it could be that, and so I will try to speak a little closer to the mic. Is that better, at the moment?

DR. CURTIS: Yes, that's better. Thank you.

DR. POTI: Okay, and so here, in this table, there are a variety of sources of data that we used, and some had many, many records, and some fewer, and there's a lot more information about this in our report. In terms of environmental predictors, as I mentioned, we created a synthesis of all of the available multibeam from NOAA's Centers for Environmental Information, NCEI, and there's a data portal with many, many collections of multibeam data. We supplemented that with some other mapping effort, and, from that, we characterized things like the depth and topography, and so here, for example, is a map of the slope.

We had data characterizing substrate, and particularly things like grain size and composition of sand or rock or mud, and these were created for us by Chris Jenkins in Colorado, and then measures of oceanography. Here is a map of bottom currents from a global ocean circulation model, and all of these were graded at a hundred-meter resolution, and that -- I am going to pass the mic now to Arliss.

DR. WINSHIP: Hi, everyone, and so I'm Arliss, and I was a little closer to hands-on with model development and execution, and so Matt invited me just to cover a few slides here, with a few

more technical details about the models. Please let me know if you're having any difficulty hearing me.

Broadly speaking, the kind of statistical modeling approach that we took was occupancy modeling, and I imagine that probably some, if not all of you, are familiar with it, and it's essentially a method of modeling the probability of occurrence of an organism in space, and possibly time, and particularly this model framework allows also for the estimation of probability detection, and so it allows for imperfect detection, kind of explicitly accounting for that in the model structure, and so that was the approach that we took here. We have presence-absence data, binary data, and we're trying to model the probability of occurrence, or occupancy, in this case.

Traditionally, occupancy models -- What makes them -- What allows them to work is replication, usually in time, and so you get replicate samples at the same site over time, and that's what allows you tease apart that probability detection from the probability of occurrence. In our case, we didn't have that experimental setup, and so we used something that is referred to as a space-for-time substitution. It essentially just means that we used spatial replicates within each of our model grid cells, rather than temporal replicates.

I've just got a couple of slides here, kind of cartoons, just to say a little bit more about that space-for-time substitution and what it means in the context of our model structure, and so this is sort of a version of our study grid, if you can imagine, and there are two of our study grid cells highlighted there, and, in those cells, we've got some corals, as shown by the cartoon corals, and we have -- What we're actually trying to estimate, ultimately, is the probability of occupancy, in this case actually the latent state, symbolized by Z, in each of these two cells, the subscripts 1 and 2, whether or not there were corals present in those cells, and, in this cartoon example, that's a 1. They are present in both of them.

Then we've got our survey that comes along and samples in those cells, looking for the corals. In this first cell, in this cartoon example, the coral is there, but it misses it, because it's obscured by a rock, and, in the second one, it misses those corals, because it just didn't happen to pass over them in its field of view, and so the data that we're going to get from both of these are zeroes, absences, symbolized here by Y, but the important thing, or the reason that I'm going through this kind of cartoon example, is that these two cells represent two technically-different processes.

On the one, it's a failure to protect it, and, on the right-hand side, it's more of an availability issue, where the corals weren't available to be seen in the area that was sampled, and so the point I wanted to make here was that, by using this space-for-time substitution in the occupancy modeling framework, when we say probability of detection, what we're actually capturing is a combination of what's truly the probability of detection, but also this availability probability, and so those two are folded together, and there's been at least some research, and simulations, to suggest that that's not too big of an issue, at least in some situations, being able to fold those together.

This slide lists out just some of the standard assumptions of occupancy modeling, and I'm just going to go through them here quickly and relate them to our particular model, and model structure, and so, again, one of the foundational aspects of an occupancy model is that it allows for imperfect detection, and so sampled absences are not being treated, or assumed to be, as true absences, and that's certainly true of what we did here. There's an assumption there are no false positives, so that, you know, when there is the presence of data, it's assumed to be true.

What helped here to justify that assumption was that the deep-sea coral observations, in the data that we used, were only classified to the finest taxonomic level for which the observation essentially could be identified with confidence, that we were confident that it was that, and so that should justify this assumption that there weren't any false positives.

Closure of the system is another important assumption, particularly with that replication, data replication and survey replication, and the really nice thing about deep-sea corals, which was new to me, before I started modeling them, is that that is actually a safer assumption than usual, because they don't move, and they are very long-lived, at least with respect to the timeframe of our study, and so, again, we felt that was a justifiable assumption.

The model also assumes that those occupancy and detection probabilities are independent, and so that was another important assumption, and the most basic implementation and occupancy model assumes that that probability of detection is homogeneous, or constant, throughout the study area. This is probably not true, in our case, and so what we did was we develop the observation part of the model a little bit, to allow for some effects on that probability of detection, and so specifically an effect of the taxon, and so allowing for different probabilities of detection, depending on the taxon, and, also site-level effects on detection probability, and our data were also variable, in terms of the amount of survey effort that was represented by each replicate, and so we included an effort offset in the model, to account for that variation as well, which technically would affect the observation model, the probability of detection.

We're getting a little more mathematical here, and hopefully also a more precise description of what I've been rambling on about and trying to describe the model structure, and so the overall structure is we've got, again, presence-absence data, symbolized here with Y in that top equation. We're assuming that those data are generated through a Bernoulli process, and that is a function of the occupancy state, symbolized by Z, and so that's a 1 or a zero, the state about whether the coral is or is not there, multiplied by the probability of detection, P.

I guess I will start pointing out the subscripts here, and so the probability of detection, you will note, is subscripted by i, which is our site, and that's equivalent to one of our grid cells, 100-meters-by-100-meters, and occasion refers to the replicate, and so the data replicate in that grid cell, and k represents genus, and so I think Matt mentioned this, but that taxonomic level we ended up with, and we were modeling genus.

All right, and so that occupancy state also is also modeled as a Bernoulli process, and that latent state is a Bernoulli process of the occupancy probability, and so this is the second equation, and so this is the probability for each site, again, for each grid cell and each genus, of that genus being in that grid cell, and that probability is a -- It's a linear function, through the complementary log-log link of an intercept, and a series of functions of the different environmental predictors in the model, and those functions were spline-based, natural cubic polynomial spline basis functions, to be specific, functions of those different environmental predictors. Again, each genus had its own functions, its own coefficients for those functions, and, also, its own intercepts, and each predictor, obviously, had its own estimated coefficients.

This was a hierarchical model, and so we included all of the genera together in the same model, and the coefficients for that linear predictor were assumed to be drawn from -- The intercepts as

well were assumed to be drawn from normal distributions that span all of the genera, as well as all of the environmental predictor variables, and so just kind of overall pooled assumed normal distributions for those parameters.

Jumping back to the probability detection and the observation model, as I already alluded to earlier, we allowed for some effects on that probability of detection, and so, again, it was modeled as a linear function on the complementary log-log scale, and we have a detection intercept, and then we have site effects on detection, and also genus effects on that probability of detection, as well as that effort offset, and, specifically with the effort offset, it was the area viewed, or an estimate of the area viewed, for each of those data replicates.

The site effect, in some sense, kind of acts -- You know, it's not something that we were interested in, per se, and it's almost acting a little bit more like kind of allowing for overdispersion in the model, but it turned out to be a fairly important to include, in order to get these models to fit well, and, again, a hierarchical model, and so all of these effects were assumed to come from normal distributions, and so separate normal distributions, in this case, for the site effects.

We fitted this model in a Bayesian statistical framework, and I'm happy to discuss the kind of implementation details, if anyone is interested, but I will pass on them for the moment. You know, we followed -- We have one of the kind of foundational texts on some of this stuff that we used as a guide, and so some details and sort of the approaches that we took in there, and I've already alluded to it, and we included it, and it's a multi-taxon model, a hierarchical model, and it included all of the genus together, and one nice feature of that is that it allows you to straightforwardly also estimate genus richness, or functions of the probabilities of occurrence of all of those genera together, and so that would be one of the outputs that Matt will discuss a little bit later.

A couple more details, and we ended up fitting a single model for twenty-three different genera of deep-sea corals, and so six genera of stony corals, five of black corals, and twelve of gorgonian corals. In addition to that kind of master model of those twenty-three genera, we also fit a separate individual model, just to a single family, the Stylasterids, and we also fit a model to hardbottom habitat, and so, in this case, the idea was to predict the probability of occurrence of hardbottom habitat itself, and so actually more of a model of the physical substrate, rather than the occurrence.

To assess the model fit, we relied on a couple of different metrics. Since our response data were binary, our predictions were continuous, and so two that we have found useful, in the past, are the area under the receiver-operating characteristic curve, AUC, and also point-biserial correlation coefficient, just the correlation between those binary data and the continuous predictions.

We also conducted a spatial cross-validation exercise, just to maybe try and get a little bit better idea of how well these models might work in that context, and that is being fit to data from one area and how well they might transfer to a different area, and that's what the plot on this slide shows, or the map rather, is sort of a one-example cross-validation setup, and each of those red blocks would represent a full -- Actually, I shouldn't say that. Each of those is a spatial block that was chosen, and the pulls in the cross-validation would be a number of those blocks taken out, but you get the idea, hopefully, that space is chopped up into blocks, and you fit the model to the data in some of those blocks and see how well the fitted model predicts the data in the remaining blocks that were withheld. I think I'm going to hand it back to Matt at this point, to go through the results.

DR. POTI: Overall, the general performance, looking at the model fit, was quite good for many of the genera. Several genera had point-biserial correlation coefficients greater than 0.6, including a couple that are particularly important for coral protection, lophelia and oculina. With the cross-validation, most of the test AUC values were greater than 0.9, and there were a few genera that didn't perform as well with the test AUC values, partly because their distribution of records across those blocks that I was mentioning, and it was a bit of struggle to have data represented across blocks, and so there were a few genera where that test performance didn't do quite as well. Here's a very large summary table of all of those statistics that you can just to drill-down and look at the genera as well as the --

Most importantly though, we have, in terms of what comes from our work, are these maps, and so, in our report, for each of the genera, we have a set of maps, and one map shows the occurrence data itself, and so, just to kind of walk you through that, we have our presence-absence data, represented by the black circles and Xs, and we also overlaid on that additional records that are in the NOAA national database that is hosted by our Deep-Sea Coral Research and Technology program.

These are records from other surveys that didn't meet our requirements, and we couldn't, for example, infer absence from them, or we didn't have information to quantify sampling effort, but we wanted to at least compare those additional records to the predicted distributions from our models, because, in some cases, those were additional records in places where we didn't actually have data.

On the right is the map of the median occupancy probability, and we have that map for each of our genera. Here, you will note, for oculina, that the warm colors, representing the highest median occupancy probability, correspond to the area around the Oculina Bank, which is comforting, that the model predicted that. We have similar maps, again, for all of these genera, and here is lophelia. Lophelia, in particular, you can see that we had a lot of additional records that were in the NOAA national database that were either from -- In this case, actually trips that were conducted by Okeanos Explorer after we had compiled our database, our models, and so there are data that we just didn't have access to, and so there are a lot of additional records, but our models did predict high median occupancy probability in those areas where we didn't actually have data within our presence-absence database, and so that, again, is good for giving us confidence that the models are doing well.

You can see, as well, up here, and this is, I believe, outside of the South Atlantic Council's domain, but, when we zoom-in at canyons, and, if any of you are interested with the distribution of lophelia in different regions, here in the South Atlantic, particularly on Blake Plateau, we have extensive stony coral mounds. As you move up into the canyons, instead, the lophelia tends to aggregate in overhangs on the canyon walls, and so two very different places, but the model seemed to be able to predict lophelia occurrence pretty well in both of those places, and so that made me feel good.

Paramuricea, this is a slightly deeper and not a stony coral, in this case, and you can see here the distribution. It's a lot more offshore, on the Blake Plateau. For Paragorgia, this is a model that perhaps focused a bit more on the canyon area. We've heard anecdotally, and you can see in a few of the blue dots on the map, on the left, that there may be more Paragorgia occurrence across the Blake Plateau, and it might be patchy, but perhaps the model didn't quite pick that up and

include it, and those are sparse and rarely occurring. There's a lot more Paragorgia, in my experience, in the canyons, and that model did pick that up in the canyon region of the domain.

Then Acanella, bamboo coral, that occurs deeper and you can see that is not as well distributed, not as common, and there is an area, if you look to the very bottom here of the domain, along the Miami Terraces, that we didn't have records of its occurrence there, but there were records in the NOAA national database. For our model, because it didn't have data there, it didn't -- Based on the records that we have in the national database, it is likely that it does occur there. On the other end of the domain, to the north, we didn't have records farther offshore of Hatteras Canyon and Baltimore and Norfolk Canyons, but the model did predict that it occurs farther offshore there, even without records, and so there are places where the model may have performed better than other areas, just due to the limited survey data that we had available.

Again, Arliss mentioned that, with this framework we used, we could easily compile a map showing genus richness across the twenty-three genera, and so now this is that map, showing areas where more of the genera are likely to cooccur, and this could be useful for -- You will see, as well on the right here, that we do have maps of uncertainty around the predictions as well, and these are maps of the coefficient of variation, and so, here, we have that map for genus richness, and that map exists for all of the other individual genera predictions as well.

In summary, the data products that we have available include a Microsoft Access version of the presence-absence database, and we also have that -- Then we have GIS data of all of the different models. These products can be used for, as I mentioned, environmental risk assessments, and BOEM is using them now, and they're using them in offshore wind planning up in the central Atlantic, which there's all kinds of processes that require information to review proposed offshore activities. Again, as well, we hope to use this to inform future research and exploration, when more resources are available in the region to do that kind of deep-sea research.

Some conclusions, and so we felt, overall, that the occupancy approach provided us considerable improvements over existing models in the region, and just in general. We were able to incorporate absence data, with associated sampling effort, and the models, through the incorporation of -- We were able to distinguish true from false absences. We used bathymetry, derived from multibeam, as it existed, which wasn't the case for earlier models that used coarse regional bathymetry models.

We incorporated ocean current predictors, things derived from ocean circulation models, that weren't in earlier models, and we were able to model at the genus level, instead of broad taxonomic groups, and, as Arliss mentioned, we could model multiple genera jointly, in a joint model, which allowed us to include some rarer genera that otherwise might not have been able to be modeled.

There are certainly some limitations, and one really, I think, big challenge, for our work, and kind of deep-sea coral work in this region, is that, often, the data we have available to us for deep-sea coral occurrence is a compilation of opportunistically-collected data, data from a variety of surveys, or sampling regimes, with their own objectives, sometimes focused on specific sites that are known to be coral habitat, and so the introduction of bias, and this kind of cobbling together of sampling data isn't ideal.

Ideally, we would have a standardized, balanced collection of data across the area of interest, but, unfortunately, that's just not possible at these regional scales, with deep-sea corals at this stage,

and we are, as I mentioned, compiling data from a number of partners who have collected the data for us, and we don't actually go out to sea and collect this data, generally, although sometimes we do get the luxury of going out to sea with our partners.

There is also a variability in the number of observations and replicate samples at each site. Some of our grid cells have been heavily sampled, and others not quite as much, and that's something that it would be ideal to have a more uniform number of replicate samples at each site. There are environmental predictor variables that we know don't exist for the region, and that would be important for predicting distributions of corals, including measures of ocean chemistry, aragonite saturation, for example, that simply don't exist at the resolution that we need, and so spatial scale and resolution is a constraint, and limitation.

Sometimes we don't have environmental data at the right scale, or resolution, but, also, some of the features we know exist in this region, coral mounds, for example, in the Blake Plateau, may actually be at a finer resolution than our models, and so we may not have been able to discriminate individual mounds, like a model focused in on that domain, with high-resolution multibeam from some recent Okeanos Explorer work might be able to do, and so we have to recognize that our models -- We're at a regional scale, at a hundred-meter resolution, and so they give that regional sort of perspective on the distributions, and there may be a need to drill-down and look at finer-scale distributions as well, for certain questions.

One recommendation that we've been trying to espouse, across our partners, is this promotion of a more systematic sampling design to inform models, and we really foresee that, moving forward, and we want to have annotations that allow us to model abundance, or density, because, too often, we get the question of where are the areas where there are abundant corals, and not simply where are the areas where corals are likely to occur, and so that's a future area of work that we'll be trying to get toward in our future work. Unfortunately, in terms of continuing work in this region, because we're part of NOS, and the National Ocean Service, our work, in many cases, depends on our partners, and our partners funding us to do work.

We work a lot with the Deep-Sea Coral Program, and we work a lot with the Bureau of Ocean Energy Management, but we don't necessarily have as much control over where new sampling occurs, where new models might be needed next, and so, while that's a recommendation, and we hope to continue doing work in the region, there is not something in the works already for the South Atlantic in our office.

Here's some acknowledgements to a number of folks across NOAA and academia that provided conservation data to us, and we had help with multibeam bathymetry from Jason Chaytor at the University College of Charleston, and the surficial sediment data layers were created by Chris Jenkins, and Martha Nizinski and Sandra Brooke provided some very helpful feedback on maps of our model predictions.

With that point, I will pause here. We have the BOEM technical report, which I believe is in the documentation. It's quite long, but it is mostly maps. We also have a project website, and, soon, the NCEI data archive of our model prediction data layers, the GIS layers that I mentioned, will be available from NCEI, in links to that project website. In the meantime though, if you're interested in the GIS layers, feel free to reach out to me, and I have them in a zipped-up folder that I can share. With that, we'll take any questions you have.

DR. BUCKEL: Thank you, Matt and Arliss, for the great presentation, and you are correct that full report is in our -- It's one of our attachments, and so, if folks want to see the full report, it's there, but, for now, does anyone have questions for Matt or Arliss, or comments? No hands right now, but I will ask, or just comment, and I appreciate the occupancy modeling. We've done some of that in my group, and I like breaking down the occurrence and the detection probability.

I think that's important, and I was curious if, before you went with that approach, if you tried just modeling the kind of traditional presence-absence with a generalized linear model, if that approach was taken, or some other modeling framework that didn't account for the detection probability, and if you found different results, or if you went straight for the occupancy modeling. Thanks.

DR. POTI: Thanks. That's a great comment, and, yes, we -- We did consider other approaches, with the presence-absence data, and I think the occupancy approach actually came to us when Holly Goyert, who is listed as one of our coauthors, came to our group, and she had a lot of experience with occupancy modeling in her previous work, but we considered a variety of presence-absence approaches and other kinds of -- Some kinds of machine learning, like boosted regression trees and random forests.

We didn't get to the stage where we actually created models with those approaches on the final dataset, and that might have been a good thing to do, for comparison, but we used those techniques, and have used those techniques, in other regions, but the feedback that we tend to get, from the deep-sea coral biologists and ecologists we work with, is that they have considerable concerns about us using absence data. There are concerns about detection and worrying that we might consider something an absence where the coral is actually there, but it just wasn't seen, where that part of the grid cell wasn't surveyed, and so we felt that an occupancy approach would help us to address that concern and make the folks in the deep-sea coral community more comfortable with the use of presence-absence data, by incorporating imperfect detection.

DR. BUCKEL: Great. Fred Scharf.

DR. SCHARF: Matt, I just had a follow-up on the recommendation for the systematic sampling design, and do you anticipate sort of recommending that that -- I guess one is focused more on, like you said, estimating abundance and density, where the data already shows that they're present, as opposed to doing more survey work to sort of validate the occupancy model, to indicate actually where they're present?

DR. POTI: That's a great question, and I think, you know, there's sort of a two-part need to that kind of systematic approach, and so, you know, in an ideal world, there would be resources available to design a sample to go out and validate the occupancy models. From my experience, with the kinds of technologies that tend to be used for surveying for deep-sea corals, that would likely be an extremely-costly endeavor, and that's why -- That's one reason we used cross-validation as a way to assess the models, but I think it would be important, if we're going to use modeling -- Use data to validate models, we need to be thoughtful about the design of that sampling.

Certainly we want to know that the models do well in the places we predict a high probability of occupancy, but, too often, I think, in my experience with deep-sea work, those are the places that

everyone focuses on, and we don't end up with survey data in marginal habitats, or places that perhaps aren't deep-sea coral habitat, that really would be helpful for, you know, training new models or evaluating whether the models are predicting absence in the right place, or they're missing occurrence in places.

With respect to abundance and density, that could be my personal opinion, and I know that Heather Coleman, from the Deep-Sea Coral Program, is on the attendee list here, and so she may have more thoughts about that, but I just get the feeling, in sort of conversation from all the people we talk to, BOEM and others who use this information for management, that what they would really like to see, as an iteration of these kinds of models in the future, would be models that show them those, you know, highly dense aggregations of corals, because those maybe would be the focus of protections, relative to places where the corals might be more sparse.

That's the reason for that recommendation, and I think we're doing work now related to the Natural Resources Damage Assessment, related to Deepwater Horizon, and there's a lot of field work in the Gulf of Mexico going on related to that, and we're purposely annotating counts of individual coral species, so that we can do some models of density, building off of this kind of approach, and then we can make comparisons between that and, you know, using a presence-absence-based approach, to see what we really gain, if it is really as I guessed that it would be, or hoped that it would be, but, you know, we need to actually test that out, to see that it really is needed. At this moment, it's just my hope and dream.

DR. SCHARF: Great. Thanks, Matt. I appreciate the depth of that answer.

DR. BUCKEL: Other questions for Matt or Arliss? I have a question for council staff, or maybe Matt can get involved with this one, but one of the action items is determine whether this analysis is consistent with BSIA and is appropriate for use in managing fisheries resources, and so the fisheries resource there -- Is that the -- Matt, if you could comment, if you're familiar with these videos, but it would be helpful, for this group, if you maybe described some of the species, juveniles, sub-adults, or adults, that are using these habitats.

UNIDENTIFIED: (The comment is not audible on the recording.)

DR. BUCKEL: I thought you were talking about essential fish habitat for species that we're managing, and so the corals that we're managing. Got it. All right. Never mind, Matt. Strike that.

DR. WINSHIP: Okay. Good. I wasn't able to answer that either, and so --

DR. BUCKEL: All right, and so that's helpful to me, and hopefully others, and so I don't see any hands, Matt and Arliss, and so thanks again for the presentation.

DR. POTI: Sure. Thanks for having us and inviting us to present.

DR. BUCKEL: All right. Have a good day. All right, and so do you want to -- We'll hit those action items right now, Judd, while we're -- Our action items for the coral distribution presentation are review and discuss the methodology, uncertainties, and assumptions associated with the

distribution model to describe habitat probability, and then the second is the one that I just read, related to managing fisheries resources, which is managing the coral.

I can put a strawman in there, Judd, something to the effect of the distribution model of deep-sea corals was -- I am trying to remember some of our language, but was deemed adequate to describe the probability of deep-sea coral -- The probability of occurrence.

DR. SCHARF: Should we say -- Should we make a statement about the improvement, that the use of occupancy models represents an improvement over existing coral spatial distribution models, since it accounts for the probability of sort of lack of detection?

DR. BUCKEL: I guess that we didn't get that comparison, but I think we could say is likely an improvement. For the second action item, is this consistent with BSIA and appropriate for use in management? I am seeing some nodding heads, and so the -- Great, Judd. Thanks. Okay. Thanks, Judd. Are folks okay with those? All right. Seeing nodding heads, we will move to I think it's research and monitoring was the next, and that's you, Judd?

DR. CURTIS: Yes.

DR. BUCKEL: Okay. Judd is going to walk us through the South Atlantic research and monitoring.

## SOUTH ATLANTIC RESEARCH AND MONITORING PLAN

DR. CURTIS: All right. Thanks, Jeff. As we alluded to earlier, we'll probably treat this more as a desk exercise, but I wanted to just put this on the screen and just kind of give a little background to the purpose of this document, and so the council reviews the South Atlantic Research and Monitoring Prioritization Plan every couple of years, and this is used by the council and NOAA Fisheries to kind of identify and prioritize research needs for the region, and, in this case, the South Atlantic.

It's then circulated around for various FMPs and research priorities, to be used by researchers and academics for trying to address some of these concerns and these priorities, and so this document, different iterations of this document, have been circulated to the SSC, the Socioeconomic Panel, and the various advisory panels as well will see them, in the next coming weeks, and all that information will then be compiled, and feedback from these different advisory panels will be compiled and presented to the council at their June meeting, and so you can see all the details here, but it's broken up into several different sections, and you can see these bold headers here, and so we have short-term research needs for various stock assessments that are upcoming, and those are broken down into the different assessments that you'll see in those next couple of years.

The second section is just kind of a more general assessment and research priorities, and so anything from things we talked about this week, looking at projection performance, you know, evaluation of discards, and a lot of that kind of information is in here, as well as independent species priorities as well.

The third section is our research need for various managed areas, and so spawning SMZs, deepwater MPAs, and then management and research needs, and so things like climate-change-related priorities, and this is where some of the social and economic priorities were listed, that the SEP delved into in their meeting earlier this week, and habitat research and monitoring needs, and so we just saw a great presentation on the coral distribution models, and so things like that, that might be upcoming, that would be useful for managers and the council, and then other kinds of specific monitoring priorities, such as, you know, MARMAP funding, SEAMAP funding, and, of course, the commercial discard logbook program, et cetera.

Then specific annual reporting requests, typically specific to the SAFE reports that Chip already introduced earlier today, and what other information you would like to see in those. Then, lastly, you have a table of the different assessment priorities and when each of the stocks was assessed, what the priority level is, and when the last assessment was, as well as the next -- Year of delivery for the next stock assessment, and so we would like you to just review this report, kind of on your own time, and if you can highlight some -- A few items, maybe in each of these sections, and we'll come up with any new things that you think might be useful, and we can compile those and then provide those to the council, at their June meeting. Any questions for this agenda item?

DR. BUCKEL: Questions for Judd? Marcel.

DR. REICHERT: A quick question. Do you guys keep track of what items are addressed, because, in stock assessments, or other activities, you know, you receive certain research items, research recommendations, coming back, time and time again, and so I was just wondering if you, or others, keep track of what is addressed and what items are coming back and back and back again.

DR. BUCKEL: Chip.

DR. COLLIER: We have been working with the Science Center, in order to figure out what items have been addressed over the past two years, and we've been updating that, and so at the June council meeting is where we go through a lot of the research and recommendation plan and address some of the items, just general overviews of what has been addressed, and not getting down into the weeds of this entire plan, and that would be far too much to go through in a council meeting, but we do highlight some of the activities that are going on, and I believe that over 40 percent of some of these topics have been addressed somewhat, or have ongoing projects, and so it has been successful, and it is good to get the council to look at all the information that's being gathered in the region. A lot of times, we hear that we're data-limited, and we are, in many instances, but there's still a lot of information being collected out there that's valuable for management.

DR. REICHERT: Thank you, Chip.

DR. BUCKEL: Other questions on the research and monitoring prioritization plan?

DR. SCHARF: Just a -- Judd, do you want us to try to provide a little feedback on this when we provide feedback on the report to Jeff, like for the SSC report from this meeting, to try to sort of coincide with that, or it doesn't matter?

DR. CURTIS: I would say we can leave that independent of the report and just -- You know, if you're highlighting items in this document, or adding new things, and I can compile them. I guess,

if there are some common themes that emerge between different SSC members, then maybe we can include those in the report, in the final report version, once it comes out in three weeks, but I think we can do that as an independent exercise.

DR. BUCKEL: The action item to review and comment on the research and monitoring plan, and one question was if the items are -- We know that new ones are being added, but, when research is being done to address them, are they being taken off, and Chip commented that they were working with the Center to do that, and so we'll capture that. Any other comments on this? All right.

Moving on, in the Other Business section, we have the -- Judd wanted to get comments, and he talked about the National SSC Meeting, the SCS 8, and that's going to be hosted by the New England Council in 2024, and that group -- The steering committee is looking for potential themes for that National SSC Meeting. Judd mentioned that on the first day, and hopefully folks have thought about that and can provide us some potential themes. Marcel.

## OTHER BUSINESS

DR. REICHERT: Regime shifts. I think we've been discussing that so much, and I know that some research is done, but that may be something, and I think it may build on some of the topics that we discussed, or that were discussed, in previous national SSC meetings, but I think that may actually be a good topic.

DR. BUCKEL: Yes, and there was definitely non-stationarity presentations, and that wasn't the focus, and it was more ecosystem, right, but that was part of -- So maybe that's a good -- To continue on with -- That was something that emerged, I think, from that meeting, and it wasn't the main focus, and so regime shifts, non-stationarity. Others?

DR. SCHARF: I am trying to remember, and did they deal -- When you guys went last year, did they deal at all with sort of recruitment projections, in terms of how to deal with sort of recruitment uncertainty in the projections?

DR. BUCKEL: No, but there may have been one where they tried to build a predictive model for recruits, using environmental data, and I seem to remember at least one presentation on that, but, yes, nothing in terms of assessment projections. Recruitment decisions and projections. Discards seem to be another hot topic for our region, and I don't know if other councils are having to deal with that as much.

DR. LORENZEN: I think that would top the list nationally, or, well, in the Gulf and the South Atlantic, the discarding. I think we would top the discarding league, nationally, and, actually, I was on the steering committee for the last meeting, and it's interesting that, you know, these topics are very -- The whole recreational fishing and discarding is not a really big deal for most other regions, whereas, for us, it's really big. Actually, I think, you know, a focus on sort of managing recreational fisheries, from my mind, would be interesting, in quite a broad sense, and so then, you know, you get Alaska saying, well, we don't care, but it's --

DR. BUCKEL: Marcel.

DR. REICHERT: But I think it's good to keep trying to draw attention to those issues that are perhaps specific to our region, because, in the past, I think we have focused on certain issues that were more important, or more relevant, for, for instance, the Northeast, and the Northwest, and so, even if that doesn't end up on the agenda, I think it's good for us to make a point to say, hey, this is an important issue in our region.

DR. LORENZEN: I think recreational fisheries are important in other regions as well, but they just, you know, never rise quite to the top with the particular group that is steering that meeting, but we should push.

DR. BUCKEL: Thanks, Kai. Others? That's a good list.

DR. CURTIS: Yes, it's a good start. If anyone can think up anything else, please send it along, and I think we need to send along the list to the steering committee by May 18, I believe, and so by the time our final report is due from this meeting, and, if you have any other additions, you can include those, and I will send them along.

DR. BUCKEL: Okay, Judd, and there's a couple other -- Some of the Other Business items we took care of, like the SSC photo, and are there any others on there that you wanted to touch on?

DR. CURTIS: Just briefly, I wanted to show the website, and I know you guys have probably been looking at the current meetings, and pulling material from there, but I just wanted to highlight that we've -- With our web guru, Nick, and he's been working really diligently to get -- To kind of archive some of these briefing books and information, all on this meeting page here on the website, and now, if you go into, like let's say the October 2022 meeting, it would have -- Here is the agenda, but also the final report is linked right there, any of the briefing book materials at this tab, and you also have a link for the public comments that were linked to that particular meeting, as well as the meeting transcript, all linked right there on that single page, and so, from an archive perspective, it's extremely handy, and you can pull all the materials from this single webpage now, and so I thought that would be useful to just point out, moving forward, where you can locate all these materials, instead of having to go back into your notes, or into old briefing books and things.

Then, just lastly, I wanted to touch on this discussion that the council had at the March meeting, and so the Science Center had approached the SSC, and the council, about a transition in role for the SSC Chair, and where they would be presenting the summary of the stock assessment reports, as well as the SSC's recommendations, coming out of our meetings, to the council.

That idea was circulated among the SSC Executive Committee, and then, also, the council discussed it at their March meeting, and they decided that, no, we did not want to have those two roles blend together, and there was some concern about having the stock assessment summary, as well as then the review, coming from the same person, and that you're starting to blend the actual work being done with a review body, by the same person, as well as some other concerns with, you know, would that then deter some members of the SSC, that may be not as stock assessment savvy, from wanting to serve as the chair, and there was a few other concerns too, and so the council is very much against that transition in role, and so it will remain as it is now, where the Science Center will provide the stock assessment summaries to the council, and then, currently

Jeff, and then future SSC chairs will provide the review that the SSC has given from these meetings.

Just the other thing is the fishery management plan updates, and I don't have time to go into that right now, but there is a document that outlines all the fishery management plan updates in the SEP's briefing book. If you are interested, you can look at that. You can look at that document in the briefing book, and that's it, Jeff, unless there is any questions.

DR. BUCKEL: Scott Crosson.

DR. CROSSON: It's not a question, and it's just a comment, and it's probably of more interest to the SEP, but just letting you all know that I spoke to the New England SSC, a few weeks ago, or, actually, it was not the whole SSC, but it was the chair and the economists and social scientists from the New England SSC, and they were curious about the Socioeconomic Panel works and how well it's integrated into the South Atlantic SSC process, because they're trying to figure out a way that they can better utilize those folks, the non-biologists, on their SSC, and so it was a productive meeting. It went on for a couple of hours, and it was really quite interesting, and so I'm just letting you all know that.

DR. BUCKEL: Great. Thanks, Scott. Any other comments on the Other Business items for Judd? I've got a Marcel thumbs-up on the website, and, yes, I agree. It's very user-friendly. It looks good, and it's user-friendly, and I just went there for the next item, which there's a tab for public comment, and I clicked on it, and I don't see any public comment on the website, and nobody has provided any written to the website, but folks that are in the public, that have been on the webinar, and apologies that we didn't take public comment on each individual item, but hopefully you stuck around, if you had some on those items, and now is your chance to provide the SSC with your comments on the items that we covered either today or on Tuesday or Wednesday. Just raise your hand, and Judd will unmute you. Kyle Shertzer, please go ahead.

**PUBLIC COMMENT**

DR. SHERTZER: Okay. Thank you. I have two comments on the black sea bass review, and I offer them in case it helps with the editing of the report. The first comment is that I don't think it's accurate to say that Fmax was used as a proxy for FMSY in that assessment. FMSY was estimated directly from -- The usual way to estimate FMSY is the equilibrium landings, as a function of F, and it's more accurate to say that, in the absence of a spawner-recruit curve, when you use the mean recruit model, such that recruitment is constant, that FMSY equals Fmax, and the two are the same, but that's different from using Fmax as a proxy.

I think it's fine to scale back from that and use F 0.1, as you suggested, but just keep in mind that, by doing that, you are assuming some level of density dependence, some level of compensation, which is really functionally equivalent to assuming the value of steepness, and so my main comment is that I don't think it's accurate to say that the assessment used Fmax as a proxy.

My second comment was about the use of females only as a measure of spawning capacity, and it's true that, in every other assessment of protogynous stocks, we use mature biomass of both sexes, and black sea bass is the only exception, I think, in the South Atlantic, where we used only

females, and the reason for that dates back to the SEDAR 25 data workshop, where the life history group recommended that they did not think that sperm limitation would be in play for black sea bass, and so that was the original rationale for using females only, and then that just carried forward into subsequent assessments, but I agree that it is a good topic for further research and consideration in future assessments. Thank you.

DR. BUCKEL: Thank you, Kyle. Any questions for Kyle about what he's brought to our attention? Marcel.

DR. REICHERT: Kyle, can you briefly repeat what you said about scaling for the black sea bass?

DR. SHERTZER: Sorry. About scaling?

DR. REICHERT: Yes, and you mentioned something about the scaling was okay, and then I -- Sorry, but I missed what you said.

DR. SHERTZER: I'm sorry. Scaling back from the estimate of FMSY, which in this case equals Fmax, scaling back from that to a lower value, which is what you proposed with an F of 0.1, I think is a fine approach, but it just recognizes that there is some compensation, or density dependence, in the spawner-recruit relationship that is not captured by the stock assessment, because it used the mean recruitment model.

DR. REICHERT: Thank you.

DR. BUCKEL: Kyle, I had a question on that, the FMSY that's developed from the equilibrium landings versus F plot, and is that FMSY just an F for landings, and not total -- So then, when you compare it to an F that's total removals, is that a correct thing to do, or -- If you could comment on that.

DR. SHERTZER: Yes, that's correct that that's how it was computed in the assessment, is the F that maximizes the equilibrium landings only, and not total removals.

DR. BUCKEL: But then the F estimate that's being compared to that is an F for total removals?

DR. SHERTZER: Well, the F has all the sources of mortality in it, and it's just that what is being estimated, or maximized, is landings, but the F that would go into that has all those other sources of mortality included in it, as part of the Z, and it would also include natural mortality as well, in terms of determining equilibrium abundance at-age, and so it would have -- It would have M, and it would have F from discards, and it would have F from the landings, and so all of those things are included in the age structure, and it's just that what it's maximizing is landings.

DR. BUCKEL: Okay. Thank you.

DR. SHERTZER: That probably just makes it more muddy.

DR. BUCKEL: Thanks, Kyle. Others? Kyle, did you have any other comments?

DR. SHERTZER: That was all. Thank you for the opportunity.

DR. BUCKEL: Thanks for the corrections. I much appreciate it, and the comments. Are there other public hands raised?

DR. CURTIS: I don't see any. If there's any other public comment, please go ahead and raise your hand now.

## CONSENSUS STATEMENT AND RECOMMENDATIONS REVIEW

DR. BUCKEL: Okay. Seeing no other public comment, Judd, unless you have something else, I think we move into our consensus statement review, and we've captured some language for the final report, as we've been going along, and so we can check that language, and do any editing now, and then I know there's a few action items that we are blank, but hopefully folks that have notes will be able to -- We can fill those in fairly -- We can do a good job of filling those in now, so we don't have to do it at the report stage.

I would like to, you know, get the report out within the next week, and that's due to council staff, for upload to the briefing book, on Friday, May 12, and so I would like to have that to them early that week, that Monday, and so I will probably ask for comments back from you guys on the week before, Friday, May 5, and so we've got a couple of weeks to work on this, but I would like to -- Before it goes to the full SSC, it would be nice to have as much text on there as possible, so that everybody can see what's in the report. Marcel.

DR. REICHERT: What's the deadline again?

DR. BUCKEL: It's due May 12, Friday, May 12, to the council.

DR. REICHERT: No, but when do you need our comments, at the latest?

DR. BUCKEL: The latest would be that Monday, the 8th, Monday the 8th, but I will probably ask for the 5th, the week before, but the 8th, Monday the 8th. Okay, and so Judd is going to start scrolling. Just raise your hand if you have edits or additions, or if you think we have something wrong, and we can delete, and then we'll give folks a few minutes to read, and then Judd will scroll.

I think one statement, Judd, that we could have here is that these action items were written with the -- Because we were -- What we were told, at the March meeting, from the Center, is that we were going to be moving to -- Our understanding was that we were going to be moving to landings and discards being combined, and so that was done for scamp, and we were given the reason why that was done for scamp, because the discards were very small, but it was our impression that that was going to be done, moving forward, for all of our species, and that's what these action items for, and so I think, if we just have a statement that that is not the case, that these -- Our comments are just for species where they're combined. Marcel.

DR. REICHERT: It would be good to specify that the future assessments -- That you're not referring to the scamp and yellowmouth grouper, but, generally, this approach is not -- Or something like -- Do you know what I mean? It's not that this is a change to the scamp and

yellowmouth. Anyway, that's just a -- That can be wordsmithed later, but I just want to make sure that we are clear in what we mean here.

DR. BUCKEL: That would be just to remind us, that we would likely not use this approach, as the magnitude of discards is high enough that it warrants a separation. Great. Thank you. I think that look at ABC recommendations from the past -- Was that to do that in relation to see what the recommendations were, and then compare it what the observed catches were, and maybe Fred Serchuk had that, and I don't remember.

DR. REICHERT: Yes, and I believe that's kind of a retrospective.

DR. BUCKEL: Yes, and we need a little more there to -- What are we supposed to look at them? Does anybody remember the last bullet, what we were getting at there?

DR. REICHERT: I believe I made that remark, but now I've forgot what that was about. I will take a look at my notes.

DR. BUCKEL: I don't know if -- I've got something related to dead discards, but we'll see if we've captured that. Marcel said that he would check on that.

DR. REICHERT: Yes, and I think it was more related to, you know, we're talking about discards, and mostly in single-species situations, and they're all related, and I think it had more to do with not necessarily how the dead discards of one species affect the dead discards of another species, but more the complex, but I will take a look at my notes.

DR. BUCKEL: For the next bullet, I think that is directly related to scamp, or I think Chip mentioned some of our deepwater species, that the projections are just -- They're combined discards and landings, and so how you allocate for fisheries sectors is just for those, and so that bullet that's there, the need improvement on reporting of actual dead discards, it can probably -- It could either be moved to the previous section, or I guess it's related to this, if it's -- For that second bullet, you know, we're not getting discards, right, and so we have to break out the -- If the discards and landings are combined in the projections, we need to have the landings broken out to monitor the ACL, and I don't -- Or to compare to landings, right, because we've talked about how we know we're not getting the full picture on the discards. That's the second bullet, the discuss how projected stock level discards and landings can be allocated.

I don't think we had any discussion related to the allocation. I think one way, and so this is -- I feel like Chip -- I think, at the March meeting, you presented to the council a proposed plan for scamp, and so if you can come up and provide that, but I think -- Maybe this is the same as what you did, but it seems like you would need to break out -- If you get the projections, and then have discards and landings combined, you would need to just break out the landings and then do your allocations, as you've done previously, and I guess, if the discards are a super small component, then maybe you're able to ignore that, but if you can enlighten us on what your plans are for scamp, or what you proposed to the council for scamp.

DR. COLLIER: The typical way that it's done is, as you guys know, we get an ABC that has a landed stream and a discard stream, and so what we could do is create the ABC, using that method, where it would be using the landings stream, and we would say this is typically the proportion that

is landed relative to discards, and continue that forward. The other option is to separate -- Is to take that entire catch and apply an allocation to then and then go to independent sectors, with the -- The entire catch, we would apply an allocation for all catch to the sectors, and then an ACL would be developed up from that for just landings, and so it's a minor tweak, but it could have big consequences, when you're thinking about the impact of discards from certain fleets compared to others.

DR. BUCKEL: An alternative would be to try to separate it out on the frontend, before you -- So then you just get your total ACL, or total ABC, and then break that down, using the traditional allocation approaches. Do folks have comments? Chip, I think this was more of an issue, right, if this approach was going to be applied to species where we have to equal the discard -- The dead discards is equal to landings, and now it's not, and we're going to get those two different streams, two different data streams, and so, if this is the only time it's going to be combined, is for species where the discards are a minor component, then this action item is -- To me, it's no longer an issue, unless I'm missing something.

DR. COLLIER: Well, so it could still be done in the other stock assessments. We could request that we get a combined ABC, and so that would include landings plus dead discards, and then have -- As opposed to the way that you're getting it now, where it's broken out between an ABC of landed catch versus an ABC for discarded catch, and it could be broken out among fleets, where it's an ABC for a commercial fleet and an ABC for a recreational fleet, and then remove the discards, in order to develop the ACL, and so that could still happen, going forward. It would be -- Overall, there would be a total ABC, and then we would have an ABC by sector, and then the ACLs would be reduced from each sector, to account for the discards in that. Does that make sense? Once again, it's a minor difference, but it leads to a different accounting of discards.

DR. BUCKEL: Scott.

DR. CROSSON: Chip, so we would set a different ABC for each sector, because, if you do that, then one sector -- Okay. I'm obviously misunderstanding.

DR. COLLIER: So there would be a total ABC that would be set by the SSC, similar to now, but that ABC, like scamp and yellowmouth, that would include landings plus dead discards, and that's a suggested method of accounting for ABCs, actually, in the National Standards, where it's supposed to be accounting for catch, and so landings plus dead discards, and Erik is coming up, and he can correct me, if what I'm saying is wrong.

DR. BUCKEL: Erik Williams.

DR. WILLIAMS: Thank you. Chip is right, and just recognize that, when we give you an ABC, in our projections, the assumptions behind it, and this goes all the way back to my very first presentation, and the assumptions are that the ratio among say recreational and commercial and discards all remains the same. When you start reallocating that, you are, by definition, changing the benchmarks as well then, if you're radically changing. If you're only tweaking it a little, it probably is not worth going through the calculations to recompute the benchmarks, but recognize a big shift probably is going to change your benchmarks.

DR. BUCKEL: Chip.

DR. COLLIER: Yes, and that's one of the reasons that we wanted to bring it to the SSC, is because we felt like it was going to be increasing the workload, not only for the Center, in order to deal with these potential tweaks that come up, but also the SSC, to have to re-review these ABC recommendations, and so it could lead to quite a bit of a feedback loop, and looking at a lot of different projections, going forward.

DR. BUCKEL: Erik.

DR. WILLIAMS: Chip is exactly right, and the thing we don't know, which is unfortunate, and maybe we'll learn this, if we start doing this process more, is at what point do we need to sort of recalculate benchmarks? How far off, in the original allocation do we have to get before we're like, okay, this is going to require re-estimating the benchmarks? I don't know the answer to that.

DR. BUCKEL: All right. What do SSC members think about this? I guess my opinion is this -- That it's -- Because of the selectivities of the discards, keeping them separate, for the species where they're a large component, and you can see those separately, and not combining, for the reasons just mentioned, of having to deal with changing benchmarks and that, and that seems to complicate a situation that -- I guess I'm not seeing the pro, but maybe others can weigh-in.

Those discards, again, if we want to monitor those, and so we've talked about how to improve the projections of discards, by not having the reduction -- You know, if we're in a rebuilding, and the ABC gets reduced on the landings, we don't want it reduced on the discards, and so we'll get to that topic, but then we have these projections of dead discards, and we need something to compare it to, and that's a whole other issue.

DR. COLLIER: Just to give you an idea of a potential pro is, if you had a cleaner fishery, you would be able to fish closer to your ABC, or, if you could somehow reduce the number of discards, you could fish closer to your ABC, and so that would be a reason to separate it out by sector, giving some incentive to that sector to reduce the number of dead discards in it.

DR. BUCKEL: Thanks, Chip, and, unfortunately, we don't have good estimates of dead discards in the commercial sector, correct? Right. Anne.

MS. MARKWITH: So I'm trying to wrap my head around this, and this might be a question for Erik, and if -- Because what Chip is talking about is either removing the dead discards off the top or not, when you have them included in your projections, which I know we've done it in North Carolina. With flounder, we removed them off the top and then split our ACLs that way, but, in terms of what Erik was referencing, in terms of the ratios, is it better not to do that, from a projections standpoint, to keep those ratios more accurate, I guess, for what we're trying to do, and that's what -- I am trying to wrap my head around that, knowing there could be differences.

DR. WILLIAMS: Yes, and this is -- Anne is hitting why it's complicated, because even -- Let's take the case of black sea bass. The projections, and you saw preliminary projections, assume that the ratio of catch to discards stay the same, right, and among the fleets, and, if we change the projections, so that we're going to keep discards the same, or even higher, but then reduce the catch, we're already messing with the ratio right there, right off the bat, and so, depending on how bad we change that ratio from the original assumption in the model, we may have to recompute

the benchmarks, even just for that projection, and so that's -- That's why I said that I don't know where that breaking point is yet, and I don't even have a sense of that from all my years of experience, you know, and when do those ratios get far enough apart that you really do need to recompute benchmarks, and when is it okay to just sort of say you're close enough.

DR. BUCKEL: Thank you, Erik and Anne, for that question. All right. Judd, you had that captured for that second bullet, and so we're on to the third bullet, the discuss changes in default projections from SEDAR assessments and adjustments in ABC setting. I think this is a situation where there's not -- If we don't ask for the change, we're going to have -- The scamp is a unique situation, because there was a small amount of discards, and they were combined, and we have maybe a few other deepwater species, and so there's not going to be changes in default projections unless we ask for them. I think the specific change that -- Let's be explicit about there will not be changes to the default projections, and then, in parentheses, landings combined with dead discards. Thanks. All right. I think we hit on some of those, but we can deal with that in the editing. Thanks, Judd. Next is the black sea bass operational, and so this is one that we've -- Marcel.

DR. REICHERT: I provided some text earlier that we may need to adjust a little bit, based on Kyle's -- I am not sure if you were able to include that yet, but we may need to adjust that a little bit, based on Kyle's comments earlier, and so I just wanted to mention that I did that before Kyle spoke. I emailed it earlier, and this was relative to black sea bass. Sorry. I am completely mistaken. It was Spanish mackerel. Sorry.

DR. BUCKEL: Okay, folks. We're on black sea bass, and the action item to review the assessment, and you can see how we addressed the sub-bullets. I think we spent some time on this yesterday, and so it should be pretty good, Judd, if you want to --

DR. CURTIS: I think, based on Kyle's comments just now, you might want to change some of the text and language here, with regard to Fmax is not representing the proxy for FMSY.

DR. LORENZEN: So I sort of -- I trust Kyle, but I also disagree on this one. To my mind, FMSY implies something other than the assumption of complete compensation, which would be the case if you have a constant stock-recruitment relationship, and we can -- You know, if we want to resolve the terminology, and the way that Kyle uses it, it needs more explanation of what the issue is.

DR. BUCKEL: I think just a statement that says the FMSY was estimated from the maximum of equilibrium landings, as a function of F. Jie.

DR. CAO: I am trying to understand this case, and so I tend to agree with Kai, but I also trust Kyle. To me, FMSY implies that the dynamics pool approach, basically the per-recruit analysis, needs to be combined with the stock-recruitment relationship, right, and then the classical procedure to calculate a biological reference point involves the concept of replacement and intercept, basically the stock-recruitment curve, and so I guess Kyle was saying that, in this case, Fmax equals FMSY, because the stock-recruitment relationship is mean recruitment, and I think I have to think more about that, but I trust Kyle.

DR. LORENZEN: It depends on how you define FMSY, and I disagree with this way of defining what FMSY is, but, if we decide to change the terminology, we have to make bigger changes to

this paragraph, because we need to then explain why FMSY, in this case, is not how we normally understand the FMSY, as to actually include a stock-recruitment relationship, because that does not imply complete compensation.

DR. BUCKEL: I agree, and I think just having two or three sentences, right at the beginning of this, that says exactly what you just said, that, typically, the FMSY that were using is from the stock-recruit relationship, something along the lines of, for this assessment, it was -- Or, however, in this assessment, it was -- FMSY was estimated in a different way, and describe that.

DR. LORENZEN: I think his argument is that, since we had a stock-recruitment relationship, and it happened to be constant, if your definition of FMSY is the equilibrium catch, then that is correct, but I still think it's not correct in the spirit of the theory of fishing.

DR. BUCKEL: Alexei, did you have a comment?

DR. SHAROV: I reconsidered it.

DR. BUCKEL: All right. Thanks.

DR. LORENZEN: I can try and -- Not on the spot, but I can try and provide an alternative, tomorrow or so, to sort of be consistent both with Kyle's definition and to explain why this is somewhat different from what we --

DR. BUCKEL: I appreciate that, Kai.

DR. LORENZEN: It seems too complicated to do that on the spot, and so --

DR. BUCKEL: Yes, and especially at the end of three days, and so I appreciate you spending time on this in the future. Thanks, Kai, and Jie can chime-in as well. Any comments on this bullet, our response? All right. Judd, if you want to scroll to the next one. Kyle provided a comment on this as well, that gave justification for why the egg production is used as the SSB, but also acknowledged that it may be good to look at this male and female biomass, and so that's good. This is one we read yesterday, and so are folks okay with scrolling? Thanks to Chris, and I think that's the most thorough we've ever addressed that type of -- If folks are okay, we'll scroll down.

We talked about that list yesterday. Any additions? Okay. Does anybody want to spend time on the ABC Control Rule, or do you feel good that we dealt with that yesterday? Okay. We can scroll on. Any additions to monitoring, or deletions? All right.

We spent some time on this yesterday, the research recommendations provided in the stock assessment report, and we were asked to indicate those most likely to reduce risk and uncertainty in the future assessments, and we've got the list provided there. Any comments? Then the next bullet is any additional research recommendations that we believe would improve future assessments for black sea bass.

DR. SCHARF: For the development of the juvenile index of abundance, do we want to just note, underneath that, or next to it, that it's something that SC DNR has initiated, since they have that

small trap, small-mesh trap, survey, and their hook-and-line survey, just that they've started the process of trying to develop one of these?

DR. REICHERT: It's a short-term grant, and so, if you're talking about a long-term index, then maybe some --

DR. BUCKEL: Then there's -- I think we -- It may have been listed as a research recommendation, and so it might be up above, but what Kyle just brought up, in terms of a good topic for research for the future, is using mature biomass for both males and females. Then the next bullet is the timing and the type, and we spent some time on that yesterday. Have any folks changed their minds, or have any additions? See SAFE report, for that second bullet. Then we can -- Those others that Chris listed, we can, in editing, see if we captured those, Judd, and I am not sure if we have captured them all, but I can do some copy-and-pasting, unless folks have comments on those.

DR. CURTIS: These are ones that Chris had provided that are just kind of floating around, and don't have a home quite yet, and so I guess we'll just leave them here intact, and people can decide where they best fit.

DR. BUCKEL: Okay. The next agenda item -- Go ahead, Alexei.

DR. SHAROV: I'm sorry, and maybe I missed it, or is it coming down there, but I've been waiting for the review of the recommended F projection, the F of 0.5 of FMSY, and is that down?

DR. BUCKEL: I think it's in this next section.

DR. SHAROV: All right. I was afraid that I missed it. Thank you.

DR. BUCKEL: Alexei, there is your -- You had a comment on the second-to-last --

DR. SHAROV: It's at the bottom, the ABC projection using the recent average recruitment and 75 percent times F 0.1, and that's a substitute to 75 percent times FMSY. We have used that because we said that FMSY is an overestimate, because it's an Fmax, but we also were focusing on the higher M value, right, of 0.42. Sorry. I am totally confused here. Okay. Never mind.

DR. BUCKEL: All right. Thanks. I think this F 0.1 -- It sounds like, Kai and Jie, or, Kai, when you write that up, if that's something where, talking with Kyle, that we feel like it's -- It's an FMSY, right, and that's what we've used as our OFL in the past, is 75 percent of that, but, because it's equal to Fmax, then we know, for the yield per recruit analyses, where Fmax gets you in trouble, and so we went to F of 0.1, and so if folks are still comfortable with that, after Kyle's explanation.

DR. LORENZEN: I would say that Kyle's explanation is a rewording, but it doesn't change the concern that, if you have the -- If you assume constant recruitment, then, effectively, what you're doing is a yield-per-recruit analysis, and we know that compensation cannot be complete over the whole range of the stock-recruitment relationship, and so I think it is still appropriate to use something like this to account for that.

DR. BUCKEL: Great. Thank you, Kai. All right. I think you can scroll on, unless folks have --

DR. CROSSON: I just have a clarification, and so we're going to get these ABC projections?

DR. BUCKEL: In October.

DR. CROSSON: In October. Okay, and one of the -- So we're going to get several -- Are we also going to get that with -- I mean, the one that says allowing F in the discard fleet to remain constant or increase, and those are different options that we're also going to see, that are going to be incorporated into the ABC? Am I misinterpreting something?

DR. BUCKEL: Are you talking about the bullet that says consider all available information?

DR. CROSSON: No, the one that says about the way we're going to handle the discard fleet and the ABC projections. Those are the ones that we want to see in October and consider when we set our ABC.

DR. BUCKEL: Yes. Thanks for the clarification. All right. Thanks. This is scamp, and so the first bullet has to do with the rebuilding projections, and we had considerable discussion about them, and all of these different options were equally plausible, and so we did not determine a Tmax. We completed the fishing level recommendation table, using the 75 percent of the FMSY proxy, with low recruitment, or recent average?

DR. CURTIS: This is where I was a little unclear in the documentation and my notes, is we had the Scenario 7, representing -- For setting ABCs, and that's the 75 percent at F 40 percent. The OFL then would represent F 40 percent, but did the committee agree that -- Or come to consensus that that was with the recent average low recruitment, the same as the ABC, or the long-term average recruitment?

DR. BUCKEL: Anne Lange.

MS. LANGE: My notes say that using a recent average low recruitment.

DR. BUCKEL: Amy.

DR. SCHUELLER: I thought that was just for the ABC, and so, for the OFL, if we're congruent with the recommendations we've made elsewhere, we would say with the long-term average recruitment, and so there's two statements there, right, and the first one is the ABC, and the second one is the OFL. We can't say "or".

DR. BUCKEL: Others? That's consistent with what we've -- I know the long-term is for the rebuilding, but the workgroup also -- Was that something the workgroup discussed for the ABC, versus the OFL? Judd, maybe scroll down to the table, and so these are going to be -- We haven't decided, but I was just going to show what the table looks like, so then people can -- There's going to be annual OFL recommendations and annual ABC recommendations.

DR. CURTIS: Right, and so I was able to fill out the ABC recommendations based on that scenario that was selected by the SSC, and the OFL recommendations still remain blank, because it was

unclear whether we're using that recent average low recruitment or the recent long-term recruitment scenarios for the rebuilding plans and selecting OFLs.

DR. BUCKEL: Chip, are you slowly moving to the table to help us?

DR. SCHUELLER: Can you just go back up? What section are we in again?

DR. BUCKEL: This is for --

DR. CURTIS: This is scamp and yellowmouth.

DR. SCHUELLER: Scamp. Okay. That's what I'm making sure, that I was --

DR. BUCKEL: Go ahead, Chip.

DR. COLLIER: Like Amy said, the typical process that you guys have used has been to use the long-term average for the OFL value.

DR. CURTIS: That was a recommendation coming out of that catch levels projections workgroup, where we use the long-term, or recent long-term, average for rebuilding projections, and then you would use the recent low average, in this case, for ABC setting.

DR. BUCKEL: Marcel.

DR. REICHERT: What do you mean with the recent long-term?

DR. CURTIS: I misspoke. Long-term average.

DR. REICHERT: Sorry. I think our brains are equally fried right now. Thanks.

DR. BUCKEL: That last bullet there, on those action items for scamp, had to do with the shallow-water grouper complex, and I think that was fairly straightforward, and everyone agreed with that, and so we can -- Do you need any other information for the catch table, Judd?

DR. CURTIS: No. Now that we've got the scenario agreed upon for the OFL, I can fill that table out, and I will send that out to you, Jeff, when you fill out the final report.

DR. BUCKEL: All right. Spanish mackerel.

DR. CURTIS: Spanish mackerel is next.

DR. BUCKEL: Judd has a question there on the provide values for the OFL and the ABC. We talked about the ABC, but not the OFL, and so he has the setting OFL as the FMSY from the base model run and provides the poundage there. Okay. We can take away the question-marks. Amy says yes.

DR. CURTIS: I think maybe something in this first point here, where we determine that SEDAR 78 is sufficient for providing stock status, and we also are using some of the model outputs from

the assessment as well, if not the projections, and do you want to say something to that extent? That first statement is just that, you know, it's sufficient for providing stock status, as it's not overfished and not overfishing, but we are, per those ABC and OFL numbers -- That is model output though, and it's not the projections, which is an acceptable way to go about doing that, but I just think if you want to capture that information there, and so saying it is -- In addition to providing stock status, it's going to be used for catch level recommendations as well.

DR. BUCKEL: Yes. Great, but not projections, or something along those lines.

DR. REICHERT: There may be some language down there that you could potentially use. As I said, my brain is fried, and so I forgot.

DR. CURTIS: I have included some comments that Marcel provided, via email, down below, and so we'll include those there, and that might justify some of the language and the points you make up above.

DR. REICHERT: That first point was, I think, mostly because of remarks that Kai and myself made.

DR. LORENZEN: Maybe, to add that, because I also worded something that is a bit more general, but to the same point, and I think that we'll discuss that later, but I think it can be said twice, and so what I have could be integrated at this stage, but I also feel that we may want to make that as a separate comment, because I think it does beyond the specific case, because I think there's a general push from the Science Center to say that, well, this is it, and, you know, don't ask us questions or require modifications that cause us work, and I think that is something we want to push back on.

DR. BUCKEL: Yes. Thanks, Kai and Marcel, for providing text on these, specific to Spanish mackerel and more broadly. Marcel.

DR. REICHERT: My only question is I wrote "some SSC members", because I didn't want to speak for the entire SSC, but, if the committee feels that they all felt the same way, maybe we can make that into "the SSC".

DR. LORENZEN: I did the same, and so my impression was that, actually, a lot of people agreed with the broad sentiment, but so we need to discuss that and have a consensus, I guess, or just report that some people felt like that.

DR. BUCKEL: If folks haven't had a chance to read -- Hopefully you're reading Marcel's now, and Kai just made the statement, and so, if you have concerns about that, or you don't agree, then please raise your hand, or provide us comments now. Otherwise, we'll provide it as a consensus.

DR. CURTIS: I forwarded Kai's text, via email, to you all at lunch today, and so you have that.

DR. REICHERT: When I was listening to Kyle, I originally thought have I just mixed assessments up, and so that was a question I have, and please correct me here, because we're switching stocks back and forth, and, as I said, the fry level of my brain may have affected what I wrote.

DR. BUCKEL: But likely conservative, because of the use of lower M, and then that a higher M -- The fact that a higher M will result in increased productivity, and you could just do that, to avoid the -- Thanks for putting this together, Marcel.

MS. LANGE: Relative to whether it's the SSC, or some SSC members, I think, the way that Marcel worded it, it's not really harsh, and it's just that we're disappointed, which I think we are, because we were hoping that we would get more -- The additional runs done, and so I don't think that it's, again, too harsh of a comment to say that, you know, we're disappointed.

DR. BUCKEL: Thanks, Anne. I appreciate that. Judd, do you have the information you need? Those are going to be constants in that table below, and so we can fill that out.

DR. REICHERT: I would say there, yes, given the -- You know, considering the work, but we considered the caveats, or something. If it should be used, I think we all agree that, yes, we should definitely be using that approach.

DR. BUCKEL: I don't remember the -- I wrote down a note, but the SSC has to be willing for ABC to go up and down. Wally.

DR. BUBLEY: I had just in there as basically the interim approach was appropriate to be used to develop ABC adjustments, both up and down, but it will depend on these caveats that we're talking about, like species situation, magnitude of change to the data inputs, the amount of inputs involved and the efforts involved to produce those analyses, and I know we talked about potentially using a basic interim analysis that can be utilized as a health check to determine if that triggers further, and potentially more complex, efforts.

DR. BUCKEL: Wally is going to email what he just said to Judd, to make that easier. I have a comment that Amy had made, which I thought was a good one, that we should use Nikolai's analysis to determine what species this would work best for, and I know there were some species that it didn't work as well for, and so that should be something that we consider when applying it. Amy.

DR. SCHUELLER: The October 2022 report has a full writeup of that topic, and I think that we should reference back to that, just make a comment that says like "see the October 2022", and I think that's fine, but there was a thorough vetting of that already. I had also just said that, you know, it sounds like we're getting this for vermilion snapper, but, in the future, whoever is making these decisions, and I guess that's the SEDAR Steering Committee level, but perhaps consider like which species this worked well for and which ones it didn't.

DR. BUCKEL: Thanks, Amy. Jennifer.

DR. SWEENEY-TOOKES: This was one of my note assignments, and there was concern about setting parameters ahead of time, so as not to replace more thorough reporting, about when this could be used in place of larger analyses.

DR. BUCKEL: Are folks good with what we have?

DR. SCHARF: I think the other thing that we mentioned too is making sure that the interim analysis stays at sort of the appropriate level, so it doesn't become sort of another rerun of the model, right? In other words, we kind of define what it is.

DR. BUCKEL: Are folks okay to move to the next agenda item? This is one we -- The SSC workgroups, this is one that we just dealt with that folks, over lunch, may have decided to join one of these groups, or chair. We need a chair for the EwE and members for several others. All right, Judd.

DR. CURTIS: I think this will be a post-meeting action. As I alluded to, I'll send an email, doing some recruitment for these different workgroups, as well as that SADL scope of work, so that you can review that and provide any feedback.

DR. BUCKEL: Anne.

MS. LANGE: I am not volunteering right yet, but, Judd, when you do that, could you put a little summary of what the expectations of that working group are, or if there's already a terms of reference, so we have a better feel before we volunteer? Thank you.

DR. CURTIS: Yes. Where those exist, we'll send along any of those scopes for the various workgroups.

MS. LANGE: Or even just your comments of what your expectations are, if there isn't a document.

DR. BUCKEL: Thanks, Anne. That may get some people to join, or it may scare some off, but we'll see. It's good to know what they're getting into.

DR. REICHERT: Most of them are no work whatsoever, right?

DR. BUCKEL: Okay. The next agenda item is the SEP report summary, and there was no action required. Thank you, Scott, for doing that yesterday, late in the day.

DR. CROSSON: Yes, and I'll get a draft report to you, but it will probably be the week after next, for incorporation into the SSC report.

DR. BUCKEL: Thank you. Okay. The next agenda item is the portfolio theory presentation that we received, and there were a couple of action items that we didn't address after that, and so we need to provide some text here. Marcel.

DR. REICHERT: Can I suggest that perhaps we should refer the SEP report on this?

DR. BUCKEL: I think that's a great suggestion.

DR. CROSSON: I think everybody will like that except for the actual authors of the project.

DR. BUCKEL: Jennifer.

DR. SWEENEY-TOOKES: But Chris also had some really good comments today, and so Chris could add those comments to the record as well, because he wasn't there for the SEP.

DR. BUCKEL: Okay. Fred Serchuk had some -- Scott, did you address describe how the council could use the information?

DR. CROSSON: In the sense that we said that it couldn't. I mean, we didn't find -- The SEP, the economists, like I said, had nothing positive, that I can recall, that I can report, for including this in EBFM, and so they had serious, serious methodological data concerns, theoretical concerns, and so I will try and make it cheerful, but --

DR. BUCKEL: So Chip took notes on the suggestions for the SAFE report, but, overall, I think that we could provide a summary that the overall comments were favorable, were very positive, and we appreciated all the work that Chip has put into that, but Chip took notes on the additions, and so thanks for putting -- You can send them to Judd, for him to -- Is that the easiest way? Okay. Thanks.

DR. SCHARF: Make sure you commend yourself.

DR. BUCKEL: That's why -- I knew he wouldn't, and so I wanted to get that -- To have a statement that says something, that the SSC commends -- All right. Gear type analysis.

DR. SCHARF: I noticed these are all the items that I missed, and there's no notes on any of them.

DR. BUCKEL: We were just trying to get through the morning. Marcel.

DR. REICHERT: I mean, if you want to have notes right now, I would say, on the first one, it's, yes, it's informative, and, on the second one, I think we concluded that, although there's caveats, that it provided some evidence that one hook caught less red snapper, but there were some questions, in terms of whether -- What was it, that two red snappers, on both hooks, and things like that.

DR. BUCKEL: Yes, and there were a lot of grouper, red grouper in particular, on the single-hook rigs. They were more competitive, and they got caught first, and then you wouldn't catch a --

DR. REICHERT: The other caveat was it's a study in western Florida, and so there may be differences, although perhaps not for red snapper so much.

DR. BUCKEL: Then the big one -- Judd, tell me when you're -- Two snapper was the mechanism, two snapper on two hooks, and Chip was going to look at that. Amy.

DR. SCHUELLER: I think there were two other things that need to be in here, and one was the comment that Scott made about changing your gear might actually result in tradeoffs with other species and unintended consequences, and I think that's an important thing to say upfront, and the other one was the elephant in the room, which we talked about a bunch of times, which is we don't actually know the proportion of the fishery that's using two hooks in our region.

DR. BUCKEL: Yes.

DR. SCHUELLER: Then I also made a comment about that it was just difficult to make a statement, given that we don't know how this is written-up in the documentation for the management action.

DR. CURTIS: Can you say that again, Amy?

DR. SCHUELLER: I'm sorry, and I was -- What have we gotten down? Did you get the species, the potential for species tradeoffs and unintended consequences?

DR. CROSSON: I mean, you can actually just word it more specifically. If the council implements restrictions on using two-hook rigs, in favor one-hook rigs, there is evidence, from this study, that you would increase the catch of other species that are either overfished or undergoing overfishing, the grouper species, although I -- I mean, I'm not going to put it up there, but the findings for those was less robust, because the N was smaller for groupers, and so I think that's kind of up in the air.

DR. BUCKEL: Amy had the comment about we haven't seen how it's incorporated into the amendment. The next agenda item is the research and monitoring. Is everybody good with that? Then Other Business, and we just did this, and we got the photo. We didn't hear from Kim, and we haven't seen her yet, and it must have been a good one.

DR. CURTIS: It looks good.

DR. BUCKEL: Okay. All right. Judd, anything else for the draft report? It's not final yet.

DR. CURTIS: No, and I think we've got everything for the draft report. Send any additional information to me, and I will compile that and send it along to Jeff, and then he will circulate it to the committee.

DR. BUCKEL: Kai.

DR. LORENZEN: (Dr. Lorenzen's comment is not audible on the recording.)

DR. BUCKEL: Kai sent some text, similar to what Marcel had, in relation to the Center and, Judd, if you can pull that up.

DR. LORENZEN: The intent, I think, is quite clear, and it's to reflect that discussion that we had, but I warmed it a little, just to generally -- Because my sense is this is not a one-off, but we'll get this response a lot in the future, that they say, yes, but, you know, it's kind of done, and you can't ask questions that cause us work, or ask for revisions that cause us work, and I do think that that really constrains our ability to do a thorough review and to improve those products, and, of course, there is still, you know, the option that we could then just reject the assessment, but, of course, that's -- That's probably a line that, a lot of the time, we don't want to cross, because then that puts everything back to square-one.

Then, to my mind, it's important to retain the ability to do a thorough review and to ask for some modifications, and then that's really what this is trying to do, and I am not wedded to the text, but

I was trying to express the concerns, and I was hoping that we can get this into the report somewhere.

DR. BUCKEL: We have Marcel that had some text related to this, in the Spanish mackerel section, and Kai is asking us to take a look at his text, which would be more broad, a message back to the Center that would go into our report, if we can reach consensus, and so I want to make sure that everyone is good with this, and so we'll spend a few minutes reading what Kai has drafted, and thank you, Kai, for putting this together. Marcel.

DR. REICHERT: Is it your intention to come up with the final text or -- Perhaps let us mull over this a little bit and then provide some feedback later.

DR. LORENZEN: What I wanted to see is whether we have broad consensus that we want to say something like this or not, but, like you, I wasn't sure whether it was just two or three of us or -- I just feel it's important for us to put our foot down, a little bit, on this, because I think, if we don't do that now, we'll soon be in a situation where the normal expectation is that we don't ask for much.

DR. REICHERT: To that point, you know, it's Marcel's text, or Kai's text, and I very much would like this to be an SSC text, because, if there's no consensus, then there's no text, and so I want to make sure that this is something that we can all agree on, and then it becomes an SSC comment, rather than an individual comment, because that's -- Anyway.

DR. BUCKEL: Thanks, Marcel. Fred and then Anne.

DR. SCHARF: I agree with what Marcel just said, that I think that's important that the statement represents a consensus. I guess I also think it's really important to -- You know, that we maybe provide some text, and we don't have to do it now, and it could be some thoughtful text later, as we do edits, just to maybe be reflective a bit, in terms of -- I haven't been on this committee as long, you know, five or six years, and other people have been on it for a long time, but one thing that has always been very apparent, to me, is the very strong sort of collaborative and collegial sort of working relationship that this SSC has had with the Center, and the group of analysts in Beaufort particularly, and so I think it's really important that we, you know, are sort of reflective in that context and making the language such that we're really trying to work to maintain that, and that we feel it's important for our function to maintain that, and at least that's my sort of two-cents on it.

DR. BUCKEL: Thanks, Fred. Anne Lange.

MS. LANGE: I agree with Fred. That's why, earlier on, I made the statement that I liked the way that Marcel had included that we're disappointed. It raises the issue, but it's not -- Sorry, Kai, but it's not like we're demanding our turf, which, to me, this is more -- I mean, I agree with Kai that we do need to have the ability to ask for more runs, but I think the Center has worked hard, and I was a little surprised that the letter came that, you know, they don't have the time to do it. That has never happened, in my twelve years or whatever on the committee, but, to me, there's a reason for it, I'm assuming, but I would be -- This seems a little harsh, to me, and that's where I thought the issue was raised in what Marcel said, and if this could be wordsmithed, so it's not quite so sounding like we're trying to demand our turf or something.

DR. LORENZEN: I want to add here that this is not meant to be adversarial with the analysts or anything, but this is more directed at the leadership of the Center, and I am very happy to, you know, entertain amendments to that.

DR. BUCKEL: Thanks, Kai. George.

DR. SEDBERRY: I was just going to say that I agree with what Anne said, in that it does sound a little adversarial, to me, and I'm not sure that anything positive can come out of that kind of approach. I think what we're trying to do here is to have something positive come out of this, and I think -- I believe the tone of this is not going to help that.

DR. BUCKEL: Marcel.

DR. REICHERT: No.

DR. BUCKEL: Okay. Anne and George, if we do some wordsmithing to this, to the broader -- I think there's -- Erik Williams told us that part of it -- That, if this came at another time, right, things -- There is a workload issue right now, and, if it came at another time, and speaking about SEDAR 78, that those revisions might have been able to be done, but then there's parts of the letter from the Center that are that we don't want these types of -- We don't want to have these types of requests, and so that's where this speaks more to that, and so I will look back at the letter, and we can soften.

DR. LORENZEN: Yes, but that is exactly it, is the sort of tone of the letter, in that respect, that I felt, you know, we should say something towards, and, I mean, really, the request is that there should be provisions, to the last sentence, to support, you know, some workload after the assessment report has first been submitted, so that, you know, some additional analyses, or modifications, can be made, following the SSC -- I mean, that's sort of really the request, but, you know, I guess I was sort of taken aback a little bit by the spirit of that letter and the idea that, you know, you just shouldn't be asking for these things, and that's what I wanted to counter.

DR. BUCKEL: Yes. Understood, Kai. We'll -- This will be -- There will be some wordsmithing done before it's put in the draft and sent, and then folks can still -- If they're not comfortable, then we can have, as Kai mentioned -- We can either include it as a separate letter from a subset of members or that this was not consensus, and this is a -- We'll put it in the draft, and then we can all work together to -- We've been able to reach consensus in the past, and so hopefully that can be done here.

DR. LORENZEN: I can take the first stab at niceifying the middle part.

DR. BUCKEL: Thank you, Kai. All right. Great. Thanks, everyone. I know we're past time, and I appreciate you reading through responses to action items and this important -- Carolyn. Carolyn Belcher is approaching the table.

DR. BELCHER: It's just quick, and I just wanted to let everybody know how much the council does appreciate what you do at this table. Obviously, the Spanish mackerel has been a big issue, for everybody involved, and I talked a little bit with Jeff, and I've talked with John and Chip and

Judd about the possibilities of us working, the Executive Committees of the two working a lot closer together, to make sure that the miscommunications are kind of limited, within the council and the SSC, because we are all working towards that same common goal, and we don't want people being frustrated, and just knowing that we'll do our best to make sure that we back everything that is going on with you guys, to the level that we can help leverage to get the asks done.

As you all know, I was one of you all for nineteen years, and so I'm extremely sympathetic, empathetic, to the plight of what happens at this table, and we're definitely paying attention and wanting to make sure that, like I said, we get the management needs done, and the science needs addressed too, and so, again, thank you for your time, and it was a good week.

DR. BUCKEL: Thanks very much, Carolyn. Okay. Judd has the next meetings, the agenda item, and, Judd, did you want to say anything?

## NEXT MEETINGS

DR. CURTIS: I will just bring up our next meetings, and so, for our SSC, we'll likely have a July webinar, and that will be determined by the Executive Committee. We'll get together, and I will put some dates out there and get it together, and usually it's at the end of July, but that will be a chance to review the projections for black sea bass, as well as get that greater amberjack count update that we had to cut from our agenda this week.

Then we'll be back here in October, the 24th through the 26th, in Charleston, for an in-person meeting, and then you have the 2024 dates on the calendar already, and then the council meetings are below, and our next one is June 12 to 16 in St. Augustine, Florida. I just wanted to reiterate what Carolyn said, and what Jeff said, and thanks a lot for sticking with the agenda this week. I was -- When I was putting it together, I was like, man, this is going to be a heavy lift, and we had some heavy topics, and so great job getting through it, and I appreciate you willing to work until three o'clock, and beyond, on this last day, and so hopefully we can end the next one at noon, as usual, but I really appreciate that.

DR. BUCKEL: All right. Just to reiterate that point, and thank you, all, very, very much for a job well done this week, and I would also like to thank Judd for taking notes, while simultaneously monitoring the webinar, and I know that's difficult, and we'll have to work on maybe a more efficient approach there. Judd, we also appreciate you organizing the agenda and the overview and all the attachments, and so thanks for all your work there. It makes it easy to go through all the items.

Also, I appreciate the assistance, and guidance, of the staff from the council, the staff from SEDAR, and the staff from the Southeast Fisheries Science Center. Thank you, all, for your help, and the Erik Williams show was a good one. Thank you for all your presentations, Erik, and, also, thanks to the council members, Carolyn and Mel, for being here, as well as our legal counsel, Shep Grimes, and so, with that, we'll adjourn this April 2023 SSC meeting. Thanks, everyone.

(Whereupon, the meeting adjourned on April 20, 2023.)

Certified By: _____ Date: _____

Transcribed By
Amanda Thomas
May 25, 2023

SSC attendee list
4/18/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# SCIENTIFIC AND STATISTICAL COMMITTEE


Dr. Jeffrey Buckel, Chair
Center for Marine Science and Technology
NC State University
303 College Circle Morehead City,
NC 28557
(252)222-6341
jeffrey_buckel@ncsu.edu
9/05*,3/08*,6/10*, 6/13*,6/16*, 6/19*,
6/22*

Dr. Frederick Scharf, Vice Chair
Department of Biology and Marine Biology
University of North Carolina Wilmington 601
South College Rd
Wilmington, NC 28403
scharff@uncw.edu 6/17*,
6/20*

Dustin Addis
FL FWCC/FMRI
100 Eighth Avenue SE
St. Petersburg, FL 33701-5095
727- 502 - 4935 (ph)
Dustin.Addis@myfwc.com
9/19*, 6/22*

Dr. Walter Bubley
SC DNR/Marine Resources Division
217 Ft. Johnson Road
Charleston SC 29412
843/ 953-9810 (ph)
bubleyw@dnr.sc.gov
6/20*

Dr. Jie Cao
Center for Marine Science and Technology
North Carolina State University
303 College Circle
Morehead City, NC 28557
252/222-6331 (ph), 207/385-7309 (m)
Jcao22@ncsu.edu
6/20*

Dr. Scott Crosson
NMFS SEFSC
75 Virginia Beach Drive
Miami, FL 33149
(305)361-4468
Scott.Crosson@noaa.gov 6/09*,
3/08*, 6/11*, 6/14*, 6/17*, 6/20*

Dr. Chris Dumas
University of NC-Wilmington
Dept. of Environmental Studies
601 South College Rd.
Wilmington, NC 28403
(910)200-0670 (ph)
dumasc@uncw.edu
6/18*

Dr. Jared Flowers
GA Dept. of Natural Resources
172 Lakes Drive
Brunswick, GA 31523
(912)262-3125 (ph)
Jared.flowers@dnr.ga.gov
9/19*, 6/22*

Dr. Eric Johnson
Department of Biology
University of North Florida
1 UNF Drive
Jacksonville, FL 32224
(904)620-5764
eric.johnson@unf.edu
6/10*, 6/11*, 6/14*,
6/17*, 6/20*

Anne Lange
1493 Diamond Blvd
Mt Pleasant, SC 29466
(843)971-0628 (ph)
AMLange@aol.com
3/08*, 6/11*,6/14*, 6/17*, 6/20*

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## SCIENTIFIC AND STATISTICAL COMMITTEE (continued)

✓ Dr. Kai Lorenzen
School of Forest, Fisheries and Geomatics Sciences
University of Florida
7922 NW 71st Street
Gainesville, FL 32653
352-273-3646
klorenzen@ufl.edu
12/21*

✓ Anne Markwith
NC Division of Marine Fisheries DEQ
127 Cardinal Drive Ext.
Wilmington, NC 28405
910-796-7292 (office)
Anne.Markwith@ncdenr.gov
3/23*

X Dr. Genny Nesslage
Chesapeake Biological Laboratory
P.O. Box 38
146 Williams Street
Solomons, MD 20688
(410)326-7223 (ph)
nesslage@umces.e
du 6/16*, 6/19*,
6/22*

✓ Dr. Marcel Reichert
185 Snug Harbor Lane
Walhalla, SC 29691
(843) 459-3510 (ph)
MReichert2022@gmail.com
6/22*

✓ Dr. Amy Schueller
NOAA Fisheries
SEFSC Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516
(252)838-0815 (ph)
Amy.Schueller@noaa.gov
6/14*, 6/17*, 6/20*

✓ Dr. George Sedberry
6 Sorghum Lane
Savannah, GA 31411
912/ 308-5193
george.sedberry@gmail.com
6/10*, 6/13*, 6/16*, 6/19*, 6/22*

✓ Dr. Fred Serchuk
Casa Bonita 1,
26000 Hickory Blvd. Unit 704
Bonita Springs, FL 34134
(774)392-4975
fred.serchuk@gmail.com
6/15*, 6/18*, 6/21*

✓ Dr. Alexei Sharov
Fisheries and Boating Service
Maryland Dept. of Natural Resources
508 Taylor Avenue B-2
Annapolis, MD 21401
(410)260-8288 (ph)
ASHAROV@dnr.state.md.us
6/15*, 6/18*, 6/21*

✓ Dr. Jennifer Sweeney-Tookes
Georgia Southern University
P.O. Box 8051
Statesboro, GA 30460
(912)478-6587 (ph)
jtookes@georgiasouthern.edu
6/16*, 6/21*

**STAFF LEAD**: Judd Curtis

SSC Attendee List
4/18/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# 2023 COUNCIL MEMBERS

**Voting**

Dr. Carolyn Belcher, **Chair**
GA DNR – Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520
(912)264-7218
Carolyn.belcher@dnr.ga.gov

Trish Murphey, **Vice Chair**
NC Division of Marine Fisheries
P.O. Box 769
3441 Arendell Street
Morehead City, NC 28557
(242) 808-8011 (O); (252)241-9310 (c)
Trish.murphey@ncdenr.gov

Mel Bell
SCDNR-Marine Resources Division
P.O. Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
(843)953-9007
bellm@dnr.sc.gov

Chester Brewer
4440 PGA Boulevard, Suite 600
West Palm Beach, FL 33408
(561)655-4777
wcbsafmc@gmail.com

Gary Borland
422 Highwater Court
Chapin, SC 29036
(561) 290-9274 (cell)
GborlandSAFMC@gmail.com

Tim Griner
4446 Woodlark Lane
Charlotte, NC 28211
(980)722-0918
timgrinersafmc@gmail.com

Judy Helmey
124 Palmetto Drive
Savannah, GA 31410
(912) 897-4921
JudyHelmey@gmail.com

Kerry Marhefka
347 Plantation View Lane
Mt. Pleasant, SC 29464
(843)452-7352
KerryOMarhefka@gmail.com

Jessica McCawley
Florida Fish and Wildlife Conservation Commission
620 South Meridian St
Tallahassee, FL 32399
(850)487-0554
Jessica.mccawley@myfwc.com

Tom Roller
807 Deerfield Drive
Beaufort, NC 28516
(252) 728-7907 (ph);(919)423-6310 (c)
tomrollersafmc@gmail.com

Andy Strelcheck
Acting Regional Administrator
NOAA Fisheries, Southeast Region
263 13th Avenue South
St. Petersburg, FL 33701
(727)551-5702
Andy.strelcheck@noaa.gov

Laurilee Thompson
P.O. Box 307
Mims, FL 32754
(321) 794-6866
thompsonlaurilee@gmail.com

Spud Woodward
860 Buck Swamp Road
Brunswick, GA 31523
(912)258-8970
Swoodwardsafmc@gmail.com

## 2023 COUNCIL MEMBERS continued

**Non-Voting**

Robert Beal Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200 A-N
Arlington, VA 22201
(703)842-0740
rbeal@asmfc.org

LT Cameron C. Box
Seventh Coast Guard District
909 SE 1st Ave.
Miami, FL 33131
(305) 415-6781(ph); (786)457--6419(c)
Cameron.C.Box@uscg.mil

Deirdre Warner-Kramer
Office of Marine Conservation OES/OMC
2201 C Street, N.W. Department of State, Room 5806
Washington, DC 20520
(202)647-3228
Warner-KramerDM@state.gov

U.S. Fish and Wildlife Service
Representative
TBD

SSC Attendee List
4/18/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# COUNCIL STAFF

**Executive Director**
John Carmichael
john.carmichael@safmc.net
843-302-8435

**Deputy Director – Science**
Dr. Chip Collier
chip.collier@safmc.net
843-302-8444

**Deputy Director - Management**
Myra Brouwer
myra.brouwer@safmc.net
843-302-8436

---

**Citizen Science Program Manager**
Julia Byrd
julia.byrd@safmc.net
843-302-8439

**Admin. Secretary/Travel Coordinator**
Cindy Chaya
cindy.chaya@safmc.net
843-571-4370

**Quantitative Fishery Scientist**
Dr. Judd Curtis
Judd.curtis@safmc.net
843-302-8441

**Fishery Economist & FMP Coordinator**
John Hadley
john.hadley@safmc.net
843-302-8432

**Fishery Scientist I**
Allie Iberle
Allie.iberle@safmc.net
843-225-8135

**Public Information Officer**
Kim Iverson kim.iverson@safmc.net
843-224-7258

**Administrative Officer**
Kelly Klasnick kelly.klasnick@safmc.net
843-763-1050

**Habitat & Ecosystem Scientist**
Roger Pugliese
roger.pugliese@safmc.net
843-302-8434

**Best Fishing Practices Outreach Specialist**
Ashley Oliver
Ashley.Oliver@safmc.net
843-225-8135

**Fishery Scientist II**
Dr. Mike Schmidtke
mike.schmidtke@safmc.net
843-302-8433

**Communication and Digital Media Specialist**
Nicholas Smillie
Nick.Smillie@safmc.net
843-302- 8443

**Staff Accountant**
Suzanna Thomas suzanna.thomas@safmc.net
843-571-4368

**Fishery Social Scientist**
Christina Wiegand christina.wiegand@safmc.net
843-302-8437

**Citizen Science Project Manager**
Meg Withers
Meg.withers@safmc.net
843-725-7577

**SEDAR**

**SEDAR Program Manager**
Dr. Julie Neer
Julie.neer@safmc.net
843-302-8438

**SEDAR Coordinator**
Kathleen Howington
kathleen.howington@safmc.net
843-725-7580

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# SCIENTIFIC AND STATISTICAL COMMITTEE

Dr. Jeffrey Buckel, Chair
Center for Marine Science and Technology
NC State University
303 College Circle Morehead City,
NC 28557
(252)222-6341
jeffrey_buckel@ncsu.edu
9/05*,3/08*,6/10*, 6/13*,6/16*, 6/19*,
6/22*

Dr. Frederick Scharf, Vice Chair
Department of Biology and Marine Biology
University of North Carolina Wilmington 601
South College Rd
Wilmington, NC 28403
scharff@uncw.edu 6/17*,
6/20*

Dustin Addis
FL FWCC/FMRI
100 Eighth Avenue SE
St. Petersburg, FL 33701-5095
727- 502 - 4935 (ph)
Dustin.Addis@myfwc.com
9/19*, 6/22*

Dr. Walter Bubley
SC DNR/Marine Resources Division
217 Ft. Johnson Road
Charleston SC 29412
843/ 953-9810 (ph)
bubleyw@dnr.sc.gov
6/20*

Dr. Jie Cao
Center for Marine Science and Technology
North Carolina State University
303 College Circle
Morehead City, NC 28557
252/222-6331 (ph), 207/385-7309 (m)
Jcao22@ncsu.edu
6/20*

Dr. Scott Crosson
NMFS SEFSC
75 Virginia Beach Drive
Miami, FL 33149
(305)361-4468
Scott.Crosson@noaa.gov 6/09*,
3/08*, 6/11*, 6/14*, 6/17*, 6/20*

Dr. Chris Dumas
University of NC-Wilmington
Dept. of Environmental Studies
601 South College Rd.
Wilmington, NC 28403
(910)200-0670 (ph)
dumasc@uncw.edu
6/18*

Dr. Jared Flowers
GA Dept. of Natural Resources
172 Lakes Drive
Brunswick, GA 31523
(912)262-3125 (ph)
Jared.flowers@dnr.ga.gov
9/19*, 6/22*

Dr. Eric Johnson
Department of Biology
University of North Florida
1 UNF Drive
Jacksonville, FL 32224
(904)620-5764
eric.johnson@unf.edu
6/10*, 6/11*, 6/14*,
6/17*, 6/20*

Anne Lange
1493 Diamond Blvd
Mt Pleasant, SC 29466
(843)971-0628 (ph)
AMLange@aol.com
3/08*, 6/11*,6/14*, 6/17*, 6/20*

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## SCIENTIFIC AND STATISTICAL COMMITTEE (continued)

Dr. Kai Lorenzen
School of Forest, Fisheries and Geomatics Sciences
University of Florida
7922 NW 71st Street
Gainesville, FL 32653
352-273-3646
klorenzen@ufl.edu
12/21*

Anne Markwith
NC Division of Marine Fisheries DEQ
127 Cardinal Drive Ext.
Wilmington, NC 28405
910-796-7292 (office)
Anne.Markwith@ncdenr.gov
3/23*

Dr. Genny Nesslage
Chesapeake Biological Laboratory
P.O. Box 38
146 Williams Street
Solomons, MD 20688
(410)326-7223 (ph)
nesslage@umces.e
du 6/16*, 6/19*,
6/22*

Dr. Marcel Reichert
185 Snug Harbor Lane
Walhalla, SC 29691
(843) 459-3510 (ph)
MReichert2022@gmail.com
6/22*

Dr. Amy Schueller
NOAA Fisheries
SEFSC Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516
(252)838-0815 (ph)
Amy.Schueller@noaa.gov
6/14*, 6/17*, 6/20*

Dr. George Sedberry
6 Sorghum Lane
Savannah, GA 31411
912/ 308-5193
george.sedberry@gmail.com
6/10*, 6/13*, 6/16*, 6/19*, 6/22*

Dr. Fred Serchuk
Casa Bonita 1,
26000 Hickory Blvd. Unit 704
Bonita Springs, FL 34134
(774)392-4975
fred.serchuk@gmail.com
6/15*, 6/18*, 6/21*

Dr. Alexei Sharov
Fisheries and Boating Service
Maryland Dept. of Natural Resources
508 Taylor Avenue B-2
Annapolis, MD 21401
(410)260-8288 (ph)
ASHAROV@dnr.state.md.us
6/15*, 6/18*, 6/21*

Dr. Jennifer Sweeney-Tookes
Georgia Southern University
P.O. Box 8051
Statesboro, GA 30460
(912)478-6587 (ph)
jtookes@georgiasouthern.edu
6/16*, 6/21*

**STAFF LEAD**: Judd Curtis

SSC Attendee List
4/19/23

# SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## 2023 COUNCIL MEMBERS

**Voting**

Dr. Carolyn Belcher, **Chair**
GA DNR – Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520
(912)264-7218
Carolyn.belcher@dnr.ga.gov

Trish Murphey, **Vice Chair**
NC Division of Marine Fisheries
P.O. Box 769
3441 Arendell Street
Morehead City, NC 28557
(242) 808-8011 (O); (252)241-9310 (c)
Trish.murphey@ncdenr.gov

Mel Bell
SCDNR-Marine Resources Division
P.O. Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
(843)953-9007
bellm@dnr.sc.gov

Chester Brewer
4440 PGA Boulevard, Suite 600
West Palm Beach, FL 33408
(561)655-4777
wcbsafmc@gmail.com

Gary Borland
422 Highwater Court
Chapin, SC 29036
(561) 290-9274 (cell)
GborlandSAFMC@gmail.com

Tim Griner
4446 Woodlark Lane
Charlotte, NC 28211
(980)722-0918
timgrinersafmc@gmail.com

Judy Helmey
124 Palmetto Drive
Savannah, GA 31410
(912) 897-4921
JudyHelmey@gmail.com

Kerry Marhefka
347 Plantation View Lane
Mt. Pleasant, SC 29464
(843)452-7352
KerryOMarhefka@gmail.com

Jessica McCawley
Florida Fish and Wildlife Conservation Commission
620 South Meridian St
Tallahassee, FL 32399
(850)487-0554
Jessica.mccawley@myfwc.com

Tom Roller
807 Deerfield Drive
Beaufort, NC 28516
(252) 728-7907 (ph);(919)423-6310 (c)
tomrollersafmc@gmail.com

Andy Strelcheck
Acting Regional Administrator
NOAA Fisheries, Southeast Region
263 13th Avenue South
St. Petersburg, FL 33701
(727)551-5702
Andy.strelcheck@noaa.gov

Laurilee Thompson
P.O. Box 307
Mims, FL 32754
(321) 794-6866
thompsonlaurilee@gmail.com

Spud Woodward
860 Buck Swamp Road
Brunswick, GA 31523
(912)258-8970
Swoodwardsafmc@gmail.com

Rick DeVic web
Shep web

## 2023 COUNCIL MEMBERS continued

**Non-Voting**

Robert Beal Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200 A-N
Arlington, VA 22201
(703)842-0740
rbeal@asmfc.org

LT Cameron C. Box
Seventh Coast Guard District
909 SE 1st Ave.
Miami, FL 33131
(305) 415-6781(ph); (786)457--6419(c)
Cameron.C.Box@uscg.mil

Deirdre Warner-Kramer
Office of Marine Conservation OES/OMC
2201 C Street, N.W. Department of State, Room 5806
Washington, DC 20520
(202)647-3228
Warner-KramerDM@state.gov

U.S. Fish and Wildlife Service
Representative
TBD

SSC attendee list

4/19/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# COUNCIL STAFF

**Executive Director**
John Carmichael
john.carmichael@safmc.net
843-302-8435

**Deputy Director – Science**
Dr. Chip Collier
chip.collier@safmc.net
843-302-8444

**Deputy Director - Management**
Myra Brouwer
myra.brouwer@safmc.net
843-302-8436

---

**Citizen Science Program Manager**
Julia Byrd
julia.byrd@safmc.net
843-302-8439

**Admin. Secretary/Travel Coordinator**
Cindy Chaya
cindy.chaya@safmc.net
843-571-4370

**Quantitative Fishery Scientist**
Dr. Judd Curtis
Judd.curtis@safmc.net
843-302-8441

**Fishery Economist & FMP Coordinator**
John Hadley
john.hadley@safmc.net
843-302-8432

**Fishery Scientist I**
Allie Iberle
Allie.iberle@safmc.net
843-225-8135

**Public Information Officer**
Kim Iverson kim.iverson@safmc.net
843-224-7258

**Administrative Officer**
Kelly Klasnick kelly.klasnick@safmc.net
843-763-1050

**Habitat & Ecosystem Scientist**
Roger Pugliese
roger.pugliese@safmc.net
843-302-8434

**Best Fishing Practices Outreach Specialist**
Ashley Oliver
Ashley.Oliver@safmc.net
843-225-8135

**Fishery Scientist II**
Dr. Mike Schmidtke
mike.schmidtke@safmc.net
843-302-8433

**Communication and Digital Media Specialist**
Nicholas Smillie
Nick.Smillie@safmc.net
843-302- 8443

**Staff Accountant**
Suzanna Thomas suzanna.thomas@safmc.net
843-571-4368

**Fishery Social Scientist**
Christina Wiegand christina.wiegand@safmc.net
843-302-8437

**Citizen Science Project Manager**
Meg Withers
Meg.withers@safmc.net
843-725-7577

**SEDAR**

**SEDAR Program Manager**
Dr. Julie Neer
Julie.neer@safmc.net
843-302-8438

**SEDAR Coordinator**
Kathleen Howington
kathleen.howington@safmc.net
843-725-7580

SC attendee list
4/20/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
# SCIENTIFIC AND STATISTICAL COMMITTEE

Dr. Jeffrey Buckel, Chair
Center for Marine Science and Technology
NC State University
303 College Circle Morehead City,
NC 28557
(252)222-6341
jeffrey_buckel@ncsu.edu
9/05*,3/08*,6/10*, 6/13*,6/16*, 6/19*,
6/22*

Dr. Frederick Scharf, Vice Chair
Department of Biology and Marine Biology
University of North Carolina Wilmington 601
South College Rd
Wilmington, NC 28403
scharff@uncw.edu 6/17*,
6/20*

Dustin Addis
FL FWCC/FMRI
100 Eighth Avenue SE
St. Petersburg, FL 33701-5095
727- 502 - 4935 (ph)
Dustin.Addis@myfwc.com
9/19*, 6/22*

Dr. Walter Bubley
SC DNR/Marine Resources Division
217 Ft. Johnson Road
Charleston SC 29412
843/ 953-9810 (ph)
bubleyw@dnr.sc.gov
6/20*

Dr. Jie Cao
Center for Marine Science and Technology
North Carolina State University
303 College Circle
Morehead City, NC 28557
252/222-6331 (ph), 207/385-7309 (m)
Jcao22@ncsu.edu
6/20*

Dr. Scott Crosson
NMFS SEFSC
75 Virginia Beach Drive
Miami, FL 33149
(305)361-4468
Scott.Crosson@noaa.gov 6/09*,
3/08*, 6/11*, 6/14*, 6/17*, 6/20*

Dr. Chris Dumas
University of NC-Wilmington
Dept. of Environmental Studies
601 South College Rd.
Wilmington, NC 28403
(910)200-0670 (ph)
dumasc@uncw.edu
6/18*

Dr. Jared Flowers
GA Dept. of Natural Resources
172 Lakes Drive
Brunswick, GA 31523
(912)262-3125 (ph)
Jared.flowers@dnr.ga.gov
9/19*, 6/22*

Dr. Eric Johnson
Department of Biology
University of North Florida
1 UNF Drive
Jacksonville, FL 32224
(904)620-5764
eric.johnson@unf.edu
6/10*, 6/11*, 6/14*,
6/17*, 6/20*

Anne Lange
1493 Diamond Blvd
Mt Pleasant, SC 29466
(843)971-0628 (ph)
AMLange@aol.com
3/08*, 6/11*,6/14*, 6/17*, 6/20*

7/20/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## SCIENTIFIC AND STATISTICAL COMMITTEE (continued)

Dr. Kai Lorenzen
School of Forest, Fisheries and Geomatics Sciences
University of Florida
7922 NW 71st Street
Gainesville, FL 32653
352-273-3646
klorenzen@ufl.edu
12/21*

Anne Markwith
NC Division of Marine Fisheries DEQ
127 Cardinal Drive Ext.
Wilmington, NC 28405
910-796-7292 (office)
Anne.Markwith@ncdenr.gov
3/23*

Dr. Genny Nesslage
Chesapeake Biological Laboratory
P.O. Box 38
146 Williams Street
Solomons, MD 20688
(410)326-7223 (ph)
nesslage@umces.edu
6/16*, 6/19*,
6/22*

Dr. Marcel Reichert
185 Snug Harbor Lane
Walhalla, SC 29691
(843) 459-3510 (ph)
MReichert2022@gmail.com
6/22*

Dr. Amy Schueller
NOAA Fisheries
SEFSC Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516
(252)838-0815 (ph)
Amy.Schueller@noaa.gov
6/14*, 6/17*, 6/20*

Dr. George Sedberry
6 Sorghum Lane
Savannah, GA 31411
912/ 308-5193
george.sedberry@gmail.com
6/10*, 6/13*, 6/16*, 6/19*, 6/22*

Dr. Fred Serchuk
Casa Bonita 1,
26000 Hickory Blvd. Unit 704
Bonita Springs, FL 34134
(774)392-4975
fred.serchuk@gmail.com
6/15*, 6/18*, 6/21*

Dr. Alexei Sharov
Fisheries and Boating Service
Maryland Dept. of Natural Resources
508 Taylor Avenue B-2
Annapolis, MD 21401
(410)260-8288 (ph)
ASHAROV@dnr.state.md.us
6/15*, 6/18*, 6/21*

Dr. Jennifer Sweeney-Tookes
Georgia Southern University
P.O. Box 8051
Statesboro, GA 30460
(912)478-6587 (ph)
jtookes@georgiasouthern.edu
6/16*, 6/21*

**STAFF LEAD**: Judd Curtis

SSC Attendee List
4/20/23

# SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

## 2023 COUNCIL MEMBERS

**Voting**

Dr. Carolyn Belcher, **Chair**
GA DNR – Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520
(912)264-7218
Carolyn.belcher@dnr.ga.gov

Trish Murphey, **Vice Chair**
NC Division of Marine Fisheries
P.O. Box 769
3441 Arendell Street
Morehead City, NC 28557
(242) 808-8011 (O); (252)241-9310 (c)
Trish.murphey@ncdenr.gov

Mel Bell
SCDNR-Marine Resources Division
P.O. Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
(843)953-9007
bellm@dnr.sc.gov

Chester Brewer
4440 PGA Boulevard, Suite 600
West Palm Beach, FL 33408
(561)655-4777
wcbsafmc@gmail.com

Gary Borland
422 Highwater Court
Chapin, SC 29036
(561) 290-9274 (cell)
GborlandSAFMC@gmail.com

Tim Griner
4446 Woodlark Lane
Charlotte, NC 28211
(980)722-0918
timgrinersafmc@gmail.com

Judy Helmey
124 Palmetto Drive
Savannah, GA 31410
(912) 897-4921
JudyHelmey@gmail.com

Kerry Marhefka
347 Plantation View Lane
Mt. Pleasant, SC 29464
(843)452-7352
KerryOMarhefka@gmail.com

Jessica McCawley
Florida Fish and Wildlife Conservation Commission
620 South Meridian St
Tallahassee, FL 32399
(850)487-0554
Jessica.mccawley@myfwc.com

Tom Roller
807 Deerfield Drive
Beaufort, NC 28516
(252) 728-7907 (ph);(919)423-6310 (c)
tomrollersafmc@gmail.com

Andy Strelcheck
Acting Regional Administrator
NOAA Fisheries, Southeast Region
263 13th Avenue South
St. Petersburg, FL 33701
(727)551-5702
Andy.strelcheck@noaa.gov

Laurilee Thompson
P.O. Box 307
Mims, FL 32754
(321) 794-6866
thompsonlaurilee@gmail.com

Spud Woodward
860 Buck Swamp Road
Brunswick, GA 31523
(912)258-8970
Swoodwardsafmc@gmail.com

# 2023 COUNCIL MEMBERS continued

**Non-Voting**

Robert Beal Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200 A-N
Arlington, VA 22201
(703)842-0740
rbeal@asmfc.org

LT Cameron C. Box
Seventh Coast Guard District
909 SE 1st Ave.
Miami, FL 33131
(305) 415-6781(ph); (786)457--6419(c)
Cameron.C.Box@uscg.mil

Deirdre Warner-Kramer
Office of Marine Conservation OES/OMC
2201 C Street, N.W. Department of State, Room 5806
Washington, DC 20520
(202)647-3228
Warner-KramerDM@state.gov

U.S. Fish and Wildlife Service
Representative
TBD

SSC attendee list
4/20/23

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

# COUNCIL STAFF

**Executive Director**
John Carmichael
john.carmichael@safmc.net
843-302-8435

**Deputy Director – Science**
Dr. Chip Collier
chip.collier@safmc.net
843-302-8444

**Deputy Director - Management**
Myra Brouwer
myra.brouwer@safmc.net
843-302-8436

---

**Citizen Science Program Manager**
Julia Byrd
julia.byrd@safmc.net
843-302-8439

**Admin. Secretary/Travel Coordinator**
Cindy Chaya
cindy.chaya@safmc.net
843-571-4370

**Quantitative Fishery Scientist**
Dr. Judd Curtis
Judd.curtis@safmc.net
843-302-8441

**Fishery Economist & FMP Coordinator**
John Hadley
john.hadley@safmc.net
843-302-8432

**Fishery Scientist I**
Allie Iberle
Allie.iberle@safmc.net
843-225-8135

**Public Information Officer**
Kim Iverson kim.iverson@safmc.net
843-224-7258

**Administrative Officer**
Kelly Klasnick kelly.klasnick@safmc.net
843-763-1050

**Habitat & Ecosystem Scientist**
Roger Pugliese
roger.pugliese@safmc.net
843-302-8434

**Best Fishing Practices Outreach Specialist**
Ashley Oliver
Ashley.Oliver@safmc.net
843-225-8135

**Fishery Scientist II**
Dr. Mike Schmidtke
mike.schmidtke@safmc.net
843-302-8433

**Communication and Digital Media Specialist**
Nicholas Smillie
Nick.Smillie@safmc.net
843-302- 8443

**Staff Accountant**
Suzanna Thomas suzanna.thomas@safmc.net
843-571-4368

**Fishery Social Scientist**
Christina Wiegand christina.wiegand@safmc.net
843-302-8437

**Citizen Science Project Manager**
Meg Withers
Meg.withers@safmc.net
843-725-7577

**SEDAR**

**SEDAR Program Manager**
Dr. Julie Neer
Julie.neer@safmc.net
843-302-8438

**SEDAR Coordinator**
Kathleen Howington
kathleen.howington@safmc.net
843-725-7580

# April 2023 SSC Attendee Report: Meeting

Report Generated:

04/23/2023 07:26 PM EDT

| Webinar ID | Actual Start Date/Time | Duration |
|---|---|---|
| 385-490-707 | 04/18/2023 12:24 PM EDT | 4 hours 60 minutes |

## Attendee Details

| Attended | Last Name | First Name |
|---|---|---|
| Yes | Allen | Shanae |
| Yes | Barrineau | Marina |
| Yes | Bianchi | Alan |
| Yes | Brouwer | Myra |
| Yes | Christiansen | Heather |
| Yes | Coggins | Lew |
| Yes | Curtis | Judd |
| Yes | DeVictor | Rick |
| Yes | Foss | Kristin |
| Yes | Franke | Emilie |
| Yes | Gentry | Lauren |
| Yes | Grimes | Shepherd |
| Yes | Griner | 00 Tim |
| Yes | Hadley | John |
| Yes | Helies | Frank |
| Yes | Howington | 02Kathleen |
| Yes | Iverson | Kim |
| Yes | Johnson | Eric |
| Yes | Laks | Ira |
| Yes | Marhefka | 00Kerry |
| Yes | Mehta | Nikhil |
| Yes | Murphey | Trish |
| Yes | Neer | Julie |
| Yes | Newman | Thomas |
| Yes | OFarrell | Halie |
| Yes | Pugliese | 01Roger |
| Yes | Reding | Brandon |
| Yes | Sedberry | George |
| Yes | Seward | McLean |
| Yes | Shertzer | Kyle |
| Yes | Sinkus | Wiley |
| Yes | Smart | Tracey |
| Yes | Smillie | Nick |

| | | |
|---|---|---|
| Yes | Spanik | Kevin |
| Yes | Travis | Michael |
| Yes | Vecchio | Julie |
| Yes | Withers | Meg |
| Yes | collier | chip |
| Yes | merino | joy |
| Yes | thomas | suz |

# Attendee Report: April 2023 SSC Meeting

Report Generated:

04/23/2023 07:44 PM EDT

| Webinar ID | Actual Start Date/Time | Duration |
|---|---|---|
| 385-490-707 | 04/19/2023 07:53 AM EDT | 9 hours 54 minutes |

## Attendee Details

| Attended | Last Name | First Name |
|---|---|---|
| Yes | Allen | Shanae |
| Yes | Barbieri | Luiz |
| Yes | Bell | 00 Mel |
| Yes | Brouwer | Myra |
| Yes | CARMICHAEL | JOHN |
| Yes | Christiansen | Heather |
| Yes | Coggins | Lew |
| Yes | Coleman | Heather |
| Yes | Cowdrey | Michael |
| Yes | Curtis | Judd |
| Yes | DeVictor | Rick |
| Yes | Fitzpatrick | Eric |
| Yes | Foss | Kristin |
| Yes | Franke | Emilie |
| Yes | Gentry | Lauren |
| Yes | Grady | Cole |
| Yes | Grimes | Shepherd |
| Yes | Griner | 00 Tim |
| Yes | Hadley | John |
| Yes | Hartig | Ben |
| Yes | Helies | Frank |
| Yes | Iberle | Allie |
| Yes | Iverson | Kim |
| Yes | Johnson | Eric |
| Yes | Klasnick | 01Kelly |
| Yes | Laks | Ira |
| Yes | Lorenzen | Kai |
| Yes | Malinowski | Rich |
| Yes | Marhefka | 00Kerry |
| Yes | Markwith | Anne |
| Yes | Mehta | Nikhil |
| Yes | Merrifield | Mike |
| Yes | Murphey | Trish |

| | | |
|---|---|---|
| Yes | Neer | Julie |
| Yes | Newman | Thomas |
| Yes | OFarrell | Halie |
| Yes | Oliver | Ashley |
| Yes | Poti | Matthew |
| Yes | Sauls | Beverly |
| Yes | Schlick | CJ |
| Yes | Schmidtke | Michael |
| Yes | Sedberry | George |
| Yes | Seward | McLean |
| Yes | Sharov | Alexei |
| Yes | Shertzer | Kyle |
| Yes | Sinkus | Wiley |
| Yes | Smart | Tracey |
| Yes | Smillie | Nick |
| Yes | Stemle | Adam |
| Yes | Travis | Michael |
| Yes | Vecchio | Julie |
| Yes | Wiegand | Christina |
| Yes | Withers | Meg |
| Yes | Wyanski | David |
| Yes | collier | chip |
| Yes | merino | joy |
| Yes | thomas | suz |

# April 2023 SSC Attendee Report: Meeting

Report Generated:

04/23/2023 07:47 PM EDT

| Webinar ID | Actual Start Date/Time | Duration |
|---|---|---|
| 385-490-707 | 04/20/2023 07:48 AM EDT | 8 hours 1 minute |

## Attendee Details

| Attended | Last Name | First Name |
|---|---|---|
| Yes | Allen | Shanae |
| Yes | Bell | 00 Mel |
| Yes | Brewster | Lauran |
| Yes | Brouwer | Myra |
| Yes | Bullard | Elizabeth |
| Yes | Byrd | 01Julia |
| Yes | CARMICHAEL | JOHN |
| Yes | Cadrin | Steve |
| Yes | Christiansen | Heather |
| Yes | Coggins | Lew |
| Yes | Coleman | Heather |
| Yes | Curtis | Judd |
| Yes | DeVictor | Rick |
| Yes | Edwards | Fiona |
| Yes | Fitzpatrick | Eric |
| Yes | Foss | Kristin |
| Yes | Gentry | Lauren |
| Yes | Grady | Cole |
| Yes | Grimes | Shepherd |
| Yes | Griner | 00 Tim |
| Yes | Hadley | John |
| Yes | Helies | Frank |
| Yes | Hiers | Homer |
| Yes | Iberle | Allie |
| Yes | Johnson | Eric |
| Yes | Laks | Ira |
| Yes | Lorenzen | Kai |
| Yes | Marhefka | 00Kerry |
| Yes | Markwith | Anne |
| Yes | Mehta | Nikhil |
| Yes | Merino | Joy |
| Yes | Merrifield | Mike |
| Yes | Muller | Robert |

| | | |
|---|---|---|
| Yes | Murphey | Trish |
| Yes | Neer | Julie |
| Yes | Newman | Thomas |
| Yes | Poti | Matthew |
| Yes | Pugliese | 01Roger |
| Yes | Reding | Brandon |
| Yes | Sedberry | George |
| Yes | Seward | McLean |
| Yes | Sharov | Alexei |
| Yes | Shertzer | Kyle |
| Yes | Sinkus | Wiley |
| Yes | Smillie | Nick |
| Yes | Stemle | Adam |
| Yes | Travis | Michael |
| Yes | Vecchio | Julie |
| Yes | Wiegand | Christina |
| Yes | Willis | Michelle |
| Yes | Withers | Meg |
| Yes | Wyanski | David |
| Yes | collier | chip |
| Yes | merino | joy |
| Yes | thomas | suz |