

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SCIENTIFIC AND STATISTICAL COMMITTEE

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

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Transcript

Scientific and Statistical Committee

Dr. Marcel Reichert, Chair
Dr. Walter Bubley, Vice Chair
Dr. Jeffrey Buckel
Dr. Jennifer Sweeney-Tookes
Dr. Luiz Barbieri
Dr. Chris Dumas
Dr. Jared Flowers
Dr. James Gartland
Dr. Kai Lorenzen
Dr. Matt Damiano

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Dr. Kelsey Roberts
Dr. Fred Scharf
Dr. C.J. Schlick
Dr. Amy Schueller
Dr. Fred Serchuk
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Kelly Klasnick
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Emily Ott
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Rachael Silvas
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Christina Curtis
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Attendees and Invited Participants

Shep Grimes
Chris Bradshaw
Dr. Erik Williams
Dr. Sarah Gaichas

Kathy Knowlton
Dr. Tracy Smart
Dr. Tom Carruthers
Dr. Cassidy Peterson

Observers and Participants

Other observers and participants attached.

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at the Town and Country Inn and Suites in Charleston, South Carolina on April 14, 2026, and was called to order by Dr. Marcel Reichert.

INTRODUCTIONS

DR. REICHERT: Good afternoon. I'm Marcel Reichert. I'm the chair of the SSC, and I would like to welcome everyone to our April 2026 meeting of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council.

A special welcome to our new SSC member, Matt Damiano. He is going to join us this week online. Matt, we are looking forward to working with you and seeing you in-person in one of our next SSC meetings. Several of us know you, and have worked with you in the past, but, when we do our introductions, maybe you can tell us a little bit about yourself, a little bit about your background.

I also want to welcome Dr. Carolyn Belcher, a council member, and she is also the SSC's -- The council's liaison to the SSC. I also want to welcome council member Amy Dukes. Shep, from the Office of General Counsel, is here. Welcome Shep. It's good to see you again, and I also want to welcome several council staff in the room. Thank you all for your support to the SSC, to our committee, and, before we get started, would like to remind everyone that this committee meeting is a public meeting and it is broadcasted and recorded, and so, with that, let's do a round of introductions, and maybe. Genny, we can start at your end of the table.

DR. NESSLAGE: Genny Nessler, University of Maryland, Center for Environmental Science.

DR. SERCHUK: Fred Serchuk, and I'm retired from National Marine Fisheries Service for some time now, but I'm active on this committee, and I'm also active on the S&S Committee in New England. Thank you.

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

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

DR. SCHLICK: C.J. Schlick, South Carolina Department of Natural Resources, shared with Georgia Department of Natural Resources.

DR. GARTLAND: Jim Gartland, Virginia Institute of Marine Science.

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

DR. REICHERT: Marshall Reichert, SSC Chair.

DR. BUBLEY: Wally Buble, South Carolina Department of Natural Resources and SSC Vice Chair.

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

DR. ROBERTS: Kelsey Roberts, University of Massachusetts, Dartmouth.

DR. LORENZEN: Kai Lorenzen, University of Florida.

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

DR. TURNER: Steve Turner, retired from National Marine Fisheries Service, Southeast Center.

MR. WALSH: Jason Walsh, economist at North Carolina Division of Marine Fisheries and SEP Vice Chair.

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

MS. PACKAGE-WARD: Christina Package-Ward, NMFS Southeast Regional Office and SEP member.

DR. REICHERT: Thank you. Online, as I said, welcome, Matt. Are you online?

DR. CURTIS: Go ahead, Matt. I've got you unmuted. I see your hand raised.

DR. DAMIANO: Thanks, Judd. That was the only way I could get anyone's attention, and so, first of all, thank you very much for allowing me to attend this meeting remotely. I will definitely be there in person this October. Hi, everyone. I'm Matt Damiano. I'm the Stock Assessment Program Manager for North Carolina Division of Marine Fisheries. A little bit about myself, I've been in this position for almost a year, and, prior to that, I was a stock assessment analyst for the Caribbean Fisheries Branch at the Southeast Fisheries Science Center. Prior to that, I did my post-doc with Kyle Shertzer at the Beaufort Lab, and, prior to that, I did my PhD at North Carolina State University at CMAST here in Morehead City.

It's going to be an interesting first meeting for me, because I have seen my name show up on a whole lot of the materials we have to review, which is kind of weird, but I'm very much looking forward to being part of the SSC, and so thank you for having me.

DR. REICHERT: Thank you, Matt. We have Luiz, who is unable to join us today, but he'll be with us online tomorrow and Thursday. Also, I'd like to mention that Jie Cao was unable to join us this week, and we were -- I will let Amy get settled. Amy just joined us. Amy, welcome.

DR. SCHUELLER: Hi. Amy Schueller, NOAA Fisheries.

DR. REICHERT: Thank you, and I also saw Erik Williams. He's our Southeast Fisheries Science Center liaison to the SSC. Welcome. Good to see you, Erik. All right. Next up is the Review and Approval of the Agenda. For those of you remembering our last meeting, I had hoped that we would have a couple of less changes than we had last time, but, just by hoping it, I think I jinxed it. Judd sent us an email earlier today relative to Agenda Item 7, which will be severely shortened.

Tracey has offered to present the SERFS overview on Wednesday morning, so that will be a slight change in the agenda. Other than that, currently I have no changes to the agenda. Are there any questions or additions to the agenda? Seeing none, the adjusted agenda was -- Sorry. Anyone? Genny.

DR. NESSLAGE: I was just wondering if maybe I missed it and we might be getting an update on the process review at this meeting, or at least what progress is being made on along those fronts, from staff maybe?

DR. REICHERT: Judd. What process review? What are you referring to?

DR. NESSLAGE: Exactly. I don't know, and I was interviewed for a South Atlantic process review a few months ago. Is that something that's on the agenda, or we would be getting an update on that, or a briefing?

DR. REICHERT: Chip Collier is coming to the table to address that topic. Chip.

DR. COLLIER: So that is one of our projects related to the resilient fisheries projects that we have going on. We refer to it as Project 1, and it's looking at the management process, and so they are going to be reaching out to a variety of folks, and getting their input, and so we're trying to make sure -- We're trying to get us more efficient, and get us through the management process more efficient.

DR. NESSLAGE: (Dr. Nessler's comment is not audible on the recording.)

DR. REICHERT: Sorry, and, Genny, what is --

DR. COLLIER: So she was asking when the SSC will get an update on the findings of that report. That will be presented to the SSC hopefully in April of next year.

DR. REICHERT: Thank you, Chip. Any other questions or comments? Again, seeing none, the adjusted agenda was approved. Up next is the approval of the minutes of our October meeting. Are there any corrections to these minutes from the committee, or anyone else? Steve.

DR. TURNER: Yes, and perhaps my name would not be in all caps in the -- The only person in all caps in the list of attendees at the end of the document.

DR. REICHERT: We'll make sure that we will correct that, Steve. Thank you, and, with that, the minutes were approved with minor editorial corrections. All right. Thank you. Our next agenda item is public comments. There was an opportunity for written comment, as usual, and verbal comments at the beginning and the end of our meeting, and also during each agenda item, after the presentations, and after the committee has an opportunity to ask clarifying questions. Judd, were there any written comments? I checked, and there were none. Okay, and so there were no written comments. Would anyone in the room or online like to make a public comment? Seeing no one in the room, Judd, any hands online?

DR. CURTIS: No hands online.

DR. REICHERT: Seeing none, no written or verbal comments were provided. Before we move to Agenda Item 3, I'm reminded, or I want to remind everyone, that I sent a list of assignments out last week. As always, we are asking that in particular those assigned to agenda topics help us draft the report by making detailed notes.

Judd prepared a Google Doc, and you can drop your notes into this document, and, as we discussed before, there's no need to repeat anything that Judd will write on the screen here, and that will also appear in that document, or repeat comments from others, but please feel free to add any comments in a comment box if you have any. We will briefly review our notes after each agenda item, and again on Thursday, under Agenda Item 16.

I also want to mention, or repeat, what I said before in earlier meetings, that we may go into work sessions to allow you to read through the notes and work on your own report notes. During these work sessions, the broadcast will be paused, and there will be a notice when the SSC is expected to go back on the record, and so that basically helps us drafting our reports, and there will not be any discussions or decisions made. It just helps us working on the report, and I believe those are all the housekeeping stuff I have. Judd or Wally, do you want to add anything relative to the Google Doc or anything else?

DR. CURTIS: No, Marcel, and I think you covered it. Please add your comments and edits to the Google Doc shared. If you have trouble accessing it, just let me know, and I can add SSC members to that document.

DR. REICHERT: Thank you.

DR. CURTIS: Just the way we're going to process it in the room is we'll have, on the left screen, the presentation materials. The right screen should show that Google document, where I'll be making notes, and any other edits that get included will be seen. Those online, SSC members, you can bring up the Google document and follow along as we're discussing it.

DR. REICHERT: Thank you. Any questions or comments from the committee? Everything crystal clear? All right. Let's move on to Agenda Item 3. That is the Fishery Management Plan Amendments and Council Activity Updates. This was Attachment 3. I didn't make specific assignments, but I am asking everyone to contribute to notes where needed, and, Judd, will you provide an overview?

FISHERY MANAGEMENT PLAN AMENDMENT AND COUNCIL ACTIVITY UPDATES

DR. CURTIS: Yes, and Chip and I will tag-team this, and so the document, Attachment 3, has all the active amendments that the council is currently working on. I selected several amendments that were of interest for the SSC in particular, and those are at the top of this document, and we'll just talk through a few updates for each of these different topics, and, if you have any questions, we'll have a chance for SSC members to ask any questions. The first is the snapper grouper management strategy evaluation. I'm going to pass it over to Chip to give us an update on where the status of that project is at.

DR. COLLIER: So we're continuing to work on it. We just had a report that was completed looking at some of the social science regarding the management strategy evaluation. Kai had presented the work at the SEP meeting in February, and then it was presented at the March council meeting, and that was basically looking at some of the preferences of the general public, doing a survey of a group, and we are continuing to model everything else.

We are adding species in there, and I think it's going to be looking at five species, and we're going to have different regional approaches in them. There was another piece of information that was considered at this meeting, at the SEP meeting just yesterday, which was looking at potential economic effects of discards, and trying to incorporate that into some of the evaluation, and so we're going to continue to work on that, but, other than that, I think that's all we have for you right now.

DR. REICHERT: Chip, a quick question. Do you already know when kind of the next SSC action is expected in this snapper grouper MSE, or it kind of depends on how developments are going?

DR. COLLIER: Yes, and it depends on how development is going, but, obviously, the next time we expect it to come to you all would be October.

DR. REICHERT: Okay. Thank you. Anyone else have questions, or comments? Thanks, Chip.

DR. COLLIER: The next topic is spawning special management zones. Within there, the council had -- When they developed this, they selected five different areas as spawning special management zones. Two of those were artificial reefs, which were permanently designated as spawning special management zones, and then there were three natural reef areas. Those three natural reef areas had a ten-year sunset clause on the regulations, and so the council is going to be developing an amendment to look at whether or not they should continue the regulations for those spawning special management zones.

This is going to be a fairly quick turnaround, and so what we might end up doing, or what we will end up doing, is sending out a survey, or a questionnaire, to the SSC, to get their feedback on whether or not they should be incorporated. I've been working on trying to get together a report on all the work that's been done in the spawning special management zones, as well as other work that could be related to that, and that way it will help you all look at the evaluation materials and provide a scientific analysis, or a consideration, on whether or not these areas should be incorporated. Based on the survey results, I'll incorporate that into the report that will go to the council for their consideration. I've got one more. All right.

DR. REICHERT: Any questions on that one? Jeff.

DR. BUCKEL: Chip, thanks for the update on that. I'm just curious. On this workgroup, are there any enforcement folks that are -- Great, and I would be curious about their work on enforcing those. Some of them, you know, they're so small, and -- Thanks.

DR. COLLIER: Yes, and we do have members of law enforcement on there. We also took the evaluation tool to the Law Enforcement Advisory Panel, and so they provided some recommendations on it, but, as you mentioned, it is a challenge to enforce those areas, but they feel like they can enforce them. You know, they do have limited resources, but, when they get out

there, they feel like it is successful, and we need to develop some outreach tools for them to hand out if they do see some folks in non-compliance.

DR. BUCKEL: Thank you.

DR. COLLIER: My final one, I hope, is standardized bycatch reduction methodology. This is -- The councils are required to review their bycatch reduction methodology every five years, or not reduction methodology, but reporting methodology, and so we are going to be updating that, and hopefully be bringing that to the SSC in October, and for review by the council in December, and so, if there's any questions on that, and that one's fairly straightforward.

DR. REICHERT: Seeing none, Chip.

DR. CURTIS: Then, lastly, we have Abbreviated Framework 5, which is blueline tilefish, and that is adopting the latest catch levels that were recommended by the SSC. If you'll recall, this was -- There was a subgroup that was convened consisting of Mid-Atlantic and South Atlantic SSC members to look at that sliver region north of Cape Hatteras and into the Mid-Atlantic, and then the entire South Atlantic SSC reviewed the model for the South of Cape Hatteras model, and then recommended an ABC for the council, and that is going through the amendment process right now, and those are all the kind of highlighted updates for current active amendments. If there's questions on those, or anything else in the document, we can address those as needed.

DR. REICHERT: Thank you, Judd. Amy.

DR. SCHUELLER: As I was looking through this document, I noticed that a lot of things had been sort of submitted, and were sitting in review for quite long periods of time, and I guess I was just wondering if they were abnormally long periods of time, or if you guys had any sense of like the timeline on that, or is it sort of trapped in review purgatory?

DR. REICHERT: Chip is coming to the table to address that question.

DR. COLLIER: Thank you for noticing. We also have noticed that it's been a while since some of our amendments have gone through. It's been over two years, in fact, since some of them have gone through, and this is not just a South Atlantic issue. It is an issue throughout the nation, and so it's just slow to get things through the process right now. Hopefully things will speed up, but we can't give you any more feedback than that. We just know we've submitted them, and we've tried to meet our timelines as required.

DR. REICHERT: Thank you, Chip. I've got a couple of questions, Judd. Snapper Grouper Amendment 61, and that's the unit revision, and I know the council is still working on that, but I assume that the species that may be removed, or that is being discussed, are mostly low-risk species, and I think you and I talked a little bit about the fact that our risk matrix for our ABC control rule is on a relative scale.

This means that, if species are being removed, especially more -- Disproportionately more low-risk species, that that may affect that matrix, and so I was wondering, and were there any discussions relative to the implications that this may have our ABC control rule, and is it expected

that that means that we may have to adjust that ABC control rule, or maybe I'm wrong, but I'm curious whether there were any discussions about that.

DR. CURTIS: Not directly related to the ABC control rule as of yet. That has been discussed, and what the ramifications of either removing some of the species from the FMU, through that process, or through that risk-value matrix process that is being put on hold now that we've heard. For those kind of newer to the South Atlantic SSC, the control rule that we have in place currently requires what we call a stock risk rating, and that is an evaluation of various biological human dimensions and environmental parameters that categorize the risk that goes into the development of the control rule and the P* approach.

Currently, the scores are on a relative scale, and so they're all relative to each other, and so we have something like gag that may be high risk, but something like Atlantic spadefish may be low risk, and what Marcel is alluding to is, if you start removing some of the low-risk species, that relative scale may shift, where you have some previously high-risk species that might fall then into the medium-risk category, and so we've thought about that. We have not gotten to the point, at this time, where we're thinking of adjusting the control rule right now, but that is something to consider moving forward in the future, and if there's any other modifications to the control rule.

DR. REICHERT: Thank you, Judd, for that clarification. I appreciate that, and I know this is still in development, so I may have jumped the gun a little bit on that. I also have a question, and that was later, further down in the list, the unassessed snapper grouper species, the ABC, ACL, and allocations, and that reminded me that the SSC really still needs to address the ABC control rule for especially Tiers 2 to 4.

That's just a reminder to all of us that I think we need to see if we can add this to the agenda of one of our upcoming meetings, because this will also be important, and we'll talk a little bit more about it later, but this will also be important for the black sea bass stock assessment that's coming up and the red snapper stock assessment that's coming up, and there's, obviously, also a relationship with that and the proxy, the joint proxy working group, with the Gulf.

We'll talk a little bit more about that under Agenda Item 13, and so I just wanted to mention that to the committee, that I've been thinking about the fact that we really need to start having that conversation about that ABC control rule and how to address those Tiers 2 to 4, and that was -- The ABC control rule was in the Comprehensive Amendment 45, and this is not a question, and it's just a comment. Does anyone want to say something about it? Judd.

DR. CURTIS: Yes, and just to that, and so, right, we've had this unassessed snapper grouper species amendment on hold following the adoption of the new ABC control rule, which has since passed. Now we've been put on hold waiting for the new MRIP-FES revisions and calibrations to come through. I believe Erik is going to give us an update on this precision threshold workgroup that has been looking a little bit at that, at some of these questions on obtaining best scientific information and available data streams for some of these unassessed snapper grouper species, but I agree that, at some point, this will need to be evaluated, as part of this amendment, and as part of the work group that has been formed, but has not yet been called to task.

DR. REICHERT: Thank you. I just want to make sure that we don't keep this can kicking down the road until -- We really need some resolution to that. All right. Anyone else relative to this

document and the updates? Seeing none, there's another opportunity for public comment. Anyone in the room or online want to make public comment? Seeing none, no public comments were provided relative to Agenda Item Number 3.

Let's move on to Agenda Item 4, SEDAR Activity and Assessment Updates. These were Attachment 4a and 4b, and the same thing here. I didn't make any specific assignments, and, again, I'm going to ask everyone to contribute notes where needed. Judd, I believe you're providing an overview?

SEDAR ACTIVITY AND ASSESSMENT UPDATES

DR. CURTIS: Yes, and thank you, Chair, and so, as part of the kind of updates for the SSC meetings, you all have requested just kind of a brief update of what the status is of various assessments that are ongoing or upcoming, and so I put together something brief. SEDAR staff has also been working on various materials that help track where each of these assessments are in the various process, and what are the components that are needed for the different assessments that are upcoming, and so I'll go through that documentation in just a minute. This presentation here is -- I'll just cover the first few slides, and the other bit we'll cover during the more extensive black sea bass discussion and review of the terms of reference.

An update on the current South Atlantic SEDR schedule. You see, here in front of you, the terms of reference that were approved by the council at the March meeting included the dolphin MSE CIE review, the Spanish mackerel terms of reference, king mackerel, and then gag had been previously approved, I think about a year ago, but that assessment has been put on hold, and some others have been prioritized ahead of that, and you all have reviewed those terms of reference at a prior SSC meeting.

Some upcoming terms of reference to review include the black sea bass and vermilion snapper, which we will address at this meeting either tomorrow or early on Thursday, and so I don't want to get too into the weeds on those just yet, but you see the assessment schedule there, including the South Atlantic regions, and then the Florida assessments that are pertinent to the South Atlantic as well. The SEDAR 94 hogfish is in the process of the assessment phase. I think I have it on the next screen. Yes, and sorry. I'm jumping ahead a little bit.

One of the main things that is that we're waiting on is these MRIP-FES updates and calibrations. These were scheduled to be completed, or are scheduled to be completed, by August 31. We sent a letter to the NOAA Office of Science and Technology to see if they could prioritize black sea bass and red snapper for the South Atlantic region, because those are the next assessments that are coming up.

The response has been that, because there is a batch approach to how they go about doing the calibrations, it's difficult to tease out any single species, but we're still waiting to hear, as those develop further, and hoping that we can get those earlier, rather than August 31, because, as you'll see from the black sea bass schedule, this is sort of the tipping point of when we need -- The crucial step of what we need to happen before the entire assessment can proceed.

The black sea bass assessment, we'll get into Agenda Item Number 10. The SEDAR 90 South Atlantic red snapper assessment has been underway. We've had several assessment webinars already conducted. We also had the CIE review of the South Atlantic Red Snapper Research Project, which we'll have a more in-depth discussion on tomorrow afternoon. The review workshop has been scheduled for this assessment for December 14 to 18 of this year, and that will be held in Beaufort, North Carolina.

There are still a number of assessment webinars that are scheduled, and the focal point of those assessment webinars is going to be on how to integrate some of the components from the SARSRP project into the assessment.

SEDAR 94 is a Florida-based assessment for Florida hogfish, and this is broken into both east Florida -- Or into two stocks, an east Florida/Florida Keys stock and then a west Florida stock. Both those are underway. We've had several assessment webinars. The analysts are getting close to coming up with a final report for that, I think, and a review workshop has been scheduled for July 13 to 17 of this year as well.

As part of this assessment review, as well as the black grouper management procedure review, we'll have to convene a joint SSC workgroup with the Gulf members, and so this would likely take the structure of what we did for mutton and yellowtail snapper where we had a smaller subset, or subgroup, of each of the regional SSCs convened to review those two different assessments.

The next thing is the Southeast Fisheries Science Center's precision thresholds workgroup report I had on there. Erik, can you give an update on that? Erik is going to come to the table to give a quick update on where they stand for that workgroup.

DR. REICHERT: Erik.

DR. WILLIAMS: Yes, and so that group has the precision threshold, and it went through a CIE review, and they're in the process of sort of writing up the results from that still, and issuing a report, sort of final report, that addresses some of the issues that were brought up by the CIE, and so that should be coming out in the next couple of months, maybe, depending -- I mean, MRIP's workload is busy right now.

DR. CURTIS: Great. Thanks, Erik, and that's something I think the SSC would certainly like to see, once the report is concluded.

DR. REICHERT: Erik, would it be unreasonable to think that we may be able to get that update in October, or you really don't know what's going on, and it may be a little too early?

DR. WILLIAMS: I think it's a good guess that we'll have it, yes.

DR. REICHERT: Okay. Thank you.

DR. CURTIS: All right. Before I cover the SEDAR infographics and new materials, any questions on the assessment schedule or various project progress updates?

DR. REICHERT: Judd, I'm not sure where this would fit, but the SSC made some recommendations to the new SEDAR procedures. Are there any updates on that? Is that covered somewhere else, or I'm not sure if the council has made some decisions, or discussed this after we made our recommendations in April.

DR. CURTIS: Thanks for bringing that up, Marcel. I forgot to include that in this progress update, and so from what I -- A lot has transpired since the SSC met on the new SEDAR process, and remember we formed this -- I forget what it's called, but an analysis assessment team that was going to be part of the shortlist to review the -- Assessment technical team. Thank you.

In the December Council meeting though, we were informed that that's not necessarily how we're going to go about doing it anymore, and there is still going to be an assessment technical team, but it's not going to be appointed by the council, or the SSC, and the Science Center will be reaching out directly to SSC members and others that need to -- For insight into the assessment development process.

DR. REICHERT: So, relative to that, because we had a list of names, and that ATT is no longer - - That's no longer an issue, because the Science Center will reach out to individuals, or will the Science Center reach out to individuals that were on that list that we came up with in October?

DR. CURTIS: It's my understanding that the center will reach out directly to the members that they wish to reach out to to get the guidance. I'm looking over it.

DR. REICHERT: Chip will come to the table. The reason I'm asking is, if that list is no longer relevant, then I think SSC members should know that that list is no longer relevant. Chip.

DR. COLLIER: Yes, and so this isn't necessarily a council decision. This decision was made by the SEDAR Steering Committee, and so the South Atlantic Council is just one body that's part of that, and, as far as the assessment technical team, like you're saying, Marcel, it just doesn't exist right now. We did put together a list, but it's going to be up to the Science Center to reach out to the experts that they think are most appropriate for that assessment, if they feel like they need to get additional input on the assessment.

DR. REICHERT: So that list is no longer relevant?

DR. COLLIER: Correct.

DR. REICHERT: Thank you, and so, anyone who was on that list, you're no longer on that list.

DR. COLLIER: Thank you for your service.

DR. REICHERT: You can still be called up, as we all can. Judd, I'm not sure if you're going to talk about the schedule for the black sea bass assessment. Are we going to talk about that under Agenda Item 10?

DR. CURTIS: Correct.

DR. REICHERT: Okay, and so then we will come back to that. All right. Thanks.

DR. CURTIS: Any other questions from the committee?

DR. REICHERT: Seeing none. Thank you.

DR. CURTIS: Okay, and so I wanted to briefly just go through and show some of the materials that have been developed by SEDAR staff to help track some of the different stock assessment components in this new assessment paradigm that we are all sharing, and also some of the materials that they're using to track where different assessments are, and what components are necessary for them.

Here you have a decision tree that was put together that kind of shows what components along the process may be necessary for the various species for an assessment, and you can see the different pathways that it may take, if it is inclusive of a data workshop, or a data webinar, topical working groups, et cetera, and then what are those expectations moving forward.

The main difference also now is whether assessments are going to go through a full SEDAR process, which would have your potential data phase, assessment phase, and a review phase, or if they are going to be an agency-led internal assessment, which would skip the data and the assessment phases, and it would be more akin to like an update lite, but then the SSC would have a review, would be the review body, at the end of that assessment. The idea is there to kind of expedite some of these other species that maybe we do not need to look at as in-depth.

Moving down into the review phase, so two options here, right, and we have either, as described for the agency-led internal assessments, where the SSC would act as the review body. We may also have external peer review, in the form of a CIE review team, and that would include not only CIE members, but then SSC members as well. That would form this concise review body before it would go to the entire SSC for catch-level recommendations.

Here's a schematic, and it's still in development, and so, you know, don't print this and take it home just quite yet, but, once we have finished and put the final touches on these different documents, we'll be circulating them to SSC and council members and others that are interested.

The other thing is just outlining the various data components that are part of the different aspects of the assessment, topical working groups, data webinars, and data workshops. This gives a list of how these things are going to be conducted, what the scope of the data is, timing, what kind of platform we may be looking at, if it's a webinar or in-person, and who the coordinating body is for these.

The same sort of schematic for the assessment components. Again, we have topical working groups for the assessment, internal assessments, and then assessment webinars. I'm going through this kind of quickly, because we've seen most of these already in the previous talks, but this, again, outlines who the participants may be in these different types of assessment components, what the scope of modeling may be, the timing, platform, and who the coordinating body may be.

Then, lastly, we put together this development timeline for terms of reference and other components. This will then be tracked in a spreadsheet, which is on the next slide, in very small font, but you'll get the general idea, and so the idea here is to just be able to track the different

species as they're selected by the council, and then where they are at the various stages, and which components does the SSC recommend for that particular stock assessment and species, and this would then be used to help draft various statements of work that are approved by the council.

From there, the drafting of the language of the terms of reference would depend on the various components recommended by the SSC and the statement of work approved by the council. This is a very small font, and I'll zoom-in a little bit. The idea here is to have materials like this for each of our SSC meetings that would show where the different assessments are in the pipeline, so to speak, and what components are necessary to help aid in tracking, and so you see like the red snapper had a data workshop, and the scoping was done on this date. The assessment started on this date, et cetera, and all the way down the line for species that are selected for upcoming assessments. I'll stop right there, Chair, and take any questions.

DR. REICHERT: Any questions from the committee, or comments? I know that table that you just showed was kind of an example, I assume, but it's, I think, important to add years to those dates.

DR. CURTIS: Yes, and those are the -- Those will be filled in with the years, and thanks, Chair. That's just an example template of what this will look like. Obviously, the dates will get filled in as those become available, and we'll see those at subsequent SSC meetings.

DR. REICHERT: Cool. Appreciate that. Anyone else? Genny.

DR. NESSLAGE: A quick question and a comment on the decision tree cool infographic. The very bottom yellow box, I'm sorry, and you lost me. Is that the SSC or a different technical committee that would be formed?

DR. CURTIS: The technical committee review? Is that what you're referring to?

DR. NESSLAGE: Julie is mouthing SSC. Is that correct?

DR. CURTIS: Yes, and that would be the SSC review at this meeting, yes, and there are still some elements to be worked out. So, for instance, for black sea bass, as you'll see, we are going to convene a smaller subgroup to be the first review panel before it goes to the entire SSC, and so that may have several iterations within that little box, but, again, thanks for pointing that out. That's something we can elaborate on.

DR. NESSLAGE: Thanks, and just a quick typo. The very last one, that's page 4 of the PDF, that has the vertical cool infographic, is -- We're the Scientific and Statistical Committee, and it's just a typo. Thanks.

DR. REICHERT: Thank you, Genny. Anyone else? Amy.

DR. SCHUELLER: Yes, and just to clarify this decision tree. Is that going to be walked through for each species by the SEDAR Steering Committee? Is that who is making the decisions on this, or -- I guess I'm -- What's the process for that?

DR. CURTIS: So this is meant to be more of just a snapshot guidance document. The SEDAR Steering Committee will -- I mean with input from the council and from the SSC on what components they think are necessary for the various assessments, and that information will all go to the SEDAR Steering Committee meeting and then aid in development of those schedules.

DR. REICHERT: Judd, so this is basically for all of us, the SSC and council, as a guide to how to approach this process?

DR. CURTIS: Correct. Yes.

DR. REICHERT: Anyone else? That was it, Judd? Public comment, any public comments? Seeing none in the room, and seeing none online and no public comments were provided, and I kind of skipped over the action items, because the action items for these agenda items were that there was no action needed, but we basically provided some feedback, and some clarification.

Next is Agenda Item 5. The documents are 5a, b, and c, and the assignments were Alexei, Wally, Jared, and myself, as the members of the ecosystem working group, as well as Christina, Kelsey, C.J., and Steve. Judd, Sarah is available online?

DR. CURTIS: Yes, and, Sarah, I have you unmuted, if you would like to test your audio.

DR. GAICHAS: Yes, and can you hear me okay?

DR. REICHERT: We can hear you loud and clear.

DR. GAICHAS: All right.

DR. REICHERT: Go ahead.

DR. CURTIS: Wait one second. Let me just adjust the volume a little bit.

DR. GAICHAS: Would it be better if I wore a headset or something, or are you --

DR. CURTIS: No, and you're good. We were just a little bit loud on our end. You're coming through loud and clear. Would you like -- I was going to drive on my end. Would you like me to bring up just the ABC document, or would you like to drive?

DR. GAICHAS: If I could drive, it might be just more efficient, because I also was going to maybe go to the HTML document with the questions for the SSC, but I can do it either way. If it's hard to share --

DR. CURTIS: Yes, and you're logged into the web right now, and not the desktop, which makes it so I can't pass control, and so if I could just drive on this end, that will be --

DR. GAICHAS: Yes. Totally fine.

DR. CURTIS: Okay. Let me just bring up your documents. Okay. Is this the document you would like to start on, Sarah?

DR. GAICHAS: Well, I might give the presentation first, because it gives a bit more background on the project, and then I think we could go to these questions, if that works okay for you.

DR. CURTIS: Okay. You should be seeing it now. Let me know when to switch sides. Thank you.

DR. GAICHAS: Yes, and that's great. Thanks.

DR. REICHERT: All right, Sarah. Go ahead.

RESILIENT FISHERIES PROJECT: ECOSYSTEM INFORMATION REVIEW

DR. GAICHAS: Okay. Thanks for having me. I apologize for not being there in-person, but travel was looking kind of difficult with the three other meetings I had today, unfortunately, and so I appreciate the opportunity to present online, and maybe I'll see you all in-person another time, but I'm going to give you an overview of my portion of what I believe is project one that Genny asked about earlier. I'm doing a subset of that project, to kind of give some -- An idea for the council on what sort of ecosystem information is available, and how they might move forward with some strategies to incorporate this information into decisions.

I should probably introduce myself. I know many of you, but not all of you, and so I'm Sarah Gaichas. I now am the lead and only scientist in Hydra Scientific LLC. I was formerly working with NOAA, at the Northeast Fisheries Science Center, up until last April, and I'm also on the Mid-Atlantic SSC, and so I have not interacted as much with this SSC though, and so I'm looking forward to speaking with you all today. I have experience in ecosystem reporting, ecosystem modeling, stock assessment, and a few other things, management strategy evaluation.

For this project, there were a couple of objectives, and the first one was to review the types of ecosystem data and information for all of the councils in the United States, and so this would include data products and decision support tools, and to evaluate how they're used, and so not just what do they have, but how are they using this, and so there were two steps to this, and what you have, the really big document you have, is reviewing this portion of the project, and so that's pretty much done.

It was based on a literature search, as well as some semi-structured interviews that were completed basically last fall, and over the winter, and so I think the overview of this is we learned quite a bit from this. I presented some of the information at the ecosystem data workshop that was held in January, and then the interviews weren't complete yet though, and so the full report that you've seen does include also the results of the interviews, and we can just go to the next slide, so I can give you some information on what we learned.

Skipping right to the end, I think, when you look across all eight councils in the United States, as you might expect, there's a big diversity in both the data available and the approaches that they're using right now, but I think you can divide them into kind of three general classes. The first is sort of your more fishery management plan and indicator-based approach, and that's in the North Pacific, the Pacific, the Mid-Atlantic, and New England.

These are regions that have high value, data-rich stocks, generally commercial fisheries, and complex assessments. They all have annual ecosystem reports, and indicators can, and have, informed assessments in these regions. Many of them have risk tables, and all of them have uncertainty frameworks that are integrating ecosystem considerations, either currently in use or in progress, and they all have some kind of non-regulatory fishery ecosystem plan that can provide an actionable pathway. Almost all, and not quite all.

The second group is what I'm calling FEP, fishery ecosystem plan, or geography-based, and that's pretty much the Western Pacific and the Caribbean. This is where you have a lot of human community connections to really complex and data-limited fisheries. They're both using place-based ecosystem or fishery management plans that are operational management documents. In the Western Pacific, they have fishery ecosystem plans that are functioning as fishery management plans, and, in the Caribbean, they have place-based fishery management plans. This is all co-developed with stakeholders, and they're really trying to reflect their distinct regional conditions that they have.

In particular, the Western Pacific is a gigantic amount of area. That's more than half the U.S. EEZ just in that one region, and they both have ecosystem considerations kind of embedded in the management structure, because they're taking this more regional approach, and then what I'm calling developing approaches are right here in the South Atlantic, as well as the Gulf, and these areas are characterized by a real dominance of recreational fisheries and fewer assessments relative to the number of managed species.

They are both species-based FMPs, similar to the first group, and there is expanding ecosystem integration here as well, and I think we'll talk a bit about the South Atlantic's sort of unique positioning to bring in ecosystem information, but one of them is the direct linkage between essential fish habitat and habitat in general with ecosystem. That doesn't happen other places, and then the Gulf is actually developing fishery ecosystem issues within a fishery ecosystem plan, and so they have an action-oriented framework kind of in progress.

I think, across all of these, there's some common management concerns that were expressed. I think everyone is interested in forage fish. Many of the councils have implemented protections for unmanaged forage species, and/or developed harvest control rules that account for ecosystem services, and there's also the ASMFC that has a harvest control rule accounting for ecosystem services for menhaden.

All of them are dealing with climate change. They're all addressing some kind of rapid change in the data-rich systems that have long-term ecosystem reporting, and have still experienced unexpected stock collapses, and so just having a lot of data doesn't necessarily help. You do need to have some kind of climate-ready management approach, and those are in development pretty much everywhere, and so you can click to the next thing to bring up the rest on this slide.

I think there were common challenges, and these really came from the interviews, and so this is something to really think about in developing an approach. The complexity of ecosystem information is something that all of the council staff that I interviewed talked about, and so this ranges from places that have gotten ecosystem reports for over twenty-five years to places that

haven't gotten regular reporting, and they all are -- It's really important to get this information in digestible packets and to very clearly link it to management processes and decisions.

There is resource constraints identified absolutely everywhere, even in data-rich regions. Even before there were more capacity constraints imposed last year, the data-rich regions were already saying that, you know, we need more capacity if we're going to bring in ecosystem and climate information into management, and so that's pretty much universal.

Then I think the stakeholder perceptions are also important to consider. In some regions, and perhaps all, but maybe not all, considering ecosystem information really is viewed as only increasing restrictions, rather than expanding opportunities, and that can be a significant barrier to implementing anything, and so next slide, please, and apologies that this one is going to be clicking through. I think you can just click through like three times, and then we'll have them here.

The successful practices identified across all of the systems were iterative co-development, and so really being able to work together between councils and scientists and folks producing ecosystem reports has been incredibly important, because that restructures the ecosystem reports to make them more useful to the council. All of the fishery ecosystem plans that have been developed are emphasizing collaborative development of basically everything from problem statements through analyses, conceptual models, model scenarios, and indicators, and that's as collaborative as possible across the fishers, the managers, and the scientists.

Risk-based frameworks have been pretty successful across many regions, including those from a lot of data to not very much data, and so, everywhere from the North Pacific through the Caribbean, we've seen some kind of risk-based framework developed, and indicator-based risk assessments can adjust catch advice, and/or support strategic decisions, and so it's being used in a variety of ways.

Actionable fishery ecosystem plans are also something that we've seen kind of co-develop, or be sort of shared, or leapfrogged across councils, and so the North Pacific has what they call action modules. The Pacific has initiatives. Fishery ecosystem issues are what they're called in the Gulf, and the EAFM approach in the Mid-Atlantic are all giving kind of a structured pathway, so that you can go from sort of an idea in a fishery ecosystem plan to a management action for a specific issue, because I think that's the really important thing, to go from descriptive to action-oriented.

Then, finally, having multi-scale ecosystem information can be really important, and so there's regular reporting at the ecosystem scale, and that's been very valuable for the councils that have been able to get that. It gives context for decisions, and it familiarizes people with ecosystem information, but stock-specific ecosystem reports can also be really important, to make those direct links between environmental drivers and stock productivity, to use either in the assessment or in catch specification, and you don't necessarily have to make a big document to do this.

There's many ways to approach bringing in ecosystem information, and, in particular, in the Pacific, it's a very interesting process they're developing now, which is more of a structured dialogue between ecosystem and stock assessment scientists, that everyone comes in having done a bit of homework, and they decide on what the risks are, and so there's many ways to achieve this.

I think what I found, in looking across all the councils, is that the South Atlantic Council, despite having some, you know, gaps and things, that I think everyone recognizes, is there are some unique strengths here in this region. There's already been thinking, all the way back from the beginning, how habitat and ecosystem are integrated, and, in a lot of other councils, this is described as siloed, and so I think this is a huge advantage in the South Atlantic.

There's explicit links between EFH policies and ecosystem approaches already in the policy statements. There's an extremely well-developed citizen science program, where people are collecting data and really interested in helping out, and I think that can be great for filling gaps. There are already existing products, including an ESR, and that's ecosystem status report, a fish climate vulnerability assessment, and that's CVA, and there's also one for the fishing community, and so there is information that can be used already, and this is the only council that has its own food web model, and that's been looked at by the SSC, that I understand, and already endorsed to address some council questions, and so I think, between these existing tools, there's a lot of opportunities for bringing in ecosystem information into the South Atlantic management structures.

That pretty much brings us to our overview of recommendations, and then the next phase of the project is what I'm in now, to actually come up with some example pathways for how this is used, and so, overall, the idea would be not to try to take something directly from another council and apply it here, but to have more of a mix. There's a mix of data-rich and data-limited stocks and diverse habitats in the South Atlantic, and so I think bringing in different practices from different councils will be pretty useful.

Leveraging those existing products that I already mentioned is going to be important. Thinking about an action process similar to the FEP initiatives, or whatever you want to call them, from the other councils could be really helpful in this region. There's already two FEPs actually with a lot of description in them, but I think moving those -- Coming up with a structured process to use information in decision-making would be the next step from those.

Thinking about how to get increased reporting of some of the ecosystem information will be really important. This doesn't mean an entire ESR every year necessarily, but more of a collaboration between the council and the SSC and the scientists in the region to figure out what the priority indicators are and how to come up with a more automated process, which the Southeast Center is already working on and has used for the Caribbean ecosystem status report.

There could be the use of climate vulnerability information in the SSC ABC decisions, which I want to ask you about today, to see if that makes any sense at all, and so we'll come to that in a moment, and then I think there's a real opportunity to evaluate multispecies management strategies, using that food web model. We could look at things like both commercial yield and recreational fishing opportunities, which I think would be really important in this region.

In the next slide, we get to what the next steps are, and so this was presented to the project oversight team a few weeks ago, and I think the feedback that I got was kind of, yes, do all of it, and so that's what I've been working on. The idea here is to identify the opportunities for bringing ecosystem information into South Atlantic management processes, and so one thing to look at, obviously, is catch specification, and I want to talk with you about that today. I have more of a discussion on

this, of how to possibly consider the climate vulnerability results in the current risk policy and ABC setting process, and so I'll have another slide on that in a minute.

Would there be any use in coming up with either a structured decision, or structured discussions, or maybe having ecosystem profile type of reports for some high-priority stocks? Could we look at some risk table approaches, and I'll give you some examples of those, and then, yes, here we are at the SSC meeting in April to discuss the options, and so we can check that box.

The other things I plan to do, or am already doing, are looking at prototype indicators, and I'll give you an example of that. Alignment of the EFH policies and some existing indicators, and, actually, I have already done that, and so, if people want to see it, I can show it to you.

Looking at some of the other processes in the council, reviewing multiple years of council actions, I have actually started this as well, and so I've looked at a little over three years of council motions, to try to figure out where some ecosystem information might come in, and also to understand kind of how things work in this council, and then, if the SSC has any feedback on any priority management actions, I would love to hear that, because that can feed directly into what I will be doing next.

Now I want to talk a little bit about the SSC process, and here's where I'm on thin ice, and you guys are going to help me, I hope, because this is my understanding of the recently-approved control rule, which you were just discussing, in particular, the information on the risk of overfishing, and so I believe I've plotted this correctly, where your P^* is going to vary with the stock status, and so, if you're above BMSY, it's going to be maximized. If you're between BMSY and half of the minimum stock size threshold, it's going to drop down, and then, if you're below that halfway point, it's even lower, and so that makes sense, but the risk levels are what adjust you vertically on the plot there.

The assessment of risk for high, medium, or low across these different attributes, biological, human dimensions, and environmental, is what tells you which one of those lines you're on with respect to the recommended ABC, and then the council will look at this, both the SSC recommendation and an AP recommendation, to come up with the final P^* , which could vary by as much as 10 percent from the recommendation, and that is my current understanding of what happens in these three FMPs.

That's one question I will have for you, whether this is correct or not, and so I guess we could either kind of go through the rest of this presentation a little more slowly, with discussion, or I could finish it, and then we could have a discussion, and I leave that up to the chair. What would you rather we do?

DR. REICHERT: Let's finish the presentation, and then we'll have some clarifying questions, then public comment, and then we'll have our discussion, if that makes sense, Sarah.

DR. GAICHAS: Perfect. Yes. Okay. All right, and so I am going to give you a few examples of how indicators are used in catch setting processes in other regions that may weigh-in on what's being done here, or what the possibilities would be to sort of expand the process in the South Atlantic, and so this is something that is in development in New England, and maybe several of you are already familiar with this.

This is a risk policy, and so this is a council-level decision on risk tolerance, where multiple factors are looked at, and so stock status is one of the things that's in just about everybody's risk policy, but it will also be looking at recruitment, climate vulnerability, and aspects of both commercial and recreational fisheries, and scoring these based on indicators to determine where we are on this range of risk tolerance. Then they will be weighted, and the council will come to a decision of where to land in terms of risk tolerance, based on multiple indicators in addition to stock status, which I think many councils use.

I had a question asked to me at a talk a few months ago. When the SSC goes through these things, at least in some regions, they've been instructed to only look at biological information, and so the fishery characterizations wouldn't be part of it, but, when the council is taking their decision, all of these things come into play, and so that's a consideration, is what information is considered where, and so this is basically, before you've set the ABC, what level of risk tolerance would you want to have, and so that's in process, and could change, but this is my understanding of the latest version of this, which does use multiple indicators, including the climate vulnerability assessment results that are available for the Northeast U.S.

Also, in these slides, all the little red things that you see down there, those are links to either references or something online, so that you can get back to the original source document, and so I just wanted to give a little note on that.

Here's another example of indicators and catch specification. This is the North Pacific process. The North Pacific Council has been getting ecosystem reports since something like 1995, and they also have developed these ESPs, or ecosystem socioeconomic profiles, basically, which is an ecosystem report at the stock level. I would call this a data-rich system, and so, basically, what you have here are multiple reports that can feed into a stock assessment risk table, and then that risk table goes with the assessment through the harvest specification process.

I'll show you a little bit more detail of how that works in a minute, but, basically, they introduced the risk tables in 2018, and so quite a bit after they've been seeing the ecosystem reports, and they've had fourteen stocks that have had reductions from maximum permissible ABC due to the risk information, which includes not just ecosystem concerns, but also stock assessment, population dynamics, and fishery concerns, and so you can go to the next slide, and that will give you sort of what their risk table looks like.

I've left out the criteria for minimal and increased and extreme concern for all of the things except for ecosystem considerations, but, believe me, there's a lot, and those are things I think that we're more used to looking at, and so I'm really focused on the ecosystem considerations here, but, basically, the concept here is you start at your minimal concern level, and that's basically your maximum allowed ABC, and, with each increasing level of concern, there is increased precaution and reduced catch.

This is an example of kind of a one-way trip, where you can only go down from the maximum permissible, but this is what is used in the North Pacific, and is accepted by the stakeholders there, and so this is what they're doing, and, basically, as you can see, if there's no apparent concerns in the ecosystem or environment, you're at minimal, and you stay with your maximum permissible ABC. As soon as you have multiple indicators, sort of at the stock level, you're increased, and

then, if you have an extreme concern, it tends to be throughout the ecosystem, and so those are the levels of risk that they're looking at for ecosystem considerations.

In contrast, we have what the Pacific is doing, which is somewhat based on the North Pacific system. However, they have decided they explicitly want to have what I'm calling a two-way street, and so, your neutral conditions, you could go to more favorable or less favorable conditions than the neutral condition, and the neutral condition is kind of your standard risk buffer.

The Pacific Council uses a P*approach. The North Pacific Council does not, and so they're not directly comparable, but I think what the Pacific Council is testing out right now is sort of IPCC descriptions of uncertainty, in terms of the indicators, and their level of confidence in those indicators, and so you see that somewhat reflected in the table here.

They're explicitly talking about indicators that are not already used in the stock assessment to avoid double-counting, and you can see sort of what happens. Basically when you have favorable conditions across multiple indicators for all of these things, you might be decreasing your risk buffer, which is giving you a higher catch recommendation, and, of course, the opposite happens with unfavorable conditions, and these tables are scored on the basis of that structured discussion, but there's, obviously, a lot of information behind that.

I think those were all the examples I was going to give you of ABC setting, and so this is just a brief overview, for the last couple of slides, of the other types of analyses that could be done, and so, for prototype ocean indicators, one of the things I was going to try was there's already both surface and bottom temperature indicators in the South Atlantic ecosystem status report that was published a couple of years ago, and so this would be to complement those existing ones, but, basically, the idea would be to use a regional ocean model, or a global ocean model, to look at kind of hindcasts and forecasts of ocean temperature and salinity in the South Atlantic region.

There's multiple models. One of them is the MOM6 model that was intended to provide the climate ecosystem fisheries, and kind of both hindcasts and forecasts. That information is there. That model is still there. The Copernicus Ocean reanalysis products also have some kind of data integrated models that are used, more for hindcast purposes, and the main thing here is it I think it would not be that hard to develop indicators for the South Atlantic, because the Northeast Fisheries Science Center has already developed code for the Northeast region to give indicators.

The reason to do this, when there's already temperature indicators, would be to kind of fill both spatial and temporal holes in the information, and so our surveys are not out year-round, obviously, and, if we want to know something about conditions during a non-survey time, these ocean model indicators could be pretty helpful, if we can calibrate them with some observations, and I'll talk about that in a minute, but the thing you're seeing on the right-hand side of your screen is bottom temperature, but it's a very specific way of presenting bottom temperature.

It's bottom temperature -- It's the number of days that bottom temperature was at or above the temperature that scallops find stressful, scallops being a really important species in the Northeast U.S. That black box there, the line there, that's a scallop rotational management area, and you can see that it's filled in green, and, if you look at the scale, that means it was more than a month that the bottom temperature was stressful, and it turns out there was a die-off that year, and so indicators like this could be helpful for identifying both stressful conditions or conditions that are good.

I can tell you that, when I presented this to a group of stakeholders, it was the first time I've ever presented a temperature indicator and had someone ask me a management question, which is, well, if they're going to die anyway, can we go catch them, which is -- You know, it's not something I can answer, but it is definitely a management question, and suggests that this type of indicator could be useful for making management decisions.

The last objective of the project is to take a look at the well-developed citizen science program and see if this can help integrate information as well, and so I know that there's already been really cool participatory workshops in the South Atlantic region. This is an example of a conceptual model for dolphin wahoo, that was developed several years ago now, but you can go to the next slide, please.

The idea here for integrating with citizen science is so, if we were to take our temperature indicator example and extend it a little bit, I think, if you're using an ocean model, and you're basing it on actual temperatures that animals are sensitive to, you probably want to validate it before using it operationally, and so one way to do that would be to take a vessel-collected temperature. What I'm showing you here is some information from the Northeast U.S. eMOLT program, and that stands for Environmental Monitors on Lobster Traps and Large Trawlers, and they send out an email every week.

George Maynard sends it out. It's really cool. He compares what they're seeing in real time, pretty much, from the last week, from their fishing-vessel-deployed temperature sensors with ocean models, and so this is a comparison showing that, and it's hard to see any dots at all up in the Gulf of Maine there, and that's because the temperatures matched pretty well.

You're seeing some red dots out there on the continental shelf, sort of off Hudson Canyon, and that's where the measured temperature did not match the ocean model, and so it gives you an idea of where your indicators might be better than others and can possibly even help the model, ultimately, if it goes back into it, and so that's one idea for citizen science. It wouldn't have to be an eMOLT program, but there's maybe other ways that people could participate in collecting temperature information.

I think another program to think about, which I've heard has been thought about a bit here, is cooperative research, and so there's already many of these programs in the Southeast, but maybe a more formal study fleet could be a way to collect information for ecosystem indicators, and so the Northeast study fleet has been collecting a lot of really great information that's been used already for species distribution modeling, for studies of biology, looking at the ocean industry user conflicts, basically wind and fisheries, and also supporting data for stock assessments.

I think the beauty of this is, again, the fishing fleets, whether they're commercial or, you know, recreational headboats, whatever, they're out there in seasons, and collecting information at a spatial scale that our surveys just can't really address, and so it could be a really nice way to start to fill gaps, and especially, if the council comes up with some priority use cases, or indicators, this might be a good way to fill gaps that exist.

You can go to the next slide, which is my last one, and thank you for putting up with me while I'm walking you through this project, and so we're more than halfway through the project. Basically,

you have already the draft report on all council data products and approaches. I'm in progress on the draft report on pathways for integrating ecosystem information and prototype ocean indicators, and so you saw an overview of some of the information that I'm collecting for that, and I'll have a draft done by the end of this month, and sorry that I didn't have it done in time for your meeting.

Then the final report is going to really be the end of July, and so I'm at a great place to get some feedback, and also any nudges or suggestions from the SSC to bring in some more ideas here, and I thank you for your time, and I look forward to the discussion. Thanks very much.

DR. REICHERT: Thank you, Sarah. Any clarifying questions from the committee? Kai.

DR. LORENZEN: Thank you, Sarah. That was a great presentation, and so I learned something, which is that apparently we're ahead of the curve with the essential fish habitat and ecosystem integration, because I wasn't aware of that, and I'm wondering whether either you or someone else can expand on that a little bit, you know, how that works, and how it interfaces with our decision-making, because I haven't encountered that in the usual SSC work that we're doing, and so I was wondering if someone can give us a bit more background on that.

DR. GAICHAS: I would be happy to try, but if other council want to jump in, and so, basically, I have not seen any -- First of all, the South Atlantic Council has two fishery management plans for habitat, basically. There's the corals and bottom habitat, and also there's sargassum, and I'm not sure anyone else has that, and so there's that.

There's also the policy documents on specifically -- There's a bunch of policy documents that are filed under EFH, basically, and a lot of them are very much ecosystem-based management oriented, and so, for example, there's energy exploration, development, transportation, and hydropower policy. There's beach dredging and filling, beach renourishment, large-scale coastal engineering policy, and there's a whole bunch of other ones.

The three that I focused on were the food webs and connectivity policy, which was just updated this January, the climate variability and fisheries policy from March 2018, and there's also a marine submerged aquatic vegetation policy from June 2014, and so that's a bit more out-of-date than the other ones, but it's still there, and what I did was these outline a whole bunch of policy descriptions, and even, in some cases, ecosystem indicators to be used to sort of monitor progress against the policy, and I just aligned them with the indicators that were already available in some of the products.

I don't know if I have a chat that I can put this link in, but if I do -- Is there a chat in this? Anyway, I could give you a link to the tables that I've made, but, just having those policies alone, I haven't really seen that in other councils, and so that's my answer, but I'm sure others can elaborate.

DR. REICHERT: Chip Collier came to the table. Chip.

DR. COLLIER: Yes, and thank you for the question. The council has taken an ecosystem approach in a lot of the ways they do things, and one of the ways that they've done it is through EFH, developing these policy statements, and it's designed to help some people that are commenting on development projects, exactly what should be, you know, looked for in the development projects and trying to protect some of the essential fish habitat.

You know, it's not a quantitative approach. It's more of a qualitative, recognizing the fact that we are data-limited down here in the Southeast for much of this stuff, and so they've taken the more qualitative approach, trying to provide recommendations on how to protect essential fish habitat from potential negative impacts of development.

DR. LORENZEN: Okay. thanks. That's helpful, and I guess I was looking for a link to the sort of assessment ABC setting type work that we do, but this is more about development impacts on habitat and so on, and is that right?

DR. COLLIER: Yes, and we have not tied it back into ABC setting yet.

DR. LORENZEN: Okay. Thanks. Yeas, that clarifies it. Thank you both, Sarah and Chip.

DR. REICHERT: Any other clarifying questions from the committee? Chip.

DR. COLLIER: Sarah, if you want to put a link in the question log, I'll put it out to everybody else.

DR. GAICHAS: Okay. I will try to figure out how to do that.

DR. COLLIER: It should be the bottom-right of your panel.

DR. GAICHAS: I'll see if I can figure it out. Otherwise, I can email it to you, if I can't find it, because I'm in the browser, and that might be the problem.

DR. REICHERT: Thanks, Sarah. Chris.

DR. DUMAS: Thanks, Sarah. This is a very interesting project. I had a question about one of the -- What some of those results will look like. I was expecting to see sort of a table of the different ecosystem data streams that were being used by each region, or considered for use by each region, and is that something that's going to be part of the results? The example we're you showed the slide of the ocean bottom temperatures, and I guess that was in the Northeast region, and so is there going to be like a list of the different ecosystem data streams that are being used in each region? Is that part of this project? I'm assuming so.

DR. GAICHAS: Yes, and so, in the really long document, and I think it was your first document that was linked, there are -- It's like probably more detail than anyone wants to look at, but it is, by council, what indicators are in their ecosystem status reports, is included in that document. I didn't summarize -- All of the climate vulnerability assessments have the same structure, pretty much. They just differ in what species were there.

They're supposed to be all using the same methods, although I think they tweak them a bit between regions, but, yes, in the large document, under ecosystem information review, that has lists of -- Let's see, and it should be linked from -- Slide 2 has the link that says "posted online", and, if you click the link, where it says "posted online" down there, it should bring you to that, and, if you go to the results and you could just pick review of products and processes by council that gives -- There's an overview, and then, each of those councils there, and you can pick whichever one you

like, and it should -- It will have a list of -- So you can scroll through here, and there is a table that -- It also lists those habitat policies, and there's the habitat policies.

It lists the table a little bit further down, and so it's kind of -- This report is intended to show all of the ecosystem data products and processes that are used in the council, and so including, but not limited to, ABC setting, and so here's the table that says what information is currently in the ESR, and so basically, without reproducing the whole ESR, this was pretty much what I could do. Is that kind of getting at what you were looking for, or is there something --

DR. DUMAS: Thanks. Yes, that's exactly what I was looking for. Thank you.

DR. REICHERT: Thanks, Chris. I've got a minor clarification on slide 8. You mentioned, or it says, catch specification. When I read that, I thought that that referred to the SSC catch level recommendations, but maybe you can let me know if that was correct or whether that refers to something else, basically that term of "catch specification", and you may have mentioned in your presentation, and sorry if you did.

DR. GAICHAS: No, no, and that's a great clarification. Catch specification, yes, to me does include the ABC decision on -- The SSC decision on ABC, but it's also like a broader process that, you know, you could think of it as including everything from the assessment terms of reference all the way through the council decisions on management measures, and so, yes, it includes the SSC ABC decision though, and I would love to chat more about that with all of you, obviously the experts in that.

DR. REICHERT: So that includes ACL and some management decisions by the council, again, that term "catch specification"?

DR. GAICHAS: Yes, and that's how I would describe it, yes.

DR. REICHERT: Okay. Thank you. Anyone else before we go to discussion? Amy.

DR. SCHUELLER: Hi, Sarah. Thank you for the presentation. When I was looking through the report, I see that you have a section called examples from other organizations, and the menhaden example is in there, and I just wondered if there were any other examples that were going to be included in the documentation from some of the other groups outside of the United States that might be doing stuff that might be informative for the council system to consider?

DR. GAICHAS: Yes, and that's a great question. I have, due to the time for the project, limited my scope to the United States. That said, if people have other examples, I would be happy to include them, but I can't think of any right now. Like the menhaden one is actually one of the most advanced ones, I think, in terms of quantitatively dealing with trophic interactions and ecosystem services, and the only other things I was considering including, but, in the end, I thought maybe they weren't quite as relevant, is that, in the U.S., the sanctuaries also do sort of ecosystem status reports.

They do status updates for each of the sanctuaries, and they have some information in them. I was thinking about including those, and I have gathered the reports from them, but then, in the end, I

decided they weren't quite as relevant, but, if folks have other suggestions, I would be happy to try to include them, to the extent possible.

DR. REICHERT: Amy.

DR. SCHUELLER: Sarah, the only other one that really pops to my mind is the Irish Sea example that looked at like an ecosystem context related to multispecies fisheries, and I think that would be pretty pertinent, potentially, for this council, and so, that's the one that like Bentley et al. and Daniel Howell worked on, and that's the one example that pops to my mind.

DR. GAICHAS: Thank you, and that would be a good example. Yes, and I could easily add that in. I think that's well documented, and so, for folks who are unfamiliar, what they do there is they have the assessment outputs, and then they just sort of -- They have slightly different system, where they give a range of sort of upper to lower catch recommendations, based on a range around FMSY, and they use ecosystem-model-based indicators, or an ecosystem model is integrating the indicators, to sort of give some information on where within that range you might want to be, given the ecosystem conditions, and so, yes, I can definitely add that, Amy, and thank you. That's a great example.

DR. REICHERT: Thank you, Amy. Thank you, Sarah. Any other clarifying questions? Kai.

DR. LORENZEN: You mentioned, early on, that, you know, there's this perception that considering ecosystem effects typically leads to more restrictive management, and then you have an example, and I thought that was really interesting, where -- I think often that is the case, because we designed the system to be like that, and so, when you look at the example from the North Pacific, I mean, that is probably the more common way of dealing with social risks, but then you had the other example from the Pacific Council, where, you know, you can become more or less precautionary depending on, you know, what that information is.

I was wondering whether that is the only example where that is actually the case, because I think, predominantly, we're having this sort of more risk more precaution sort of approach, but maybe that's not as useful in the context of major changes that are ongoing as it was when we were thinking about something that is less changing, if you see what I mean, and I was wondering whether, you know, there are other examples of sort of a two-way street, and whether you sense interest in more going in that direction, or is there a lot of resistance?

DR. GAICHAS: Thank you. That's also a great question. I think the other example of the two-way street is New England's risk policy, and so that would be slide 10, where they're explicitly trying to bring in considerations that can move in both directions, and so you can see that -- There may be others that know this better than I do, but some of their indicators only go in one direction, and so the climate vulnerability, for instance. If you have low vulnerability, you're sort of neutral, and, as you go to high vulnerability, you would suggest decreasing risk tolerance, if that were the only thing you were looking at.

The commercial and recreational fishery characterizations are sort of the mirror image of that, and so, if you have a positive outlook, you're neutral, but, if things are going poorly for the fisheries, you might actually increase your risk tolerance.

Then I think the other two indicators are spread more across the two-way street, if you will, and so I think this policy is also trying to address the same issue, which is you may have sort of multiple reasons for wanting to either be more or less risk tolerance, and I think the council considers a wider range of indicators than the biological ones that SSCs often consider, and so this -- I'm sure there are other examples, but this is the other one that I came across in kind of looking across the regions that was developed enough to be able to give an example.

DR. REICHERT: Thanks, Sarah. Any other clarifying questions? Seeing none, let's go to public comments before we go to our action items. Anyone online, Judd, or in the room? Seeing no hands in the room, and no hands online, there was no public comment. The action items, Judd, if you can bring them up on the right-hand screen. Go ahead.

DR. CURTIS: Hang on, and so Sarah has another document that she put together to focus on the ABC setting process that I brought up now on the screen.

DR. REICHERT: Did I jump the gun, Sarah?

DR. GAICHAS: No, and that's okay. I think it leads well into a discussion, rather than -- You know, it's not really a presentation. I think the information in this document is the same as in the slides, except for that Section 1.1, my questions for the SSC, and so titled in a very obvious way to try to get at sort of what steps should be taken to be the most helpful from this project for the SSC, sort of what recommendations might be useful for the council, and for the SSC, in terms of the current ABC control rule, and so not really thinking of, you know, starting over, or changing it or anything, but like how could ecosystem information, and, by that, I do include social and economic information when I say ecosystem, just for the record.

Could we bring more indicators and more information into this process, and so, really, I mostly wanted to know if I got it right when I described it, because I want to make sure I'm describing it correctly, and then, basically, what's your experience using the rule? I could find the black sea bass risk table from April 2025. I haven't done an exhaustive search, but I haven't been able to find a lot more. I'm sure they're out there, and so further examples would be great.

Then, when you go through this process, kind of what's working, and what isn't, and is there other information, especially among the things that I mentioned that are already existing, like for instance the food web model, or the climate vulnerability assessment or, you know, any other information, and so that's sort of what I was curious about, and, if you all have any thoughts on this, that would be really helpful, and it will just basically go into the project and back to the council for their consideration, and so thank you.

DR. REICHERT: Thanks, Sarah. You were ahead of me, because one of the questions, or notes, I had to ask you is to bring up the questions, which you already did, and so thanks for that. Before we go to the discussions, and addressing those questions, I want to remind the committee of our action items, and they're rather broad, and so I'm really appreciative that you brought up those specific questions.

We've received the preliminary report. One question I have relative to that is, and we can talk about that in a little bit, will the SSC have an opportunity to see and discuss the final report, and the second action is comment on the mechanisms for including ecosystem information in the ABC

setting process, and that's what you just addressed, and provide feedback to the potential for inclusion of ecosystem information through similar or different mechanisms for the South Atlantic, and so, again, that addresses some of the questions that you had.

I would like to open the floor to either additional questions or addressing some of the questions that Sarah had. Anyone want to start this off? How about, you know, the specific question about the characterization of the ABC control rule? That was that graph that you presented, correct?

DR. GAICHAS: Yes, and that's the one.

DR. REICHERT: Anyone want to comment on that? I think it's a brief overview of how we address that. Of course, the details are a little more complicated, but I think that's a decent characterization. Judd.

DR. CURTIS: Sarah, I think you've characterized it well here. It's probably the first time we've seen it in like a figure form. We've typically seen it presented as a table, where you have the stock risk rating on one axis, or on the columns, and then you have the spawning stock biomass relative to MSY on the other axis, but, yes, I think this characterizes the P* approach for our comprehensive ABC control rule correctly, and the various attributes that are included in that stock risk rating, the biological, human dimensions, and environmental.

DR. GAICHAS: Cool. Yes, and I have to graph stuff, so I understand it, and so thank you for validating that.

DR. REICHERT: How many times has the SSC applied the rule, and I was looking at that. I think it's like three or four times. A, it hasn't been that long, and, also, we haven't seen that many stock assessments, and so it's mutton snapper, yellowtail, golden tilefish, blueline tilefish. Those were the four, and black sea bass also, and so five. Any other species that any of the members remember? I thought four, but Judd added black sea bass, and so that's about five times.

For every single of those species, we filled out a risk table, because that was not available. It's the first time that it was -- For all of these species, the first time that we filled out a table. I do remember that we sometimes adjusted the -- What is it, the PSA, the productivity and susceptibility -- Anyway, that table.

Sometimes we adjusted that, because we felt that the information in that table, or in the document, may have been, you know, too old, and so I'm not sure if it's helpful, but sometimes we adjusted that, and I remember, when we were first applying this, we had some difficulties with some of the categories, and I should have looked it up, but I forgot, and I think that was mostly related to, I believe, some of the economic scoring, and perhaps some of the ecosystem scoring, and I think it had to do with some -- It wasn't quite clear how exactly the SSC should interpret the text, but I'm asking others to help me jog my memory. Is that helpful, Sarah, at all, that information?

DR. GAICHAS: Yes, that's very helpful. The Mid-SSC fills out a table as well, and so I was just thinking of our process, and the places where it's easy to reach agreement, and the places where it's harder, and why that is, and so it sounds like similar things are occurring.

DR. REICHERT: Exactly, and we can possibly -- That information can be found in our report, because I think we specifically mentioned in our report where we had difficulties filling this out, and we actually made a recommendation to potentially change the text. However, that's complicated, because it's an amendment, and so that means, if we change the risk table -- If I remember correctly, it is part of the amendment, and so, if we change the text in the risk table, that means changing the amendment, but I may be wrong about that. Anyone else? Chip.

DR. COLLIER: So, when a new stock assessment is coming forward, this is when we develop the stock risk rating, through conversations with the SSC, the advisory panels, and the council, and so Judd has scores from each of those groups that might be useful for Sarah as well, because that could potentially indicate where there's some discrepancy among the rating systems.

DR. REICHERT: Thank you, Chip. Judd.

DR. CURTIS: Thanks, Chip. I was just going to add on that, Sarah, I can send you the list of the species that we've gone through that risk tolerance spreadsheet process with the SSC and the council, and then, right now, I'm counting six times we've gone through that matrix, but it has actually only been applied, I think in the rule, twice so far, for various reasons.

DR. REICHERT: Judd, what were the other two species?

DR. CURTIS: Right now, I have black sea bass, blueline tilefish, gag, golden tilefish, red snapper, yellowtail snapper, and mutton snapper.

DR. REICHERT: Red snapper and gag were the two that I forgot. Okay. Then we can provide some of the text from the SSC report that addresses the difficulty. The first time we did it, it addresses the difficulties that we encountered filling in the table, and why.

DR. GAICHAS: That would be super helpful. Yes, that would be great, because I think -- I feel like this framework could benefit from having maybe some more standardized information, especially for the ecosystem components. The only table I saw was the black sea bass one, and so it seemed like that had a lot of agreement between the AP scores and the SSC scores, but I may not have been interpreting it correctly, and it seemed like at least the climate attribute wasn't scored, and so I didn't know -- Maybe that's just a black sea bass thing, or maybe that attribute is harder to score, and so that's what I was trying to figure out, and so that would be super helpful.

DR. REICHERT: Thinking back, I think there, in general, were only minor differences between how the SSC, the AP, and the council filled out those risk tables, and so there hasn't been -- To my knowledge, there haven't been any species where there were major differences in the scoring. Okay. Anyone else to that point?

The next one is it appears that quantitative indicators are available for the biological and human dimension attributes, and not for the environmental attributes, and I think that's a fair statement. I think the SSC, in applying -- In reviewing stock assessments, I think we've always struggled with how environmental factors -- How to include that in our decision-making. I think, in the old ABC control rule, there was one tier that specifically addressed that, and we invariably had to go one down, because those environmental factors were not, or could not, be fully included in the stock assessment. Anyone else relative to that?

Then could the ecosystem importance attributes be informed by the food web model? Anyone? I think it could, and I think that's what -- If I remember some of our discussions, that was something that the SSC ultimately was kind of looking forward to, how we could potentially get some information from that model to help us guide some of those decisions. Could a climate change attribute be informed by South Atlantic climate vulnerability? Anyone on that point? Jim.

DR. GARTLAND: Yes, and, just to that, I think it could, but I think, if you have a species that is highly vulnerable, let's say from a climate standpoint, we also need the environmental indicators of what is the climate doing, right, because, if it's highly vulnerable, but things are staying pretty steady, well, it might not be in that bad of shape, but, if it's highly vulnerable, and we see that indicators are showing that things are changing pretty drastically, then that might change how we evaluate the risk to that stock.

DR. REICHERT: Anyone else? What information is most often used to evaluate the other environmental variable attributes? When I looked at that, I thought, for me, the difficulty is that we -- In our stock assessment or decision-making, it has always been very difficult to evaluate other environmental variable attributes, and so, again, that's where I'm not sure how to answer that.

The only thing I thought of was one of the questions that you had in your presentation, is about the modeling salinity and temperature, and I think that information, whether from data or modeling, would be extremely helpful for decision-making, and for stock assessments, and one of the notes I made is I remember -- Was it NC State, Jeff, that had the modeling, and I forgot the researcher's name who is doing extensive ocean modeling.

DR. BUCKEL: Ruoying.

DR. REICHERT: Yes, Ruoying, and so that may be useful, and I'm not sure. I think -- Wasn't that some of the modeling that was used for the -- Maybe I'm wrong, but for the recruitment study?

DR. BUCKEL: Yes, and I'm not sure about that, Marcel, but, in terms of this question, Sarah's question here, I think the most often used is, you know, the example in the table for black sea bass, and it came up for gag, and it's been in the discussion for the other groupers, right, this trend of low recruitment, and potential regime shifts, and so keep -- You know, keeping an eye on that, if recruitment continues to stay low for those serranids, and so I think that's -- The recruitment has been one that we've been discussing in relation to the other environmental variables, Sarah.

DR. GAICHAS: Thank you. That's really helpful.

DR. REICHERT: Yes, and, as I said, I think the model, and like you showed that the graph of the more northern region, and I think that would be very helpful, and I think some of that information is actually available, and you're probably aware that there are several surveys, including our SERFS, our reef survey, that does water column temperature and salinity measurements.

DR. GAICHAS: Yes, and that's really helpful, and it made me think, and I think Jim brought up the -- So you have your climate vulnerability, which, if you scroll down in this page, there's the results underneath this ABC plot, and I think the next thing is the climate vulnerability, and so those -- These are the results that you have already, and that plot on the top is interesting, but I

think it's the bottom plot that could be more useful for the SSC, that talks about the direction of change.

It made me think like this could be a baseline. Like if you're like, okay, the species I'm looking at right now is neutral, then, you know, you would score it as neutral or something. If it were positive or negative, maybe then you would need to look at specifically what the sensitivities of that species were, like which of the climate attributes was, you know, the thing that made it positive or negative.

If it's ocean acidification, that's one thing, but, if it's temperature, that's something else, and then that's maybe what you would need, you know, current conditions or projections of, and I'm just sort of thinking out loud here of what would be useful indicators, but is that sort of what you were thinking, Jim?

DR. GARTLAND: I didn't get that far, but, now that you say that, you kind of got the wheels turning in my head. You know, in terms of which indicators to select, that's always the hard part, right? I mean, we can make thousands of indicators if we wanted, and then we overwhelm ourselves, and we don't know what to do, but, just like you said, if you take those lists of species and find, you know, why -- The ones that were listed as negative, why were they listed as negative, and what do we think is the main driver causing it to be negative, and, if you start to see patterns to emerge of what we think is driving them negatively, that could be your at least initial candidate list of indicators that we could report, because that would probably give us the most useful information, the most bang-for-our-buck kind of thing.

DR. GAICHAS: Cool. I like this. Okay. That's great. Thank you.

DR. REICHERT: Chris.

DR. DUMAS: To follow-up on that comment, also the correlations among those indicators. Indicators that are more correlated are, you know, basically giving you the same information, and so we're looking for not only a list of indicators, but those that are not correlated with each other that are giving you additional information, or information that the other indicators are not giving you. That's one.

Then a totally new comment. In addition to looking at environmental indicators for what's going on, you know, below the surface of the ocean, as far as human dimensions go, and impact on fishermen and fisheries, we also want to think about environmental indicators that are occurring above the surface of the ocean, and, specifically, I'm thinking about bad weather days, and so environmental indicators for wind and waves that would be sufficiently severe, that would prevent fishing in different types of -- In different fisheries.

Looking at, you know, if climate changes, how does that affect the wind and waves and the mean -- Not only mean winds and mean waves, but also variance, and also clustering of bad weather days, or runs of bad weather days, and how that would affect the number of fishing days, and then how that would affect the, you know, the impact of any regulations, and affect P^* , or the actual effects of a chosen ABC on the fishery, or the likelihood of the catch actually reaching the ABC.

You might set an ABC assuming there's a certain number of good fishing days, but, if it turns out to be many fewer fishing days, due to climate change, then the realized catch could be much lower

than you anticipated, and so, anyway, we might want to look at some environmental indicators that would affect what's going on above the waves that could affect the realized fishing effort. Thanks.

DR. REICHERT: Thanks, Chris. Anyone else? Sarah, I -- Kelsey, go ahead.

DR. ROBERTS: Sorry, Marcel. I didn't mean to divert. I just had a quick question about the food web model. I was just looking at it, and I think Sarah showed a quick infographic of it, and so I'm seeing online that it's an Ecopath with Ecosim model structure, and has -- I'm assuming that includes environmental drivers, because Sarah mentioned the possible integration of MOM6, I think you said, Sarah, or ROMS or GLORIES, or there's other available products, but has this model ever been utilized for future like projections, and so forecasts, or sub-seasonal forecasts, or decadal predictions or anything?

DR. REICHERT: Sarah.

DR. GAICHAS: I spoke with the modelers, and so food web models in general are going to -- They have to be driven with some assumptions, because there's no direct physics in this type of model, but I think, when I talked to them, they're very interested in sort of a spatial expansion of this model that would allow more kind of driving with the kind of output of those models to give you sort of the habitat conditions underlying the map, but that I think would be a future thing with this model.

I think what I was thinking more with this model was just exploring kind of multispecies reference points, which a food web model -- You know, that's right up its alley, usually, but I believe different -- This model in the picture right now is the fully disaggregated model from 2000 maybe, and I think the operational model, that's been used more recently, is an aggregated version of this that's really focused on the snapper grouper complex, I think, but I think Chip has more information on that, and I see lots of hands up, and so I should probably be quiet and let people who know what they're talking about answer.

DR. REICHERT: Chip.

DR. COLLIER: Yes, and I was going to say there are some hands up, but, yes, and so we have been answering some questions for this, and we did use forward projection. One of the pieces that was -- One of the questions that was answered with this was looking at the impact of high red snapper recruitment on other fish populations and trying to model different scenarios of red snapper recruitment.

There was concern that red snapper were eating all the other snapper grouper species in the complex, and, given that a lot of the species in the snapper grouper complex are generalists, and not necessarily focused on a single species, as one population goes up, they're going to change their diet to what they need to, and so it showed very minimal impact on a single species based on red snapper recruitment.

We are working on black sea bass right now, looking at the potential impacts of climate change on that species, and what's driving some of the low-recruitment events, and so that one is supposed to be completed later this year, I believe, and then we're going to work on another aspect of it, but that's going to be coming out in an RFP, hopefully later this week, and so we're continuing to work

on it, but, you know, with this model, what we have to do, and the SSC had advised us on this a while ago, which was know your questions for this model, to make sure that you can get the answers out of it, and it's basically hypothesis testing. It's not going to give you all the answers at one time, in one crank, and so we've been very focused on some of the questions that we've asked of it.

DR. REICHERT: Thank you, Chip. Matt, your hand was up. Go ahead.

DR. DAMIANO: I believe Tom's hand was up before mine.

DR. CARRUTHERS: Thanks for that, Matt. I hope you can hear me okay, and so, this issue of trying to summarize the status of secondary species, and it's not exactly what you're dealing with here, but it might be relevant. This issue came up in the tuna commissions, where they have primary species that they assess, and then they have secondary species, which they would like to get some idea for how they're doing, like a report card, and so we developed a project called ECOTEST.

I don't know whether it's relevant, or of interest here, but I can send you a link, but what it does is it takes a multispecies model and creates an enormous number of simulations for a very wide range of different fish species, and what you do is that is a resource of data that sits out there, simulated data, and what you do is you say what data types you have, and it subsets that data set down, uses AI to show you what's possible, whether or not it can tell you what status is, and, if it can, according to those simulations, what you do is you can then put your real data into it, and it gives you an actual estimate of stock status according to the data that you have, with uncertainty in that.

Some of the species you can see in here actually fit into that framework. You could just take the data types you have, subset the dataset, work out whether it could be informative, and then give yourself an actual estimate of stock status at the end of it. We're now validating that thing with real stock assessments, to make sure it's actually working, but, anyways, it might be of interest, and I can share a link, Sarah, if you think it's relevant.

DR. GAICHAS: Yes, and I would love to see that. Thank you.

DR. REICHERT: Thank you, Tom. Matt, go ahead.

DR. DAMIANO: Thanks. I had to step away for a minute, and so I apologize if this was already covered, and you can feel free to dismiss it if that's the case, but, when we're talking about the climate vulnerability indicator, how well-tested are, you know, the climate or environmental drivers that are being linked to whatever stock you're making decisions about?

I'm thinking about this in the context of the recruitment that we've been seeing for a lot of grouper stocks, and wondering whether we know enough, because, as far as I know, there's no smoking gun for why we're seeing this, you know, one or two decades-long recruitment decline across all of these species, and so it almost seems like you're kind of forced into a situation where you're only really able to use estimated recruitment after you've done a stock assessment to determine that condition, as opposed to identifying a specific environmental driver, or specific climate vulnerability, that's actually driving those, if there is one. Sorry, and that came out more as a stream of consciousness than I intended, but hopefully folks understood what I'm getting at.

DR. REICHERT: Thanks, Matt. I think I know where you're coming from, and I think you're right. Sometimes we have knowledge of what's going on, and other times not, and sometimes I think, as you said, we see the signal as a result of the stock assessment, or as a result of the data that ultimately go into the stock assessment. All right. Any other comments, or hands up? Sarah, I want to go back to you. What we discussed, does that give you enough information, answers to your questions? Are there any others that you would like our input in?

DR. GAICHAS: I think that was really helpful for me. I really appreciate you engaging with these questions. I think this is going to help me. The rest of this report, obviously, this report is just presenting some ideas for the council, and so I will integrate this discussion, to the extent that I can, and I think my objective will be to give some examples of how this could work, without being prescriptive about how it needs to be done, and so, if folks have other ideas, or thoughts, I would be happy to hear them.

I think one of your questions was whether you'll get to see a draft of this. If you're not meeting until October, you won't, but I would be happy to circulate a draft to folks who are interested as it's going out. You know, it's kind of up to Chip who he would like to share it with, but I would love to get feedback from folks before finalizing it, and so that's totally fine with me, and thank you again for all of you. It was really helpful.

DR. REICHERT: All right. Thank you, Sarah. That was a really good overview of all the work that you and others have done. Judd reminded me that we may have a summer webinar, but we'll discuss, or staff will discuss, whether or not the SSC will have an opportunity to see this again. Again, thank you for all of that, and we'll put our thoughts in our report that we can share with you, if that's helpful, for your next steps.

DR. GAICHAS: Yes, and that would be great. Thank you.

DR. REICHERT: Okay. Again, thank you. Here, we'll take a fifteen-minute break, and we'll come back at a quarter-till-four, and we'll continue with our last agenda item of the day.

(Whereupon, a recess was taken.)

DR. REICHERT: All right. Welcome back. Please make your way to the table. Our next agenda item is Agenda Item 6, Dolphin Management Strategy Evaluation Operating Model Review. The documents are Attachment 6, and Jeff, Fred Scharf, Matt, Chris, Kai, Jennifer, and Jason were assigned to this agenda topic. We have seen this several times now, and, Judd or Chip, will you give an introduction, or we go straight to the presentation? We'll go straight to the presentation. We're happy to have Cassidy here in-person, and Tom is online. You heard from him just a while ago. Are we ready to get the presentation? Cassidy, take it away.

DOLPHIN MANAGEMENT STRATEGY EVALUATION (MSE) OPERATING MODEL REVIEW

DR. PETERSON: Great. Thank you so much for sharing some time with us today to talk about the dolphin MSE. Quickly, to start, I want to put up this table which sort of distills all of the key

components of the management strategy evaluation, defining management objectives and performance metrics, developing operating models, and these are our hypothetical states of nature against which we test our different management options.

Our management procedures, these are our pre-agreed-upon management recipes for how to specify management recommendations, and, exceptional circumstances provisions, these are the annual checks to make sure that we are managing based on circumstances that were simulation tested within the management strategy evaluation, and then we outline the roles and responsibilities of each of the players in the process.

We have modeling teams, stakeholders, and associated council advisory bodies, SSC and the council. Basically, the modeling team is tasked with listening to every feedback we get from all the other players, quantifying it in the process, but I obviously want to highlight the role of the SSC. Basically, advise on biological minimum performance criteria and risk tolerance, in terms of defining management objectives and performance metrics, and we touched on this in our last presentation to the SSC.

Today, we want to focus on operating models, and so this terminology should be, you know, recommend as consistent with best available scientific information, and then get some advice on what the management procedure structure and parameterization should look like, as well as advise on unacceptable management procedure performance for exceptional circumstances provisions, and this will come later, and so, today, we want to focus on operating models and management procedures.

A quick overview of what we're going to cover today. We have a presentation on the MSE tool and operating model design as it sits right now, and we would love for some thoughts and feedback on whether this consists of best scientific information available. We'll review what the management procedure could look like, with some quick demonstration of, you know, some candidate management levers we might be able to pull, and we would love some advice on what that should look like, and, lastly, we're using this MSE tool for Regulatory Amendment 3 scoping, and we have some preliminary results to share today, and we would love to hear some feedback on that as well, and so, with that for Item 1, I'm going to turn it over to Tom.

DR. CARRUTHERS: Thanks, Cassidy. Up until about a minute ago, I was locked out of my office, and so I just managed to get in in time. This process is going through -- This MSE process is being fully documented, and so there's a splash page that you can go to which gives you an update on where we are with the project, and it also has some links that you can go to for supporting information. It also has code and other things on it that's useful.

Central to any MSE is a document called the trial specifications document. The principal purpose of this is to make sure that every decision and methodological specification that's done is reproducible, so you can say why it happened, and say I get hit by a bus, or Cassidy gets hit by a bus, and somebody can rebuild this entire process from scratch.

Of course, all the code for this is available in a dedicated GitHub, and so this is just a place people can go to look at the raw code, and so nothing is being kept from anybody. Everything is transparent. That GitHub contains an R package as well, and so, when you want to run this MSE, other people can do it. It's documented, and it's got code examples. This isn't something that just

belongs on one of our computers. It's something that, you know, in theory, people can pick up and use and go through the examples online, if they would like to.

For reasons that will become obvious in just a few more slides, this is a seasonal model, and it's age structured, and it encapsulates spatial dynamics as well, and so there's five areas and eight different fleets, which captures not only the different interests of those fleets, but their historical captures, their spatial distribution, and also the sizes that they exploit in the population.

Currently, we don't have implementation error. We're just assuming, like most MSEs do, that the advice will be followed, but it's something that can be added later, and so that's the fundamental kind of shape of the MSE.

The spatial aspect of this MSE is really interesting, because we know that, depending on the area that you look at, biomass can remain somewhat constant across seasons, or you can have really high fluctuations in available biomass across seasons as you go northwards, for example, and so you have to be able to capture that seasonal availability.

We also know that, fundamentally, there's really different big differences in the scale of what's available between these areas, and so the spatial thing ties in with the seasonal thing. We've actually been through a few iterations of what spatial definitions should look like for mahi, but, in the end, we have to choose something that was reasonably coarse, for the reason that these fish move very rapidly at certain times.

The problem is if the index, and this is based on the index that Matt Damiano et al. developed, if the index sees a low catch rate, it thinks there's not many fish there, but there could be enormous catches of that as it's passing through, and so you end up with a mismatch between huge catches and a small inferred biomass, and so they have to be quite big, these areas, in order to account for the fact that the fish are moving a lot.

In the end, we converged upon this spatial definition, which captures the off EEZ international and other catches, but also captures the broad north-south divide in U.S. EEZ catches and exploitation, and it captures that very different Caribbean area, and so this is what we converged upon, and this is all based on Matt's model that he developed, and his team developed, and it's just that, after the fact, we've summed it up into different areas, basically, and so it's a model that has passed peer review. We're just choosing to break it up according to the colored boxes that you see here, and so that's the current spatial definition that we have.

In terms of fleet structure, in theory, all of these fleets are available across all the areas, but you can actually see that some are, obviously, specific, and so the U.S. commercial fleet has got catches in all of those five areas, in various seasons, but some of the others are more specific, and so, the second fleet down, and this is recreational north, is only involved in just one of those areas, and so we have a fleet definition that captures different dynamics, and different potential management, at the spatial and seasonal level.

We have these eight fleets, which are used principally to capture the differences in location and vulnerability, and that's the size vulnerability of fishing, so that we can extract from the population, the correct length structure when we're, for example, rebuilding the historical fishery, like reconstructing it, or dealing with projections, and so that's the current fleet setup.

I wasn't -- I don't know the exact origins of this, but this has been kept pretty constant throughout the process, and it seems to do a pretty good job of capturing that heterogeneity in how these fish are exploited, both seasonally and spatially.

We've got this VAST index, which we can either have all together for the whole stock wide, and you can just add it up over areas, or we can have it for each of those five areas, and, when you break it down by five areas, what you end up with is an understanding of how these fish are moving, or the stock is mixing in these areas, throughout the different seasons, and we've also got the catches for each of those fleets, and by area, and we've also got some effort data as well.

Importantly, for most of the fleets, we have the length composition, and so we have an idea of the lengths that are being removed, along with those catches, and some of those are mirrored, because we have sparse information, and so they're assuming the same selectivity as other fleets that we do have length composition for.

By the way, and sorry. If you go back one slide, and sorry, but just to mention all the hard work that Mandy has put into this. She has actually put together a really neat little site that you can go, this Quarto Book, which describes some of these data types, and it's really a very useful resource for understanding how this was done, and so just to note the link there for Mandy's work that underpins this.

When you look at the catches, it's really apparent that what we're dealing with is officially that predominantly is caught by either the international fleet, and that's recently, that blue line increasing in recent years, and the recreational south fleet that's happening in those southern two areas of the model, and so, you know, the vast majority of catches are coming from a rec south or an international fleet, and you can see, much lower down the list of contributors, the unreported fleet, and that's those are catches we think are occurring, but we don't have knowledge about those catches.

Then it's really a group of quite non-contributory fleets, by comparison to the total extractions of those top two fleets, and, at the very bottom, you can see the U.S. commercial fleet, where the catches are actually very small, that black line, and so it's quite interesting. There's a very strong emphasis on exploitation by a relatively small number of fleets, and one of those, the international, is outside of your management jurisdiction, and it's not something that's controllable by an MP, and so, you know, this is quite an interesting figure, and it's important to look at, because it gives you an idea of the scope of potential management impacts and what they could impact of the sort of the U.S. component of the exploitation.

The work that Matt did was to make sense of all this pelagic longline data, and basically synthesize that into like an index that we could use to fit models to, and here we've got it all added up, across all the areas, and you can see the seasonality here very clearly in the total index, the availability of fish full stop that comes out of that interpretation, and that provides us with a basis to actually capture the dynamics of the aggregate population, and like, for example, just to capture simply how big it is, and like you've got this trend, and this seasonal trend in biomass, and we know the catches at the total level, and so we can characterize stock-wide scale, exploitation on a stock-wide level, but we can also capture things like recruitment, and so this aggregate index is something that we can use for fitting models.

We've also got some other indices that we can use as an input as a way of supporting management procedure development, and so Mandy has been working hard on four different indices which might be able to capture aspects of available biomass for use in setting catch advice, for example, so you can have a responsive management system, if you would like one.

Here's just a summary of the length compositions, all added up over all years for the different fleets, and you can actually see they're quite different, and so we're actually managing to capture this in an empirical and numerical estimation approach. Just like a catch-at-length or statistical catch-at-age model, just like a stock assessment, we're able to use these data to estimate selectivity, and also reconcile the catches with that index that you just saw previously.

One of the most important aspects of the dynamics is just the fundamental uncertainty over life history. Even if you were to span just areas like the Gulf of Mexico and the Caribbean, and you were to come, for example, to Florida, or Northern Carolina, and look at this figure over here. It's enormously different somatic growth curves, and associated with those is enormously different scenarios for natural mortality, and so one of the things that's really interesting about this MSE is that it's got to work -- If we're going to develop management procedures, they have to be shown to be robust to what is probably quite a high plausible range of things like somatic growth rate, and particularly natural mortality rate, and so in this -- This is a key axis of uncertainty, and it's something we really worry about, is life history.

We've also got some information to help us characterize the post release mortality, but also condition factor their weight-at-length, and so we're pulling together all the information we have on life history, and we're identifying those aspects that need to be represented, and the uncertainty has to be carried through into the testing of management procedures.

In terms of conditioning, the approach that's taken here -- This is the bit where we make sure that anything in this operating model is, broadly speaking, empirically credible, but that, when we map different scenarios, for example for natural mortality, that that scenario can be made consistent, or is at least consistent with an interpretation of the data, and so what we do is we have two steps. The first one is we use a regular well-documented and widely-applied statistical catch-at-length assessment model, essentially, called the rapid conditioning model.

That fits spatially aggregate, but still seasonal, population dynamics in a fishery model, just like a regular stock assessment, and what that does is that captures the stock-wide scale, and it captures the recruitment variability, and it captures selectivity of those fleets and things like that, but it does so in a very kind of terse, reliable, and robust way.

Then the idea is what we do is we superimpose spatial dynamics on top of that. We take that aggregate dynamics, and then we put movement on it that matches the spatial VAST index, and that spatial VAST index shows us how much the distribution changes between seasons in these different areas, and it gives you an idea about not only the spatial distribution, but that that degree of variability across seasons.

What we did in this figure, this rather complicated figure that you see here, which looks like a table, what that's doing is it's taking the blue fraction of the stock going into a season, and it's solving the movement to get the red fraction out, and those come from that VAST index, that

spatial VAST index, and what we've been able to do is develop a way of capturing movement and spatial distribution that fundamentally fits that spatial VAST index, and so we're matching our best possible -- Our best understanding of seasonal spatial dynamics, and we're actually able to capture that.

Moreover than that, if you look at that matrix, it's got a sort of yellow diagonal line through the kind of the square in the middle, and that's the probability that they're staying put, right, and they're staying in an area, and so what we're able to do is we're actually able to solve for that blue fraction in, and that red fraction out, but for different assumptions about how viscous the stock is, and like how many are staying put or we're leaving, and so we can actually capture a fundamental axis of uncertainty to do with movement using this approach.

This is a way that we can go from a defensible fit of a model, to everything aggregated, to a defensible fit of the model spatially disaggregated, and, not only that, we can actually capture uncertainty in how much they mix, like how much -- What fraction of the stock is staying put in the Caribbean between the winter and the spring, for example. We can actually fit the VAST thing with different assumptions for that, and so this gives us a huge amount of flexibility, but it fundamentally makes sure that we are doing everything in the most empirically credible way that we have, and so this is the broad approach to operating model conditioning.

One thing we can do, and this is actually an older figure, but it captures the thing perfectly. What we can do here is have spatial indices. That's every one of those panels you see there. We can capture it historically, and then use it in the future as well, and we can capture that seasonal dynamics and project with it, and so what we've got, fundamentally, is something that fits spatial distribution, seasonal variations by area, and captures both the selectivity and exploitation dynamics of the principal fleets.

That was the core challenge of designing and conditioning these operating models, and, you know, it's been left to our technical team, and in particular me, to come up with something I think is defensible, that in July I can sit in front of a CIE review and say, no, no, this is something I think does a really good job of that, and, in a way, lots of what we're doing is kind of new, but we can demonstrate how it works, and we can show that we've met those core requirements of any operating model, and, more than that, with that, we can span ranges of uncertainty, and so we're making sure that everything is both empirically credible, but also spanning what we think are reasonable ranges of uncertainty for things that we genuinely don't know, like natural mortality.

The whole idea, of course, of MSE is the idea of achieving management certainty given scientific uncertainty, and so the idea here is kind of like we can use this pilot, because we've tested that pilot across all of these weather conditions in a simulator. We have certainty in our ability to be responsive and get us what we want, like safely to our destination, because we've tested them across all these difficult flying conditions, and so what we're doing, in this reference set of operating models, is trying to span that plausible range of uncertainty.

What we've done here is a relatively comprehensive job of that, because we have five types of uncertainty, and we have two levels for each, and so we've got high and low natural mortality. We've got high and low resilience, steepness, the ability of the stock to recover from low stock sizes, and those top two are two of the most important things in any MSE. They're usually present in just about every MSE that you can think of, but we also got quite a bit of feedback from

stakeholders and managers about catch levels and uncertainty in catches for this stock, and so we've got scenarios for low and high catches as well.

We also -- There are concerns that recruitment is changing, or, in the future, it may not be as high as it has been previously, that something fundamental has happened to this stock in recent years, and so what we've got is a projection of recruitment that is at current levels, roughly speaking, or historical levels, and one that is somewhat reduced, and it's at 75 percent of historical levels, and, as I said before, we've been able to superimpose a low and a high probability of staying put in any one of those areas, and so we've got a stock that mixes more than another one.

If you get these five axes, and you make a full grid, you actually end up with thirty-two operating models, thirty-two let's say stress tests for your pilot, your management procedure, and, you know, so, in this case, we've got a really quite wide range of outcomes of testing scenarios.

If you were to just project status quo management for each of those thirty-two operating models, this shows you the diversity of magnitude in spawning biomass. We're capturing what I think is a reasonably plausible range of uncertainty in just how much stock is available, or spawning biomass could be available, at the end of a management period, and here it's 2040.

You can see some of the patterns across that grid. You can see groups of four, for example, as they tie into different levels of those reference operating models, and the idea here is that, across this range, you know, we're really going to put a management procedure through the wringer, to make sure that we know that it can perform well, even when this thing could be quite low or quite high. Of course, this is just spawning biomass, but we can produce all kinds of other outputs, for example biomass relative to MSY levels and exploitation relative to FMSY levels.

There's any number of different performance metrics we could put in here. We could, for example, have, you know, the average size caught by the recreational fishery. You know, we've monitored all that information, and so there's a huge number of things that we can present, and we already have some performance metrics that we've -- Sort of provisional performance metrics.

The reference set is being used as a way of saying -- Sort of core way of saying this MP is kind of performing generally better than this, but people bring up scenarios which we don't have strong empirical evidence for, and they bring up scenarios which could provide us with greater discrimination between MPs that perform similarly with that reference set.

One way of doing this is to have this robustness set, an additional set that can sort of stress out our management procedures to a greater extent, and that's one of the purposes here, but they also allow us to take in expert judgment, or alternative ideas, about the future of the stock, or what's happening with it, that we can then entertain and look at what the impact is going to be on management, and so, for that reason, we span some of the typical things, like an increase in IUU fishing, and recruitment that has systematic changes, and so this is R1 to R3. They step, or they have declines, in recruitment strength.

Recruitment level four, R4, that's one that just has more variable recruitment than we've seen previously, and we've also got things like declines in the spatial distribution, and so we can have an upward-northward shift, to see whether our management procedure can survive something like that, and so on, and so you can see, down this list, we're stressing it out with respect to both catches,

recruitment, the spatial aspects, but also things like productivity, and so somatic growth and other things, and so these might turn out to be quite useful as a basis for saying, well, we like these two management procedures roughly the same, but this one survives the robustness test better.

Of course, when you're using a management procedure, you're kind of assuming that the basis for adopting it was reliable, that these operating models captured something that's really happening in the fishery system, but one thing we can do is we can monitor data, as we're using a management procedure, to make sure that the data that we're actually seeing in reality match what we thought we would see when that management procedure was adopted.

If we do a projection with a management procedure, we might see, let's say, mean length stabilizing, and catches going up, and indices dropping a little. However, what if we don't see that? What if we're using that management procedure and we start seeing data that don't look like what we thought they should? This is one way of triggering exceptional circumstances, a sort of safety check to make sure that the MP can be -- Continued to be used, because it was established based on operating models that match up with the data that we're seeing, and so this is something we can add once an MP is adopted, and it provides that additional safe safeguard.

The whole point of an exceptional circumstances is it can bring forward a review of the MSE, and so, for example, if we suddenly see crazy data, things we never thought we would see, we could bring through a review and start re-examining operating models and re-examining management procedures, and so I'll leave this now to Cassidy, because I think you assigned me 4 to 19, and we're there, but, from my perspective, as someone who builds these types of MSE frameworks, you've got basically a lot of firsts here.

You've got a short-lived stock, and you've got spatial seasonal dynamics, you know, and you've got a potential to have things like trip limits and other management actions, and so this is quite a complicated MSE, but I think, in a way, it's an excellent basis for establishing MSEs in federal U.S. fisheries, because we're testing a lot of the water here, and I think, by the time it comes around to July, we'll have a very -- You know, I think we'll be able to defend this fairly rigorously. The question is whether or not, of course, on the operating models you agree with that. Cassidy, I can hand it to you.

DR. PETERSON: Thanks, Tom. This is a good pausing point too, and so, if there's any thoughts or questions on the operating models, please feel free to raise hands and chime in. Thanks.

DR. REICHERT: Any questions relative to the operating model in the room or online? Any hands up? Matt, go ahead.

DR. DAMIANO: Thanks. I just wanted to speak to the fleet structure introduced early in the presentation. Tom mentioned he wasn't sure where that came from, but I think it may have been inherited from the first stab at the operating model I took, and there is documentation of that, and just to make sure that's totally transparent. I did want to just check in about that, to make sure that all of those assumptions that, you know, were sort of inherited from an earlier stage of this are still past the sniff check internally with Tom and his group.

DR. CARRUTHERS: Well, I mean, I can certainly say that -- I can certainly say they seem to characterize that heterogeneity in the way that the fleets operate spatially, but also capturing their

selectivities. It certainly does that job very well, and so, from my perspective, I don't see an analytical issue. It would have to be something else. Maybe, Cassidy, you can comment.

DR. PETERSON: Yes, and thanks, Matt. I'm also wanting to validate that these are still consistent with the revised spatial areas, and they're consistent from the feedback we heard from our stakeholder working group and our first round of stakeholder workshops, where our stakeholders were clear that the ways in which the fleets operate varies regionally, and that's why we characterized the fleet structure this way. Thanks.

DR. REICHERT: Relative to that point, and I know it's probably somewhere in the documentation, but the selectivity for each fleet came out of the data from that fleet, or --

DR. CARRUTHERS: That's correct. If there was length composition data available, and it was available for five of the eight fleets, the model was fitted to characterize that.

DR. REICHERT: Thanks. Anyone else? Seeing no hands -- Chip.

DR. COLLIER: So, going back to that map, Brazil has done a lot of work on stock structure of dolphinfish, and they identified -- Like around the Caribbean is where their stock seemed to be breaking, and I didn't know if there were two or three stocks where, you know, southern Brazil has one stock, and then, kind of around the Caribbean, there seemed to be a second stock, and I'm just curious if that Caribbean piece is that second stock that Brazil kind of has identified, not knowing that -- I haven't looked into a lot of the research more recently, but just curious if you guys have looked into that, to see if that could be some of that Brazil stock, or how things are working out there.

DR. REICHERT: Can you bring up -- I think it's slide 6, correct, the map earlier in the presentation, Chip?

DR. CARRUTHERS: It's pretty hard to comment without actually seeing what they've done, and so what would be useful, I think, is to just -- Rather than speculate here, it would be to go and take a look at exactly what they're considering to be a second, or whatever stock, and go from there, because it's going to be pretty difficult to just sort of do it verbally here, I think.

DR. REICHERT: So just a clarification, and so, right now, you -- This is all considered one stock?

DR. CARRUTHERS: Yes, that's right.

DR. REICHERT: Chip, did that answer your question, or concern?

DR. COLLIER: Yes, and it answered my question, yes.

DR. REICHERT: Thank you.

DR. CARRUTHERS: But, Chip, I think, if you can forward any information you've got, and, of course, this is another reason why things like robustness operating models are useful, is because, in the scope that's possible, it's able to recreate, wherever possible, these types of questions, to see whether or not they're influential, and so it would be very helpful to have -- If you could forward

a copy of that, just so that, on the off chance that I can create another robustness scenario, or sensitivity scenario, to look into that.

DR. COLLIER: Well, and I'm thinking Matt probably looked into this when he was originally creating these areas, because it looks like it does address more of that central area that the dolphinfish were splitting up on.

DR. REICHERT: Thanks, Chip. Anyone else? Go ahead, Tom.

DR. CARRUTHERS: Sorry to interrupt, Chair, and so, Matt, I mean, when you presented -- Because you managed to get this thing published, and so, like when you presented it, how much of -- You know, did you get feedback on aspects of potential Caribbean structure, or like what was the -- Did this sort of come up, or is it something that's more recent than that?

DR. DAMIANO: It's more recent than that. I've read some of the work that Chip is referring to, and my understanding is that Brazil has identified, via growth patterns, a couple of stocks, one that also either co-occurs or might mix with the stock that, you know, we're looking at here within the Caribbean Sea.

I don't know how you would go about discerning which is which, but it seems essentially like there are, you know, maybe three stocks within the Atlantic, the one that follows the pattern of movement characterized by that study, and then the two off the coast of Brazil, with one moving up into the Caribbean Sea and the other kind of staying in that lower-right area not included in this model.

DR. CARRUTHERS: I mean, I think my take on this, when people talk about adding structure which requires drastically different analysis, like multi-stock assessments and things, is to just simply say that this is the first go at this MSE. We're doing an awful lot already, and like we're breaking new ground in several ways.

The thing to do is just to remember that, in a revision, or way down the line, or a reconsideration of this, you might want to include, once this is established, these types of questions, and like create hypothetical multi-stock models and see what happens. The issue here is that it's not clear how to divvy up the data and do those analyses, and we would be doing it on top of an awful lot of already quite complicated work to review in many ways, and so my sense is to make a note of this, and just remember that, you know, in a future iteration, you might be able to consider some of these in the robustness set, for example.

DR. DAMIANO: I agree. I don't think you have the data to do anything more in that part of the distribution than you already are.

DR. REICHERT: Thank you, and I'm looking around the table. Does anyone in the SSC disagree with the assumption that this is one stock? C.J., I saw your -- No? No one here around the table disagrees with that, and, Tom, I appreciate -- At least make a note and see if, in the future, something could be looked at, but the SSC agrees that this is a reasonable assumption. C.J., to this point, or another point? No? Jeff, go ahead.

DR. BUCKEL: Yes, and maybe change the language to that we're making that assumption, right, and that we don't -- I think there's indication that there could be at least one other stock, potentially, and so we don't know, and we're going to make the assumption that it's one.

DR. REICHERT: Thanks for that clarification. Steve.

DR. TURNER: I would call it a management unit, and not a stock.

DR. REICHERT: Okay. Jeff.

DR. BUCKEL: If we're done with the stock, I have another question for Tom.

DR. REICHERT: Change it to a management unit? It's just a language -- What language is used. Does it matter?

DR. CURTIS: Well, the conversation was are there multiple stocks, right, which are treated different than management units, and I wouldn't say they're synonymous, or interchangeable, and so I think the SSC should be clear if they're intending the stock identification or if it's a management unit identification.

DR. REICHERT: Steve.

DR. TURNER: I just feel that there's some uncertainty about the number of biological units in there, which I consider to be stocks, and a management unit might include multiple stocks, but perhaps I'm not using the definition that the SSC prefers. Anyway, it's just a comment.

DR. REICHERT: Okay, and we'll have a placeholder in the text, and we can come back to that later. To this point, anyone? Otherwise, I'll go to Jeff. Jeff, we're done with stock or management unit.

DR. BUCKEL: We're done with stock. Tom, I had a question on slide 13, the movement, and so, when you were talking about the fraction in and fraction out, and estimating the probability of staying, the V parameter, I was reading the text, and it was talking about the exploitation rate, and I was like what -- There's a mismatch between the staying and the exploitation, and so if you could, I guess --

DR. CARRUTHERS: I'll unpack that. I'll unpack that for you, if you would like. Okay, and so what you see here is the solving for movement, and so what we're doing is we're saying, given the VAST index, this is what a movement could look like, a movement matrix could look like, but, once you've got that, what you've got, if you think about it, is a spatial model with vulnerable biomass now by area, and so what you need to be able to do is get your spatial exploitation rate.

Now, you didn't have it in the aggregate model, Number 1 at the top, and now you've got to have spatial F, spatial catches, right, and so what we do is we step through and we solve -- Given this movement, we solve for the spatial F, and that's what that exploitation rate thing is. What it does is it basically runs the whole model with a guess at what the spatial Fs are, and it looks at how well that matches the catches, and it makes a small adjustment, and then reruns it until two things happen, that it matches the VAST index and it matches the spatial catches, so that, when I sit in

front of a bunch of CIE reviewers, I can say we have operating models that match our fundamental data sources.

They match our catches by space and season for all the fleets, and they match our VAST index, and so our operating models are at least consistent with the two principal data inputs, and we do that in this multi-step approach, and it's the only way I know to do it without having a multi-fleet spatial assessment model, and all of those spatial sets require independent data about movement, like, for example, electronic tagging, or conventional tagging, and we don't have enough of that to do such a thing, and so this is our solution. It's very robust, and I think it's very defensible, and it's what we went with to sort of very rigorously and robustly get a fit to those two datasets. Does that help at all?

DR. BUCKEL: Yes. Thank you.

DR. REICHERT: Thanks. Anyone else? Genny.

DR. NESSLAGE: If I could piggyback on that question then, and I'm looking at your fleet definitions, Table 3.3, and trying to wrap my head around -- The assumption is, and correct me if I'm wrong, that the selectivity for each of the fleets, including the north-south split fleets, is the same across all years, correct?

DR. CARRUTHERS: That's right, yes.

DR. NESSLAGE: Just for -- I'm not a dolphin expert, and is that reasonable, because, if it's not, then you're doing your estimation of this, and, you know, you're superimposing the seasonal movements, and solving won't be -- It will mask some of the selectivity that might have occurred from management measures, and does that -- Does my question make sense?

DR. CARRUTHERS: I think so. I think so. You're concerned that making an assumption about stationarity in selectivity is overly simplified, and it won't capture the seasonal aspects of it, and I think that's a fair concern. It's an aspect of stock assessment as well that's always been quite difficult to capture.

In this case, the big uncertainties are not really about selectivity. The principal reason is, and I guess we can show this with some of the robustness tests, but one of the issues with mahi is they die off so quickly, and their M is so high, that a fish that's left in the water to grow dies off about the same speed that it would have grown if you had taken it, and so there's a tradeoff between the production in the cohort and when you take it, and so it's not very selectivity sensitive anyway, but I think it's up to us to demonstrate that.

I would just say, your concern about time varying selectivity at the spatial level, we never have the data to estimate it. It would be nice to have, and I think a key context here for this MSE is that it was very difficult, and it proved, I think, not possible to develop a peer-reviewed stock assessment for mahi, and so we're choosing this MSE approach because we accept that there are simplifications in some of these things that have to happen, and that those simplifications couldn't get through a kind of traditional data-rich stock assessment approach, but maybe could be included in the mix in the operating models.

What I can make a note of here, for example, is, if there are concerns about selectivity, we should include, at the very least, a robustness test which investigates whether or not our conclusions are sensitive to a plausible alternative for the selectivity, and that would help address the types of comments that you've just made, but also that might come from our reviewers.

DR. REICHERT: Thank you, Tom. Two thumbs-up from Genny. Anyone else? Jeff.

DR. BUCKEL: Genny can correct me, and I see the text that Judd has of held constant, and that's across the regions, and maybe years, but --

DR. NESSLAGE: It was across years, was my concern, and so I guess where my brain was going was that, if there have been major management measures that have changed selectivity within a certain sub-spatial region across the stock's range, then that might create a pattern in harvest that when they go to -- And/or subsequent dynamics, you know, spatial dynamics, that, when they go to do this solving with the spatial VAST index, that they might end up with a pattern that looks like it's spatial movement, but it's really management, and, honestly, again, I don't understand dolphin management well enough to know if that's even a concern, and so I guess that's a question for the dolphin experts in the room, or online too, that I still -- It might not be worth doing all that work if someone can speak to that.

DR. CARRUTHERS: I think it's an important point to bring up, selectivity as an uncertainty. I can't comment, sadly, and so I'll leave it to Cassidy, or even Matt or somebody else, to comment on whether or not they think somehow there could be an interaction between selectivity spatially and this estimated exploitation rate.

DR. REICHERT: Tom, you mentioned that this could possibly be investigated with the robustness?

DR. CARRUTHERS: I think so, and so one thing we could do is break -- One thing I could do is break down the spatial length data, as I have it, and see whether or not I could, you know, post hoc fit selectivities that would be different across space, and reconstruct the model with those, and use that basically as a basis for constructing operating models and testing management procedures.

That way, you can say, well, if it really was true that these selectivities were different, you know, over time and space, then, you know, you come to a different conclusion. I would just say, compared to the very large range of uncertainty in M , steepness and other things, it's likely to be an almost imperceivable rounding error, but that doesn't change -- That doesn't affect our obligation to demonstrate that, and so I think, having something like that, I will look into as a robustness OM, because, really, we want to go into a review being able to take the wind out of these types of sails, you know, from a reviewer, and so it's a very useful comment, and I think it points to something I need to try and address with at least a robustness operating model.

DR. REICHERT: Thank you, and so we will phrase that in terms of a recommendation, and, if I understand you correctly, that is something that you guys could look into prior to the review.

DR. CARRUTHERS: Yes. Absolutely, and the one that I would create would be quite extreme, and so it would be something that would be reassuring. That's usually the best thing to do with

things that you expect to be non-consequential, but you would like to allay concern, and so I'll choose something which would certainly bracket the kind of expectation of a reviewer.

DR. REICHERT: Thanks. Yes, and I agree. Anyone else? C.J., and then Chris.

DR. SCHLICK: Thank you. I actually was interested in your robustness set of operating models that you have and some of the values that you chose. You say that it's not used for MP development, but is to identify exceptional circumstances, and are these kind of the limits you hit for the operating models robustness, or just points you picked, for instance the IUU increases by 1 percent every year, and is it now an exceptional circumstance if it goes over 1 percent, or was that just a number that was picked?

DR. CARRUTHERS: Well, that's an interesting point, and so, traditionally, what exceptional circumstances are is let's look at the reference set of operating models, and let's see whether or not the types of data we thought we would see when the MP is happening, and these are the data that we're talking about here, like the indices, the catches, the mean length, whatever you want to choose, right, and let's see whether or not those look like, as we observe them, as we're using MP, what we thought the data would look like.

What you're saying is something else, and it's saying what if there was a scenario that was really happening in the fishery, and let's say that catches were being over -- You were over catching by 10 percent, and like, just qualitatively, you're over what your assumption was in the reference set of operating models, and that's actually a different type of exceptional circumstance.

It's not based on the data. It's based on a condition that -- Being a sort of categorical or qualitative difference between what you tested and something else, and those exist in things like Atlantic bluefin tuna. Like, if we see 20 percent overages, or more, from what -- That was not tested. The MP was not tested for that, and, therefore, it's an exceptional circumstance, and we should review everything, or we may want to review everything, and so you make a really good point.

Another use of the robustness test is to do what you've said, is that, if you saw something, and let's say you saw what you think is a recruitment failure, you can see whether or not, after the fact, whether that was actually an issue in your robustness, and should we worry about that, and so, for example, if IUU was increasing by half a percent every year, you could look at this ROM_C1, and you say, well, actually that wasn't consequential, and, therefore, we don't have to trigger exceptional circumstances, but what you bring up is a different kind of exceptional circumstance. It's like we are in a different world than the set of operating models we tested it for, right, categorically.

DR. REICHERT: Thank you. Chris.

DR. DUMAS: First, I would like to say, you know, wow, and thank you. This is a clearly extensive and exciting modeling effort with, in my opinion, a tremendous potential for investigating alternative environmental and management scenarios, and so thank you for this work. My first question is sort of following up on I guess Genny's question about the modeling of the dynamics, and so what if the fish did not move, and what if management actions did not change, but what if just the boats moved, and so what if, I don't know, there were changes in fuel prices,

or changes in weather, so that the vessels moved, and that's what was driving changes in the spatial distribution of the catch?

Does your model hold constant sort of economic and environmental factors that would affect the fishing effort and the spatial distribution of fishing effort, well, and the temporal distribution of fishing effort or not, and the reason why -- I'm just quickly going to say the reason why I asked that is like what if fuel price doubles, right, and can we use this MSE to investigate something like that, because clearly those types of things happen in the world these days, or, with climate change, what if there's an increase in the number of bad weather days in different places, or the distribution of bad weather days changes spatially, and could we use this to investigate that, or changes say in unemployment rate or interest rates?

These may not be part of the model, but, if they could be incorporated at some point, that could be really useful also, in addition to everything that you've already captured, which is a tremendous effort, and I applaud greatly. Thank you.

DR. CARRUTHERS: Well, thank you for the kind compliment. Let's see if it gets through peer review first, you know, but what I was going to say is I built this thing with the capability to prescribe -- Like, in the MP, prescribe the spatiotemporal distribution of effort, and so, if you wanted to, and let's say it's not in the operating models, right, and it's not being treated right now as a dynamic in the future, and it's not one of these ROMs, but let's just say, for example, you said I think there's going to be a reduction in effort, but an increase in catchability, and they're going to get more efficient, but they'll be smaller, and I think they're going to go north, that there's going to be a shift north.

We can do that right now. What we would do is we would specify in the MP -- We'll treat it like we're actually saying that's the management. We'll say we're telling you to do that, but we can change the distribution of the effort according to a model that you specify for the economics, and so, right now, if you had an economist, they could say, well, my model predicts in the future this effort distribution, and we would just simply insert that code in the MP, and it would do that for you, and so it's doable now, but what you require is the actual model to predict it, right, but it's something we can do.

Even now, we can do it, and, to go to your first point about was actually -- I just want to sort of highlight this to the SSC. Your first point was to say that this could be useful in a broad sense, and I would really agree with you. What we're -- In some sense, what we're aiming to do is build a kind of calculator, a shared understanding of how this stock and fishery behaves, so that we can test ideas with that.

If we can accept this calculator, we can accept the range of reference OMs, and the robustness OMs, what you've got is a shared kind of laboratory for testing your different ideas for what size limit, what spatial MP, you know, and no longer do those things necessarily have to be presented separately, and not considered together, and so, you know, one value of this is like the centralized calculator idea, and so, at the end of this, someone could say -- At the end of this process, say, well, what if we were to do this, and we just run it through it, and you could say, well, this is what it says, and so that goes to your first point about the other potential uses of this. Anyway, thanks for your comment.

DR. REICHERT: Thank you. Matt, we saw you had your hand up.

DR. DAMIANO: Yes. Thank you. Tom, I'm looking at the splash page, and I was thinking about Genny's comment about selectivity, and I noticed that, for some fleets, there's, you know, virtually no fishing in the winter season, and so selectivity wouldn't be an issue for those fleets in that season, and I'm wondering -- I'm wondering if you could simply demonstrate, you know, using the length composition data that are available for those U.S. fleets, whether the availability of the size bins within that selectivity pattern is constant over the spring, summer, and fall, and if that might actually address the concern, rather than having to put together another robustness OM.

DR. CARRUTHERS: Yes, and I think the first thing is to do that empirical check. I mean, the question was brought up about selectivity. The first test is to see whether we see empirically any basis for like -- As you've said, for whether this is worth pursuing, and so I think that's step one, and then step two is, if it is there, let's try and approximate it in some way, and then step three is test sensitivity, and so I think it's a good point, is let's focus on empirical evidence first, right?

DR. DAMIANO: Thanks.

DR. REICHERT: Thank you. Anyone else? Cassidy.

DR. PETERSON: Okay. Thanks, Tom, and so part two is thinking about the management procedure. As a friendly reminder, a management procedure is sort of a pre-agreed-upon recipe for how we manage or specify management recommendations. It includes sort of a description of the data that we have available and the quality of data. It includes the way we analyze those data, how we use those analyzed data to adaptively adjust our management recommendation through the use of a control rule, and how those management recommendations are implemented.

We're considering an empirical management procedure, given that we don't have sufficient data to support a full stock assessment, and so how does this fit into the sort of Magnuson-Stevens National Standard Guidelines of characterizing overfishing limit, allowable biological catch, acceptable catch, and annual catch limit, and so, basically, our proposal, or suggestion, is that the management procedure itself is going to specify annual catch limit.

Inherently, through the process of the MSE, where we translate management objectives, like ensure we are not overfishing, into operational objectives, and like ensure there is a 60 percent chance that we are not overfishing, across the next thirty projection years across all of our operating models, we are inherently accounting for risk that would characterize our reduction from an overfishing limit to an annual catch limit.

In terms of building the management procedure, Tom has done a lot of work to build in a lot of options, and so we want to sort of clarify what options are built into the package right now. There are options to build static management, and so something that is set and fixed for the entire projection period, or the entire management period, and that could be something like size limits that are constant over time, or we have the ability to build in dynamic management recommendations as well.

Typically, we think of this as like an annual catch limit that could adapt over time based on the behavior of the indicator, but we do have the capacity to sort of mix and match, and so we could

think about size limits that adjust over time as data changes, or as the stock dynamics change, but we have the ability to mix and match both, and Tom has built in several management levers.

It includes things like annual catch limit, and this can be specified by fleet or area. Effort, obviously, this isn't something that we could probably manage for, but, to get at Chris's comment, this is how we could, you know, simulate changes in fishing distribution and things like that. We can look at vessel limits by fleet, and minimum size limits by fleet and area, and when we want -- All of those management levers can, again, either be static or dynamic. If they're dynamic, we can be really flexible, or creative, with how we want that control role to look at it.

This chart, in sort of the bottom-right corner shows, that we could have something that has a direct one-to-one relationship, where, as the indicator of relative abundance changes, the annual catch limit, for example, or any other management lever, could change directly. It could change in any relationship, and this is just an example of a threshold control rule where there's sort of a maximum minimum value, and then, as the index declines, the value of that lever would also decline, but we can specify what those threshold points look like, what those maximum and minimum levels of the lever look like, and more, and so we have a lot of flexibility in what that looks like.

Here we've outlined what status quo management currently is for dolphin, and this is built into the package, and so everything that we build will be compared to that status quo management, and, again, we have a lot of flexibility with what indicator we use for our management procedure. We have the VAST index, and we can look at CPUE indices. We can look at size composition from each fleet, catches, things like that. We can explore the levers that we talked about on the last slide, and, again, we can build in some control rules that have a lot of additional bells and whistles.

One thing that we often look at is sort of a maximum allowable change for any lever, and so you could say, you know, we want to have stability in our fishery, and so we're going to limit the allowable change from one management cycle to the next of annual catch limit by 20 percent, so we're not wildly changing ACLs in our fleets.

Referencing some indices that Mandy Karnauskas has done a lot of work to develop, we have some other candidate indicators, and we can look at things like standardized CPUEs. There's some suggestion that shows that El Nino Southern oscillation and sea surface temperatures in May are correlated to dolphinfish availability in the U.S. Atlantic in that subsequent year, and we also have some weaker, but existing, Puerto Rico tournament index data, and there's some suggestion that dolphinfish show up in Puerto Rico before they're available to the U.S. fleet, and so these are some predictive indices that Mandy's done a lot to explore. She has this all documented in her Quarto page, and so, again, I highly recommend to take a look at that, if you're interested, and so these are some of the indicators that we can explore for the basis of our management procedure.

Just for demonstration purposes, we have some quick management procedures that we ran just for a subset of simulations for our base case operating model, and so this is Operating Model Number 29, and this is a management procedure where we're comparing status quo, which is blue, with our static minimum recreational size limit, where we're basically expanding it from just the southern states to all the way up to Maine, and we're looking at stock-wide spawning stock biomass and stock-wide landings.

You can see that there's very, very little difference, and so, overall, stock-wide impacts are minimal, but we can then go ahead and break this down by U.S. fleets, and basically, once again, we see that there's very little impact on many of our fleets. There's a slight difference in our for-hire north, but, essentially, this will have very minimal impacts on stock-wide landings.

Again, for demonstration purposes, this static management procedure is just setting a ten-fish recreational trip limit for all regions. Again, there's a slight increase in our total spawning stock biomass, a slight decrease in our landings, but you can see there's a lot of uncertainty inherent in these simulations, and so the difference is very statistically insignificant.

Again, when we break this out by U.S. fleet, we can see that the impacts are most strongly felt in the recreational fleets in the south, and so the private recreational and for-hire recreational in the southern regions, and, lastly, again, for demonstration purposes, we can build dynamic harvest control rules.

I will caveat this by saying that this is a demonstration, but there is a bug in this code, and so these results will change as we continue to develop and test the management procedures, and, again, for the purposes of this demonstration, we're applying the same management procedure to all of the fleets in all of the regions, and we do have flexibility to provide regional or fleet specific management as needed to meet our management objectives, and, again, this one is sort of limiting some of the landings, particularly for U.S. commercial, but more to be done on this.

I don't want to hang our hats too much on this, because it's just for demonstration, and so I'll pause here on our next action item, which is just please provide any thoughts on what types of management procedures we should see, if you have thoughts or opinions. Obviously, there's a lot of work here to do, and so we would love any recommendations. I'll pause. Thanks.

DR. CARRUTHERS: If I could just follow up, and so, when we think about management procedures, remember that essentially this doesn't have to be something that's like necessarily to advocate for, and it doesn't necessarily have to be something that you think everybody would agree to. We hope that people could build a consensus on what's appropriate, and what would be doable, and defensible, but think of this like a menu in a restaurant, and you could have like some things that are the top of your choices, but you could also, just for the sake of exploring things, come up with some dishes under the sort of, you know, unpalatable section, that you know are not necessarily things which are going to be agreed by all people, but maybe it's good to look at those and see whether they're consequential or not first.

There can be sensitivities around what management procedures are to be tested, but it's just to remind everyone that that's not -- You're not advocating for it. You're just, out of curiosity, seeing what management options are possible, and what the sensitivities are, and it's really important to like phrase it in that way before people become sensitive to whether or not it's something that is politically viable or something that could create problems in some sectors. This is just a menu, first and foremost, and how it tastes is sort of something else.

DR. REICHERT: Thanks, Tom. I'm looking around the room. Amy, go ahead.

DR. SCHUELLER: I was just wondering if you could talk a bit more about the implementation of the dynamic version of the ACL option, and how that's implemented, and I guess what I'm

wondering is it only implemented through this control rule on the bottom-right of the slide, or is it implemented in another way? Like are assessments being run intermittently, and then having adjustments to an ABC, based on the OFL estimation, or anything like that, correct?

DR. REICHERT: No, and I have a similar question, and also one related to ABC, but I'll let Cassidy and Tom address your question first.

DR. CARRUTHERS: So, technically speaking, any management procedure just takes data in and provides advice out, and so, in some places, people do a stock assessment, and the thing that you see on the bottom of the control here, which says index, would be something like estimated spawning biomass, right, and then you would alter your catch recommendation, the dependent variable on the Y-axis, and you would vary that based on those estimates.

In this case, much like other fisheries, we've got an issue here with we don't have a defensible stock assessment, and so what goes on that X-axis, on that independent variable that says index here, is going to be something empirical, and it's going to be something like an observed index, or the mean of an observed index over the last few years, or something like that, and that has become the objective of, for example, management strategy evaluations for highly migratory species.

Although we can have stock assessments for things like swordfish and bluefin and albacore, people are aiming for an empirical rule, because the index on the X-axis is something that's observable. Everybody understands it. The managers can look at it, and the stakeholders can see it, and it provides a direct link with what the management advice is, and so the actual system of providing advice is now relatively simple.

Everybody knows the rule, and it's transparent to a wide range of stakeholders, and, moreover, it's often shown to perform quite similarly to more complex approaches that have that step where you have to peer review a stock assessment to get the estimate, and so we would be looking here, in the absence of an assessment, for an empirical rule, or at least testing empirical rules that use those data, those indices directly, and then pull a management lever in response to that.

DR. REICHERT: Okay. Thank you for that.

DR. PETERSON: Really fast, can I add onto that?

DR. REICHERT: Absolutely, Cassidy. Go ahead.

DR. PETERSON: So the example that we implemented right now, basically, on this plot, the index is the VAST index, and so, basically, as that index goes up, we're increasing annual catch limit, and it's following this sort of red dashed line, and so we have two-times current index as the top value, zero-times the current index as the bottom value, and then that's how it's specifying, and so, basically, you know, the VAST index goes up, we're assuming, in the following year. We have a lag time of one year. The next year, the ACL is going to be adjusted based on whether that index went up or down, if that helps.

DR. REICHERT: Amy.

DR. SCHUELLER: It does help, but it also assumes like management is responsive in that quick manner, and so that's another just sort of caveat on this, is like are -- Is management going to be that responsive, and, if it's not going to be that responsive, what are the implications, or sort of lost catches potentially, from that, or, you know, catching too much because of that, right? You could have one or the other, depending on which way you're going.

DR. CARRUTHERS: I think it's -- I think the point you make is very, very valid, because what you're basically saying is we need to be -- To see what the potential performance could be, and then we can ask ourselves difficult questions about whether it's possible or not later, and so maybe it doesn't make a difference, in which case you don't have to agonize about that, but, if you can show that there are, you know, advantages to responsive management, and that, with short lags, maybe that incentivizes, and not this round, but in the future a different management system.

The idea is to treat this, like I said, like a menu, and then start to see what those tradeoffs are, like, like, you know, what's really worth investing in, and so we can alter the lags in the MPs, and we can alter how much you change the lever in this case, in response to the to the index, and so I think it would be nice, for example, to think about this as a way of exploring, you know, a range of possible ideas, and some of them might not be possible yet.

DR. REICHERT: Thank you. Steve.

DR. TURNER: I have a slightly different set of questions. Is it time to bring them up?

DR. REICHERT: Sure, and I may come back to this ACL.

DR. TURNER: Go ahead with that discussion.

DR. REICHERT: Okay. Well, it is related, but maybe not entirely, and please let me know if this is a discussion or conversation that we will be having later, but it is my -- Ultimately, the SSC will need to provide fishing level recommendations for dolphinfish, based on this MSE, is my understanding. Typically, the SSC is charged with providing ABC recommendations.

It's my understanding that an ABC, or an OFL, will not roll out of this MSE. It gives -- It's my understanding that it gives options for ACLs, and so I am -- I'm struggling a little bit in terms of how this will ultimately translate into the SSC's task in providing an ABC, or fishing level recommendations, to the council, and, again, if this is a conversation that we are going to have, or that will follow, then I'm perfectly happy to hold on to that thought, but can you, or Tom, or someone else provide some feedback on how this is going to work?

DR. PETERSON: It's a really good question, and so, I mean, inherently, we're dealing with a system where we don't have the ability to follow this framework. There's no -- There's nothing in Magnuson that says, you know, by definition, you have to manage based on stock status, per se, and so, basically, the idea with the MSE is that this scientific and management uncertainty is inherently accounted for, because we're characterizing our probability of not overfishing as a key performance metric within the MSE, and so I see that that doesn't make sense, but, essentially, like ideally, what our overfishing limit could be in a situation like this, where we can't get MSY, is we would characterize a probability of overfishing of 50 percent and tune the management procedure to essentially achieve that.

That's sort of our variant of a brute force approach, because then we're targeting -- You know, managing with our OFL, essentially, and then any probability that we specify -- We don't want a probability of 50 percent chance of overfishing, and we're targeting a probability of 60 percent chance of not overfishing, and that's how we're sort of reducing our OFL, following this sort of conventional framework. I'm sorry, and I feel like I don't make sense.

DR. REICHERT: No, and I -- Anyone please tell me if I completely misunderstand, but go ahead, Amy.

DR. SCHUELLER: I mean, essentially, we're making our own proxy. I mean, it's -- You know, I know, we're used to using SPR and stuff as our proxy, but, in this case, we're going to make some other thing that's our proxy, and that's what we're going to use, but what is that proxy, and I don't know, but we have the ability to make that choice, I think, and this should help explore those choices.

DR. REICHERT: I get that, and that's why I said maybe this is a -- We will have this conversation at some other time, but I'm still -- I'm still trying to wrap my head around how we are ultimately going to do that. I understand the process, but, you know, initially, I thought, okay, we have an -- This potentially provides an ACL, and so you're going basically backwards, rather than, you know, relative to how we normally approach setting an ABC. Anyway, Matt, I believe you had your hand -- John Walter.

DR. WALTER: Marcel, this is John Walter.

DR. REICHERT: Yes, and can John Walter reply to this point, and then I have Chris, and Steve, and anyone else's hand up? Okay.

DR. WALTER: Marcel, I don't want to jump the gun, or the queue for SSC members, but, if you'll give me the opportunity, and good afternoon, everyone. This is a great question, and we haven't really done this approach before for providing management advice, and so this is a bit of new ground.

One way of doing it is exactly what Cassidy said, is that you tune the manager procedure to achieve a 50 percent probability of not overfishing to get an OFL, and scale that back to some buffer of say 40 percent to get an ABC, and then, ultimately, the council is going to make a decision about their risk tolerance, and that would be the ultimate tuning target, which might be something like maybe a only 35 percent probability of overfishing.

I think the key decision right now before the SSC is does the suite of operating models adequately capture the scientific uncertainty so that it provides an appropriate testing ground for developing the MP, and I think, as we proceed further, we'll be able to flesh out that OFL, ABC, ACL framework so that it's clear that the advice that this body is going to be giving to the council adequately represents the scientific uncertainty, and is in the spirit of an ABC, and I think that's something that we -- Really, we want to work together with the SSC in how to best frame what is a new approach for providing management advice.

Then, just to Amy's point about can the management deal with something on a one-year or two-year time scale, and that's another conversation that is actively going on between the Regional Office and the councils about streamlining the rulemaking and implementation process, so that, if science can give this advice on a rapid time scale, can the remainder of the process implement it in time, and there's a number of options to be able to do that, like closed framework actions, and so I wouldn't limit ourselves at this point to what the status quo is. I think that if we can, again, make, as Tom said, the case for the benefits of it, then the process can work through to implementing it. Thanks.

DR. REICHERT: Thanks, John. That is helpful, and I'm looking forward to the follow-up on that discussion relative to how the SSC is going to formulate its recommendations to the council, and so, again, thanks for that clarification. I've got Steve, and then Chris, or Chris, and then Steve. Chris, go ahead.

DR. DUMAS: Thanks. I was just going to say why can't we run it backwards and plug in a bunch of range, a grid of ABCs, and run it backwards and get all the other results out of the model, and then the SSC can consider those different ABCs, and what the results are that come from those different ABCs, and then select an ABC based on that, and so basically run a grid, a grid search of ABCs, through the model and see what we get out of it, and then we can compare the different results, including probabilities of various things happening based on the different ABCs.

DR. REICHERT: To that point, Cassidy? Go ahead.

DR. PETERSON: Yes, and, really quick, it's a great idea. I think, computationally, that's really challenging. The tuning process itself is pretty involved. It requires tuning across the entire set of thirty-two operating models, and this is a particularly slow and high-memory-intensive exercise, and so we could consider some sort of grid approach, and tuning to different targets for demonstration purposes. Absolutely, but I just wanted to flag that that is going to be a particularly challenging issue computationally.

DR. REICHERT: Thanks for that. Steve.

DR. TURNER: Okay. If we're finished with the modeling and ABC discussions, I'm going to go back to one of my more favorite topics, the basic data, and I'm thinking about these demonstrations look over the entire time period of the data that exists. During that time period, the foreign fleet has tripled in size, and now is the largest of all of them. How are you handling, in these demonstrations, the foreign fleet, and where's its selectivity coming from, right, and I think it's coming from the pelagic longline fleet, but I'm not sure of that, and would you give me some information on the foreign fleet itself? You know, what is this? Caribbean countries? Is this international longline fleets, and then, for the questions you're asking us, would we have the ability to handle the foreign fleet very differently from the domestic fleets in your calculations? Thank you.

DR. CARRUTHERS: Cassidy, I'll let you talk about things like composition of the foreign fleet, because you understand those data better than I do. Steve, thanks for your question. I'll get to the kind of assumptions. It's assumed to mirror the pelagic longline, as you said. Its current -- Although it reconstructs those historical changes that you've described in exploitation rate, total catches, in the absence of a fleet dynamics model for knowing what's going to happen in the future,

it's frozen in all those projections at the current exploitation level, and so they're just going to fish with the same intensity, effectively the same effort as they do right now.

To your last point, that is modifiable, because, again, we have control of fleet independent effort, and so, if you wanted to look at a continuation of that, you know, increase in exploitation rate, like increase in effort, or you wanted to look at declines or anything, any of those things, we actually can change the selectivity of it too, and so, if you want to look at different behaviors in the selectivity of that fleet, you can do that also, and so we do have control of it, but, the assumption right now, we haven't gone beyond basically what's happening today. We haven't pretended to sort of have a projection of what that fleet is going to do. Does that get to that, at least that first part of your question?

DR. TURNER: Yes, and that got to most parts of my question, but one of the basic questions is I assume this information came from FAO, or something like that, and do you know which countries were contributing to these major changes?

DR. CARRUTHERS: I'll defer to Cassidy, who potentially understands this better, or if Mandy is online, and, in fact, your newly-appointed SSC member, Matt, is probably also an expert in that.

DR. REICHERT: Cassidy.

DR. PETERSON: If Mandy is online, I welcome you to chime in, Mandy, because you know the data better than everybody. Yes, and international catches are based on FAO. They include all fishing in these spatial areas that are included in that database, and so it does include Caribbean fishing, and it does include anything in the Atlantic high seas that's characterized in these boxes.

Mandy has done some really good analyses of, you know, what countries are catching on her Quarto Book, and so these are the links that are sprinkled through here, where she analyzed those data, and so I would recommend looking at those, because it does outline it really, really nicely by country, I believe, and so there's these data, and then there's the Sea Around Us project, which takes the FAO data and sort of estimates any unreported landings beyond those, and that's what we're using to characterize unreported. Basically, we are making the assumption, with this MSE, that we will be managing just the U.S. component, just the U.S. fleets, and so we are not touching -- We are not managing, in any way, these fleets that are sort of outside of our jurisdiction for the purposes of this MSE.

DR. TURNER: Thank you.

DR. PETERSON: You're welcome.

DR. REICHERT: Thank you. I'm looking at the time. How many -- How much more do you have to present? Why don't you finish your presentation, and then we can go through our action items. If we feel that that may take longer than we have today, we can come back briefly to our action items tomorrow morning, but why don't you finish your presentation, Cassidy?

DR. PETERSON: Sounds great. Thank you, and so, really quickly, this is just a first analysis of scoping for Regulatory Amendment 3, which proposes potential regulatory measures, including extending the twenty-inch fork limit minimum size limit up all the way through Maine, modifying

the daily bag limit, and modifying the vessel limit, and considering captain and crew bag limits for dolphin.

Essentially, we're using this tool to specifically look at Number 1 and 3, and so looking at extending the geographic minimum size limit and looking at modifying the vessel limit. This is because we're considering sort of bag limits and captain and crew bag limits as sort of special cases, essentially, of the vessel limit, because we don't have sufficient detail on what the composition of anglers per trip is for each of the fleets, and we know that there probably is some bag limit sharing, and so we're looking at these management procedures. They're all static, and so they're not adaptive right now.

We're comparing status quo management with the expanded minimum size limit. We're looking at recreational vessel limits for all the recreational fleets between twelve, twenty-four, thirty-six, and forty-eight, and then we're looking at a couple of special cases where we're just applying a recreational limit to private rec or only to for-hire rec, and those are twelve fish and thirty-six fish, and this is sort of what that -- What the MP key looks like.

This is just a demonstration for Reference Case Operating Model 29, and, basically, when we're looking across spawning stock biomass and landings for the entire stock, there's very little impact on any of these management measures, but we can break it down by fleet, and this is across all of the reference operating models now, and so we're looking at all of those uncertainties in the reference grid.

Basically, again, we see very high overlap in the uncertainty bounds. We're seeing very little impact for the northern fleets and U.S. commercial, but we do see some impacts on the recreational south and the for-hire south, and, in this next slide, I'm just zooming way in on all of these lines, just to see what the differences look like.

Keep an eye on the axes, because, again, we're zooming way into these lines, and they change from fleet to fleet, but, essentially, we're seeing there's a slight impact in the north of an extended minimum size limit. The landings go down slightly, and, specifically, when we're looking at the impact on recreational vessel limits, this is where we see the biggest impact in the south, both in the private recreational fleet and the for-hire fleet. When we have -- You know, I'll try to be fast, but, basically, when we have recreational vessel limits that apply to the for-hire fleet, that benefits the private fleet slightly, and vice versa, and so we see these like two lines down here.

This is the recreational vessel limit of twelve fishes across all recreational fleets, and then we see the 12F, and so, when just the for-hire fleet has twelve fishes, that has the least impact. When the private has a twelve-fish fleet limit, or trip limit, then that actually has a positive impact, slightly, and probably not statistically significantly, but that's this purple line up here, and so you can see, if you put limits on the private recreational south fleet, that will be beneficial to the for-hire fleet in the south.

We can look at this a different way. Again, this is across all the reference operating models. Now we're looking at landings just in the year 2030, and, again, when we think about all of the uncertainty, we see that there's very little impact on landings specifically, but we do see these slight drops when the recreational vessel limit is twelve fish for the for-hire south fleet, and, again, keep an eye on these axes bounds, because they do vary for each fleet.

This is kind of the last action item, and before -- There's one more slide on the timeline that I'll just get to really quickly. Basically, we're in spring. We're looking to sort of get some sort of scientific sign-off on the operating model design here. We're going to come back to the council in June and give a presentation, again, on Regulatory Amendment 3 scoping.

We're going to try to present some candidate management procedures, take feedback for revision, and our CIE review is scheduled for July of this year. In September, we're hoping to sort of finalize, or choose, our preferred management procedure, recognizing that that's a pretty ambitious goal. We also will plan to present in December, and I'll pause here, but that's all for me. Thanks.

DR. REICHERT: Thank you, Cassidy. Anyone relative to the Regulatory Amendment 3 scoping? Anyone? Amy.

DR. SCHUELLER: I guess I got to this, and I went, well, I don't know what to say or think about what to advise on Regulatory Amendment 3, because I don't know what the goals and objectives of Regulatory Amendment 3 are, and are they all council decisions? Like I guess I was confused about what exactly we're supposed to comment on with respect to this. Are you looking for feedback on options, or like ways to present the outcomes or -- Some feedback on that would be helpful.

DR. PETERSON: From my perspective, basically, do you have sufficient faith in the tool and the analyses that we're doing to support using these results to support the council's decision on what to do for Regulatory Amendment 3? That's my understanding, and maybe, Judd, if you have that.

DR. CURTIS: Yes, and so, I mean, the council -- It's within their purview to select the management procedures on what they would like to see. I think a way for the SSC to think about it is, based on the examples that were provided, is the model behaving in a mechanism that it would be consistent with you all's expectations, and capturing levels of uncertainty based on the different management procedures that are selected, as opposed to focusing on what the actual selected management procedures are themselves.

DR. REICHERT: Kai.

DR. LORENZEN: I just -- Yes, and I was wondering, with that timeline, and so will this come back to the SSC at some stage, because you have the CIE review, and then you have council and council, and I was wondering -- Usually there should be, I guess, SSC after the CIE review or something, and I don't know what the procedure is going to be.

DR. REICHERT: I had the exact same question, because, especially after my previous question about, you know, ABC, and how that works in terms of how we formulate our fishing level recommendation, I had expected that that may come back to the SSC, and so I'm also curious how that schedule would work, and I'm not sure who can best answer that question.

DR. LORENZEN: Because, I mean, we are meant to make that recommendation, right, and so it will have to come back to us at some stage.

DR. REICHERT: Judd, or Cassidy, or anyone else?

DR. CURTIS: Yes, and I was having a similar thought, when we're looking at just having the SSC making that determination that's consistent with BSIA, right, and the order of operations for these various management products has previously, or has been, right, is we have the CIE review, and then you all would get the CIE review information, and then, from there, the SSC would determine -- Make a BSIA determination.

In addition, right, we've had some discussion on how the ABC/ACL/OFL framework may work moving forward, and so if we could -- If there is time for it to come back to look at some of those questions that are still on the table, the final framework of the operating models after the CIE review, and then how that OFL/ABC/ACL framework may unfold, when we have some more guidance on that, would be helpful, if we could put that in at an October meeting, and I see Carolyn is coming to the table to talk, maybe about the council's timeline.

DR. REICHERT: While Carolyn is coming to the table, I just wanted to make sure that what I understand -- Even if we say, okay, this framework is best scientific information available, that doesn't mean, or does that mean, that the SSC gives its blessing to whatever roles out there in terms of management, and so that's -- I want to make sure. Carolyn, go ahead. Welcome to the table.

DR. BELCHER: Thank you, and so, just for a little bit of clarification, the Dolphin Wahoo Committee is meeting in June to discuss more particulars of this, and so I would kind of hate for there to seem like there's a finalization from the SSC on this when we still have comments pending, and so --

DR. REICHERT: Thank you. I think that's consistent with what we just discussed. Kai, go ahead.

DR. LORENZEN: Yes, and, you know, to that same point, I mean, this is interesting work, and there's nothing that jumps out at me as being, you know, particularly problematic or anything, but, at the same time, I don't feel we have reviewed this to the extent where we can say this is BSIA, and I think partly because this is new and not -- You know, not something that, you know, is just a variation of a model that we've looked at before, and so I think, yes, we want to see the CIE review, and then probably spend a bit more time on digesting that, and, you know, coming to an assessment.

DR. REICHERT: No, and I completely agree with that, and so, going back to our action points, and so consider operating model as consistent with BSIA determination, and does the committee want to postpone that determination until they have seen the results of the CIE review, is basically what you are telling, and I agree with that. Does anyone disagree with that, and it -- Obviously, it doesn't diminish the amount of work that is done. We are not saying that it's not consistent with BSIA, but the ultimate decision, I think, it's a little premature for us to make that determination right now. Anyone disagree with that? Any hands online? Okay. Thank you. Thank you for that, Kai.

DR. CURTIS: Chair, I was just talking with Cassidy, and we can get this back on the SSC schedule for October, and she was amenable to being able to present then, and that would give us some time after the results of the CIE review comes in, and we can add that information all to the briefing book for October.

DR. REICHERT: I think, with the CIE review in July, that would give enough time for us to actually get the CIE reports. Good. Excellent. We provided feedback. We can -- We will review some of this on Thursday. My question for you, Cassidy and Tom, is there anything that you guys need to hear from us, or advice on, that you haven't heard yet that's critical for you guys to move forward at this point?

DR. PETERSON: No, I don't think so. Just if anything -- You know, if any concerns are raised, if there's any uncertainties we're not building into our reference grid, anything like that, please let us know, so we can make sure we account for all of those, all of those needs. Thanks.

DR. REICHERT: Thank you. Tom.

DR. CARRUTHERS: No, and I think that sounds very reasonable, and I just thank everybody for the feedback we've got already. It's always helpful. Thank you.

DR. REICHERT: Okay. Thank you so much. I just want to make sure, before we recess, that you guys still don't have questions that you need some feedback from the committee from. Judd, go ahead.

DR. CURTIS: Yes, and so I think we can finish up some of these bullets in the morning, but what I would like the committee to think about is, with the upcoming CIE review, what are some potential model components and uncertainties that you all identified during today's discussions that may need to be further explored, or would be good things for the CIE to really dig deep into, so that then you could review those again in October.

On the review panel, we do have SSC presence on the review panel, and so we'll recruit members for that review panel on Thursday, when we go through our various workgroups and SEDAR appointments, and so I do have one person. Jeff has already indicated he is interested in serving as a reviewer, and so we're looking for one more reviewer and a person to chair that review panel that would also include CIE reviewers, and so think about it, and we'll get to that on Thursday.

DR. REICHERT: Thank you. Anyone else to this agenda point? Cassidy and Tom, thanks for that overview. We really appreciate your presentations, and the tremendous amount of work that was done on this, as Chris mentioned earlier, and, with that, let's recess, and we'll be back here at 8:30 tomorrow morning.

(Whereupon, the meeting recessed on April 14, 2026.)

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APRIL 15, 2026

WEDNESDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Town and Country Inn and Suites in Charleston, South Carolina on April 15, 2026, and was called to order by Dr. Marcel Reichert.

DR. REICHERT: Good morning, and welcome back to the April meeting of the South Atlantic SSC meeting on this Tax Day. Before we get started, I mentioned yesterday, we'll have a really, really brief update on Agenda Item 7, and then we'll go into the trends report presentation by Tracey Smart. That's Agenda Item 11, but, before we do that, I want to welcome Fred. I failed to mention yesterday that Fred was unable to join us yesterday, but it's good to see you today, Fred, and then welcome Luiz. Luiz, was also unable to join us yesterday, but he's online, and so maybe we can do a quick voice check, Judd, to make sure that everything works, and the same with Matt, who will be online again today.

DR. BARBIERI: Good morning, everyone. Thank you, Marcel, for that introduction. Yes, and I'm here.

DR. REICHERT: Good. We can hear you loud and clear. Matt, can you do a quick voice check?

DR. DAMIANO: Sure thing, Marcel. Can you hear me?

DR. REICHERT: Yes. Loud and clear. Thank you so much.

DR. DAMIANO: Great.

DR. REICHERT: So I think it's going to be Judd or Chip who will introduce the updates from NMFS, or the non-update from NMFS.

NMFS FRAMEWORK FOR NARROWING SCOPE OF MANAGEMENT AND SCIENCE

DR. CURTIS: Thanks, Marcel, and so we had prepared some attachments as part of the briefing book on this NMFS framework for narrowing the scope of management and science, and you see, if you've read the overview, a little history of the development of these documents, this procedure, and we were informed, yesterday morning by the Southeast Fisheries Science Center, that they're -- This process has been strategically paused for now, as they continue thinking through the development of this, and so a presentation was still provided to the Social and Economic Panel yesterday, focusing on the economic and social aspects of this process and the risk-value matrix.

There was not any information, or there's a little bit of information in the slide shows on the environmental components that has to do with the climate vulnerability analysis and the PSA analyses, but we're not quite ready to talk about those right now, and that process is still being developed, and so, we're not going to address that today, and stay tuned as this unfolds, and we may be able to get back to this at a later date. I did want to pass the mic over to Jennifer Sweeney-Tookes, the Social and Economic Panel Chair, to just quickly give a quick overview of the discussions at the SEP.

DR. SWEENEY-TOOKES: Thanks, Judd. We spent a fair amount of time on the economic component, which, Jason, feel free to correct me. There was some shifts still being recommended

there. There is the social analysis component, the social values, and the SEP was very, very excited to see something like this in process, that this is a good idea.

This is potentially a tool that could be very useful to the SEP, and to the SSC, and to the council as a whole. We just really hope that sufficient time and resources will be allocated to the Science Center to be able to develop this fully, because it has a lot of potential, and so we had a great discussion with the Southeast Center yesterday about where this can go and how to make revisions and next steps, and so we just wanted that on the record, that we're very excited to see this starting to happen.

DR. REICHERT: Thank you, Jennifer.

DR. CURTIS: Yes, and so, as part of their discussions, all that will be captured in the final SEP report, and that will then, of course, be added as an appendix to the full SSC report too, and so, if you want to see what discussions they had in more detail, please read that, once it becomes available, and that's all we're going to talk about on that topic for today.

DR. REICHERT: Thanks, Judd. Before we move on, I would really like to express some disappointment that council staff, and then also the SSC, because Judd informed the SSC yesterday, I believe, via email, that we didn't know that this work was suspended.

This was in spite of the fact that it was known a little earlier than yesterday. It was discussed at the Gulf and Mid-Atlantic Council meetings, is my understanding, and I think it would have been nice if we as an SSC would have been informed a little earlier, so many of us wouldn't spend the time going through the briefing book and through the materials that were -- That ended up being irrelevant for our meeting. Our briefing book is fairly extensive, and so, as I said, I was a little disappointed that we were not informed earlier, but it is what it is, and so, Jennifer, thank you. Judd, thank you.

Let's move on to the next agenda item, which is the SERFS Update. Dr. Tracey Smart, from South Carolina DNR, will give that presentation. I assigned Fred Scharf, Matt. Sorry. I don't think we have assignments. Let's go to Agenda Item 11. Yes, and I didn't make assignments. This is just for our information, our annual update, and I know we always appreciate that presentation. It was Attachment 11a and b, and, with that, I'm handing it over to Tracey. Tracey, go ahead.

SERFS 2025 TRENDS REPORT

DR. SMART: I do want to acknowledge the scientific army that helped out with this presentation, putting it all together. The informational content that we're providing today has expanded over the last four or five years, and it has expanded even more today, and so we thought it was time to update the title of the presentation as well as the acknowledgement field. We've added some co-authors, and some folks that have been working on this, and I'll show you why in a few minutes, and so now this is our South Carolina DNR Updates for Regional Fishery-Independent Surveys.

We'll talk today about relative abundance trends, distributions, and demography. I especially want to highlight some of the new folks that are now involved, Julie, Margaret, Amy, Dimitrios, Elizabeth, Wally, our elusive co-chair who has been hiding from giving the presentation, because

he's been too busy SSC-ing, as well as our collaborators at the Science Center, Nate, Kevin, and Christina, and, with that, all right.

Previously, this has been an update from our chevron video trap survey, which historically had been the MARMAP survey, and currently is the SERFS Survey, the Southeast Reef Fish Survey, but, additionally, we're starting to provide data, and regular updates, on species that are under federal interest and control from our coastal trawl survey, and now we've added information, and will hopefully continue to do so, from the new South Atlantic Deepwater Longline Survey, thus the broader name. to try to be a little bit more all-encompassing.

These are all multi-state, i.e., regional surveys, fishery-independent and cooperative, generally multi-partner. We are involved in all three of them, which is sort of why they're combined under this sort of in-house presentation.

We'll touch very briefly on the survey design. I think most folks here have heard a fair amount about these surveys, but there's also a fair amount of documentation from either reports previously given to the SSC, several review workshops, SEDAR documentation publications, a recent review of SADLS, for example, and so, if anyone needs that extra information, please just reach out, and we can provide that.

I will talk about the methods to produce the data products, and then get into the details of our distribution, abundance, and length for the selected species, and I believe some ages from SADLS, new hot off the presses, or hot off the microscope, I guess.

A few caveats for today's data products, and so this is not intended to be updates of stock status. You know, typically, these are one of several, if not many, data inputs into an assessment to provide stock status, and so this is really to give you an idea of what the surveys are seeing out there on the water, but you all know that you have your APs to also provide their perspectives as well, and so all of this information coming together can be really, really useful.

Additionally, these may not be provided in a way, or have been reviewed in a framework that has them being done in a way that would probably be most likely to be adopted for an assessment, either SEDAR or otherwise, and so it's -- We tend to do these in a very general sort of methodology that we can apply sort of quick and automatically for a whole variety of species.

All right. To get into the Southeast Reef Fish Survey, or SERFS, again I mentioned that historically it had been run by MARMAP as just a chevron trap catch survey, from 1990 to 2009. Starting in 2010 through present, it's been a collaborative effort through the MARMAP and the SEAMAP programs at SC DNR, plus the Southeast Fishery-Independent Survey at the Science Center, or SEFIS, and it's now a Chevron video trap survey, as we've added the videos on top of the traps themselves, and we now have a collaboration of multi-boats leaving from different ports to really expand the coverage and the density of sampling in the region.

A little bit of details on that, and the survey is meant to target natural hardbottom habitats at depths from about fifteen to 110 meters, and we do this from spring until a little bit into fall, and so that mid-April to mid-October timeframe. It's a simple random selection design, where we select about -- Currently about 1,500 of our about 4,300 stations that have been established from various sources over the years, but we also do it with what we call commonsense execution, where, as

we're planning cruises, we're ensuring that we're covering areas that haven't been covered, we're going to the ends, we're going to the middle, we're going to the deep, we're going to the shallow, et cetera, and so we're functionally trying to think our way into the things that would be covered by stratification.

These are paired with bottom water temperature, and we use that in our indices of abundance usually, and then, starting in 2011, all traps were equipped with two video cameras that face in opposite directions, and these are baited traps, and you can see the menhaden in the photo below, if you look closely, and, in 2010, about half of the videos had -- Or half of the traps had video, and so some of the indices will actually go back a little bit farther than others for video, and we use those cameras for things like habitat characteristics as well as counts for fish.

All right. In 2025, we accomplished eighty-five days at sea, sampled just over 1,500 samples, and so 100 percent completion of our targets. Thirty-eight potential stations were investigated to add to the universe in the following years. We encountered about sixty species that were counted, weighed, and measured, and about twenty-six species were sampled for some type of extra samples, such as otoliths or spines for ageing, gonads for reproductive analysis, DNA, stomach content, et cetera.

A little bit about the methods for what we produce, and I'm going to use the Chevron video trap data source, since that's the first we'll talk about, as an example, and so our distributions will be based only on the catches from the surveys currently, but the videos, of course, for this survey are another source of distributions. They do tend to be pretty consistent.

It's typically produced in quintiles, or sort of five bins, and so it's really from a low in, cool colors, to high, in warm colors, and so it's very relative, and that's just to put everything on the same scale and not to worry too much about numbers. We do combine across the five most recent years. That's just to give you an overall sort of view of where the distributions are, identify sort of those central tendencies, and not to focus on any one year's distribution, and, also, for some of our more moderate to low abundance species, it would be really hard to see for something like groupers, and white is where we don't sample.

For indices of abundance, these are typically zero-inflated, mostly negative binomial or Poisson, is what we'll present today, and these usually will include some combination, or all of the above, of depth, day of year, latitude, and bottom temperature. Additionally, we could have things like salinity, and the video indices can have, or will have, bottom habitat types, such as the vertical relief of ledges, the coverage of hardbottom, the coverage of attached biota, like algae and invertebrates.

For the catch, this is typically the number of fish caught per some level of effort, like the soak time or the area swept. For video, sum count, and this is typically done starting after the track lands, about ten minutes, so things sort of start to act normally, forgetting that some alien thing has been dropped into their habitat, and we read one static frame every thirty seconds for twenty minutes.

All right, and so, for indices, you'll see the catch on the top, denoted by a lovely little trap, and the video on the bottom, denoted by a GoPro camera. Currently, right now, the catch goes all the way through 2025, because, since those are fish in-hand, that data is turned around pretty much as soon as it comes off of the boat, whereas, videos, the files come off of the boat, but then they have to be

read and processed by people on land, and so there's a bit of a delay. Typically, the video indices are ready late spring to summer, into fall, and I've seen a few preliminary ones.

What the graphs will look like, the red line is the index time series, so that's sort of our main focus for today. The gray shading is the 95 percent confidence interval, or the error around that estimate, and the black dots are the nominal value, and so those are the basic counts if we had done no sort of standardization with the index.

To put everything on the same scale, these are normalized to the long-term average, i.e., that dashed line at one, and so the number two on that Y-axis is twice the long-term average, but 0.5 is one-half of the long-term average, and so it's a little bit -- It's a skewed scale above and below.

Length compositions, we'll provide these in either inches or centimeters, depending on the survey. Again, this is fish in-hand, and so catch only. For SERFS, this is maximum or pinched total length in inches, in one-inch length bins, and the bubble size is just proportional to the total number in that bin over the number caught in that year, and so a bigger bubble means more fish were in that length bin in that year.

The red line, again, is that average over the time series, and we'll also add a green arrow if there's a commercial minimum size limit, so you can kind of know where the survey catch is relative to what the fishery is likely pulling out, or harvesting, and then a pink arrow at the size of 50 percent maturity for females, so you can kind of gauge what the survey is seeing relative to the population reproductive behavior.

All right. We're only going to talk about a subset of species for the reef fish survey, because I mentioned sixty species is an awful lot, and so we pulled out some that we figured were of interest for you all, and so we'll talk about eight of our ten most common species, two of which are sort of ecosystem species, tomtate and stenotomus, that we'll only provide catch indices for.

The other six, we'll do both catch and video, and then gag, almaco, jack, scamp, and red grouper are in our top twenty, but they are certainly of interest for management and fisheries, and then we'll also present two species that are not as catchable, or trap-interested, and so we have video-only indices for greater amberjack and mutton snapper, and soon you all may be seeing and reviewing an index for cobia, whether or not this tiger shark enjoys becoming cobia habitat. Currently, for SEDAR 95, a cobia video index is under review for use, and so cobia may be coming up as well.

All right. Tomtate one of our broadly-distributed species. It was also our most commonly-caught fish in the traps in 2025, and has been for many years. The index has been hovering right around the long-term mean for about the last seven or eight years. However, in 2025, the nominal abundance was quite low. The standardization brought it up a bit, but it still was much lower than the long-term mean for the catch. However, our size of tomtate collected by the trap is steady, as usual, and well above the size of maturity for females.

Black sea bass, typically it has been a widely-distributed shallow-water species for the survey. Our hotspots are tending towards being more concentrated from Georgia to North Carolina now instead, and a little reduced from Florida in recent years. Both the catch and video indices are very

consistent, since we've had both overlapping, with the most recent years being the historic lows, and 2025 was no different. It was a continuation of that decrease in the index value.

Minimum size limit was a little bit higher on average in 2025, or sorry. The average size in the trap catch was a little bit higher relative to 2024, and higher relative to the long-term mean in the time series, sitting right around the minimum size limit for the fishery. The trap catches are adults. We rarely ever get juveniles of black sea bass, and usually it's only when there are so many black sea bass that they actually just get sort of smooshed in there, and retained, and they generally fall out of the mesh, and so this is really an adult gear for black sea bass.

Vermilion snapper, again, a very widely-distributed species, generally broadly across the shelf. Hotspots are centered in the center of the survey region. It's relatively variable around the long-term mean in the most recent years. 2024 and 2025 were below the long-term mean for trap catch, with 2024 as well below the long-term mean for video index. Our average size has been higher in more recent years than the long-term mean, and it's hovering right around that commercial minimum size limit. Again, vermillion snapper mature very, very small, and so we do not see immature vermillion snapper. I'm not sure I've ever seen one in my life, other than in stomach content.

Stenotomus, we combine longspine, porgy, and scup, because they're very difficult to tell apart once they've been sort of smooshed together in traps, and that spine can break off very easily, but they are more shallow, and so we combine them for this analysis. They are a more shallow-water species, and generally broadly distributed from Georgia to North Carolina into northern Florida. However, their long-term mean, despite being one of our more common species, has been at sort of historical lows in the last ten or so years, and, our average size, we typically see mature adult Stenotomus in the survey, although we had a little bit of a dip in the average size in the most recent year.

Red snapper is our sort of southernmost-distributed species, with those hotspots off of Florida, although you can see secondary hotspots off of Georgia, South Carolina, and North Carolina in these most recent five years, with that dramatic increase from 2010 through about 2020 or so, with the sort of leveling off. There's been a bit of a dip in 2024 starting, and 2025 was also another decrease, with that nominal coming back down to the long-term mean. However, the standardization did bring that number back up, and we'll talk a little bit about the water temperatures, because that's probably one of the factors that brought that standardization back up.

We typically see a mix of mature and immature red snapper in the survey. You can see -- I love looking at this length distribution plot. Because red snapper was so uncommonly caught in the traps in the 1990s and the early 2000s, those length distributions were very, very variable. However, once there were strong recruitment classes, starting in about 2006 or so, you can actually see those fish grow through the length compositions over time, particularly if you track those sizes from 2006 up until about 2014 and 2015, which is fun to see. Once they become more common, and once year classes start sort of regularly recruiting into the survey, those signals disappear a bit more, but you can see a little bit of them.

Gray triggerfish is another broadly-distributed species across the whole range of the survey, and across most of the shelf. We've been hovering around the long-term mean, just a bit below it, with a little bit of a decrease in 2024 and 2025. We typically see mature gray triggerfish in the survey,

with an average above the commercial minimum size limit, and, again, these are probably species that are so common -- It's a species that's so common that it's hard to see sort of age classes in the length comps alone.

Red porgy is a more mid to deeper water species, and it does tend to be centered in South Carolina, more than widely distributed. The most recent ten years have actually been below the long-term mean, and 2025 was a continuation of that low period, and, again, we see a little bit of a mix of some immature red porgy, although the majority of them are mature adults, and our average has been hovering, for the last fifteen or so years, around the commercial minimum size limit. However, 2025 might have a little bit of a positive signal here, with a little bit of a bump in the representation of smaller than mature fish in 2025, and so we'll wait and see how that comes out in the ages, as well as next year's catch.

White grunt is our northernmost-centered species, mostly off of North Carolina, in that hotspot area, and the last five years have been a decreasing trend for trap catch. The video has been a little bit more variable, and that might be just sort of based on the lack of that long-term contrast for white grunt, but we'll sort of see what that 2025 video data point looks like.

Additionally, this is a species that we see a mix of both mature and immature individuals. This is another species where we saw a bit of an increase in the representation of immature fish in the most recent land compositions in 2025, which may be a positive sign for some young fish coming in.

Gag grouper is a shallow-water grouper, and so you can see those hotspots sort of towards the inner section of the survey, primarily off of southern South Carolina and North Carolina in the most recent five years, and we've been hovering right around the long-term mean for the catch, and then just below it for the video index, with a slight dip in 2025 for the catch. Additionally, we've seen an increase in the representation of small gag grouper in the survey in the most recent years, and the survey itself typically sees small grouper, and typically averaging grouper that are below the commercial minimum size limit, and well below the size of maturity.

Almaco jack are a more deepwater species, found more on the outer shelf, as well as the shelf edge, and the reason we're presenting these, and hadn't for many years, is because they increased in abundance enough that we could actually produce an index, and start tracking them a little bit better, and they do show up in videos quite well, and so we've been averaging over the long-term mean. Additionally, you can see that in the coverage of the link compositions as well. We've increased our encounter rate, and we typically see a mix of mostly immature, but some mature almaco jack, and both some below and above the commercial size limit.

Scamp grouper is still in the shallow-water grouper complex. However they do tend to be sort of central to outer shelf, as well as inner shelf for us, especially the most recent five years, and, again, this is a species that their most recent ten to fifteen years has been for the trap catch, because we have that long time series, and that contrast of what it looked like back in 1990, that they are right around their historical lowest point. For the video, they're just hovering right around their long-term mean for the video, because that portion of the survey has only occurred since the decrease, following the 2000s, and we typically see a mix of mature and immature scamp, and, additionally, this is a species that we've seen some higher representation of some smaller immature individuals recently.

Red grouper tends to be more southerly distributed in their hotspots in the most recent years. However, there are -- It's a sort of a disjunct population, or a distribution in the survey, where we see quite a few in Florida and Georgia, and then a break, and we start seeing them again in North Carolina, and, again, this is one very similar to scamp in the catches. They were quite high in the late 1990s and 2000s, sort of historically low more recently, and the videos are quite flat. However, in the lengths we see a lot higher -- Good representation of some small fish in recent years as well, immature fish.

Moving into our video-only species, amberjack, the last couple of years on video only, have been above the longer-term mean, and, again, there's no trap catch. They don't trap very well, and you maybe get one or two at a time, when you do get them, and mutton snapper have actually become quite a bit more common on the videos themselves, and more abundant in that time series in the most recent five to six years.

I did want to touch a little bit on bottom temperature, and I imagine your Snapper Grouper AP will probably comment on this a little bit next week too, and we have been taking a look at our bottom temperature, because, when we were out sampling in last spring and early summer, we noticed that it was quite cold on the bottom, and fish didn't seem to be terribly active, and so we took a look at our temperature time series.

I just zoomed in on 2005 through 2025 here, and this is where the historical survey, as well as the current SERFS survey, had good coverage of Florida. This is a standardized time series, taking into account location depth and day of year, similar to what Kevin Craig and his group did for the environmental vulnerability study that they released in 2021, just kind of updating it, and so 2025 was not an anomalously cold year by any means for the survey, compared to the time series after these last four somewhat anomalously warm years, but it was cold for these last four years, and so it doesn't look like it was anything crazy.

However, one thing that we did notice in 2025, relative to sort of that longer time series as well as the last couple of years, is so the distribution of water temperatures was a bit different, and so, you know, warm water in 2024, and, actually, basically, if you look at 2025 through 2024, it looks the same. Warm water was distributed across the shelf in these years, versus 2025, and Florida actually had cold water distributed almost all the way across the shelf in the survey, and that was particularly true in spring all the way up until about July.

Whether this was from an upwelling event or something else, eddies, you know, we're not set up to do that sort of oceanography, and so this broad distribution of colder water on the shelf was most likely one of the things that was contributing to some lower catches, and lower observations in 2025 for some of the species, which is why that standardization did bring up some of those estimates of abundance for some species.

It may not be the only thing, but we did certainly want to acknowledge this, and I'm sure some of the folks on the Snapper Grouper AP can probably provide some extra information about this next week as well, and certainly groups that are much better set up to study oceanography, because, again, this is purely just from our data, and paired with the traps as well, and so, you know, this is literally looking at this for the last three or four days.

All right, and I just want to touch on some things we're planning on doing this year, since our field season starts next week. I believe next week. Yes. A couple things we're doing. We've certainly gotten questions on why does SERFS stop where SERFS stops, and we don't cover the whole council range. Well so, if you live off of Florida, so the SERFS base footprint stops at about Port St. Lucie, and, you know, there's a lovely inlet there if you want to go and take a break, if you've cruised all the way down there from Charleston, and that hopefully is not why it stopped there, but I was not here when the survey was set up at that point, and so I won't testify on that.

However that's where it stops. After that though, it really changes. The currents are much closer to the shelf, or much closer to land, as well as much closer to -- The shelf ends very close to the land right there as well, and so there's not a whole lot of space to do a trap survey, and they become much stronger, including the fact that the Gulf Stream is very close, and very fast, right there.

The species composition changes there to things like hogfish, mutton snapper, black grouper, yellowtail snapper, and these are not terribly trap-happy species. They are great for video. This is also an area where you get a lot more hard corals, versus the soft coral sea whips that we typically see in the rest of the SERFS base footprint.

Additionally there's the Florida Keys National Marine Sanctuary down in that area, and so that's special permitting to work in that area, and so, you know, as part of this, in -- So this actually started back in 2024, the discussion of what would it take to expand SERFS down into this area, and can we do it, and how would we do it.

So, in 2026, we're working on a plan to investigate basically the use of camera pods as a way to expand SERFS into this area to get estimates that could be converted into sort of SERFS currency, to expand the survey into this area, pairing it with things like side scan sonar, in order to at least get species composition, counts, lengths, and habitat that then we can utilize, knowing that this is probably not a place that traps are going to work terribly well. Our hope is to do this later this summer, and hopefully you guys will see some updates on this, and how it works, and whether or not it's feasible, and how it will fit in with the rest.

Additionally, in 2024, we looked at expanding the survey up to the North Carolina-Virginia border. That is a bit less problematic, from a sort of physical oceanography standpoint. However, going up there and doing some of the mapping, the habitats change quite a bit. It wasn't our typical sort of hardbottom area. This is an area where trawl surveys start to take over, because it works for trawl surveys pretty well. However, there were some areas that did have that typical sort of SERFS hardbottom habitat, and so we're going to revisit some of those sites, and maybe do some -- Try to do some additional mapping and sampling up in that area this year as well.

Additionally, one of the things that is missing from the current SERFS footprint is artificial reefs. I mentioned that this is natural hardbottom only, and so South Carolina is currently funding a pilot project to look at trap sampling artificial reefs paired with natural reefs, and one of the things we've been doing is actually doing winter sampling using the ropeless gear. That's the video that's missing, and so we had a lovely video of the ropeless gear in action at one of the artificial reef sites, with the pop-up buoy and the acoustic release, but that's okay.

All right. Moving on to the trawl survey, this is our nearshore complement, and so it's a soft bottom and hard pavement survey out to about ten meters, a stratified random sampling designed to spread

out effort across the trawlable station pool. Currently, we're targeting about 102 stations per season, and, in 2021, we reduced from two nets, and we were using an outrigger, to one net, and, if you would like to see some of the background about how we justified doing that, that just got published last week, with lead author Elizabeth Bullard, and, in 2023, we went from three seasons, spring, summer, and fall, to just spring and fall, because of funding and just logistics, et cetera, and, in 2024, we changed vessel and gear to the R/V Lady Lillian, which is a stern trawler instead of outrigger trawling, and it's the new Webster high-rise trawl, which is a modified flat net.

Some of the things we have tried to make the same to keep that time series, such as same size mesh sizes, and so we've been ensuring our selectivity is the same, using that geometry to correct effort, and we're using that same zero-inflated approach to conduct our standardization for indices, and we're using day of year, and not season, to deal with the fact that we've had some modifications and timing changes.

In 2025, we had some problems with the transmission in the spring on the Lillian, and so we only got about half of the surveys done, but we did get the edges and representation throughout, and then, in fall, we had a more or less full year, with valid data collected from all but one station.

All right. King mackerel, this is mostly a juvenile king mackerel survey, but we do get a mix of age-zero-plus. They're pretty broadly distributed, with a few pockets of hotspots along the coast, and our long-term index of abundance has been just below the long-term mean. It is very variable, and that's not surprising for something that interacts with young-of-the-year in particular.

Then, again, I mentioned this is mostly young-of-the-year, but it is mixed, and so you can see some of these like high year classes, with these very large bubbles in the small size classes here, here, and here, versus the commercial size limit is well above what the survey typically interacts with, but occasionally you do get a really large mackerel in there.

We also collect Spanish mackerel. Again, it's a mix, very broadly distributed up through central North Carolina, and, again, it's been pretty variable, because there are a lot of young-of-the-year, and our index in 2025 was just a bit below the long-term mean, and, again, this is kind of mixed of ones that are all the way up into the commercial minimum size limit and all the way down to well below the size at maturity, with some of these strong year classes you can see coming in here.

Two other species, white penaeid shrimp, or little penaeid setiferus, are broadly distributed. We have seen high catches in the last couple of years, and our lengths in centimeters, if you're interested. I'm told there is no minimum size limit, and it's just everything for commercial, and our brown penaeid shrimp, which has been just above for the index value. They're a little bit less widely distributed in the region compared to white shrimp. White shrimp are definitely the primary catch in our size distributions.

All right. The South Atlantic Deepwater Longline Survey, and I'm coming to the homestretch. We're going to start tag-teaming this. All right. SADLS is a cooperative longline survey. The deep water is very far offshore in this region, in some places sixty to eight miles, or maybe more, depending on what fishery you're looking at, and so cooperative was the way to go.

The objective for creating the survey was to support stock assessments with the management of deepwater species in a way that could be done hopefully more consistently than what we had been

able to do historically with fishery-independent work, and create those data products that we've talked about so far today, and so this has been running since 2020.

The Science Center, National Marine Fisheries Service, South Carolina Department of Natural Resources, and industry participants, and, currently, we've had four cooperating fishers each year, and they've enacted standardized methods in gear since 2021, or 2022, which is a three-mile mainline with 150 hooks per mile. The first couple of years, there was some experimental work, and the focal species, and the species they found that were sort of the survey has really interacted well with, is blueline tilefish, golden tilefish, and snowy grouper.

The design is four spatial zones across the entire coverage of the council's boundary and into the Mid-Atlantic, to Delaware, and so there's a North Carolina to Delaware zone, Georgia to North Carolina, central and north Florida, and south Florida and the Florida Keys. There's also stratification within this, thirty-four total blocks, based on one-degree latitude-longitude and depth. There's a shallow segment and a deepwater segment, and they allocate six stations, or sampling locations, per stratum, and the target is 204 per year.

In 2025, they got kind of a late start, and didn't start until August of 2025. The gear has to be out of the water for North Atlantic right whales by mid-October, but they were able to accomplish fifty sea days, able to accomplish 194 of 204 stations, and, across the Mid-Atlantic and the South Atlantic, over 3,000 fish caught, eighty-seven species, and almost 900 fish worked up, and twenty species for life history.

DR. REICHERT: So, Tracey, the allocation is completely random?

DR. BUBLEY: Yes.

DR. REICHERT: Okay.

DR. SMART: Yes. Sorry, and I had to look at Wally. I am less involved in that detail with the survey.

DR. REICHERT: Okay. Thank you.

DR. SMART: For blueline tilefish, 204 were caught so far, and 176 of those are worked up for life history. The fish workup is either random selection or all, if possible. There are observers onboard the vessels, and they work up as much as they can, but it depends on sort of how many fish are brought up at a given time, and so it's not always complete coverage, but they do -- For blueline tilefish, it was a really good length range that was covered, and you can see the distribution in 2025, with most of the blueline tilefish either coming from North Carolina to Maryland or the Florida Keys.

The dots are -- Sorry, and it's a really broad coverage, and so there's only so much you can do with the maps, and then sort of the overall 2023 in 2024, to give you a bit of some other context, and so that spatial pattern has been consistent over time.

Golden tilefish, about 757 fish caught, with just shy of 550 worked up for life history, with a really broad range represented, from just below thirty centimeters to 150 centimeters represented, with

most coming off of the Delmarva Peninsula down into southern South Carolina and into Florida, and, again, consistent spatial pattern, and, again, another hotspot just at the very end, off of the Keys.

Finally, snowy grouper, thirty-eight fish caught, and so it's not -- It hasn't been quite as abundant for snowy grouper, but a good size range, from thirty to 110 centimeters, and thirty-eight -- All of the snowy grouper have been worked up for life history. They were a little bit more spotty in their distribution for the survey, and that's, you know, likely because of the number of fish caught, but those sort of catches off of Cape Hatteras, in the -- I want to say in the sort of Devil's Hole area, and then again off of Cape Canaveral, and then into the Keys, have been pretty consistent over time.

For SADLS life history, the council provided funding to help with ages, since, really, the SADLS funding was really just to get the survey going, and then the Mid-Atlantic was able to help out with funding ageing and processing for blueline tilefish from their region, and so SC DNR has tackled ageing of 3,500 fish from the survey, and provided those ages and analyses in support of SEDAR 89, 90, and 92, and so five years old, and it's already getting used, which is pretty good.

Just to give you some ideas, we have some age compositions for blueline tilefish. They're primarily younger fish, less than ten years old, over the years that have been caught by the survey, although, in the most recent years, that age structure has spread out. Golden tilefish, again, primarily less than ten years, with some expansions and contractions over the years, and snowy grouper, again, most have been below age-ten, but there are some older fish, up to forty-four, and, with that, I'll take questions.

DR. REICHERT: Thank you very much, Tracey. I think I can speak for the SSC that we always enjoy this annual update. It's giving a really nice overview of what's happening with fishery-independent surveys, your data, and I think it's really cool to see how things have expanded over the years, especially with SADLS and the potential expansion, and so I really appreciate all the efforts, and so, with that, I'm opening the floor for some clarifying questions. There are no specific action items, and then we'll do some public comment. Any questions? I see Alexei, Genny, and Jim. Alexei, go ahead.

DR. SHAROV: Thank you. I always enjoy your presentation. Every time I feel like an ecological detective looking at this, or fantasizing, you know, like what I see what happens with those species. I think I might have asked that question earlier, but the length of my memory is short, and did you, or any of your colleagues, do the comparison of the GLM-based estimates of densities versus the design-based, just based -- You know, you are assuming that it's a random, pretty much random, simple random, although it looks like, in the way you allocate your stations sometimes, you are intuitively using the stratified, and so did you compare them, and then like, based on your experience, or any discussions -- It's not a perfectly randomized design, obviously, but how much potential bias is there, or none, and what were your thoughts on that? That's one, and then I'll ask the second question.

DR. SMART: Alexei, that's a great question, and so there's kind of two elements to that, and so one of the things we didn't talk about today is, yes, we do set these traps in sets, and they are deployed independently of one another, and they're at least 200 -- The reality is more like 250 or 300 meters apart from one another, especially on the bigger boats, like NOAA Pisces, that is not

maneuverable, to ensure that they're not pulling fish away from each other, but it doesn't make sense to throw one trap, wait a ninety minutes, and then go pick it up and then throw another trap, and so they are definitely -- You know, sometimes that means that we're not choosing one independent station that was randomly selected, but rather clusters of stations selected.

Then whether or not we need to do some sort of spatial stratification, or even temporal stratification, to spread out either seasonal et cetera, yes, and we have been looking at that, and I'm actually looking at Erik Williams, because we've been working with his group, and with SEFIS, the last couple -- Actually for about a year-and-a-half now, or two years, to look at that question, and it sort of started with what does it look like if we selected stations under a spatially-stratified selection, and what would that spatial stratification be based on if we did it based on either just latitude depth, which makes sense, and/or community composition, and it would look like this.

Most of those, just what would our selection look like, it looks pretty close to what we were already selecting, and it looked pretty close to what we were also executing, and then, additionally, Erik has been looking at what -- Sort of these what-if scenarios of what the data would look like, what the indices would look like, if we enacted versus what we were doing, and there are some improvements.

They're a bit small. They're pretty marginal, and there are tradeoffs. If you optimize for one or two species, then you're trading off for something else, and, if you're optimizing for trap catch, you're sacrificing video, and the opposite, and I think that, just because of the multispecies nature, and because of the video being such a good complement to things that don't enter into the traps, it's sort of -- Whatever you choose to do ends up sacrificing something else, and so that's kind of where we're at right now.

DR. SHAROV: Thank you, and the second -- Maybe not as much of a question, but more a proposal, or a suggestion, and it is intriguing, and interesting, in looking at sort of the spatial distribution, and especially when you compare adjacent years. I wonder if it would be useful to say calculate the center of the gravity for the biomass, but at least for a number of species that have like extensive distribution, because we're -- You know, obviously, in the end, we're trying to figure out the dynamics, you know what's happening, and if there is possibly species contraction or expansion, movements towards the north, like in the case of black sea bass, or whatever it is.

I mean, we can speculate later, but just seeing, you know, whether that's the center of the biomass, or, you know, abundance distribution generally is not changing, or moving around, et cetera, in terms of -- Yes, and the long time series might be useful maybe. Thank you.

DR. SMART: Yes, and that's something that we can certainly look at.

DR. REICHERT: Genny.

DR. NESSLAGE: Thank you, and I too just want to echo the great work you guys are doing, and you're critical to this region, and so thank you very much. I just had a quick question about the white penaeid shrimp model, and it was slide 53, and it looks like three of the last four points are even outside the bounds of the confidence intervals there, and I was just wondering if you have any idea, or had looked into what might be, you know, causing the model to do that. It's just kind of interesting, and it caught my eye. It's probably not critical, but --

DR. SMART: Yes, and I can take some guesses, and so, in 2021, we had a late start to work that year, because of COVID restrictions. In 2022, I know we had issues with the old vessel, with mechanical breakdowns in different areas, and I think -- So one of the areas that white shrimp are pretty abundant in is that Raleigh Bay area, and brown shrimp are not terribly abundant in that area, depending on the time of year, but white shrimp can be, and we missed that area when white shrimp can be abundant.

I think some of those things -- When we had mechanical issues -- Some of these species are so seasonal, and picky for the trawl survey, and it's those small intricacies of when we have late starts, especially on the spring and fall trips, that, when we miss certain areas, plus the timing, and I think -- These last four years have been challenging for those things, because of the boat that retired, having increasing mechanical issues, and I'm not saying that hurricanes probably didn't probably also contribute to whether or not we had to stop early, or start -- You know, stop early, or take longer breaks, because of hurricanes too, but that is also -- We've been consistently having problems with interruptions from hurricanes the last probably seven to eight years. I know, in the last -- In that 2021 to 2024 period in particular, those sorts of things have been problematic, in terms of mechanical issues or COVID restrictions.

DR. REICHERT: Thank you, Tracey. Jim.

DR. GARTLAND: So, in looking at the trap data, it looks like -- I was kind of keeping track as you were going through, and a lot of the species in the recent years have kind of a down trend in them. I'm not going to ask you why, because, when people when people ask me why about our stuff, I usually don't have an answer, and so I'm not going to do that, but I was wondering if it might be worth looking at maybe data from north, or even around Hatteras, from like the Northeast Center's bottom trawl survey, to see just encounter rates, you know, and not for an abundance index, but like, hey, did they see more of this in 2025 than they normally do, you know, that kind of stuff.

I think there's a hab cam project that's run out of the Northeast, and it's meant to look for scallops, but it goes over areas that are less trawlable, and so that was the first thought, and then my second thought was, when you're talking about areas north of Hatteras that would be hardbottom, we don't have a lot of that, but we're getting a lot more, at least off the coast of Virginia right now, with the wind energy areas, and I wonder if that might be like a candidate -- Almost like a sentinel area, you know, and set a trap in there once in a while.

We have a longline survey that goes out there monthly from May to October, and, you know, it could be as simple as go out and do the longline in that area and dump a trap and just see what it does, and nothing super scientific, but just kind of get an eye of like is there even anything here worth looking at.

DR. SMART: Yes, and that's a great idea. We had considered looking at the encounter rate even just between the traps and the cameras as well. Part of the northern expansion in 2024 was to also trap within the Kitty Hawk wind lease area, which that has been put on hold, but, again, a good sentinel sort of area, even if it's not the perfect habitat, and so it's a great idea.

DR. REICHERT: Go ahead, Jim.

DR. GARTLAND: Then I just had more of a curiosity question on the SADLS, and do you all ever run into any problems when you're hauling back with sharks taking your catch?

DR. BUBLEY: Yes, occasionally, definitely. I mean, you can talk to the fishers that are out there, and, I mean, that's something that they're going to encounter at some point. I would have to look into -- I know that they're recording instances of depredation that's happening as it's going, and I just -- I haven't looked into those data yet.

DR. REICHERT: Go ahead.

DR. GARTLAND: That's exactly where I was going, and so I know there's -- You know, depredation has become a big issue, and I've been wrestling with it in my head, like, you know, would we quantify something like that, but, if you already have a survey design set up, and if you're recording encounter rates, it may not be a perfect index, but it might be a decent time series of like, yes, it's twice as prevalent as it used to be, or half as prevalent, or something like that, and it could give us some numbers, where, otherwise, I think those numbers are really hard to come by.

DR. BUBLEY: That's one thing that we've been really excited about with the survey, is that, obviously, it was targeting certain species, and so we've got the tilefish and grouper species, are kind of why it was initially put into place, but we're realizing the amount of data that we're getting on a whole swath of species, and interactions, things like that, that might be useful in the future for things.

I mean, I know, looking at the abundance of species that we catch, stuff that we don't regularly show here, but, I mean, there's plenty of elasmobranch species that they interact with that may end up becoming HMS assessments, and they would be able to utilize some of those data, even though it wasn't necessarily what we were looking to get, but we're getting it anyways, and so, yes, things like depredation and things like that as well can be utilized.

DR. REICHERT: Thank you for that explanation, Wally. Anyone else? I have a -- Sorry. Go ahead, Amy.

DR. SCHUELLER: Just for clarification, the female maturity, was that 50 percent maturity, and so I'm asking that with respect to the minimum size limit, and those were all commercial minimum size limits, correct?

DR. SMART: Yes, and female -- So it's 50 percent female maturity, and that was either calculated from our calculations in-house or from whatever was adopted from SEDAR, if one was adopted for SEDAR, and then the commercial minimum size limit for this region.

DR. SCHUELLER: So just an observation, and it has nothing to do with the survey, but just as a comment that the SSC might consider, and so almaco jack and gag both had minimum size limits smaller than the 50 percent female maturity, and like, you know, a central tenet of fish size would suggest that that's not a very good idea, and so I wondered if, you know, the SSC might want to point that out and just say like, hey, council, maybe you guys should think about this and address that in some way.

DR. REICHERT: Anyone disagree? We can add that comment to our report. Amy, remind us if that doesn't appear. No one disagrees? Then I have a couple of quick, really quick, questions. I had a similar question to Jim, that, you know, it was kind of disturbing to see that downward trend in a lot of species, and I was wondering whether, you know, environmental issues, or maybe something in the -- How the survey ended up being done, weather or otherwise, and so thanks for looking at that temperature. That was very helpful. Relative to that, I remember we talked about longer periods of high winds that affects like length of trips, and have we seen a continuation of that this year, that you know of?

DR. SMART: Last year was actually not problematic. We didn't have any large hurricanes that disrupted things for extended periods of time last year that I can recall.

DR. REICHERT: Okay.

DR. BUBLEY: I will jump in though. I mean, I don't think we had some of the longer -- So our trips, as you know, go up to ten days, and we didn't have anything that approached ten days last year, and I think six to seven was our maximum, and so those weather windows definitely caused some problems, where we were trying to jump out for a few days at a time.

DR. REICHERT: Yes, and I remember that we talked about that before, that the sampling windows have kind of gotten smaller, and so I was just wondering about that. You mentioned black sea bass, the average size was kind of a little higher, and you mentioned smaller black sea bass, and did you see any in the traps, or they were largely absent, because sometimes I remember you would still -- Although they're smaller than the mesh, you would lose them, but you would regularly see them in the traps, and have you guys seen that this year, or the last couple of years, or are they simply missing from your catches altogether?

DR. SMART: We have not. The one -- So I remember thinking about those 150 millimeter total length black sea bass, when I first started, because I started in 2012, and I remember thinking what did I get myself into with sampling Gray's Reef on my very first trip at the end of -- In October of 2011, and what a great time of just being inundated with black sea bass spitting menhaden on you.

So not really, no. Not the small ones. In our winter sampling this year, we were hoping that that would also kind of give us an idea on whether or not there any sort of new small ones out there to be seen, and so that sampling was anywhere from sixty feet out to, you know, 120 feet, or, well, about a hundred feet, all sort of in diving range, and very few small ones, sort of even just out sort of swimming, and that -- We haven't measured them yet on the video yet, but we definitely didn't see any come up in the traps.

DR. REICHERT: Thank you, and relative, with red porgy, with red porgy being a protogynous hermaphrodite, did you guys have looked at any potential changes in life history parameters with lengths or age over time? I know you were working on that, but --

DR. SMART: Red porgy is currently off the rotation.

DR. REICHERT: Okay.

DR. SMART: Is that correct, Wally? Yes, and we're on monochrome species, and so red porgy, red snapper, and vermillion snapper are off of the rotation for taking histology for maturity estimates through this year.

DR. REICHERT: That's a two or three-year --

DR. SMART: A three-year rotation, and so we would have data through 2022, with a break in 2020, and so, yes, and I think Margaret Finch has done some of that work, and it -- We just don't hit during their peak spawning season, and so it's a little bit hard to tease out sometimes, when we have lower sample sizes, and they're not terribly common.

DR. REICHERT: Because it's a winter sample.

DR. SMART: Yes, and it's winter spawning.

DR. REICHERT: Okay. I forgot about that.

DR. SMART: Which hopefully, now that we have permission to do trap activities, and the on-demand gear has been working well this winter, and if we can expand that, and maybe that's a new option for looking at winter spawning animals.

DR. REICHERT: Thank you, Tracey, and the last question I had is we had a greater amberjack project review recently, and there was extensive discussion about species ID on the videos, and so I was just wondering, because you mentioned almaco and greater amberjack, and I know you guys don't do the video analysis, but is there -- Do you feel there's any issues in identification, or you're pretty certain about the identifying them from the videos, and, again, I'm contrasting that with the discussions we had during the greater amberjack review.

DR. SMART: I haven't heard anything from the video readers. I think Julie Vecchio is online, and she works with our video team a lot more closely, and I don't know if either Nate or Aaron are online, from SEFIS, but almaco are so much more deep bodied on the video than greater that -- I feel like, when you have one almaco, it's all almaco, and, when we have one greater, it's all greater, but -- Jeff might actually know what they look like from other things, too.

DR. BUCKEL: Yes, and I agree with that, and there is a paper that just looked at the seriola, the four seriola species, that Nate I think was a lead author on, and so you could take a look at that. You know, they definitely -- It's the smaller ones I think that are the issue, and they do a seriola spot, right, but, when they can identify them, they have been able to identify those four from the video, but, yes, there's a nice paper that may talk more about the ID from the video.

DR. REICHERT: Thank you. Julie, I think you had your hand up?

DR. VECCHIO: Yes, and I was just going to agree with Jeff there, and so, for the most part, anything under about 300 millimeters is generally going to be a seriola, but anything above that is -- You can usually get it to species.

DR. REICHERT: Thank you, and that is consistent with --

DR. VECCHIO: They do swim around in mixed schools of that small size, and like you can definitely find the smaller ones in mixed groups.

DR. REICHERT: Okay. Thank you for that clarification, and, yes, I remember that the discussion was in particular relative to the smaller sizes, and so thank you for that, but that is all the questions I have. Thank you. Anyone else? Go ahead, Jason.

MR. WALSH: I think we've talked about this before, and so I apologize in advance, but I just had a question about the commonsense, or the best judgment part, and is that -- Where does that come into play? Is that like the before the season in site selection, or is that just kind of like a caveat that allows you to, you know, account for environmental situations or mechanical issues?

DR. SMART: So it really is a week-to-week sort of decision making on where an individual trip on a vessel is going to go, and so, you know, for example, if -- So, next week, if I'm a chief scientist onboard the Palmetto, and the weather forecast tells me that I can go wherever I want to, I am most likely going to go north, because that is our more challenging area to get to, and the weather tends to be more limiting to get that direction, and so, if it's open, I'm going to go that way.

I'm also probably going to go to deep water, because the exact same thing, whereas we have more likely open -- You know, conducive weather to sampling shallow and south. If we have two boats that are scheduled to go out, like the Savannah and the Palmetto, and we have wind, you know, weather that can let us go wherever we want to, the Savannah chief and I will talk, and they'll say, hey, how about we go south, and you go north, and so that way we're doing both things simultaneously.

We'll make those decisions, rather than like let's go to the exact same place, and keep running into each other, and keep having to coordinate and call each other constantly, or email each other constantly, and so it's really those sorts of decisions on a week-to-week basis, is kind of what I'm talking about, or, when we get to August, and we've had a bunch of trips that have gone out, and there's a bunch of areas that have been like covered, covered, covered, covered, covered, and there's pockets, and it's this is a high priority, because this is long bay, mid-shelf, and we don't have any sampling there yet, and we've got to go there, and we know we have to go there, because this hasn't been done yet, whereas there's a little bit here off of Florida mid-shelf, off of Jacksonville, but we have some other representation there, and not a priority, and so it's really those sort of more weekly decision making things.

DR. REICHERT: Thank you. Jeff, go ahead.

DR. BUCKEL: Thanks, Tracey. Great presentation, as always, and I always appreciate the additional surveys you're talking about now, and the more details on the graphs, and so thank you very much. A couple things, following on Jim's comment about the Northeast bottom trawl survey, and maybe looking at how the species are moving north relative to the trap survey, if we could -- If folks agree, we could add with the trap and the coastal, the coastal bottom trawl survey, because, like the white shrimp question that Genny -- We know the white shrimp catches have increased in the Northeast, or off of Virginia, Delmarva, and Spanish mackerel. Age-zero Spanish mackerel, I think you guys are seeing more in NEAMAP, the age-zeroes, and so there may be some combinations of those surveys here in the future.

Let's see. Then, similar to Genny's question on the white shrimp, the standardized index versus the nominal, for Spanish mackerel and king mackerel age-zeroes, there was a -- In 2024, and I'm just looking, and like have we had five years of bad recruitment, or four out of five, right, and the standardized suggests that 2024 were above average, but it's different than the nominal, and I just -- If you had some -- If you knew what was the mechanism there leading to that increase in the standardized index.

DR. SMART: So, for the -- So typically for the assessments, and this is where that sort of caveat comes in, that, if we were doing this for an assessment, we would actually typically break this out into an age-zero index and an age-one index and look at them separately. If we don't have ages for all of them, we would either apply it proportionally based on the age composition, or length as a proxy, if we're missing ages for a given, you know, collection or something like that, in order to get at that, you know, sort of question about where is the variability coming from, and is that variability because we're talking about a whole bunch of size classes and age classes that got mixed in that have nothing to do with recruitment, or are recruitment from years and years and years ago, for example these fish, and, you know, these are well beyond that age-zero class.

Eliminating those out of there, that might be contributing some of that noise, is one of the things that we will do for an assessment, versus, for this sort of general update, we just don't have time to apply those things, usually, and we're just kind of doing these broad strokes things.

We can, if you would like us to do -- If it would be better to adopt that for these sort of updates, we can certainly look into that, and just focus on doing like an age-zero update for a given year, using length as a proxy, knowing that length is usually available when the data comes off of the boat, and so I can't answer that right now, because I don't have the age comps in front of me, and we haven't done that yet, but the assessment is coming up, and so that would be one thing that we would be doing in preparation for the assessment, is separating them to get the more detail on what is current recruitment dynamics, versus past recruitment dynamics, to try to get rid of some of that uncertainty.

DR. BUCKEL: Great. Thank you. I don't think there's a need for this in your annual presentation, because we'll see it when there's an assessment, and so thank you.

DR. REICHERT: Thank you, Jeff. Jim, I saw your hand up, and then we'll go to public comment.

DR. GARTLAND: This is just a point about the things moving north, you know, and this is just anecdotal, but it was fun fishing last year. The Chesapeake Bay was full of gag grouper, and, I mean, we've seen them here and there in the past, but it was consistent fishing last year, and little ones, but, like I said, you're fishing spot and croaker with your kid, and you're catching little ones, and it was fun, you know, but, like I said, it's not something we see every year, for sure.

DR. REICHERT: Thanks for that additional information, Jim. Seeing no more hands, public comment, and, Judd, is there anyone online, or anyone in the room, who would like to make a public comment? Seeing none, and no public comments were provided, again, Tracey, thank for this annual update, and we'll hope to see that again next year around this time, and so, with that, we'll take a ten-minute break, and we'll come back at 10:05. Thank you.

(Whereupon, a recess was taken.)

DR. REICHERT: All right. Welcome back. We will start with the Agenda Item 8, Wreckfish Stock Assessment Model. The attachments were 8a, b, and c, and note that some of these were in late materials. The assignments are Fred Scharf, Matt, Chris, Jared, Kai, Kelsey, and Fred Serchuk, and I believe that Judd or Chip will provide a little bit of an introduction. It's my understanding that this kind of morphed from an MSE into a more traditional stock assessment, but I will had it over to Chip.

WRECKFISH STOCK ASSESSMENT PRELIMINARY MODEL REVIEW

DR. COLLIER: No, and this is definitely still more along the lines of an MSE than a stock assessment.

DR. REICHERT: Sorry about that.

DR. COLLIER: This going to be presenting the operating model that will be going into the MSE part.

DR. REICHERT: Sorry. My bad.

DR. COLLIER: I just wanted to highlight this is one of our resilient fisheries projects that we've been working on, and so this team is has been working with a project oversight team, trying to put together the background stock assessment, trying to match the stock assessment that was approved by the SSC previously, and I think it was a 2012 stock assessment, or maybe that was a terminal year, and I might be getting the numbers confused.

What we're trying to do here is match that stock assessment, and then trying to make sure that we're developing a sustainable fishery and management plan off of that, and so we're going to have Josh give you a brief overview of what the team has been working on. Josh has been highly engaged with the shareholders of the wreckfish community, and so wreckfish was one of the first finfish ITQs in the U.S., and so this has still been going on, and he's been working with those stakeholders, in order to develop this project, and so, Josh, if you would like to take over from here.

DR. REICHERT: Thank you, Chip.

DR. NOWLIS: Thank you. Okay, and so I apologize for this, but I did add a couple of slides, and is it an option to have me share the expanded deck? I did share that with Judd, so that the committee can see all of that.

DR. CURTIS: Josh, you're currently logged in on the web browser, which means you need to log off and log back on, and are those slides critical, or can we proceed with this intro slide here?

DR. NOWLIS: In the interest of time, I'll move ahead, and so, Judd, that is in your email, and so the SSC members will be able to see this afterwards, and I'm going to go through that material, and just without some slides, which should be fine.

Great. Well, it's a pleasure to be here and have a chance to be able to share an update on this project. This is a passion project of mine. I am a jack-of-all-trades of sorts. I used to do stock assessments actually out of Miami, and so I got to work in this region back in the day, but it's been almost twenty years since that timeframe, during which time I went and got a background in economics and social science, and have been applying that combination of insights to fisheries all over the world ever since that.

I was really excited to have the opportunity to work with the South Atlantic Council to apply some of the lessons that we have learned primarily overseas to a U.S. fishery, and it's been really fun to do this work, and so a key aspect of this, this process that I refer to as adaptive implementable management, is taking the complex technical work that we as scientists do and putting it in the hands of stakeholders so that they can have meaningful discussions with us about the scientific details, but, even more importantly, meaningful negotiations with each other about what sorts of policies make sense to them, but that also makes sense, given what science we have.

In order to do this, and let's go ahead with the next slide, it's crucial that we are in a harvest strategy mindset, and most of you probably are familiar with that concept, but I'm going to just go through this extremely briefly. It's vital to the work that we're doing.

A harvest strategy, I use a very strict definition of this, for functional purposes, and so, in my definition of this, a harvest strategy includes collecting data that's primarily focused on the health of fish stocks, doing regular assessments of that data to come up with a determination of not only how healthy is the fish stock, but how that's changing over time, applying a harvest control rule, which is -- In the case of the wreckfish fishery, it would be a rule that would define what the total allowable catch would be. As a function of the outputs of that assessment model, specifically estimates of the health of the fish stock, and then the harvest control rule would determine what sorts of adjustments we would make to management, and so, again, in this case, it would be adjusting the total allowable catch.

Now, why a harvest strategy is so important, and it ties into this question about management strategy evaluation, is that, by specifying this rule, we as analysts can actually look at the long-term performance of the management system that is being considered.

Without that harvest control rule, it can be very difficult to predict what sorts of decisions will be made next year, and, without knowing what's going to happen next year and the year after, it's very difficult to put a quota this year into some sort of context, and so we have a long history of having a mindset that we just make some assumptions that maybe we'll use the same policy for a long period of time, or that, as long as we stay in a healthy stock situation right now, that the rest of it will work itself out in the future.

What's different about harvest strategy is that we're specifying what that -- What those management responses are going to be into the future, which allows us to do this precise analysis of evaluating this management strategy, in this case a harvest control rule that would determine TAC.

We've been doing this in the U.S. for quite some time. This was mandated in what came out of National Standard 1 discussions following the 1996 revision of the Magnuson-Stevens Act, and

I've been working on the theory of harvest control rules, and how they perform, ever since then, and so I'm able to apply some of that to this project.

Really, fundamentally what we're doing with this project is shifting the focus a little bit so that our primary emphasis is a risk management approach, and so what we want to do for that risk management approach is we want to be very transparent about uncertainty, and really emphasize that, and a key way that we can do that is to have -- To recognize that there are a plausible range of assumptions that we can use within our model, in this case assessment model, and so we have multiple versions of a model that reflect that plausible range of assumptions.

Then a key element of our analysis, both as scientists but also working with the community, is to look at that plausible range of assumptions, or in this case a range of different assessment operating models, and explore how robust different TAC setting rules, different harvest control rules, are across that range.

Given that, it's at least as important, when we move into doing this work, that we have taken a good look at the range of models that we are examining, at least as important as the details of the base model. Then I've intimated to this, and I'll highlight how we do this, and then we bring all of this, you know, what can often be a pretty opaque scientific process, and we bring it to the community, and so I'm going to show you a tool that allows us to do that, and, when we do apply that, and I realize I made a typo in this, and so my apologies, but the key thing with the participatory engagement is that the management strategy evaluation model, the one that's going to explore the implications of different rules is in an app that is accessible to fishers.

I will say I had a great time, when we ran our last workshop in the fall with folks, where we actually got into talking about the theory of harvest control world design, which is a bunch of calculus, and these guys were just -- Were picking this stuff up really well, and understanding it, and then applying that understanding to their own design of what they felt would be effective harvest control rules, and so I'm not -- The couple slides that are missing are the part that I'm going to talk about for most of the rest, and so you can just leave it on this slide for now.

You'll see, in an updated deck that you'll get later, that a key element of taking this scientific theory, and the scientific analysis, and putting it in the hands of stakeholders, is acknowledging what is it we are trying to actually achieve from this fishery, and so I really emphasize a concept that has a fancy term, *Ceteris paribus* objectives, but, really, all that means is, all else being equal, and we can define that by saying that that a *Ceteris paribus* objective is one where either having maximum or minimum amounts of this outcome would be good for at least some people, all else being equal, and so this means we're not doing compromising at the stage.

We're not trying to find some kind of a strategic objective that we're basing management. We're just trying to get the realm of the things that people actually care about acknowledged and built into the analysis that we do, and this turns out to be a really valuable way to engage stakeholders. because this is a chance for them to tell us what they actually want, and have really detailed discussions about that, something that doesn't happen very often in fisheries, and it's an extremely powerful exercise, one that we did with the wreckfish fishers in our fall workshop.

When we do those, it's my experience, having worked on harvest control rules for more than two decades now, that four primary objectives emerge, and I refer to these as the big four. One is

production, more fishing, and that encompasses things like overall more food, overall more income, overall more employment.

A second, that -- Actually, I'm realizing I also sent a typo in this slide, and so I will send a revised deck to you, Judd, and I used to call it ecology, and I'm now calling abundance, because it's just much more directly applicable to what we're after, and so production was more fishing, and abundance is more fish. More fish has can tie into some key objectives, like the ecosystem function that this stock serves, but also faster, cheaper, and safer fishing.

A third objective that is really good, that is a really central one, and often it can be overlooked in a direct way, but we all have a strong sense of it, and that is constancy, how consistent catches are going to be from one year to the next. For the vast majority of fishing communities, this is something that's important, in the form of food security and income security, and it's also important from an economic perspective, because supply chains almost always reward that kind of constancy, and there's -- You can get higher prices from this.

The last of those objectives is this robustness one that I mentioned, and so the thing is, with these four objectives they -- You can't have all of them, and so you have to make some hard choices about that, and understanding what it is that people want is really important.

The last slide that I included in the updated deck, that I will just talk through, because it's not on the ones that we're looking at right now, is we went through a really fun exercise with the stakeholders at the fall workshop, where we had them write down a bunch of different specific objectives, and then, after they had written these down on Post-It notes, we had a discussion, to make sure that we polished them into actual *Ceteris paribus* form, where it's all else being equal.

Then we had them organize them into these four categories of production, abundance, constancy, and robustness. There were some additional ones that fell into an other category, and you'll see, in the updated slide deck, that we have representatives of all of those major big four objectives in what the stakeholders shared with us, and then, equally important, the stakeholders, by going through this exercise, were able to connect things that they had specifically brought up as being relevant and important to them into those big four objectives.

With that sense of the different things that people might care about, we have a simulator that allows us to be able to pick different operating models and then run simulations showing the performance across those big four objectives. This is the link to it, and I'm not going to spend a lot of time going into it, because this will be the next phase of this project, but I did want to share it with you.

We have used this tool across the world, and we are doing some customization of it, specifically for this project, and this URL will be the living URL for the course of this particular project, and I welcome you to look at it, and I would welcome any kind of feedback. Don't hesitate to reach out to me. I want to cut this off now though, because Jeremy has a lot to talk about, in terms of the work on the assessment, and I'm hoping that this overview helps you have an understanding of how we're taking those assessment results, why it's actually really important that we're exploring not just the base model, but the sensitivity cases, and how we're taking all of that and putting it in the hands of stakeholders, for the sake of them being able to actively participate in the design of harvest control rules. I'll stop for now, and I'm happy to answer any questions, but even happier to turn it over to Jeremy, when we're ready for that.

DR. REICHERT: Thank you, Josh, and just -- Maybe this is a question for you or Judd, and this particular overview presentation was not shared with the SSC just yet, and so we would appreciate it if you could send that to Judd, and that will then become Attachment 8d.

DR. CURTIS: Yes, and that's correct. We'll get this uploaded into the briefing book as soon as we can.

DR. NOWLIS: Yes, and that is absolutely on me. I added a few slides to it at the last minute. Judd, just to be clear, I will be sending you some minor revisions on what you -- On what I sent you earlier, and so use the revised one, which you will have this morning.

DR. CURTIS: Okay. Thanks. Roger that.

DR. REICHERT: So, the next presentation, Jeremy, you're ready to give your presentation, and that is Attachment 8c, correct?

DR. CURTIS: That's correct, and, Jeremy, I see you are on the desktop app, and so I'm going to make you the presenter, so you can roll through your slide deck.

DR. REICHERT: Sorry. Before we do that, Chris, I saw your hand up.

DR. DUMAS: Thank you. Yes, and I had a quick question, and maybe I missed it. Were the objectives that were identified by the stakeholders -- Are they are they available? Did you did you mention those, or are they in any of the documentation? If the objectives were identified, what about the weights, and did the stakeholders identify any relative weights on those objectives? Thanks.

DR. NOWLIS: Great, and thank you so much for that question. I can nerd out about that stuff for a long time, and so I'm going to give you the quick version. Yes, those objectives, as identified by stakeholders, will be in the slides that -- The slide deck that you get later, and so you will be seeing those in a slide. The elements of the table are what was identified by stakeholders, and they are organized into those big four objectives of production, abundance, constancy, and robustness.

As far as weight goes, this is where I actually really -- As much as it's tempting to do some analysis and optimization, I've learned that that tends to squelch the stakeholder debates and negotiations that happen, and so I stay ambivalent about those things, and, in fact, I don't really encourage the stakeholders to spend too much time worrying about that part, and instead hope that, where they see any disagreement among themselves, they can use this tool itself as a way being able to come up with a satisfactory compromise, because the tool shows them the tradeoffs between these different objectives. Thank you again for that question.

DR. REICHERT: Thank you. All right. Jeremy, you're ready to take over?

DR. CURTIS: Jeremy, we see your PowerPoint, but it's in the notes mode, and so if you switch your display settings, swap the screen.

DR. COLLIE: Just a second. Okay is that better?

DR. CURTIS: Yes. It's looking good, and we hear you loud and clear.

DR. COLLIE: Okay. Hang on a second. Okay. Good. Well, good morning. Sorry we can't be in there in-person. Obviously, it's impractical, but, fortunately, I know many of you already, and so it makes communication easier. Thanks to you, Josh, for the introduction, and so I think I can jump right in here to the deep end, and I wanted to say that this presentation carries on from the one I gave at your last meeting in the fall, and so I don't feel like I need to reiterate a lot of that.

Since then, we've done a lot of work, and I have taken your questions and comments from the October SSC meeting to heart, and tried to follow-up on them, and plus we had the stakeholder workshop in November, and so I followed-up on those things too, and so one of the takeaways from the November workshop was to do -- To have another look at the data with the insight that we got from talking to the fishermen.

I'm jumping in here with the slide 15, and I'm certainly willing to backtrack if there are questions, but I want to get to the actual assessment model of relatively quickly, and so one of the key inputs to the assessment model is a fishery-dependent abundance index. There's no wreckfish survey, for obvious reasons, and so having a fishery-dependent index is really critical to the assessment. In developing the index, there are a number of choices that are required, and so I want to kind of walk you through the choices, just so you understand my logic in doing this.

This graph is showing just a nominal catch per unit of effort, and for all vessels in red, and then for a subset of vessels. For wreckfish, it's a little complicated, because there's a lot of entry and exit from the fishery, and so, in the ideal case, we would have a set of vessels that had fished the whole time, and we would just be standardizing based on those vessels.

In this case, there's coming and going, and so the red line then -- It would be all vessels, and the green is the top seven vessels, and the blue is the top four, and, by top here, I mean not the ones that caught the most, but the ones that participated in the fishery for the longest, and so the top seven includes some vessels that only have nine years participation, and, the top four those are vessels, four vessels, that that participated for ten years or more, and so that's important when trying to tease out the vessel effects.

You can see the difference moving from all to the top vessels, and obviously sub-setting makes sense, because then you're not using the same catch twice, and you have a more consistent index. There's a little difference between the green and the blue, and so that's why I focused on these top four vessels the four that had the longest participation, and so that's the rationale there. I think it's consistent with the way this has been treated in the past.

Using that as input, the standardization model is this, and so it's modeling the catch per day as a function of year, vessel, and month, and so, obviously, year is what we're interested in expecting, correcting for the vessel effects and month, and month is a -- There is a seasonality to the fishery, and month is incorporated as a cyclic spline, so i used a GAM, and, yes, vessel is a is a factor. I used a GAM here, and a Tweedie distribution for the error, because it gave an acceptable error distribution.

Fitting that GAM model results in a landings effort index, the green one, and then the light green is plus or minus two standard errors of the estimate, and so you can kind of see it went down quickly, and it kind of bumped around, and it went up, and it went down, and there were these interannual effects, which I looked at, and it's not just one vessel. I mean, there was something happening there that the model is picking up, but the covariates aren't, but then I compared it to the CPUE index that was used in the 2014 assessment, and it's a same kind of pattern, and a little different, but it's within the 95 percent confidence interval, and so I thought, okay, this is probably acceptable. This is the fishery-independent index, which then goes forward and informs the model, and so that's kind of central.

Beyond that, the length data, and I think we already showed this, that the length distribution in the wreckfish catch has been remarkably constant over time, as shown by the medians there, and there's not a lot of indication of new year -- I mean, there's some, but there's not a lot of indication of strong year classes coming in, or large wreckfish being caught in the early years and not later, and, I mean, there's a hint of that maybe, but there's no real big signals in the length data, and I think that's the main message here.

Starting in 1987, we have a sort of reliable, or usable, length frequency data, and so you can see that's where it starts there, because, before that, the length data either missing or very low sample sizes, and so this is kind of the inputs, and maybe I'll just pause, just for a beat here, to see if there's any -- If anyone wants to talk about the inputs before I go to the assessment model?

DR. REICHERT: Thank you. Any comments, or remarks? C.J., and then Steve.

DR. SCHLICK: I actually had a question on your model for your index, and I was curious about you choosing to do a catch per day model instead of a catch with a day offset, given that you still have an effort component within the vessel as a covariate, and so essentially you have effort represented as both an independent and dependent variable.

DR. COLLIE: Thanks, and so you're saying use day as an offset, but I'm not sure how that's included in vessel.

DR. SCHLICK: Well, your vessels -- I'm assuming your vessels are a categorical function?

DR. COLLIE: Yes. Factors, yes.

DR. SCHLICK: So, within your vessel alone, given that it's a category, your time your vessel spends at sea is still underlying in that category, and so then you have time as both an independent and a dependent variable in your effort, and so I think a more appropriate -- You can still do it within GAMs, of doing catch with your per day effort as an offset as an independent variable, if that makes sense.

DR. COLLIE: So you're saying, or, well, you're suggesting putting day as an offset?

DR. SCHLICK: Yes.

DR. COLLIE: Okay.

DR. SCHLICK: Just given that you still have effort in there in the vessel as -- It might be a minor component, but it's still there as a component.

DR. COLLIE: Yes, and that's the part I'm not quite grasping, but maybe I can follow-up on that.

DR. SCHLICK: Well, I just see each vessel fishing at different amounts of time every time they go out, and so, if one is fishing twelve hours, versus twenty-three hours, that has a component within their day definition.

DR. COLLIE: There was a graph back there about -- I don't know, and they looked at the distribution of days fished, and it's been remarkably constant, and I don't know if that's -- Maybe it didn't make it into this, but like the trip length has been remarkably constant, and so I'm not -- So, I mean, I take your point. I'm not sure that it's going to have a huge effect.

DR. SCHLICK: It might not, and I was just curious if you had considered it.

DR. COLLIE: No, and that's a very fair point, and so I can try that.

DR. REICHERT: Thanks, Jeremy. Steve, and then Alexei.

DR. TURNER: Comparing the nominal abundance index with the abundance index from the previous assessment, the calculated one for the assessment, you see a big change in those early years, and I'm wondering if you know if they included a vessel effect in their standardization, because clearly the 2024 assessment, versus the 2025 assessment, are pretty similar in that index, but, in the nominal, they're fairly different, and it's just a comment.

DR. REICHERT: Thanks, Steve.

DR. COLLIE: Sorry, and just if you could just clarify that. I think you were asking about the 2014 CPUE index and what it included, and was that your question?

DR. TURNER: Yes, and I'm noting the difference in the 2014 data that you showed in -- I don't know what slide number it is, and maybe it's slide 13.

DR. COLLIE: No, and that's all recent. Like that's all the update, and so that's not going back to -- That's not the data that were used in 2014.

DR. TURNER: That's all -- Okay. All right.

DR. COLLIE: The orange here is the index that was used in the 2014 assessment, and I asked Rebecca about that, and she said that we were given that, and so we used it, and so I think some more sleuthing -- I think it comes from some work that was done in 2011 or something, but that wasn't part of the assessment, and so it's a little bit hard to dig any deeper than that to find out exactly how it was standardized.

DR. REICHERT: That clarifies it, Steve? Okay. Alexei, I saw your hand up.

DR. SHAROV: Hi, Jeremy. Thank you for the presentation, and you have three options of calculating the fishery-independent index, and it does make sense, what you're suggesting using of the top four and top seven, and clearly, if we look at the graph, there are differences at the beginning of the time series, at the end of the time series, and sort of scale of the index when you compare all, versus the two other options, and how many in total were there of vessels that you had the data for and whether this number of all vessels varied a bit through time?

DR. COLLIE: Yes, and so it's a larger number. It was like twenty-seven or something, because you can you can kind of see it in this bar chart, and there's a lot of coming and going, and I can't remember the total, but it is it's on the order of twenty-seven or thirty, because some of them have only participated for a very short time, especially in the early years, and so I think that's what accounts for these differences.

These are vessels that just -- Like in the red, it's including vessels that only participated for a few years. and so they're you know -- Maybe they participated, and they weren't very successful, and they had low catch rates, and they exited, and so there's a lot of that going on.

DR. SHAROV: All right. Okay. Thank you. That, you know, makes sense then, and, you know, explains the, you know, the obvious differences on whether you use the overall average versus the top seven or top four participants, but, yes, I would have agreed with your choice of approach in this. Thank you.

DR. COLLIE: Okay. Thanks, Alexei,

DR. REICHERT: Thanks, Alexei and Jeremy, and I saw Jim and Matt's hand up. Jim.

DR. GARTLAND: Thanks, and so, Jeremy, I was looking, and you used a Tweedie distribution to model these data, and I was just wondering if you had any of the diagnostic plots, and the only reason I ask is that I know that Tweedie is good when you have count data that includes zeroes, and I could be wrong, but maybe there's not a whole lot of zeroes in the catch per day response variable.

In my experience in the past, when I've used a Tweedie with not enough zeroes, it gave me problems, and I was just wondering how it worked for what you did here.

DR. COLLIE: Thanks, Jim. That's a good point, and I think I used the Tweedie because it was pragmatic, that without it -- I'm trying to remember what I did. I think I started with just a basic, you know, lognormal log link, and the tails were really not fit very well, and so I used the Tweedie, because it's convenient with GAMs, and it cleared up the problem with the tails. I do have the diagnostics, and I'm certainly happy to share them with the SSC. I just wasn't sure how far to go into the weeds.

DR. REICHERT: Okay. Thank you. Matt, go ahead.

DR. DAMIANO: Thanks, Jeremy. Really nice work, and very informative. I'm looking at Figures 4 and 5, which, at a glance, suggest to me quite a bit of spatiotemporal heterogeneity, and potential autocorrelation, and so I'm just curious if you considered fitting a spatiotemporal model

using something like VAST or sdmTMB, and treating vessel as a spatially-varying catchability covariate, just to compare with the GAM that you've put together.

DR. COLLIE: The short answer is no, and so no. I mean, it's not a hard no though. I mean, I did include area as a covariate, and I think, because there is a strong, you know, relationship, or cofounder between vessel and space, that you wouldn't have both terms in the model. Like vessel is accounting for a lot of the spatial heterogeneity, because some vessels fish off of North Carolina, and some in Florida, and that's probably accounting for most, or a lot, of the spatial variation.

The other thing is that it's a pretty concentrated fishery. I mean, it operates over a wide area, but they fish in the same places, and so, because of that, you might think that maybe having the spatiotemporal variability is less important, and so that's a long way of saying, no, I didn't do it.

DR. REICHERT: Thank you.

DR. DAMIANO: No worries. I agree with you that I think your covariates are already explicitly accounting for space and time. It's just a personal interest of mine, because, when you move to the spatiotemporal framework, it becomes a lot harder to parse your estimated random effects and really interpret what's driving your trends, and so, more than anything, you know, I'm just thinking it would be an interesting comparison, because you've already done the work to kind of look at what's driving the bus on these catch rates, and so you would be able to groundtruth whatever results you got from a spatiotemporal model, but thanks for hearing me out.

DR. COLLIE: Thanks for your suggestion, and it's not an unwillingness to try different approaches. It's a question of priority, what we need to do most importantly to get to where we need to end up, and so I welcome your suggestions. Were there more about this?

DR. REICHERT: Yes, and we can certainly, in our report, indicate what we feel is at a higher priority than other things that would be nice to see, and so I have a quick question about the -- Or a comment about the length. We talked a little bit about that before, and if you could put up those length comps, and, you know, part of it is because of the life history of the species. You see mostly the adults in the area that they're being fished, but it's good to see that there's not like a significant decrease in average length or anything like that, but, yes, mostly I think -- It's mostly explained by that life history, and so thanks for taking another look at that. Any other hands? Sorry. Go ahead.

DR. COLLIE: No, and I'll just wait, and I think you're right, and your interpretation is that like - - Obviously, they're fishing in the same places, on spawning populations, and so, I mean, it's reassuring not to see a decrease in length distribution, but I'm not sure you would. I mean, you could just have a decrease in abundance and still catch the same way.

DR. REICHERT: Yes, absolutely. Seeing no more hands, Jeremy, why don't you continue your presentation?

DR. COLLIE: Thank you very much. I almost regret pausing there, but I actually welcome the input, and clearly --

DR. REICHERT: Lesson learned, and no more pauses.

DR. COLLIE: No, and I think the --

DR. REICHERT: We appreciate the opportunity to provide some feedback.

DR. COLLIE: Okay. Good. Well, having said that, I'll forge ahead. Okay, and so we can talk about the actual assessment now and platform. The model platform is the stock assessment continuum tool that was created by Jason Cope, and I'll just pause at this point to acknowledge Jason. He has helped -- I've had a few sessions where we've talked about assessment, and he's been very helpful about that, and also learning the kind of nuances of Stock Synthesis.

It is appropriate for what we would call a data-moderate stock for wreckfish. We have data, but they're maybe not as, you know, in the quantities that we would like to see. Having a relative abundance index is really important for this, just because we don't see the variation in the length competition data, and we're interested to know what the level of stock depletion is since the fishery started, because basically the data do start with the start of the wreckfish fishery, which is kind of unusual, and then to figure out what the optimal yields would be and what a good harvest strategy would be, as Josh explained at the beginning, and so that's our objective there.

This slide just summarizes the data inputs, and we have the landings data. For landings, the bubble size is proportional to the size, and so, obviously there are high catches in the early years. I don't want to overlook the length life history information, with basically the growth curve maturity at age, and the length-weight conversions provided by Bubley et al., in the paper which I think is going to be published this year, and so that's an important input.

The length composition from 1987 to 2024, and then we have this commercial LPUE index that I showed you from 1991 to 2020, and just something about the LPUE, and the reason for doing catch per days fish -- Part of that was just consistency with the previous assessments, and previous authors have used that ratio, and I think that was kind of the default, was to treat it as a ratio. I do take the point though about the offset. Then some age composition data have been collected by South Carolina DNR, and I'll talk about those at the end.

The life history information, I think we talked about this before, and so I won't dwell on it, but there are growth curves for males and females. Wreckfish are known to grow rapidly to their asymptotic length, and males are smaller than the females, around 100 centimeters, and we have the length-weight relationship, maturity at length ogive here, which is input, and then the fourth one, the bottom-right, is the selectivity of the fishery by length, and so this is not an input.

This is actually an estimate, but it kind of fit here in the bottom right, showing what the estimated selectivity is for fish of different length, and, if you compare the asymptotic size, you can see that by the time they reach the asymptotic length, they're pretty much fully selected by the fishery, according to this run, and so that's the life history information that goes in.

Fitting the model, now we're going to the outputs, and this is just summarizing the fit to the length distribution on the left, and so the gray is the aggregated length composition, and the green is the fit. Obviously, there's a graph like this for every year, but, since the length composition is so similar, it's a little boring to look at, but it's a reasonable fit. You can see there's a little bit of lack

of fit in the tails here, and maybe in the maximum, and it goes one length category beyond, but a reasonable fit to the length.

This is the fit to the LPUE index. It shows the rapid decline, and then a more gradual decline, and it isn't really picking up the year-to-year variability, and it's actually more smoothing through that, but, again, an acceptable overall fit to the LPUE, and so that's -- Those are some of the model diagnostics.

The result here is that here is the reconstructed spawning biomass, starting from what would be considered the unexploited biomass, and declining rapidly in those years of high catch, and then declining more gradually over time, but I guess the main thing here is this gradual decline. There's really not much indication of a recent increase that might have been expected with the relaxation of fishing pressure, and so, given that fit, we can look at some of the other metrics of that fit.

This is the estimated fishing mortality rate. It's high during the initial years of the fishing down, and then fell off sort of, and it sort of increased in the 2010s, and then falling off in more recent years. This is the reconstructed mean age in the population, and so Stock Synthesis is taking the growth curve, and converting from length to age, and then estimates, or calculates, what the mean age in the population, and so declining from above twenty-five to start with, and then declining down to about fifteen in the more recent years, and so, despite the constancy in the -- Well, this is in the population, but it is showing that there's been a truncation of population over the time of the fishery.

Then, finally, the bottom-left is the estimated equilibrium yield curve as a function of the unfished spawning biomass, and starting here unfished and then being depleted, and there are a number of reference levels. The red one is just a default, and so that's -- We can ignore the red one. That's just saying -- That would be the 40 percent of unfished spawning biomass, and so that that's really for you to decide what your biomass target would be, but the other ones are -- The light blue is for MSY, and you can get the MSY from that.

The green, which is kind of hidden here, is the 30 percent SPR, and so that's 30 percent, which I think is the default that you use as a reference point, and it's almost hidden by the current, and so saying that -- That this is suggesting is that, if 30 percent SPR was your reference point, the fit to the stock, as of 2024, was right on it, and that's what it is suggesting.

Okay, so that -- Take this one, this fit kind of -- That was at the base model, and so that seems like it's reasonable. It's reasonable in the sense that it gives it gives outputs that are kind of within the realm of what you would expect for a stock like this.

We then went on to look at -- To do several sensitivity analyses, and so one of the sensitivities is for the stock-recruitment steepness. There is a Beverton-Holt stock-recruitment function that's built into the model, and we have to make assumptions about what that steepness is, and so the base run -- Sorry for the small print, but I'll read them.

The base run had a steepness of 0.75, which is kind of a default level for a long-lived species like a wreckfish or a rockfish, and so that's the dark blue. The light blue has a lower steepness, 0.6, and the red is higher, 0.9. You can see, when you fit these, it makes very little difference to the

estimated spawning biomass, or the fraction depleted, but it has different implications for recruitment.

The high steepness suggests that recruitment has increased in recent years, and the light blue, the low steepness, suggests that it has actually kind of plateaued, and so those are differences in the recruitment deviation estimates, and, when you translate those to the corresponding yield curves, it makes a difference to the estimated yield, and so this one on the top-right is the base model, 0.75.

With low steepness, the yield curve is shifted over to the right, and it's less skewed, and also these reference levels shift as well. The MSY is shifted to the right in the 30 SPR, and it shifts to the left. With high steepness, it's the opposite. The yield curve becomes more skewed. The 30 percent -- So SPR gets shifted to the right, and the MSY is shifted to the left relative to -- You can see that relative to where the present situation is. These models of steepness have implications for what the maximum equilibrium yields would be, and also at what level of depletion, or the fraction of unfished spawning biomass, that reference level would be obtained at.

Well, I did a likelihood profile on the steepness, to see if there was any information about it, and you can see that in the bottom-right. The total likelihood goes down with lower steepness, but, when you look at the two main data inputs, the index in yellow and the length data in red, there's actually -- I mean, they are going down, but it's within two likelihood units here of loglikelihood, and normally we kind of interpret anything within two units loglikelihood as impossible, and so, even though there's a signal here, it's really -- There's not enough information to actually estimate steepness, and so that's a conclusion here, that we have to make assumptions about what the stock-recruitment steepness will be.

That was one important sensitivity, and another one would be the shape of the size selectivity curve. We looked at a case with a dome-shaped selectivity, that you might expect would be the case if you have a hook fishery, that maybe larger fish would not be vulnerable, but it made really no difference to the estimated model fits. You can see here they're superimposed, and so there was nothing there. There was no information in part of this, because the larger fish really -- You know, at the point where you would get a dome shape, there aren't any fish, wreckfish, that big, and so that's one reason why it didn't make any difference, and so forget about size selectivity for now.

Another sensitivity was for the recruitment variability. The assessment model, Stock Synthesis, estimates annual recruitment deviations, and you have to specify what the standard error, or sigma R, is on that, and so the blue is the base run, with -- I'll show this in the next slide, but the blue is the base run. The red is we've just reduced that sigma R, and the light blue is if you had a deterministic stock-recruitment relationship, and you can see the difference it makes to the spawning biomass, that the light blue one starts out lower, goes down lower, but then kind of rebounds, sort of rebounding there, and these are the estimated recruitment deviations.

The base run suggested there was a real decline in recruitment, and it bounced back. The red one is kind of smoothed out. It declined, and then it bounced back. The deterministic one, obviously, would just be a straight -- Well, it would be smoother, and I'll show you on the next slide.

I think it's easier to see here the consequences of these sigma R assumptions. The base model has this estimated time trend in recruitment, but very uncertain -- Very large uncertainty intervals. As you sort of dial down sigma R, the uncertainty narrows, and the curve becomes smoother. In the deterministic one, obviously, there's no error, or, well, there's no -- I don't think you can -- Well, there is a little bit, but you can't really see it, but it's just saying that recruitment declined because the stock declined, and then, once the stock declined, it's just been pretty constant at that level.

Those are different assumptions about recruitment variability, and, again, there's no information in the data to estimate that. You just -- It's an assumption that the stock assessment analyst has to make based on the species life history and what you expect for recruitment variability in a long-lived fish.

The reason for entertaining this is because it has consequences about selectivity, and I'll show you here that the left-hand one is the kind of -- It's the base model, the default, and, as the sigma R is decreasing, the selectivity curve gets shifted over to the right, and so -- Whereas before the -- This is the L infinity, and so, when wreckfish reaches its L infinity, it's basically fully selected to the fishery, and thus that shifts, in this case, the L infinity. The wreckfish would only be 50 percent selected to the fishery, and so that is sort of a qualitatively different assumption about selectivity.

It makes a little bit of difference to the yield curves. You can -- If you look closely, you can see these shift a little bit. The reference points shift a little bit, but not a whole lot, and so that's the sensitivity on recruitment variability.

As a result of all that, we get four candidate operating models. We have the base model, and consider this kind of like the default for Stock Synthesis, and it's consistent with previous assessments, as far as the steepness. The sensitivity on steepness is the same that Rademeyer and Butterworth used, like having a base model high steepness and low steepness, and that's the reason I chose those values, and so that's one axis of candidate models.

Then we have this other axis about how deterministic recruitment is, and so we have this deterministic recruitment model that has the same steepness, but it's sigma R set to zero, and so, for now, those are the four candidate operating models, along the two axes, and I made a table just to summarize the characteristics.

A lot of these are just kind of informational, but you can see that this one has sigma R equals zero, and there's fewer parameters, because it's not estimating deviations. You can see there is a change in the loglikelihood, the total loglikelihood, and so it's kind of -- If anything, the data are pointing toward lower steepness than the base model. The deterministic model, again, has a larger size at full selectivity, although take that with a grain of salt, because there are very few wreckfish that are that big, 126 centimeters, and so I'm not sure how relevant that will be.

Beyond that, you can estimate these various parameters of the model, the initial spawning stock biomass, the level of depletion, and the MSY, meaning it's kind of what you would expect. High steepness implies a more productive model, or a more productive stock I mean, and low steepness implies a less productive stock, and you can kind of see where they are relative to the U being exploitation rate at the end, in 2025. In the base model, it was, you know, slightly maybe under that. With the low steepness model, that current exploitation rate is maybe a little bit higher than accepted for BMSY, but they're all kind of in the ballpark, and so that, you know, I think gives

some credence to these operating models, that they are -- You know, they're not unrealistic. The next slide is next steps, and so maybe, at the risk of getting hard questions that I can't answer, maybe I'll pause here for questions.

DR. REICHERT: All right. Thank you, Jeremy. Are there any clarifying questions relative to this part of the presentation? I'm looking around the room. Amy, go ahead.

DR. SCHUELLER: When I was going through the documentation for this, one of the things that I got hung up on is the equilibrium curves at the different steepness levels, and I think part of it is because I read the report, and then I looked at the presentation, and the figures don't match between the different options, and so I'm confused about which figures are the right ones, and then I was trying to figure out like if they make sense to me.

DR. COLLIE: Okay. Let's take the first thing first.

DR. SCHUELLER: Sure.

DR. COLLIE: One thing I did change in this presentation relative to the report, is I changed the percent SPR, and so the default was 50 percent, and I changed that to 30 percent, because I thought that was more in line with your default, and so that is one change. Other than that, I thought they were the same, but go ahead with your comment.

DR. SCHUELLER: I guess the other part of this was -- Maybe I'm just not thinking linearly right now, but my expectation was like you have a higher steepness value, and you would expect to be able to harvest at a higher fishing mortality rate, was my thought, and that doesn't -- That's not what is shown here in the graphs, with respect to MSY anyway, and so I just kept staring at that, and turning it over in my mind, and so, if someone can help me with that, that would be great, if I'm off-base, or we should just talk about whether or not this makes sense, I guess.

DR. COLLIE: Well, I think I hear your question, and I think I kind of understand where you're coming from, because this presentation, this sort of Stock Synthesis output, could be different than the types of things that we're used to seeing, and so it takes a little bit of -- There is some intermediates here.

You know, one thing is that -- Well, it's the yield relative to the unfished spawning biomass, and so the reference levels here imply a certain amount of fishing pressure. I mean, as you know, in Stock Synthesis, they don't really dwell on fishing mortality rate, per se. They express it as one minus SPR, and so you have to do kind of the intermediate here.

Like when you think about the green line here, this is the level of stock depletion that would result in -- That would result in having -- In reducing your stock to 30 percent of SPR with no fishing, and I think that's correct, and so, you know, when I looked at these, it took me a while to convince myself that I understood them, but I got there in the end, and I don't know if that helps, or if you have specific questions. I think they're correct, but if you have questions about what they mean, or how to interpret them.

DR. REICHERT: Does that clarify -- Perhaps we can come back to that later.

DR. COLLIE: The other thing is, in one of these -- In one of these, and I didn't mention this, but I kind of changed these, and I think maybe I did this for the presentation, but not in the report, and like originally it was 50 percent SPR, and so you can see where that would fall here, and just in this case only did I label it here, just which direction it moves, but, again, I mean, I think that's basically for you to specify what reference point you think would be relevant for wreckfish, either expressed as a percent SPR or a biomass threshold, and those are the two that are kind of included in the package here.

DR. REICHERT: Okay. Anyone else? I saw Alexei's hand up, and then Genny.

DR. SHAROV: I don't have a question. I have comments, and, if it's for later, I'll wait for later. I'm not asking to clarify anything. I have comments regarding the results and the interpretation.

DR. COLLIE: Okay. Good. Let's wait. Since I know you, Alexei, I can beg off and defer your questions.

DR. REICHERT: Perhaps we can come back to that under the discussion, and is that okay with you?

DR. SHAROV: Yes.

DR. COLLIE: Sure.

DR. REICHERT: Thanks. Genny.

DR. NESSLAGE: Hi, Jeremy. Thank you so much for this work. I'm going to admit my brain is failing right now, and I'm going to ask a really stupid question, and so I apologize, but, at the risk of looking like a fool, I'm just going to ask. If the length composition is not changing over time, how are we getting the magnitude of the population out of this model? Please help me understand that. I've never run one of these.

DR. COLLIE: No, and I think that's a really good question. I think that it's -- Well, I think the short answer to that is that's really the importance of the LPUE index. The LPUE index is indicating the decline of the stock, and so I think it's the combination of the landings, and so that gives the scale of the of the population, and then the LPUE gives the information on how much it has declined. Does that answer your question?

DR. NESSLAGE: So that gives you the minimum population size, right, at the height of the index, the high point and the low point, but how do we get the absolute relative to unfished? Is that where you -- Is that where the assumption about what -- I guess how do we get to that portion of the magnitude estimation?

DR. COLLIE: You know, I'm not sure it's different than other age-structured or length-structured models, in the sense that the model is reconstructing the population, and it gets its scale from saying, well, how big -- Maybe I will go back here, or any of these.

You say, well, we think we know what the landings were, and so how big did the population have to be in order for the population to have been reduced by this much over time to match what the

index is telling us, and so, if the population declined by that amount, or by that percentage, how much -- How big a population would you have to have in order for, when you subtract the known catch, to get that level of depletion. I think, in that sense, it's kind of the same. Well, I mean, it is Stock Synthesis, and so that's what these length-structured models do.

I think, just to carry on from that what makes it challenging for wreckfish is because we only have the depletion part. If there was a recovery phase, then the dynamics would be much more clearly specified, I think, because you would get some idea about what the growth rate, or rebuilding rate, would be, but, whenever it's just a pure decline, it's more challenging. The fact that it's kind of equilibrium, or I don't know, and kind of flattening out, I think is helpful, because then you have some history of the stock at some kind of -- Some kind of status, I guess, relative to the early years, where it's just a pure depletion.

DR. NOWLIS: Jeremy, I wanted to throw in one other point that may drive this observation, and so, when we're looking at the length distribution of catches, it's helpful to keep in mind that this is a fish that gets to be fairly close to its full size pretty quickly and then stays there for a very long time, and so, given the flexibility this model has to interpret things, it's a plausible interpretation to basically say that that length information isn't going to have a lot of details that the model can grab on to to inform stock status, whereas, as Jeremy is pointing out, this catch per unit effort abundance index is one where that we can much more directly pin to overall population dynamics.

DR. REICHERT: Genny, to that point?

DR. NESSLAGE: Great, and so then, essentially, how would this -- How would you expect this to differ from like a production model, where you would then have to estimate or specify the percent of B zero that you start at at the beginning of the model, and that's the part that I'm really hung up on.

DR. COLLIE: So, I mean, in a sense, it's similar to a production model, and Rademeyer and Butterworth did fit a production model, and came to similar conclusions. We prioritized the length-based model, because length data exists, and so it seems like you're using more data.

With wreckfish, it's kind of a special case, in the sense that it started at its B zero, as far as -- You know, or close to its B zero, because that's when the fishery started, but it's not actually -- It's not actually assuming that. It's just that's the way it happened to be, and so it's not -- I guess what I'm trying to say is that that's not an input assumption, about whether the stock started at B zero or not. That's a consequence, or an output, of the model, but it's not an input.

I mean, you can see that, from clearly population dynamic terms, that the population dynamics -- All it knows is you had a population, and it got caught, and so, if you if you don't catch anything, it stays the same. I mean, it's a kind of simple, built-in assumption, but that's -- I guess that's the way it works.

DR. REICHERT: Chip Collier came to the table, to that point, and then I have Steve, Jim, Matt, and I have a question myself. Chip, go ahead.

DR. COLLIER: The wreckfish model is a little bit different than a lot of other fisheries we have in the South Atlantic. We know when this one started, and so we do have the full history of this

fishery, with the exception of maybe what's going on in the Mediterranean, which is on some of the juveniles over there, and so we don't have that information, but we do have the adult stock.

DR. REICHERT: To that point, Chip, but everything we're talking about here is the fishery in the South Atlantic, right, and so we do have a record of fisheries elsewhere, but that's not part of this analysis.

DR. COLLIER: That's correct, and so the international part is not part of this.

DR. REICHERT: Just -- Okay. Thanks. Genny, that kind of clarifies your question. Excellent, and so I've got Steve next.

DR. TURNER: So I'm going to display my ignorance, and so this is not a closed population, and My understanding was that this was not the adult population, and am I wrong about that, that this is the juvenile part of the population?

DR. COLLIE: No, and I think you're right on both things. It's not a closed population, and so the data we're only assessing is the U.S. part of a more broadly ranging of population, and the data are pretty much adult wreckfish. The wreckfish are pelagic, and they settle out when they get to be larger, and so it's really only the demersal part of the population, and close to maturity or above.

DR. TURNER: Okay, and so then I'll just stop there.

DR. REICHERT: Thanks, Steve. Well, that actually addresses my question, and so I'm just going to ask it, and so please remind me. The model approach that you're talking about, does it assume it's a closed population, or that's not an assumption of the model?

DR. COLLIE: No, and I think that's correct. It is an assumption, because there's an implied stock-recruitment relationship, and so the assumption is that the spawning population gives rise to the recruits some years later, and so that's where the closed population assumption comes in. It's saying that the level of recruitment is not independent of the spawning environment, and it's related to it.

DR. REICHERT: Thank you, and I think -- For some reason, I thought we talked about that earlier, but I think that's an important component of this for the SSC in our discussions, and so thanks for that. I have Jim next, and then Matt and Kai. No? Sorry. Then I have Matt next. Matt, go ahead.

DR. DAMIANO: Thanks, and so, overall, I'm really excited to see another application of the SAC tool. With that in mind, I have some questions, and then, depending on the answer, possibly some recommendations related to uncertainty. My first question is, when you were using the SAC tool to put these models together, did you utilize the jitter functionality at all to confirm if all of the candidate operating models were in a similar solution space?

DR. COLLIE: I used it, and I guess I hadn't done it extensively. I tried it a few times, and I satisfied myself that the solutions were unique, but certainly that's a valid point, and I think that, as we move forward to a final assessment, that it would be good do more of that.

DR. DAMIANO: Cool.

DR. COLLIE: I guess the reason that I sort of made that a lower priority is I've fit -- I've done a lot of sensitivity analysis, and so, as a result of that, you kind of see that the solution is going in an expected direction, so kind of, because of that, you kind of gain confidence as you go.

DR. DAMIANO: Sure, and so good. That's great. The next question I had pertains to -- I think somewhat to what Genny was getting at, which is the scale of the population, and I know that these models in Stock Synthesis do tend to be pretty sensitive to your initial equilibrium catch value, because that -- I mean, that effectively determines where that starting point is going to be once depletion begins, and so I'm wondering if you did any likelihood profiling of that initial equilibrium catch.

DR. COLLIE: Yes, and you've got me there, because I don't think that was actually included in the runs. I think -- I thought that was like a toggle, either or. Either you assume equilibrium catch or you don't, and you put in the actual catch data, and I did the latter, and so I'm not -- I'm a little confused about, you know, that parameter, because that's not the option I chose.

DR. DAMIANO: Gotcha, and so I'm assuming that the wreckfish fishery began earlier than the 1980s.

DR. COLLIE: Actually, no. It started in the 1980s, and so the first catch data point -- I don't know, and I always hesitate, because some of these are confidential, but, in 1987, the catch was close to zero. In 1986, it was zero.

DR. DAMIANO: Okay. In which case ignore that question. I've had enough coffee to substitute for confidence, and proceeded to make a fool of myself.

DR. COLLIE: No, and that's fine. I mean, you can see it -- Actually, you can see it in the fishing mortality right there, and I think you can see that pretty clearly, that at the beginning it was zero.

DR. DAMIANO: Okay.

DR. REICHERT: Thanks.

DR. DAMIANO: That's it for me then. Thank you.

DR. REICHERT: Thanks, Matt, and thanks, Jeremy. I've got Kai, and then Luiz online. Kai, go ahead.

DR. LORENZEN: Thanks, Jeremy. I just wanted to follow-up on -- I think, you know, we looked at a preliminary analysis of this a few months ago, and I remember then the abundance index he had constructed was essentially uninformative, and different from the one used by the previous assessment, and now what you have now is much closer to the previous, and it basically informs the whole assessment, right, because the length data aren't -- You know, because of the life history of this species, aren't going to be very informative, and so everything rests on the abundance in and the knowledge that the fishery started at the start of your data run here.

I just wanted to confirm, and so my understanding is the difference is that that you've subsetted the data, and you're just using the best performing, longest sort of participating vessels, and that's really what made the difference in the abundance index, and is that correct?

DR. COLLIE: Thanks, Kai, and so, yes, you're correct. Last fall, when I showed the relative abundance index, and it seemed uninformative, it's been informed through SSC comments all throughout, and talking to the fishermen, and I think, in a nutshell, it's the progression from exploratory data analysis to an actually more complete generalized linear model based on that knowledge, and also being informed by what previous stock assessment scientists have done.

I cleaned up some of the explanatory data, like the covariance, and there were some messes in the datasets. I cleaned those up, and so it was just a progression from what I would call an exploratory analysis to a more, you know, complete analysis of the landings data.

DR. LORENZEN: Okay, and so it wasn't the -- I can't remember, and it was not primarily that you changed how you're subsetting the data, but there are other things that --

DR. COLLIE: No, and I think that one of the main things was accounting for the vessel characteristics. That was not included originally, and it turns out, as you might expect, and that was one of the recommendations of the SSC last time around, and so I made sure, you know, to figure out a way to include vessel characteristics.

I didn't say this, but I think I did in the report, that, you know, vessel was included as a factor as a fixed effect, and I also fit a random effect model, but, because there were only four vessels involved, it didn't really make any difference, because there wasn't shrinkage among the vessels in the mixed effects model, and so, for completeness, I ran it, but it didn't make a difference to the LPUE index.

DR. LORENZEN: Okay. Great. Thank you. That answers my question.

DR. REICHERT: Thanks, Kai. Luiz.

DR. BARBIERI: Thank you, Marcel, and thank you, Jeremy, for the presentation for addressing all these questions in a way that I think has been super helpful in helping us understand, you know, where you are in this, and so I appreciate that.

I'm just wondering, right, since there have been some comments that have come up from, you know, other SSC members today after this presentation, whether we should be considering, and I would like to hear your thoughts on this, you know, whether we should consider stepping things down a bit from where we are, the direction that we are going with this, in terms of using Stock Synthesis and an age-structured assessment model, and moving to a more data-limited approach-based sort of approach that more explicitly acknowledges the lack of data, right, and the lack of knowledge that we have about the species, the fact that we are not dealing -- I mean, that we are dealing with an open population, right, that transcends the South Atlantic and the U.S. waters, and is fished internationally, and that we cannot measure so many of the components of the population that are in other areas of the world, right, that we don't sample.

Thinking about your slides 29 and 30, right, and the consequences of these assumptions about steepness seem to be fairly intense, right, fairly big consequences there, and I understand that, you know, the previous assessment used that middle-of-the-road 0.75 default model for steepness, but I wonder, you know, what would be, in your opinion, the possibility to proceed to something like evaluating some management procedures, right, that do not have to rely on an operating model that is structured as an age-structured assessment model, meaning we more explicitly acknowledge that we don't know a lot about these species of these fisheries, and we have to go to a lower tier of analysis to kind of make decisions about how to proceed with the fishery.

DR. COLLIE: Okay, and I think I understand your question, and it's kind of a perspective question about what to do in a data-limited situation. I mean, I'll just answer maybe a little a little facetiously, but the idea of managing a data-limited stock without much information -- You know, I think you've already been doing that for a decade, and so that's been tried.

I think the idea, in this project, was to make the best use of the data that exists, and I think that's the whole philosophy behind the stock assessment continuum, is that different species have different amounts of data, and that they can -- They fall somewhere on this continuum, and that you use -- You make the best use of the data you have to estimate the population.

Now, you might be thinking, well, yes, but this is overkill if you have a data-limited -- I mean, we actually consider wreckfish data moderate, because you can see what the data streams are, and it's not like there's no data here. There's actually quite a bit of data have been collected, and, you know, it really behooves, I think, the scientific community to actually use them, rather than just collect them and not use them, and so there's that part, but where was I going with that?

It is a continuum, but I think it flows directly back to what Josh introduced, and like we're not saying that there's a single best model. We're saying that there's a set of models, and we're trying to identify the main sources of uncertainty, and put those forward as a set of operating models, and then look for management procedures that are -- That can accommodate that or are robust to the that uncertainty, and so that's the whole philosophy we're coming here with, and not to take a step backwards, but to take a step forward.

If people hypothesize what a major source of uncertainty is, you can formulate a model that captures that. The one about, you know, the openness of the population, and so, in the past, Butterworth fit a model with a steepness equals one, which is kind of extreme, but that kind of captures that idea that it doesn't matter what you do with the wreckfish fishery, and there will always be recruitment, which is probably not very realistic, but that is a -- That's a way to express that particular hypothesis, and so that's the philosophy we're coming out here, and so that's what leads to the set of candidate models across the main axes of uncertainty. If there's another type of uncertainty that we haven't accounted for, then we could try to, you know, build a model around that.

DR. REICHERT: Thanks Jeremy.

DR. NOWLIS: I would actually love to add a little bit to that too, if that's okay.

DR. REICHERT: Well can I -- Before we do that, I want you guys really to hold on to that thought, because I think we are morphing into a discussion, which is very good, and we should have that,

but what I would like to do for folks, once again, is hold that thought, and Alexei said earlier that he had a point that is part of the discussion, and so what I would like to do, if the committee agrees, is give Jeremy an opportunity to finish his presentation, and then we go to public comment, and then we can continue our discussion. I want to make sure that we complete that before we get to that stage.

DR. COLLIE: Okay. Thanks, Marcel, and so I'm going to -- I'm going to step through just to finish my presentation in the next five minutes or so.

DR. REICHERT: Okay. Yes, and that would be great. I appreciate that, and so, again, hold your thoughts, and we'll come back to it, and, if I forget to acknowledge anyone, please let me know, and we'll give you an opportunity to speak, and so go ahead Jeremy. Thanks for that.

DR. COLLIE: Okay so we have this set of candidate operating models. You'll notice there's some blank space on this slide, and so there's room for more, if needed, and they have parameters and implications, et cetera.

I want to go on to next steps, and so the next step was to conduct sensitivity analyses for key parameters. I think I've already done that, but there's room for more, and so that's open-ended, but the important thing here is the incorporation of age composition data, and so otoliths have been collected, and a subset of those have been aged, and so there are age composition data, and these are otoliths that have been aged by South Carolina DNR.

They're in in two main groups. There's a group in the 1990s and then a more recent group in the 2000s. The early ones were mainly sampled from Florida, and recently they're increasingly sampled from South Carolina, and so you can see the sample size, and they're maybe not huge, but not insignificant either.

These were the -- Well, this is a subset of otoliths that South Carolina DNR has, and that's what they used to estimate the updated growth curves, and so we asked the question of, well, how representative are these age samples of the total population length distribution, and so I took these same otoliths, and I plotted the length distributions.

Just to orient you to this plot, the years are grouped into three-year groups, just to make them fit on one page, and so the colors are not the years. The colors are -- The red, these are the length distribution of the otoliths that were aged. The yellow, or sorry, the green are the ones that came -- That's actually the length distribution in the port sampling database of fish that were sampled in Florida, and then the blue is all states, and the green is just because, in the early years, they were mostly from Florida.

We wanted to see whether the age composition samples actually span the length distribution of the total catch, and you can see, in the early years, and, obviously, they got the mode right, but they kind of under-sampled the tails of the distribution, and so they didn't have many samples corresponding to the very large or the very small wreckfish. In the more recent period, there's a much better correspondence between the age samples and the overall length samples, and so you can see those distributions in the sample sizes.

That led us to think, well, maybe there is some possibility of actually incorporating age composition into the stock assessment, and we have a proposed procedure for doing that, and it involves entering the age composition as a marginal data in the stock assessment continuum, and it means they don't contribute to the likeliness, or the goodness of fit, but it allows comparison that we observe in estimated age compositions. You can make a direct comparison between the age data and the estimated age comp, and so that's step one.

Then, based on that, determine whether the age compositions are actually representative of the wreckage population and make a decision, you know, whether they're informative or not, and then, if yes, enter them as conditional on the length distribution, in which case the age would be included in the model likelihood, and so that's what we propose to do in the upcoming month or so moving forward. I think that that is probably a good place to stop, and I welcome any questions, and maybe we should let Alexei chime-in.

DR. REICHERT: Thank you, Jeremy. Yes, we can do that, unless there's a clarifying question relative to that age part of your presentation, and I don't see any hands up, and so, before we do that, let's go to public comment. Judd, is there anyone online who would like to make a public comment?

DR. CURTIS: No hands.

DR. REICHERT: Seeing none, and no hands in the room, and so no public comments were provided, and so let's go back to our discussion. I have Alexei, Matt in the queue, and then we'll see who else wants to continue that discussion. Luiz, I've got you in the queue. Alexei, go ahead.

DR. SHAROV: Thank you. Well, I hope I -- You know, I didn't mean to be so dramatic. I mean, I had some comments, but probably everyone has some, and so I'm sorry that I jumped in first, and, Jeremy, again thank you. Quite a lot of food for thought, and I understand -- I know like you understand the challenges and limitations of the data, and you know better than anybody else here, because you've worked with the stock, and with the data, and so I have a couple of comments, which they might be naïve, and just say so, because you've thought of it longer and better.

Nonetheless, what is the driving source of the -- What is the principal information here about the dynamics of this stock, given that the length information is non-informative, right, and, I mean, the average length doesn't change much, and then the selectivity is such that, you know, the fish are fully selected pretty much at the maximum age.

It appears, if we could possibly scroll back to this slide that shows fit to aggregated length composition and LPUE index, all that we have, other than the landings data, is we have the LPUE index, and so the index, relative index, of the population abundance of biomass, and the model doesn't fit it well, at least in my point of view, and that's typical, because there is no additional information, and there is no recruitment index or whatever that would -- I don't know what CVs are used there.

Looking at the model fit, it is obvious that the outcome of this, when you project the model forward, trying to fit to this trend of the population abundance, you will end up with a pretty flat - - Like declining, and that pretty much flat SSB estimate, which is on the next slide, right, that follows it, and I think my concern is that are we oversimplifying here, and we're over smoothing

the only information that we have, and so, that variability that is present in in the LPUE index, we're essentially ignoring it in fitting the model, even though -- The plot suggests that there is a more complicated trend, and it's just not the flat decline through time, and, if it's not, then there were probably effects of recruitment, of like a stronger year class is possibly entering the population, and that is the key.

That is, if we are to try to model the LPUE more precisely, there would have to -- There would be quite different, you know, dynamics in this stock that you would have to describe, versus this just -- Pretty much it's not equilibrium, but it's, you know, a one-way street here, where, you know, the current outcome -- You just have to apply a fishing mortality that that would drive this stock down to the level that we end up with, and it appears a little bit too simplistic.

DR. COLLIE: Thanks for that. I'll just say, jokingly, I seem to be getting mixed messages, because it seemed like Luiz thought it was too complicated, and you think it's too simple, and so hopefully we can strike a middle ground here, but, just going back to your initial question of like what's driving the dynamic here, it's clearly the high catches in the early years depleting the population, to some extent, and the LPUE index is suggesting how much of a depletion that would be.

As far as the fit to the data, I mean, it's still reconciling the different sources of information, and there are really two sides of that coin. With the length distributions, they've been pretty constant, and so we're not seeing the type of variability that would allow you to, you know, see a strong incoming year class, as we have with some age-structured things, and so that's not there, and this is a long-lived species, and so the age classes are -- Obviously, they get blended by the time they mature, and they're really smoothed out, and so it might not be surprising that you can track cohorts over time.

The flip side of that is that it still has to replicate the length distribution, and so the wreckfish have to enter, and they have to grow, and they have to get to that length where they can be caught, and maintain the length, and so it's not like there's no information in the length. It's just that -- Because the model -- The reconstructed population still has to fit that distribution, and that does impose constraints on what the estimated abundance is.

As far as the fitting the index, I think that's part of the reason why the model can't, you know, track the ups and downs of the LPUE index, because it is a slow changing population, and it kind of just smooths them out. I mean, I could argue that it's kind of going through the confidence intervals, and so, apart from these later years, this dip, but you could argue, well, that's a good fit, because it goes through the confidence intervals of the LPUE, and so that's good enough.

You could hypothesize different covariates for the fishery-dependent index, or could potentially include something else that would explain that. Obviously, we've tested a bunch of them, and come up with a model that includes the most significant, but, yes, there's always more that could be done, and I don't know, and does that answer your question?

DR. SHAROV: Well, that adds, you know, more information to the thinking, Thank you. I appreciate that, yes. All right. Thanks. I didn't have that much of a question, but more like, you know, the outlier thinking as to what is probably happening, and are we covering all possible scenarios of the population dynamics that could be hidden here. Thank you.

DR. REICHERT: Thank you, and a quick point to the longevity that you mentioned, Jeremy. I think maximum age is eighty or ninety, and so it's not perhaps unreasonable to assume that a lot of the fish that are caught currently were alive already when the fishery started, just to put this in perspective. That's not a question, and it's just a thought I had, and so that may be good to keep in the back of our minds. I have Matt and then --

DR. COLLIE: That's a good point, Marcel, and, actually, Jason suggested actually starting the model earlier, and they do that for some rockfish. Like, because the fish that were caught in the 1990s were born earlier in the century, one approach is to start the model way back in time and assume that it was at equilibrium until the fishery started, and so I did do that, and it wasn't really informative, and so I backed off of that, but that's the implication of your comment.

DR. REICHERT: Yes. Thank you. I have Matt, then Luiz. Matt, go ahead.

DR. DAMIANO: So I mostly have some comments, and maybe one question, the first one just being a vote of support for following the stock assessment continuum philosophy that you mentioned earlier, Jeremy. I'm in complete agreement with that, especially as it pertains to utilizing all of the data available.

Then zooming-out, and looking at this from a management strategy evaluation perspective, I think we don't want to reduce the complexity of the model, the candidate operating model framework here, because, unless I'm mistaken, that could lock us out of some more desirable levels of specificity in the way that management procedures are crafted, especially if they pertain at all to effects on length and age of the population, and am I right about that, Jeremy and Josh>

DR. COLLIE: Yes.

DR. DAMIANO: Okay, and so I think that's another reason to kind of stay the course with, you know, the SAC tool Stock Synthesis 3 as an operating model. I don't have as much heartburn about some of the diagnostics here, because I think the task ahead of us is really to identify the uncertainties that are going to make up the axes of uncertainty in the MSE, and so potentially the fit to the index of relative abundance is an uncertainty that we may want to explore, or at least ensure is propagated forward into the projections, the long-term projections, for testing management procedures.

Similarly, I think the point about starting the model earlier is a way to get at the population scale uncertainty that I was kind of dancing around earlier, and then, finally, to wrap things up, because I'm certainly eating up my fair share of air time, as the newest member of the SSC, is, with the steepness set to 0.9 run that you did, what was the curvature in the results when plotting out recruits with the spawner, because I'm wondering if that -- If that is high enough to functionally decouple recruitment from spawning stock biomass in a way that could deal with the openness of the population.

DR. COLLIE: Thanks for that it. I mean, I don't have the plot to show you here, but it's within the range of the estimated spawning stock biomass. The recruitment curve is not declining very much, and so it's not on really a downward. We're looking at a yield curve, and talking about a recruitment curve, and so that's kind of confusing, but it's definitely moving in that direction, and

it's not it's not extreme, like some fits would be, but I think the problem of having steepness even higher -- Well, there are two problems.

One is that the model fit degenerates, and the other thing is it gets you really into logical -- It ties you into logical knots, and like you say, well, how could -- You know, how could that actually be for a real population, and so it kind of becomes the model fit grades, and it becomes harder to justify logically.

DR. REICHERT: Thank you, Jeremy. I have Luiz, and then Genny. Luiz, go ahead.

DR. BARBIER: Thank you, Marcel.

DR. REICHERT: Thanks for waiting.

DR. BARBIERI: Sure thing. That's absolutely no problem. Can we -- Would you please move back to slide 29? Thank you. Jeremy and Josh, please understand I'm not, you know, knocking down this analysis here, that it's not being well done and being uninformative. I mean, I think that what we're really considering here is a philosophical approach for the SSC to consider, right, given all the other assessments that we review, right, for providing catch advice to the council, the amount of information that we have, and the approaches that we could consider.

I think that this has been very informative, and this is very well done, right, but it gives us now -- Now we know. I mean, look at the range, right, there that you get, right, in terms of your different levels of steepness, as expected, right, but these are big assumptions to make.

Of course, there's the issue of the virgin biomass and virgin recruitment too, right, that is implicitly included in here, and so, philosophically speaking, right, in terms of using different approaches, I was just trying to put this out here, and not to be overcritical of what you presented here, and I think this is very well done.

Going back to what Alexei had brought up, right, in terms of where are we here in terms of being able to really understand the dynamics, and do we have the pieces of information to really understand the dynamics, right, and so, as an example, we here in Florida have contracted a different consulting firm, Bill Harford's group, right, to conduct a desk MSE, and this is going to be presented to the SSC at the October meeting, that looks at a variety of, you know, different levels of -- Through that the MSE, right, different MPs that could be considered.

Different MPs are constructed differently, right, using different levels of information, and you have performance metrics, robustness, et cetera, that come out of that as well that allows you to evaluate, you know, what would be the long-term trajectory of biomass and catch, given the implementation of different levels of MPs, and so it's simply, you know, a different approach.

Of course, there's different people who prefer different things, right, but I'm looking at this and thinking, okay, if this happened to be an actual stock assessment that would be going through the SEDAR process, right, from a data, assessment, and review workshop perspective, how would we react to all of this, and so I think that this has been very informative.

I think that there's different ways that you guys could proceed, or consider proceeding, but I just think that this is something for the SSC to consider, because our Science Center, right, has been basically looking at adopting, you know, fully model-based stock assessments for some stocks, and perhaps simpler procedures for stocks that are not as well informed, for which data availability is not as high, you know, to try and deal with things that become problematic as we go into these more complex models.

Now, if you tell me I can actually appropriately capture all of this, and provide you with different states of nature, and you're going to run this in a way that we're going to be able to account for all this variability, right, and all the uncertainty that we have here, by all means, and I probably haven't seen that part, all right, and so this is why I was bringing that up, is that comments from the SSC members -- You can see how there's a level of discomfort with some of this, and not everyone, of course, but some of us do, because you have to make -- Josh started, and I thought that part of the presentation was very good as well, talking about what are reasonable, and what degree of assumptions we can make, you know, that we consider keeping us within a credible range.

That was my point there, Jeremy, and not to knock this down, but, basically, to discuss are there other approaches that we could advise you guys to start pursuing, or you would say, no, Luiz, and this is better, because, and here's what I can provide, and here's how I can account for all the uncertainty.

Eventually, we're going to -- Whatever outcome comes out of this, we're going to have to consider relative to our ABC control, right, and, as you know, we're going to have to account for a lot of that uncertainty, and capturing all of that is important to us, especially when we're dealing with a model like this, and I feel that, when we go to something lower, simpler, we are more explicitly acknowledging that we don't have all the pieces that we need, right, and that we are just going to that lower-level approach not to have to make this many assumptions, and does that make sense?

DR. REICHERT: Thanks, Luiz. Jeremy, a quick reaction, and then I have a question for Luiz, and I also have Genny and Matt in the queue.

DR. NOWLIS: I just wanted to highlight that I have some strong opinions that I want to share about this.

DR. REICHERT: Absolutely.

DR. COLLIE: Okay. I'll go first then, I guess. I can kind of anticipate what Josh is going to say, but I guess the way I see the SSC role here is to evaluate the candidate models, and I think, because of the uncertainty that you have identified, and we have, it argues like not going forward with one single best model, but to acknowledge those axes of uncertainty.

I think the role of the SSC is probably to evaluate the technical specifications of those model fits for the suite of alternative operating models, and maybe to reject ones that really are -- That don't make sense, and then to sort of evaluate the set that you think are, you know, technically feasible, and so that's the way I look at it.

DR. NOWLIS: Thank you for that, Jeremy, and so there's a few points that I want to make. One is there's a distinction, in my mind, about how complex of an operating model we use versus how

complex of a conceptual model we have from the management perspective, and I am comfortable using very complex, or not very complex, operating models, but, you know, to your point that it's -- Ultimately, the operating model issue, from my perspective, is that what we're doing with this is we're using that model to project into the future, and we're not good at it.

We're not good at it even when we have data-rich situations, and we're extra not good at it when we have data-moderate, and we're pretty horrible at it if we're trying to do it in a data-limited circumstance, and so, given that, in my own work, and informed in fact by time I spent working in Miami as the lead stock assessor for the Caribbean region, where I was constantly told, well, okay, that model right there looks like it's interesting, and might have some information, but it doesn't have enough information for us to apply our conventional way of managing things, and so we're just going to reject it outright and do nothing.

I've been motivated by a Bob the Builder mandate of can we do it, and, yes, we can. In order to do that, it's really important to have some confidence that we're not moving in the wrong direction. The whole concept behind this project of adaptive implementable management -- It has the acronym AIM on purpose, because, if we're aiming in the right general direction, then that's -- You know, we're going to be -- We're not getting ourselves worse off, and we'll maybe not be improving in the most optimal way, but we'll at least be improving.

When we acknowledge that there are these uncertainties, it's not necessarily a bad mindset to say we're going to have this this straw -- You know, straw-person proposal of what's going on here, acknowledging that we have the opportunity to come back in a few years, with more data, and revisit this and make revisions, and so that crucial aspect of committing to coming back and making revisions is a key element, but the other key element, and it's the biggest motivation I've had for the work I've done in this field for the past twenty years, is that we, as scientists, are very capable of recognizing that the significance of this uncertainty we're talking about is the potential that we set up an unrobust management system, one that's going to cause problems, one where, in the future, we are not going to get the kind of performance that we're hoping to live up to.

From my perspective, unfortunately, when we went through this discovery of robustness in the 1990s, we got really focused on this one idea, which is we need to use a precautionary approach, and a precautionary approach means that we fundamentally reduce the overall quotas that are involved, reduce the overall fishing pressure that's involved, if there's uncertainty, and the reality is that there are other ways of building robustness into systems.

They include better information, and they include more frequently revisiting where we are, and catching problems before -- When they're little, before they become big, and actually having harvest control rules that are fundamentally more responsive, that take bigger -- Make bigger adjustments in the early signs of an issue, again to be able to avoid that bigger problem.

When I've talked to people about why don't we have discussions about these different opportunities we have for robustness with the communities that are most affected by them, I've been told, by more than one person, that this stuff is too complicated for non-technical people to understand, and so, in my mind, that is the key.

The harvest control rule design tool, that you have the link to, is my attempt at making it so that non-technical people can have a full understanding of the concept of robustness, to be able to see

what the consequences are if a policy is not robust, but then, equally importantly, be able to see that there are performance tradeoffs. You don't get robustness for free, and, equally importantly, that there are multiple different ways we can potentially pay for robustness.

Getting back to an earlier point that was made, it turns out, in my experience working with fishing communities, different sectors, and different individuals, have a different tolerance for how much robustness they really feel is necessary, and, especially among sectors, there can be really big differences in how they would want to pay for additional robustness, and so that all strikes me as something where it's really fundamental for us to get stakeholders engaged, so that those perspectives can be reflected in a policy that they can that they can actually understand each other better, and areas where they disagree, and, ultimately, that they can participate in a negotiation of how we fundamentally address that uncertainty by building in an appropriate amount of robustness, paying for it in ways that are reflective of what the community wants, acknowledging that there's going to be differences in all of that.

To reference that the Harford project, Bill does great work, and absolutely nothing against that. One of the reasons why I've drifted away from doing that degree of work is that doing that kind of detailed management strategy evaluation model means getting into so much more that's uncertain than just the assessment stuff we're dealing with. There's huge uncertainties on the human dimensions side, and, oftentimes, for the vast majority of fisheries, we don't have nearly enough data to be able to resolve most of that.

What happens if we set up a system where the management strategy evaluation is something that's slow, and has to take a fair amount of time for a technical expert to go in and make the modifications, and then come back and report, is that we have very slow feedback between ideas that people might have and what they ultimately see.

The harvest control design tool is actually specifically designed to give, using differing degrees of complexities in the model, instant feedback on the tradeoffs, with just a shallow perspective, a moderately deeper perspective that looks at that in more detail, and then, ultimately, we can run something that's kind of like an MSE, but where we reserve that to where we've really honed things down, and so that's the philosophy of this project.

I realize that it doesn't negate other really valuable things like MSEs, where we have enough information to do something like that, that are done in the kind of more conventional way, but that's the concept, and I will say that it's very much driven by the idea of acknowledging that we're not good at projecting the future, and so we need to simulate what that means.

That's why we emphasize the uncertainties, and the range of operating models, as much as narrowing in on a specific base case, and to also acknowledge that there are going to be differing opinions of what kind of performance profile people want, and so we can -- As technical folks, we can provide a service, by putting in the hands of those stakeholders the ability to be able to look at those tradeoffs. Thank you.

DR. REICHERT: Thanks, Josh. It is past twelve, and I do have several people in the queue. Jennifer reminded me that we still have -- She has some comments about the SEP discussions relative to this, and so we need to get that too, and I do want to make sure that we provide Jeremy

with sufficient feedback, so he can move further with his process, and then, of course, we also have the other agenda items for today.

What I would like to do is briefly continue our discussion here. If necessary, we can come back after lunch, but I just wanted to mention the time, and the fact we are running into lunchtime, and we have a presentation, the SARSRP presentation, from Will Patterson scheduled for this afternoon, and so anyway. I just wanted to mention that briefly. I have -- I want to give Genny, Matt, and Steve an opportunity, because they had their hands up. Genny, go ahead, and then we'll go to Jennifer for the SEP comments. Go ahead.

DR. NESSLAGE: Very briefly, one, thank you for explaining. I forgot that catches were zero at the beginning of the time series, and so I'm completely onboard with everything you've done. Thank you for your patience. Two, I would be very concerned about going more simple than this, because you're just making bigger, broader assumptions, and you're sweeping a lot of that up under the rug. Here, you're exposing, with data, where you're making the exact assumptions, strong assumptions, and I like this approach. Third, I love the last slide, Jeremy, and I like your plan for incorporating age comp data, and I look forward to seeing the results. Thanks.

DR. REICHERT: Thank you, Genny, for your brevity. Matt, go ahead. You've been waiting a while, and so go ahead.

DR. DAMIANO: Thanks. I'm going to aim for Genny's level of brevity, and so, first, everything she just said. Second, I think the task ahead of us, in terms of, you know, determining the suitability of the stock assessment model as an operating model, is much the same as what we had to consider yesterday for dolphinfish. Is this the, you know, best state of information? Does this represent our best understanding of the population dynamics of the stock, and I think, in this case, it does.

So, really, what we need hone-in on, as a committee at this point, is that axis of uncertainty to explore, and I'll just kind of build on some of the points that Josh was making. I think that, when we get to the part of the MSE where we're looking at projecting MPs forward in time, we can look at MPs that range in their complexity from simple to complex, and we may find that a simple MP is insensitive to our axes of uncertainty, or very sensitive to it, but that's something that we can determine in the next step without taking a step back in terms of operating model complexity. Thanks.

DR. REICHERT: Thanks, Matt. Luiz, just to -- I also had you in the queue, because I have a question for you, but we'll go to Steve first.

DR. TURNER: I'm beginning to wonder about the appropriateness, and maybe some other people will comment on this quickly, but the appropriateness of a steepness of 0.9, or even 0.75, for an animal that lives to ninety-eight years old. I would think that you would be looking at steepness much lower than that, 0.4, or I don't know what, but perhaps the modelers could provide some feedback on that and some guidance to Jeremy and Josh.

DR. REICHERT: Does anyone want to comment on that? Maybe, Jeremy, you guys may have thought about that.

DR. COLLIE: Yes, and I've certainly thought about it. I don't have a clear answer, but I think Steve is correct that other assessments for long-lived species, like rockfish, they would gravitate toward the lower steepness values, and the data are certainly pointing in that direction, even though there's no clear estimate of what steepness is, but the data are certainly -- I guess, by now, the other stocks are going in that direction. I guess the wildcard here is the lack of closure of the population. If this were a closed population, with a long-lived species, I would think there would be strong support for a low steepness in the stock-recruitment.

DR. REICHERT: Thank you, Jeremy. I think Steve is still thinking. Go ahead.

DR. TURNER: Yes, and I'm just wondering whether, for the MSE, a low steepness should be included. Rather than a steepness of 0.6, something lower than that, but I'll stop there.

DR. REICHERT: No, and, you know, I don't disagree, you know, but sensitivities for steepness is the same as natural mortality. You kind of know what direction that's going to go, but -- Yes. Luiz, I want to make sure that your point was addressed, because I almost -- It felt like you were almost coming up with a recommendation to perhaps use a different approach, and I just want to make sure that you -- If you still feel very strongly of that, because, if that's the case, then we need to have a discussion about that, or are you comfortable with where we are right now? Does that make sense, Luiz?

DR. BARBIERI: It does. It does. Thank you, Marcel, and I just wanted to put this there, right, for discussion by the committee, and all the feedback that I've heard so far is that folks are onboard with the approach that is proposed now, right, and so I'm okay to go forward with that, and I don't have any concerns. I just thought that this was something that we would have to discuss at some point or another, and I wanted to put this out there, and, if the committee prefers to continue with the current model, and the current approach, right, this is fine. Thank you, Marcel.

DR. REICHERT: No, and thank you, and I think -- I hope you help us draft some language, because I think it's good, for the record, to at least include that thought in our report, but thanks for that. Jennifer, can I hand it over to you relative to the discussions the SEP had to the wreckfish MSE?

DR. SWEENEY-TOOKES: I'm actually enjoying your phrasing of that, because we've had none. This information has not been presented to the SEP.

DR. REICHERT: Okay.

DR. SWEENEY-TOOKES: This information has not been discussed by the SEP, unless I'm having a terrible failure of memory.

DR. REICHERT: Then I completely misunderstood.

DR. SWEENEY-TOOKES: Which is actually our concern. The first set of slides was new information to us, that we found very interesting, and compelling, and we would love the opportunity to perhaps see a bit more, to ask follow-up questions on that first set of slides, that were not in our briefing book, and we do have follow-up questions on that component, if you

would like for us to do that now, or we can wait on that, or we -- I don't know how you would like us to handle it, but there is no SEP report on this.

DR. REICHERT: Okay. Sorry. I misunderstood.

DR. SWEENEY-TOOKES: No, and I feel like you made the point really well for me. Thank you.

DR. REICHERT: Well, okay. Go ahead, Judd.

DR. CURTIS: Jennifer, I think that would be good to get some of the additional information, as part of that management procedure and the AIM process, to the SEP, and we were focusing on the stock assessment model, or operating model, for this particular agenda topic, but we can definitely add that on to a list for the SEP to review, and we can talk with Josh and Jeremy about when that might be able to happen.

DR. REICHERT: Thanks, Judd. Does that kind of address your comments? Go ahead.

DR. SWEENEY-TOOKES: I was just going to say that would be great. I mean, we see that they have an excellent project oversight team, and so I don't think that things are going badly, but just that we've never had the chance to see even how the sausage is being made here.

DR. REICHERT: Jennifer, and that's a good point, and I think, as an SSC as a whole, we usually hear from you guys after there were topics on your agenda, and I think we should probably pay more attention, in terms of stuff that comes to our committee, the full SSC, that would be useful for the SEP to have a discussion about, and so your point is well taken, and, collectively, we should probably think about that whenever we discuss our agenda items, and so thanks for that. I have Amy, and then I have a question, or a comment. Amy, go ahead.

DR. SCHUELLER: I just wanted to thank everybody for the good discussion, and it looks like our action items are to like, you know, evaluate the model methodology and data inputs, and then reflect on any uncertainties, and I think I agree with -- I mean, I know I agree with everything that Genny said, and I wanted to circle back to the steepness thing that Steve said, because, if you look at that candidate operating models table, which is like just one more slide up on the webinar, and it's like slide 36.

The one thing I've been thinking about the entire time we've been sitting here is that it's really hard for me to evaluate model fits based on like equilibrium curves and stuff, and I like to see the index fits, and so I guess I -- One suggestion would be to provide the index fits for the different operating models, and the reason I'm saying this is the loglikelihood for the low steepness run has the smallest value, and I'm wondering, you know, where that improvement is coming from, and it might be from the index fit, and so I think Steve's suggestion of maybe adding another lower steepness value would be interesting, because the log -- The likelihood profile suggests that it could be lower, potentially, and then, also, these overall fits to the model, according to the loglikelihood, are smaller, and so I think adding that one uncertainty aspect might be informative.

DR. REICHERT: Thank you, Amy. Does that make sense, Jeremy?

DR. COLLIE: Can I respond to that really quickly?

DR. REICHERT: Sure.

DR. COLLIE: So, first of all, I'm happy to provide all the diagnostics you want to look at, and I can tell you it's voluminous, and so you have to be selective. I just put on a number of things that would fit on one table. The thing about the loglikelihood is the two main components are the fit to the index and the length, and so, as you go for lower steepness, those components both go down, to some extent. When you add them up, you get the overall likelihood, and you can see it is going down, but I can certainly provide those likelihood components, and so you could say that the fit is getting sort of marginally better as far.

As the range of high, low, medium, I was really taking that from the previous assessment. That was the sensitivity analysis that was used previously, and, you know, you can make arguments for lower, as Steve did, and you could make an argument for a higher, as somebody else did, but some guidance there would be very useful. I think that, with this axis of uncertainty here, we are capturing meaningful differences in the estimated population, but it could be, you know, even more extreme values, if you think that was plausible, and so thanks for that question.

DR. REICHERT: Thank you, Jeremy, and so a question for you, Jeremy. In terms of the feedback, is this what you need from us? I think Amy mentioned -- You know, I think we've addressed a lot of the -- There were only two action items, but I think we addressed a lot of those, and is there any additional feedback, specific feedback, that you need from the committee to move this forward, Jeremy? I just want to make sure that you are -- That we haven't missed anything.

DR. COLLIE: Thanks for that, and so I guess -- I've been taking notes here on some of these suggestions, and I don't know if you want -- If they'll be formalized in your SSC report.

DR. REICHERT: They will.

DR. COLLIE: Okay, and so I'll look forward to seeing that, but, if anybody -- If any of the SSC members, you know, would like to follow up individually, that would be fine, and I've talked to Nicolai about this in the past, and I'm happy to discuss this. Obviously, we have, you know, a limited amount of time that we can devote to this, and so we have to prioritize, and so thank you very much. I really appreciate this. I was going to say, jokingly, that I'm much more used to being on the SSC, and grilling the stock assessment scientists, and so now I get to see it from the other perspective.

DR. REICHERT: All right. Thank you, Jeremy, and so I have one more comment, but, first, so, Judd, or others, is the SSC going to see this again, and what's the timeline for this, in terms of our discussions and review? Maybe you can refresh my memory there, Judd, or someone else.

DR. CURTIS: Yes, and, well, certainly it seems like this needs to come back to the SSC for a final evaluation. I think the idea is giving the broader AIM presentation to the SEP for their comment also would be helpful, and so we'll find a time to do that. I would have to look to Chip to see when the -- What the project timeline looks like, but I imagine there is time to get a presentation into the SSC for our October meeting, or perhaps sooner, but I'll get back to you on that, but, yes, certainly we'll create some space in an upcoming agenda to refresh.

DR. REICHERT: So, while -- Well, we don't have to discuss this now, but I have a similar question that I had with the dolphin MSE. If we have a stock assessment -- If we ultimately have a -- Maybe that's because I'm still a little fuzzy about the whole process, but, if we have a stock assessment, then normally we would apply our ABC control rule, and that provides a fishing level recommendation to the council.

It seems like, within the MSE process, this works a little bit different, and just to put it out there on the record that I'm still a little fuzzy how that's going to work. If we're seeing this again, then I don't think we need to have an extensive discussion about that, but I think it would be really helpful, perhaps, if we can potentially address that next time we see this, because that -- I think that helps us formulate our recommendations to the council. Anyone disagree with that, or have I completely missed the point? Okay. Seeing thumbs-up, we'll --

DR. COLLIE: Can I respond to that?

DR. REICHERT: Sorry, Jeremy. Go ahead.

DR. COLLIE: I think it's useful to have this back-and-forth, and have some iterations. Otherwise, it's really hard to incorporate suggestions. I guess one thing that you might consider would be what biological reference points would be relevant for wreckfish. I mean, what would you like to see, because, to some extent, we could try to incorporate that in the next iteration.

DR. REICHERT: Okay. Thank you. We'll review our report, and maybe we can think a little bit about that, and add that to our report, and we'll make sure that we share that report with you and Josh, Jeremy, and others. Make sense? All right. It is 12:25. We're going to recess for lunch, and we'll come back at 1:45, and so we'll have a little bit of a shorter lunchbreak, but not that much shorter. 1:45.

DR. NOWLIS: Thanks, everybody, for the great feedback.

DR. REICHERT: Thanks, Jeremy. Sorry that I forgot to mention that. I really appreciate your willingness to answer all our questions, and so thanks for all that hard work, and Josh.

DR. COLLIE: Okay. Thank you.

(Whereupon, a recess was taken.)

SOUTH ATLANTIC RED SNAPPER RESEARCH PROGRAM

DR. REICHERT: All right. Welcome back, everyone. Our next agenda item of the April SSC meeting is Item Number 9, South Atlantic Red Snapper Research Program, and those were Attachments 9a to 9d, and note that some of those were in the late materials. The assignments were Jim, Genny, Christina, Amy, Fred Serchuk, and Alexei, and Jeff, who was a project member, and Luiz and I are on that list too, and we were both members of the review panel. Before I hand it over to Will Patterson to give us an overview, I have a few slides, just to set this up. Judd, if you can bring them up, please.

While Judd is doing that, I want to remind the committee that this should not be a full re-review of this project, but we should really concentrate on the response by the research team to the review panel's comments. Also, although that is an important component, the SSC is not asked to comment extensively on how the SARSRP results are to be incorporated into the SEDAR 90 stock assessment, as that process is currently underway, and so, Judd, if you can bring up --

The review uh took place in Charleston, in mid-January. The review panel consisted of Joe Powers Daniel Ruzzante, and Noel Cadigan, who were all CIE reviewers, and Luiz Barbieri, representing the South Atlantic SSC, and I chaired the review for the South Atlantic SSC, and, officially, I was not reviewer. I was chair, coordinating the discussions, and I was responsible for editing the report.

Then we received a number of presentations by Dr. Will Patterson, Nathan Hostetter, and David Portnoy, and there were several other members of the research team present there who were able to answer some questions.

There were four presentations covering two main project components, the close-kin mark-recapture method and the Bayesian Hierarchical Integrated Model. Each resulted in a red snapper population estimate for the South Atlantic region, and, after the meeting, a consensus report was produced, and that is in the briefing book, and three individual CIE reports, that were also available to the SSC in the briefing book.

The main conclusions, as you could have read in the report, were that we felt -- The review panel felt that the methodology and study design was robust. Sampling efforts were sufficient for initial estimates of population abundance, sorry, and this relates to the close-kin mark-recapture method, and the analyses developed were consistent with theory and modeling experience and applied appropriately.

Of course, we talked a little bit about uncertainties. The review panel as a whole considered that the uncertainties were likely a little underestimated. Also, the abundance estimate based the close-kin mark-recapture method were not entirely independent from stock assessment information, and, also, we noted that there may be an unknown number of less than two-year-old fish in the analyses, and the panel recommended some additional sensitivity analyses to fully assess the potential model misspecifications, and I know we'll talk a little bit more about some of these. Overall, the review panel accepted the close-kin mark-recapture-based population estimate, given the review panel's identified uncertainties and recommendations.

The other method was the Bayesian Hierarchical Integrated Model, BHIM, and we discussed that sampling design and sampling locations were sufficient to estimate average camera counts for the SERFS sampling frame, and that's the survey that you guys heard about before the lunch.

One of the conclusions was that abundance over unconsolidated bottom was very low, and that was an initial question that was in the RFP, and we also discussed the effective sampling area of the video trap was critical for estimating total red snapper abundance, and there were two locations where that was investigated. The review panel -- The research team itself said that the Chicken Rock study was probably the one that should be used, and the review panel accepted that, but the limitation was that is just from one area, over a limited time period. Ultimately, there was little confidence by the review panel that this resulted in an effective sampling area that represents the overall ESA for the entire stock area.

Another issue that the review panel discussed was that the SERFS video and ROV density estimates were expanded to the entire study area, but there was considerable uncertainty in their information of hardbottom habitat, and that goes to an issue that we as an SSC have discussed several times, and that's the mapping the unknown areas of live bottom and other habitat, and so the population estimate was sensitive to how the bottom type was identified and classified, and there were some sensitivity -- Or there were some other maps that were used to compare the results, and the habitat uncertainty -- This habitat uncertainty was not included in the overall CV of the BHIM population estimate.

Then, again, similar to the other method the population estimate, is not entirely independent of the stock assessment data, because video trap data were used, and then, again, also, it was not entirely known how many less than two-year-olds were included, and, overall, the review panel had little confidence in the BHIM population estimate, and the research team generally agreed with that result. This is just a broad overview, and I'll hand it over to Will, and, as I said, he'll probably address some of these. Will.

One thing -- While Will is setting up, one thing that I forgot to mention, and also didn't put in my slides, is the review panel also commented on the tremendous amount of work that was done by the research team, in a variety of fields, and it made definitely great strides in understanding red snapper biology, population dynamics, et cetera, and so that was something that the review panel commented and appreciated. Thanks. Will.

DR. PATTERSON: Thank you, Marcel, and so we had a broad study team working on this project. Every state agency from North Carolina to Florida had members on our team. We had academic scientists from several universities. Jeff Buckel was the lead on the BHIM aspect of the study at NC State, and there were several other NC State scientists, Nathan Hostetter, Krishna Pacifici, Brian Reich, Erin Schliep, and several post-docs. You can see Chris Custer, Ben Goldstein, Matt Damiano, Viviane Zulian, who were also part of the team, as well as Paul Ruderhausen.

Then the other main component of the study was the CKMR component, and that was based at Texas A&M Corpus Christi, and so Dave Portnoy and Chris Hollenbeck led the team there, and then we had several different NOAA and NOS scientists who were also part of our team, and Wally and Jeff, obviously members of the SSC, were parts of our team, and Marcel very briefly was part of our team, until he headed to the grand upstate region, where he now resides, and, again, lots of federal partners as well, and so just thankful for the amount of participation and buy-in. There were countless hours of personnel time devoted to this in-kind, and, you know we mention the report, and there's no way for us to add all that together, and it was just a tremendous undertaking, and a lot of support throughout the region, and so we're very thankful for that.

Our study is dedicated to Kyle, who passed away last fall. He was an important member of our team. This is the dedication that appears in the report. I know Kyle interacted with this committee quite a bit.

The project itself was administered through South Carolina Sea Grant. Susan Lovelace was the director at the start of this project in 2021. Emily Osborne has assumed that role more recently, as Susan has moved back into an academic position. Jocelyn Julian was our coordinator, who we dealt with on sort of day-to-day basis, and lots of folks there, and really a nice team to work with,

very collegial, and are incredibly efficient at what they do. They facilitated this project tremendously, and so we're very thankful for their administrative support and guidance.

This study, you know, came about, as a few studies now in our region have, from stakeholders appealing to congressional delegations to kind of go outside of the typical way that science is done in our region, and the congressional sponsor of this was Congressman John Rutherford, who we interacted with just a little bit in the study, but he was always interested in what we were doing, and what the results were showing. Katie Ramos was our initial liaison, and then later Amber Najjari, and they both were phenomenal to work with and facilitated the lines of communication tremendously.

Again, the monies were allocated by Congress, and put into the NMFS budget, or carved out of the NMFS budget, and I'm not actually sure how that all happened, but with the intent of the funding going through National Sea Grant, and then South Carolina Sea Grant competed to host the award, and then you can see that the dates.

In November 2020, and RFP was issued, and then -- Actually, it was issued a little bit ahead of that. The LOIs were due in November, and then, by February, the final proposals were due, and so there was a considerable steering committee that was involved with this. Different Sea Grant folks from around the region as well as scientists in the region that participated, and then there was a peer review process as well for the proposal.

The RFP, the goals were to produce an estimate of absolute abundance of age-two-plus red snapper in the U.S. Atlantic with a CV of less than 0.3, with the estimate to serve as a benchmark for future stock assessments, and the RFP indicated that applicants could utilize CKMR, which we were happy to see that explicitly stated, optical data from video surveys, or a combination of acoustics and optical data, like the Great Red Snapper Count in the Gulf, and they asked for, you know, to produce an estimate, utilizing any of these candidate approaches, and the idea that fisheries managers wished to know the total number of red snapper, and where they are, regardless of where the fishery operates.

We developed a study team. Jeff took the reins and pulled folks in at NC State, different ecologists, biometricians, folks that do a lot of wildlife research, and just a tremendous quantitative team, and Dave pulled in Eric Anderson, who at the time worked for National Marine Fisheries Service, and he has since retired, and is a private consultant associated with the University of Colorado, or Colorado State University. Excuse me.

Chris Hollenbeck and others, and so we had this broad team that was assembled and put together a proposal, and we decided that we were going to try to produce two different estimates, one based on CKMR, which we thought was tractable, and the second utilizing the camera trap data collected by SERFS.

Our idea was that, because SERFS is collected every year, if we could -- If we could accurately estimate the effective sample area of the camera traps, then that could be a means by which to produce absolute abundance estimates every year, instead of just tracking relative abundance. Then CKMR was a newer technology that hadn't been applied on this scale in the U.S., and so there was some uncertainty with that, but we felt, again, that it was tractable, and so we proposed to utilize both of these approaches for the funding available.

Subsequent to the first award, there were annual allocations by Congress that flowed through Sea Grant that --There were RFPs to compete for additional funding, and so this turned into a multi-year award. I don't think we would have done things the exact same way had we known at the beginning that there would be several years of funding, and several millions of dollars, instead of just one year at \$1.5, but we still think that the approach we took was scalable and allowed us to produce estimates, just multiyear estimates, as well as we could have with the initial funding.

I should have said it earlier, but I failed to mention that Nathan is actually online. Jeff and Wally are, obviously, here, and I think Nate Batchelor is online as well, and Dave Portnoy, and so the goal of this presentation is to kind of give you the broad view of things. Judd said I had an hour, and there was no way to get into the nitty-gritty details in an hour, given the two aspects of the study, and so I'm going to go through an overview, and give sort of the high spots, and a general idea of the approach, and then, for those of you who have spent more time with the report, and you have specific questions about any of the methodology, we can get into that after we run through this presentation.

Our objectives, one, were to estimate the distribution and density of red snapper across the U.S. Atlantic shelf from North Carolina to the Florida Keys with remotely-operated vehicles in unknown or unconsolidated habitats.

The reason why we decided to do this was because the SERFS and historical MARMAP surveys were focused on known hardbottom habitat, and, in the western Gulf of Mexico in particular, from the Great Red Snapper Count, there was an estimate, or there is an estimate, that quite a few red snapper exist on unconsolidated non-reef habitat, and so we didn't see that on the West Florida Shelf, where my group sampled in that study, and the habitat in the Atlantic is more similar to that part of Florida than it is to the western Gulf of Mexico, but we still wanted to examine this, to kind of, you know, address that assumption that red snapper are associated with hardbottom or reef habitats, and not in open substrates.

The second component was to develop a Hierarchical Bayesian Integrated Model, the BHIM, to estimate age-two-plus red snapper based on SERFS trap camera and ROV survey data. Third was to conduct genetic close-kin mark-recapture analysis to estimate the age-two-plus red snapper population size, and then, lastly, to integrate/reconcile study results with the Atlantic red snapper stock assessment model.

This was a component that Kyle in particular was heavily involved in, and Paul McLaughlin and Matt Damiano, until he went to work for the state of North Carolina, as well as Matt Benson has been really critical in this component of trying to build CKMR estimation into the BAM model.

I just want to quickly touch on, and not spend a great deal of time, but we set up the report to try to efficiently convey what we did, how we did it, why we did it, and what the results were for population estimation, but there are lots of components of our study which tested assumptions or examined distributions of fish on the shelf that were critical to our ability to accurately estimate red snapper population size using either of these two approaches, and so we have eleven appendices.

Some of these have been published already, like Viviane Zulian's work on the N-mixture marked

methodology developed at NC State to try to estimate effective sample size, or, excuse me, effective sample area of camera traps. In the center is a paper that's in revision now, I believe, and it's hard to keep track, and sorry, that Ben Goldstein, a post-doc at NC State, led, an integrated approach to estimating effective sample area. This usually spatial capture recapture modeling. This is the Chicken Rock and then Turtle Mound data that Marcel had mentioned.

Spatiotemporal dynamics and habitat use of red snapper on the southeast U.S. shelf, a paper that Nate led that focuses on the distribution of animals, and it pulls in the ROV data to look at whether red snapper in the region occur on unconsolidated habitat or not.

Appendix 4 is a study looking at genetic population structure of red snapper. This has already been expanded, and it will be a little bit more before it's ready for publication. A critical assumption is that the population, or the group of animals that you're looking at that, that geographic distribution represents a single genetic population and not a mixture, or just parts of a population.

Appendix 4 is a sensitivity of CKMR population estimates to uncertainty in life history parameters, and so this is part of Liam Kehoe's dissertation research at UF, and it focused on teleosts like red snapper, and elasmobranchs like sandbar shark, and it's a pretty comprehensive analysis simulation study.

The CIE reviewers, and other members of the review team, felt that this wasn't specific enough, that it dealt with uncertainty and trying to look at sensitivities of the model to these life history parameters. However the sort of prevailing sentiment was it wasn't specific enough to red snapper, and so Liam, in the past two months, coded up and ran another simulation study specific to red snapper, and that is now Appendix 11, which will be shortly submitted for publication, for review.

Appendix 6 is incorporating CKMR into integrated assessment method model for Southeast U.S. red snapper, and so this is what Paul has been working on, and this appendix is fairly brief, but it just shows you sort of the conceptual layout of what they've been working on and how that's going to come together.

Appendix 7 is estimating reef fish exploitation rates in catch-and-release fisheries with conventional genetic tags. This is another component of Liam's dissertation, a simulation study using conventional and gene tags. The idea is that you could utilize either of these approaches to estimate the discard exploitation rate, and, if you have an independent estimate of population size, and you multiply those together, then you can get an estimate of the absolute number of discards without having to rely on any of the various surveys of effort and catch. We've since gotten funding to then put the conventional tagging aspect of this into work, and we tagged last year, and we're tagging again this year.

Next is Appendix 8, which has now been accepted for publication, but we don't have the galleys yet. It's a paper that Paul led that stakeholder insights corroborate habitat and reef fish abundance on the Southeast U.S. continental shelf. It's a really cool study that the folks at NC State did, where Paul contacted various fishers, stakeholders, and he and Jeff worked together to develop different maps of where they thought the habitat was, what their catch rates were, what their red snapper catch was in different regions, and so they were able to take this sort of qualitative data and make it quantitative, and then we compared that to the distribution estimates from the BHIM,

and the paper goes into discussion about how this type of information can be useful when other habitat information may be lacking.

Next is a paper, another paper that Paul led, discard mortality of red snapper after barotrauma and hook trauma. This was from samples with the 3D telemetry that we did at Chicken Rock, used for effective sample, or not effective. The effective sample area of the camera trap. Three-dimensional telemetry was utilized, and then they could track the fish to estimate mortality rates.

Appendix 10 is a paper from Selia Zimmerman, who is a PhD student at UF, where we took a similar approach to the Turtle Mound region off of northeast Florida. Three-dimensional telemetry was done to estimate effective sample area of traps, camera traps there, and we used the tagging data with and without descenders to estimate the effect of descending on survivorship, and then Appendix 11 is another paper by Liam, which, again, is this red-snapper-specific simulation work.

The goal -- You know, sorry to spend so much time going through these, and we don't really have time to talk about much of the details, but they're there, and they're linked on the website that the South Carolina Sea Grant hosts for the study, and, as they become published, then, obviously, they'll be available as published manuscripts, but the goal here was to try to test assumptions and to, you know, squeeze the model, some of the simulation analyses, to see where it would break, and try to understand how sensitive at least CKMR was to these various assumptions, and then, for the other components for BHIM, to parameterize the model in some respects, and so, again, quite a bit of work done by the team to address these various aspects.

Okay, and so moving into population estimation. The first approach was the Bayesian Hierarchical Integrated Modeling. Again, Jeff led this team, and Nathan Hostetter and Krishna Pacifici had tremendous roles in putting the quantitative team together as well, and various the post-docs, and applying this approach. It was a fun group to be a part of, a lot of interesting ideas, and I think --

You know, Marcel mentioned that the CIE reviewers didn't feel that the population estimate was usable in the same context that maybe the CKMR estimate would be, but they were, I think, at least a little bit, and I don't know what the correct term here is, maybe impressed, or expressed, you know, appreciation for the quantitative approach of this, and the fact that this methodology has now been developed, and, if habitat maps can become refined, then perhaps this can be applied as well.

The general approach here was to integrate red snapper density estimates from multiple survey methods to jointly estimate red snapper abundance at three spatial scales, one at the site of the survey site, which is about a thousand square meters, and the next is at the grid cell, twenty-five square kilometers, and there are 14.7 million grid cells in the region, and three the study area from North Carolina through the Keys, and so 112,500 square kilometers.

Habitat suitability was informed by study video data, so this includes the SERFS camera trap data, as well as ROV data, and then informed priors from previous studies, as well as the mapping, and then separate observation models accounted for different detection probabilities and effective sample area of the ROV traps and cameras mounted to traps.

I think this was an important component. I just want to highlight this idea of actually estimating the effective sample area, if not specifically detectability, but to estimate the effective sample area.

There's a lot of work being done in reef fish ecology using small BRUVs as they're called, these baited camera traps, and I think this provides a reasonable approach for trying to estimate the effective area of those, and not just get an index from the data.

This sort of is a schematic that shows how this comes together, and so we have the study area, right, the frame on the left, the camera counts, ROV counts, and then habitat, and so hardbottom distribution as well as depth. We'll talk about how the hard bottom distribution was estimated, and so those were the environmental covariates, and so the integration was these various data components. Hierarchical is different spatial scales that you see here, and then together producing an estimate of abundance.

This is the abundance map from sort of the base model that is the most plausible mapping. I realized this morning, as I was flipping through this, that I don't have this abundance map anywhere else in the results, and so sorry about that, but you can read the report, or have read the report, and so you've seen sort of the estimate of spatial distribution.

The idea here is that the single abundance process is jointly estimated from all the data, and then this will help reduce bias in any single dataset, and then propagating the uncertainty through to the estimate of population abundance, or size, absolute abundance or population size, and sub-models connect the observed counts to latent abundance, so unobserved fish, and there's quite a bit of discussion in Chapter 2 of the report about the percentage of habitat which was actually surveyed. There was some discussion at the CIE about uncertainty with respect to that, and we certainly acknowledge.

You know, as far as the CVs and what is or isn't included in the CV estimates, those are just statistical estimates of precision, and we attempted to track all components of variance, in the various components of this, through to the end, to that CV, but we fully acknowledge that there are other sources of uncertainty, bias potentially that's not captured in that CV, but the CV is what it is, and that's that statistical modeling uncertainty. Then, lastly, to address survey-specific sampling biases, which we attempted to do, where we were able.

The positives of this, it integrates the results from separate studies via informative priors, including things like ESA. Vague priors, when information is unavailable, and so, you know, it doesn't, if we don't have -- If we didn't have information to sort of constrain that prior, it was just a loose prior put, so that the posterior could be estimated, and we attempted, in many cases, to try to produce informed priors where we could, but that wasn't always possible. Then, lastly, the sort of negative is that the MCMC estimation process can be quite slow, given the complexity of the model.

Overall, among the SERFS sampling, there are about 4,300 sites in the sample frame, and, between the years 2021 and 2022, there were 2,434 sites that were sampled by Wally's team and Nate's team, and so SEFIS and then MARMAP, that go together to form SERFS, and then this goes from Cape Hatteras to St. Lucie Inlet, and so it doesn't go all the way through to southeast Florida, to the Keys, but red snapper densities in those regions are not estimated to be high.

On the right, you can see the ROV distributions. We had 231 sites, which were randomly selected across the shelf. You'll notice, off of the Carolinas, there are a couple of places where there's sort of empty spots on the shelf. We had some weather in 2022, and we couldn't get to the whole

region. We ended up sampling these areas where there was open spots on the shelf in spring of 2023. Unfortunately, this made the BHIM somewhat complicated, because we were adding an additional year of data for only one aspect of the dataset, and it was actually better to not have it in there than to try to include 2023 from the ROV, and so I'll show you a map in a second that has those 2023 ROV stations provided.

We also did paired sampling between SERFS and the ROV, and the idea here was to try to dial in some of the detectability and ESA components of the study. Initially, we had assumed the ROV was sort of neutral, as far as red snapper attraction or repulsion, but we learned, through this study, and then going back and looking at some work that we had done earlier in the Gulf of Mexico, that there is, on the scale of that observation, some attraction of red snapper to the gear.

For the paper that Nate was the lead author on in 2025, this shows the distribution of the ROV samples, again in that map in the center, and so you can see there were actually 282 samples total, including the 2023 data across the shelf, and the figures on the right just show you -- The top row is the proportion of stations where red snapper were observed. The bottom row, and so Panels C and D, show the mean density of individuals per thousand square meters, and then the columns on the left are structured habitat as a percentage of bottom, and on the right is habitat complexity, which is mostly relief.

Red snapper like higher relief habitat, and they -- In this region, they don't -- They weren't observed on habitats that had no structured habitat, or even just a small amount, and they had the highest densities and probability of encounter on ones that had 25 to 50 percent habitat coverage. This sort of matches what we know about their ecology from the Gulf of Mexico, in that red snapper are associated with structured habitat, but they forage away from reefs, and so, areas where you have this sort of patchy habitat, where there's some structured habitat, but then open sand adjacent to it, is where they tend to be found in highest density and highest proportion of encounter rates.

This makes what we're trying to do here a little more complicated, because, at the scale of one of these twenty-five square -- Let me get this right. Yes. Twenty-five-square-kilometer cells, we end up with patchy habitat, and so we have to call that structured habitat or not structured habitat. It adds a layer of complexity and spatial variance that we can't fully account for here. There was an attempt in the modeling to do some nearest neighbor, using Queen's connectivity, and, basically, any polygon that touched another polygon that had habitat was then -- You know, it had that component as well in the covariate structure of the data.

The take-home here is that we don't really have to pay that close attention to the non-structured habitat as far as red snapper in the region, and so we're in safe grounds there, on safe grounds there, with respect to using SERFS data predominantly to estimate the population abundance.

Okay, and so a key component to expanding this estimate is the hardbottom distribution, and so there was a working group that was convened about eighteen months ago to look at the habitat maps that existed, and there were really two. There was an expert opinion map in Steward et al., 2022. This paper was focused on estimating the percentage of bottom of reef habitat in the region that was artificial reefs, and so, to do that, you have to come up with an estimate of what the natural reef habitat was.

No comprehensive mapping, you know, multibeam across the region or anything like that, and so this is an expert opinion map, and then the TNC mapping, which was reported in Conley, et al., is another exercise to come up with an estimate of the total hardbottom distribution, and there are different qualities to these two different datasets.

One of the issues with the TNC data was that it didn't have -- In areas where we saw red snapper on the SERFS sites, those weren't actually showing up as hardbottom habitats in that map, and so it was sort of a convergence of the two information sources, with another set of expert opinion, to try to come up with what was the most plausible hardbottom distribution mapping in the region, and then also then these hardbottom neighbors, to use that covariate approach.

This combination of the expert opinion and TNC mapping produced an estimate of about 5 percent hardbottom, and a population size of 5.31 million red snapper, but you can see the CV is about 0.4, and it's quite large, and it ranged from a little over one million to ten million fish, and so not much certainty there, and so the precision was poor, but, also, you know, we know that there's uncertainty just in what the -- That there could be some bias here in the total estimate of the hardbottom habitat.

At the bottom here, and so then the different mapping approaches shown here -- Like if we assumed, made different assumptions, what the population size estimate would be is in that center column of data, in millions of fish, and the reason -- So TNC had the lowest percentage of percent hardbottom occurrence across the shelf, but you can see the population size is quite large, and the reason for this is because red snapper, using that approach, aren't tied just to hardbottom habitat, and so it expands the estimate, because red snapper are then occurring on places that we think the model thinks doesn't have structure, and so it becomes an inflated estimate.

This was, you know, something that is discussed quite a bit in the report, and, you know, we were happy, or at least I was, and I think Jeff and Nathan as well, in talking to them, that the CIE team did a good job, I think, of separating sort of the model building process and approach and trying to address uncertainty where the team, study team, could, and then the reality of using maps that are insufficient for this.

The positives that were stated were the methods were applied appropriately, with several innovative approaches within BHIM, and so the concerns, and I don't have the same comprehensive list that Marcel does, and we just tried to pick out the things that we consistently saw among the CIE reports, individual reports, and address those, trying to merge things together.

The first was that BHIM estimate -- As far as the concerns, was that the BHIM estimate was not independent of the red snapper stock assessment. Well, there's no stock assessment derived parameters that feed into the BHIM model. However, the SERFS data are utilized in both, but it's only two years, 2021 and 2022, that are utilized in BHIM, and so we felt that, more or less, you know, this was an independent estimate.

The camera trap, the ESA estimation, was based on data from one region, and perhaps not applicable to others. All I can say is here, we tried, right? We tried to do it in a second region, but -- Maybe it was the spatial distribution of the habitat, but the estimate just kept going to the upper bound, and there wasn't enough information in the data to effectively estimate ESA, but, if funding were available in the future, we could apply the same 3D telemetry approaches, and we've already

talked about this as a team, and how we would modify our approach. We think it's an effective way to do this. I mean, we could produce multiple ESA estimates from different areas, with different covariates, and also address things like release mortality at the same time, like we've done previously.

Lastly, the bottom habitat information used by BHIM was too uncertain to provide a sufficiently reliable estimate of the age-two-plus abundance. No real, you know, rebuttal here from our team, except that there are actually ongoing mapping activities in the region that could speak to this. Florida is in the stretch run of a large-scale \$100 million project to estimate the hardbottom distribution on the Florida shelf.

Given our population density estimates and our overall population abundance estimates showing a center of abundance in Florida, this could be very beneficial to our BHIM modeling approach, and so, in this approach, they're doing LiDAR to a depth of twenty meters, and along with multibeam in shallow areas to fill in where LiDAR wasn't effective in sampling, and then deeper bathymetry, from twenty to 200 meters out to the shelf edge, and so the entire Florida shelf. Sometime later this year, the shapefile should be available from that.

NOS, and so Chris Taylor's group, has also been involved in some multibeam sampling, and the idea here is to sort of groundtruth some of the maps that we were already planning to use, and so this is independent of this study, but clearly it would be beneficial and so you can see the two different tracks, red and blue, over a couple of different years.

While it's not as comprehensive as the Florida mapping, we have the overlap in the Florida shelf to examine sort of what information we can get from this approach, and also to help groundtruth some of the earlier, you know, expert opinion and other mapping efforts to the north of the Florida-Georgia line, and so we think, in the future, there will be more information available to hopefully inform the BHIM approach, and, now that we have the model set up, then this should be useful moving forward.

Next is close-kin mark-recapture, and so, again, Dave Portnoy led this component of the study, and the objectives were to estimate red snapper population size in the U.S. Atlantic, but also to estimate red snapper genetic population structure, again with some critical assumptions about utilizing CKMR, and so the approach was to do fin clip sampling of Atlantic red snapper, up to 5,000 fish per year for three years.

We developed that target, these randomly-sampled fish across the region, based on utilizing Eric Anderson's CKMRpop model to forward simulate the population size, or the sample size needed if the population, which at the time was estimated to be 500,000, and so we then tripled that, thinking the population was growing, and we better be on the safe side, and there's a table in the report, and actually I have it here, that shows what that looks like, but so that's where the sample size came from. Like if we get at least 5,000, and, actually, we thought, if we could get at least 3,500, then we should be in pretty good shape to hit our CV target of 0.3 or less.

Dave came up with a novel approach here to do the sequencing, and so to go through one pass of all the samples with GT-seq, or genotyping in the thousands, he developed -- He and his team developed a panel of 322 microhaplotypes, and so this panel was used to then look for putative kinship relationships, and the idea was that some fish would slip through that actually weren't kin,

and so to err on the side of precaution, and so you would have some false positives that, in the next step using ddRAD, you could then spend more, and invest more, funding, on a much smaller set of samples that were putative kin, to then do the kinship calls on those, and so that was the approach that was taken here.

Since this started, the cost of ddRAD has gone down, and it's probably halved, and so it might be possible just to do the whole thing with ddRAD, but this was an efficiency, and a cost-effective approach, and, yes, we think it worked sufficiently well. Lastly, to sequence the fin clip samples and population size estimation, and so we would do the sequencing with ddRAD and then population estimation with CKMR.

So, again, there was quite a bit of investment of time and effort on the front end, about a year-and-a-half developing the panel that was utilized, and so Dave and his team wanted to have a panel of about 400 microhaplotypes, and so these are single nucleotide polymorphism containing loci, and so the SNPs together forming these microhaplotypes. The idea was to develop a panel that had about 400 of those.

After optimization, they settled on these 322 markers, and so this pipeline was developed, and so then to very efficiently move samples through, and so, now that that's in place, it is quite an efficient system, but, also, then genetic population structure can be examined, utilizing the same - - Sometimes the same sequences, but definitely the same fin clip samples, and we'll talk about other genomic approaches that are coming online that routinely collecting fin clips can benefit.

So then sort of the CKMR approach, and we had quite a bit of discussion at the CIE review about, you know, what is the model here, and so the model that's utilized to estimate population size is a spoke population mark-recapture model developed in TMB, coded up by Eric Anderson, and CKMRpop is independent of this. That's utilized to do simulation work that Liam Kehoe did, as well as the simulation work to estimate the samples required to get a CV of 0.3, but, basically, the general concept here is that we're examining individuals in the population, and you're looking for kinship relationships.

This could be parent-offspring, or, in this case, we used half-sibling. Parent-offspring is actually a much easier system to work in, but, because we couldn't reliably capture age-zero red snapper in the region, we couldn't use parent-offspring as an approach, and half-sibling -- Looking for half-sibling pairs, you do get more information if you include demographic parameters in the model, and so it's not a demographic model, per se. It's a mark-recapture model that's informed by these demographic parameters.

The idea is if you have the same sample size, Sample A versus Sample B from a population, the fewer number of half-sibling pairs, the fewer marks. Therefore the higher the population size, and, again, I'm not going to get into the math, or the various components of that here, but, if you have specific questions, we can address those in the follow-up.

Dave and his team examined the population structure of red snapper before the study began, and most of this was focused in the Gulf of Mexico, the northern Gulf of Mexico, and as well into Mexican waters in the southern Gulf of Mexico, but with some samples in the Atlantic, and there was a significant difference in genetic structure between the Atlantic and the Gulf, but you can see there are relatively few Atlantic samples.

Mandy Karnauskas and co-authors published a paper in 2023, or 2022, utilizing biotransport, biophysical transport models, where, depending on the model and the assumptions about swimming behavior of the red snapper larvae, somewhere between 5 and 20 percent of the Atlantic red snapper recruits that made it the northeast Florida were estimated to be derived from the Gulf of Mexico, and so, if that were the case, and there was this high connectivity, then that would be problematic for CKMR, but it should be noted that this was assumed behavior of the larvae, but still this was the estimated distribution that was produced.

One of the first orders of operation here, or orders of business here, to examine is what is red snapper population structure, and so our FWC colleagues, and Bev Sauls was critical in collecting many of these samples, and the various teams there at FWC. They collected samples in the Gulf of Mexico, as well as we had various groups sampling up and down the east coast. A lot of this came from SEFIS and MARMAP, but also from Ted Switzer's group at FWC, and then the port samplers that Bev Sauls supervised when she was at FWC.

We assessed genetic variation across 2,776 SNP-containing loci in 307 samples between the Gulf and the Atlantic. Hierarchical AMOVA was run to analyze genetic differences. No differences were found within or among Atlantic regions, but there was a significant difference between the Gulf and the Atlantic, and so the inference here is that we have distinct genetic populations, and any inference -- Or the inference, as far as transport, is that any transport from the Gulf to Atlantic that does occur does not equate to realized connectivity, and that larval transport -- We would have no evidence that it's followed by reproductive success in subsequent generations in the Atlantic.

Dave is following this up with some more comprehensive analysis, but, at this point, like when we produced this estimate, the inference was that this is not problematic for genetic population structure of red snapper.

A considerable amount of work done by Liam Kehoe, Eric Anderson, Dave Chagaris, and Kyle was heavily involved in this, and Dave Portnoy and Chris Hollenbeck, examining the effects of life history on red snapper population estimates derived from CKMR, and so there's a complicated table to the right. We have different -- Every pair is with and without recruitment variability, and so you can see, when you have recruitment variability, the distribution spreads out. I'm not going to run through all the various life history parameters, but, for the most part -- In the center, we have zero bias, and then you go from 10 to 50 percent positive to the right, and negative 10 to negative 50 percent on the left.

The only ones that show any real pattern here are the batch size exponent, and so, in this model, there was a nonlinear fecundity relationship that was assumed for red snapper. This is different than the current SEDAR estimate of how red snapper fecundity is going to be estimated in the upcoming assessment, but, at the time, this is what was the best science available, and so that's what was utilized, and you can see that, once you get above about 20 percent, you start to see a little bit of divergence, but, for most of these parameters, CKMR is actually fairly robust.

Again, it should be stressed that almost all of the information that's informing our CKMR estimate is the half-sibling pairs themselves, and so fecundity, because it affects our estimate of effective relative reproductive output, or ERRO, again which is discussed quite a bit in the manuscript, in Chapter 3, this fecundity relationship does have an impact, but you have to go really biased, right,

up to 50 -- You know, toward 50 percent before you start to see a real substantial effect, and it's really like plus or minus 30 percent of the population estimate, and so we're not doubling or quadrupling our population estimate. It's a fairly modest effect on the CKMR-derived population estimate in this one parameter. On the right, when we add recruitment variance variability, it spreads that distribution out, but, again, it's not a tremendous effect.

Again, to estimate our sample sizes needed to produce population estimates of red snapper in the model, the CKMRpop simulation routine that Eric Anderson developed was utilized, and this just shows you, like, you know, the simulation work done on the frontend, so that we had a fair idea, given estimates of population size that existed, that we would be within the CV threshold of 0.3, and, because -- In this table on the right-hand side, if you look at a census size of 1.5 million, if we only had 2,500 samples per year, that puts us at a CV of 0.3, and so we had 5,000 samples per year, and we were able to get a CV of about 17 percent, and so we actually, you know, tracked this pretty well based on what our initial population -- Our simulation work done to estimate the sample size needed to precisely estimate population size.

You can see here the size distributions of the fin clip samples that were collected in 2021, 2022, and 2023, and I'll point out, in the legend here, that, most of the sample sources, they start with the initials "FWC", and so we have fishery-independent samples, and we have recreational landing samples.

We have discards, and so this is Ted Switzer's group. We have FWC commercial sampling, which was a smaller chunk, but still really important to what we're doing here, and so just a tremendous effort by our FWC collaborators to collect samples, and really instrumental in all of this. The SERFS sampling, and so this was done by Wally and Nate's teams. Then samples off North Carolina, collected by Jeff and his group, and then Dawn collected quite a few samples for us in Georgia, and so that was a tremendous help as well.

If you look at the samples that were carried all the way through to ddRAD, this is the spatial distribution of samples, and so, again, more in Florida than other places, but we had good representation across the shelf, and it just shows the various sources of sampling that fed into our data available to do kinship relationships.

If you look at the samples that carried all the way through ddRAD and were estimated to be half-siblings, you can see, on the left, the dotted lines are connecting between pairs of half-siblings, and then the distribution on the right is focused -- It has two distributions, actually. One is random samples, and so the total samples, the geographic distance between any two pairs of samples in the dataset, and then the sort of pinkish distribution is half-siblings.

It shows that our half-sibling distribution, spatial distribution distances between the two, match pretty well with what we see in the sampling overall, and so we don't have clustering of half-siblings. Another thing is that we don't have multiple half-siblings that were estimated to be derived from the same parent, and so we don't have doublets or triplets or quadruplets, and so there was some discussion about this idea of overdispersion, whether you had some super-spawners that routinely left more progeny that show up in our data than others, and that could potentially bias our sampling, and we don't see that in the data.

There was some simulations done after the CIE review to focus on whether -- You know, if we could artificially impose super-spawners into the population, and it had minimal effect on our estimate. Even the worst-case scenario had minimal effect on our population estimate, and, again, that's in the revised Chapter 3 post-CIE review.

The last thing I'll say is that, when we take the half-sibling pairs and then utilize that in the model to estimate population size, to avoid this potential issue on a year-to-year basis, you only use half-sibling pairs that come from different cohorts, and so, because of the potential for localized spawning, or successful recruitment events, where you have individuals from the same parents settling out in a given area, and then if you over-sample those, or they're over-represented in your data, then you could bias your population estimate, and you use samples from separate cohorts, and that's a routine approach in using half-sibling pairs versus parent-offspring pairs in CKMR, and so that was done here as well.

In the report, you'll note that we talk about this range of age realizations. That was done because a large percentage of our samples came from regulatory discards, and Dave and his team have developed an epigenetic clock for red snapper, but we weren't able to have it fully optimized through primer development, so that it could be applied to the data when the report was due in October of 2025.

Instead, we worked with Kyle to get month-specific age-length keys that were utilized then to estimate the age composition of our samples. Because most of our samples were small, young fish, this was an effective way to estimate the age composition of the samples, but, because you have some uncertainty statistical error in that key, that had to be captured in our estimation procedure, and so, across these various realizations, you end up between 39 and 56 cross-cohort half-sibling pairs.

Among those, that produces point estimates of between 1.18 and 1.69 million individuals, and a merged estimate of 1.42, and so that's sort of our base model estimate, with a CV of 17 percent, and, again, the reason that we have this range of cross-cohort pairs is because, when you're doing the ageing, right, you have the kinship relationships, but then they have to be in different cohorts, and so if, you know, one model run says Individual A is a two-year-old, but the second model run puts it as a three-year-old, then it could then be in the same cohort as Individual B from that pair, and so they would get excluded in that second run, and so we have this range of cohort pairs.

These are a range of different sort of sensitivity runs that were done with the base estimate of 1.52 million individuals. There was discussion within our team, before the CIE review, as we were putting together the pre-CIE review final report, about the issue that we utilized the relative age composition from the previous SEDAR assessment as demographic information that fed into the model, and so it was the one piece of information that we utilized that came -- That was an assessment-produced estimate.

The reason that was done was because we had external information about what the relative age composition was. It wasn't the numbers of animals at age, but just the proportion at age, and the alternative was just to use equilibrium scenario, and, when we did that, you can see here that it had little effect on the population size, and so, again, at the CIE review, there was quite a bit of discussion about this idea of independence, which is an appropriate discussion.

In the end, we used the best information we thought available by going with the assessment-derived relative age composition, but, if we just used an equilibrium estimate, they're almost identical. Statistically, you can't distinguish the two.

Another issue though was that the mortality estimate, which informs numbers at age in the assessment, right, there's an F that's being estimated, and this was going to have an effect on what the relative age composition is, and so we did another sensitivity where we halved the F estimate from the assessment, or then doubled it, or -- Excuse me. We decreased it by 50 percent or increased it by 50 percent, and so you can see what the effects are there.

When you lower the F , right, then you're also lowering Z , and so you're adding older animals into the population, and, because of their relative contribution, higher fecundity, it actually has the inverse effect on your population estimate.

If you increase the F , you do the reverse. You're saying they're disappearing faster than the model is estimating them to disappear, and so the relative age composition is more stacked toward younger animals, and, because they're less fecund, you get a higher estimate of population size, but, again, it's not a tremendous -- We're not talking about ten million versus one million or two million fish. We're talking about going up and down by a few hundred thousand animals in these sensitivities, which are extreme, right? These are extreme scenarios. Equilibrium, not so much extreme, but, anyway, you can see and form your own judgments about what they show.

Another assumption is that the population -- You know, that CKMR has is that the population is in equilibrium, and we know, from the fishery-independent survey data, that the population has been tracking upward, and the assessment has been picking this up, and so there was an attempt to come up with year-specific estimates of population growth and decline, and so Eric coded this into the model, and you can see the results here.

It was restricted to no more than four years between cohorts, and I think it was 2019 to 2023 were the data that were utilized here, but you can see the estimates, you know, tracking an increasing population in these estimates, but, the farther you get away from the core of the data, the uncertainty, you know, becomes such that it's not really reliable, but one thing that this does speak to is the potential for CKMR as a long-term tool, not just to get sort of a point estimate of what population size is, but to be able to do this over time to track how populations are changing. Again, this is kind of a new area for CKMR, and it requires potentially some more testing.

The CIE review, the positives, they indicated CKMR methodology and study design were robust. The sampling effort was sufficient for an initial estimate of population abundance, although the uncertainty likely was underestimated in our estimates, and so the specific concerns are the CKMR estimate was not independent of the red snapper stock assessment. It's true that we used the relative age composition to inform the model, but, when we assumed the equilibrium scenario, it had little impact going back and forth there.

There were other data inputs that were also data inputs into the stock assessment. There's no way really around that, because we're using the same demographic information to inform both. Joe Powers, who among the CIE reviewers had the most substantial stock assessment background, you know, he kind of said -- I don't want to put words in his mouth, but Joe said, you know, in the end, you're going to integrate the two together, and you're going to have a joint likelihood, and so it

doesn't matter that they're using same information, because you can account for that in the model, and so he was less concerned, I think, perhaps than some other members with this particular point.

Next, the estimate of CV on the population may be too low. Again, statistically, we, you know, attempted to be -- To faithfully track different sources of variance through the model, and we did sensitivities to try to figure out direction and potential for bias, and so the CV is what it is, the statistical precision estimate, but, you know, any bias that's there, we tried to at least give a sense of how far off the model could be, but that's not really a precision issue. That's a bias or accuracy issue.

Next was a point made by Daniel Ruzzante, who has done quite a bit of CKMR analysis himself, was that the assumption of equal sex-specific fecundity-at-age, or fecundity-at-size, was not tested. It's a valid criticism.

Because of the history of assuming a one-to-one sex ratio for Atlantic red snapper, and results from the data workshop for the current SEDAR 90 assessment, we hadn't paid much attention to this. Dave went back, and, for all the samples that he had sufficient tissue left among the half-sibling pairs that he could do full mitochondrial genome sequencing, he did that over the past couple of months. What that shows is that there's not a significant difference from one-to-one in those half-sibling pairs of having a shared dad, or a shared mom, and so it's not like the mothers are more -- - Showing higher fecundity-at-sex than the males, et cetera, or vice versa, and so we don't think this is an issue in the data.

Daniel, it should be noted, is working on a big half-sibling project on Atlantic halibut, which have pronounced sexual dimorphism, and differences in sex-specific fecundity, and it's huge problem in that species, or a potential issue, I should say, in that species, and so it has to be accounted for. In red snapper, we don't think this is particularly problematic.

Another recommendation was to simplify the sensitivity, the simulation analyses, by focusing only on the red snapper CKMR model, and so Liam hustled and did this, and that's Appendix 11, and so now you have that in front of you, if you want to take a look.

Next was to apply the epigenetic clock for age estimation. All I can say is, Dave and his team, they tried. Dave's team is one of the world's leaders in developing epigenetic clocks, and there have been several clocks developed by his lab, and they're at the point of developing the primers to then apply the clocks to fisheries, and that component hasn't been done on this scale before, and there's a learning curve, and they've figured out some things that they might do different the next time, but there's a process. This isn't available for this report, but it will be available soon, at least for red snapper.

Lastly, Daniel Ruzzante also commented that he would like to see a chromosome-level genome sequence to assess the degree of linkage among the approximately 1,755 haplotype loci. That comes from the ddRAD sequencing, and so the idea here is that, if you have linkages, then you don't have independent markers, and you're overestimating the -- You're mis-estimating the genetic relatedness, and so we've collected tissue samples for Dave this winter, heart samples from red snapper. He's doing chromosome-level genome construction assembly for that now, and so we'll be able to test this in the future, but, for the scaffolds, and the sort of draft genome that Dave was working with for red snapper, these haplotypes, these micro haplotypes, show up on different

scaffolds, and so it's not a definitive estimation of the degree of linkage, but it suggests that this probably isn't a big issue for this dataset.

In the end, these are the population estimates that were produced. On the left, the blue triangle is BHIM, and the light blue squares are SEDAR 73, the mid-year estimates, which we thought was most appropriate, given that we sampled across the year for these, and mostly in the summertime, to produce these estimates, and so that's a combination of 2021 and 2022 for the SEDAR 73 mid-year estimate.

On the right-hand side, you can see CKMR, and so there's no significant difference. The credible intervals overlap the medians of each of the distributions. However, the CKMR estimates were a little bit lower than the stock assessment. One thing to note here is that, moving forward, at least the recommendation from the data workshop, was that the SRFS, and a different SRFS, the State Reef Fish Survey, landings estimates for the recreational fishery in Florida would be utilized, instead of the MRIP-derived estimates, and they are lower than MRIP.

When you have lower estimates, but you have the same age composition, it produces a smaller population size estimate, and so this, the blue square, should be a little bit lower if you used -- It hasn't been done, but Kyle had previously done some simulations that showed that phenomenon for red snapper.

This is just to show you what the clock looks like now, the epigenetic clock, and so we have otolith age, and so these are consensus ages, and then you have the clock-derived ages on the left. Then you can see the line of one-to-one agreement is the solid line, and the dashed line is the model fit. Actually, I have that backward.

The dashed line is one-to-one, and the solid line is the model fit, the linear regression between the two, and the prediction here is from leave one out. It's taking the 146 samples that are in the clock, ages zero through twenty-five, and leaving out a sample and then predicting it based on the clock. On the right-hand side, you can see there's a testing dataset, and that should say "forty", and not "four". Sorry about that. You can see similar high levels of prediction, and the median absolute error is actually a little bit tighter, 0.15 years. Again, this wasn't applied in this case, because the primers haven't been fully developed, but that's a step that Dave hopes to rectify in the near future.

Then lastly, you know, where all this is sort of headed, we think, is this idea that you can take a fin clip, and you can do genetic population structure, which has been done historically, and you can use it for close-kin mark-recapture, and you can use it for epigenetic ageing. Benefits of this are it's cheaper, faster, at least as accurate, at least as precise, and, for some species, more accurate and more precise than otolith ageing, and it's non-lethal.

Then, lastly, genetic sex ID, and so this genetic sex ID is nearly finished for red snapper and gray triggerfish. For gray triggerfish, it's critically important, because you have sexual dimorphism, and so many of the landings, at least in the Gulf of Mexico, come in gutted, that you can't identify sex any longer, but, with genomic sex ID, you'll be able to do that, put all that on the same panel, and then you can do all of these analyses in one fell swoop.

Lastly, the integration. Again, this is Appendix 6 that just talks about the work that had been done to this point, and Matt and Paul continue to work on this to integrate the CKMR estimation

procedure, and so not just like scaling to an external estimate, but actually integrating this into the objective function of the model. This is ongoing work, and so far so good in that respect.

Just a tremendous amount of folks to thank that participated either in administrative tasks or sample collection. Numerous boat captains, you know, were helpful to us in doing ROV sampling, as well as the tagging work that Ted and his group at FWC have been doing in fishery-independent sampling, where they're either taking fin clips from discards or taking fin clips from fish they're tagging. Again, just a tremendous amount of cooperation among various stakeholders, scientists, agencies in the region, and we're just incredibly grateful for their participation and willingness to work with us on all of this. All right. That's it.

DR. REICHERT: Thank you, Will. Before we go to clarify questions, I want to put my review chair head on, real quick. I want to mention that the review panel really appreciated the setup of the report, and not have all that appendix information in the report itself, and so I think we really appreciated that.

I also think that the review panel agreed with what Will said about the BHIM method, and the review panel mentioned that rejection of the estimate of this model is not a dismissal of the value of the work that was done as a whole, and it will be, as I think you said, Will, a significant basis for when key uncertainties can be addressed, and you mentioned the mapping efforts that were underway. Correct me if I'm wrong, and, the last two points on slide 34, those were basically our research recommendations, correct, part of those, applying the epigenetic, and the reason I'm mentioning that is because, in general, the review panel was really excited about the genetic ageing.

DR. PATTERSON: Yes, and I do think those were mostly research recommendations, but they did also speak to some of the uncertainty that was highlighted about using the age-length key and then the result and this different realizations of the numbers of half-sibling pairs, and how that affected uncertainty, and so it was sort of a little bit of both.

DR. REICHERT: Okay. Thank you. Anyway, I just wanted to mention that. My plan is to have a couple of rounds of clarifying questions. I want to avoid getting into the discussion just yet, and have public comment, have a brief break, and then we come back and start our discussions, and so I open the floor to clarifying questions for Will. Seeing none -- Genny.

DR. NESSLAGE: Sorry.

DR. REICHERT: No, and that's --

DR. NESSLAGE: Great presentation. Awesome work, you guys. I really appreciate it, and I just need someone to remind me, because it's been a while since we've seen the red snapper assessment. The results about the batch fecundity, batch size, being the only, I guess, life history parameter, that had any real serious sensitivity issues, and is that correct? Is that -- I'm wondering how big a deal that actually is in reality. If your goal is to estimate abundance, and I thought the red snapper assessment estimated mean recruitment, and not with a spawner-recruit relationship, and does it really matter that much, or am I not remembering the details at all of the assessment?

DR. PATTERSON: So it matters to the CKMR estimate, and it would matter to -- I'm not as familiar with SEDAR 90, if anybody wants to jump in and correct me if I make a mistake here,

but, if you're estimating spawning stock biomass versus egg production, then it has an effect there, however you're tracking, but, in this case, it does affect our population estimate, because it affects the effective relative reproductive output estimate that sort of predicated -- That the CKMR estimate is predicated on.

I will say that we utilized, initially, the exponential relationship with age that was in the previous assessment, and then there was a lot of discussion, in the life history group, about simply using a linear relationship with mass, and, if you actually convert that, it ends up with an exponent of 2.99, if you convert it to length, and so it does have an effect on our estimate of the CKMR population, but you've got to be really biased before you see much of an effect, for one.

The second is that we feel we're utilizing the best scientific information available that came out of the data workshop, and so, whatever is going into the assessment, we're using that parameter here. If the assessment is biased, you know, if the estimate of that going into the assessment has a substantial bias, then it's going to affect both of them to some extent.

DR. REICHERT: Will, can you explain the last thing you said, because the current model for your population estimates uses that exponential vector quantity or not, the one that came out of the most recent data workshop? Okay. Thank you. I probably misheard, or misunderstood. Thanks.

DR. PATTERSON: Yes, and that's correct, and so we started using the initial, the previous, and then, once the data workshop occurred, it went different, and the reason that we switched was, talking to Matt and Kyle, we had to have apples and apples to integrate eventually, and so we had to use what was going to be used in the assessment.

DR. REICHERT: Thank you. Anyone else? Alexei.

DR. SHAROV: I just wanted to clarify that the final summary population size estimates, for example for CKMR, roughly 1.5 to two million fish, right? Is that correct? Is that age-two-plus, two and older?

DR. PATTERSON: Yes, that's ages-two-plus and older. There was some discussion about whether we have some one-year-olds in the estimation, because of fecundity-at-age, right the length at 50 percent maturity. There's no real way around that, right? Some one-year-olds are mature, and some two-year-olds are not yet, and so we used the L50, or age-fifty, to estimate that.

DR. SHAROV: Just as a follow-up, was there -- Did you try to compare it with the existing model, you know, model, I mean the statistical catch-at-age model-based estimate, because it seems to me it's an extremely low number, and, if you apply like just a natural mortality rate of 0.2, I'm getting that for only for thirty age groups, and you have to start with the age-two at around 300,000 fish, and, exponentially, every age class is smaller and smaller and smaller. You know, I don't know why I think that, but it seems to me like a really small number, but maybe I'm just drawn in in understanding what they should be, but how do they compare to what we've produced before?

DR. PATTERSON: So, Alexei, what you're looking at here is -- The blue squares on the right, this is the CKMR estimates by year, 2021 and 2022, and the red and the light blue squares are the mid-year estimates from the SEDAR 73 update.

DR. SHAROV: I apologize that -- You know, I was looking at it, and I just didn't see that square there. I'm sorry. Thank you.

DR. REICHERT: No worries. Anyone else? Luiz, online.

DR. BARBIERI: Thank you, Marcel. Will, I mean, you know, right, that I've had serious concerns about this, because, as we looked at that fecundity-at-age, and the way the total annual fecundity was estimated before, right, what was incorporated into the SEDAR 73 and SEDAR 73 update has some massive -- I can see, in the committee, the actual graphs and numbers that show what those differences would be, but there's some massive differences in total annual fecundity when you use the method that had been used before for both batch fecundity and spawning frequency.

This is one of the reasons why, for the SEDAR, during the data workshop, the life history working group decided to reject that data as being possible to be estimated, right, for those estimates to be possible, and decided to have to go with fish rates, female weights, as a proxy for fecundity, because, one, the data that we have is very limited in terms of the ages involved, number one, and number two is because the estimates of total annual fecundity are massively inflated.

To Alexei's point, right. as you know, because of how the ERA integrates that information into the CKMR analysis, a very large fecundity like that will be producing a highly underestimated population size, and so this is one problem.

The other problem, that I feel that could be very serious, and I know that you disagree, Will, and I'm sorry, but I just feel that, you know, looking at the review workshop report, and everything that we discussed during the review workshop, is that not actually checking for the degree of overdispersion for red snapper could be causing major, major problems in terms of your estimate, both in terms of bias, but mostly in terms of precision, because it's basically the way that you would have -- It's like looking at different natural mortality estimates with different values of steepness, right?

I mean, it's a poorly, very poorly, estimated, or very difficult to estimate, parameter, and so not conducting some kind of sensitivity analysis creates major problems, in terms of assessing the real degree of uncertainty in those estimates there.

DR. REICHERT: Would you like to reply?

DR. PATTERSON: Yes, please.

DR. REICHERT: Okay. Go ahead.

DR. PATTERSON: Luiz, to your first point about the fecundity relationship, we're actually utilizing what came out of the data workshop in the estimation, and so that's not really an issue. The second issue about overdispersion, this point -- You raised it several times during the CIE review workshop. I think there were differences of opinion in the room about how substantial an issue it possibly was, but we did explore this, and, in the updated report, and I'm not sure if you've had a chance to read it yet, but Eric went in, and he coded up another sensitivity, and imposed a pretty substantial overdispersion approach.

We don't know of any place in the literature where this has been done for other species, but we did it here. There are other metrics, you know, that I've tried to talk about here, and that Dave presented at the CIE workshop, that makes us less concerned about this potential problem as maybe some others, and Dave has experience with a very small population size in smalltooth sawfish, where you do see potential overdispersion issues very clearly and apparently in the data.

In this case, we just don't see those indicators, that it's a potential issue, but, again, Eric then went in, and he really pushed the model to try to simulate what an overdispersed population would look like, as far as reproductive output, and it had minimal effect on the estimate, and, again, it's because the half-sibling pairs are overwhelmingly the predominant information the model is receiving to estimate population size. It is a mark-recapture model. It's not a demographic model. It's a mark-recapture model that's informed by demographic parameters.

Thankfully, as it should work, these demographic parameters add to the model's ability to estimate population size, but even moderate levels of bias in them aren't having overwhelming effects on the population estimate. That's what we want to see, and that's what all of this various simulation research is all pointing to, and now, again, because of some the concerns that were raised, you know, Liam went back and did a very red-snapper-specific simulation paper, that again speaks to some of these issues, and I just think that, if this were a real issue, it would have shown up in some of these simulations, and we just don't see it.

DR. REICHERT: Thank you, Will.

DR. BARBIERI: Will, thank you. I mean, I'm going to go back, and I read Appendix 11 at least twice, right, and looked at all the equations carefully, and all the parameter values that are there, and I did not find any values other than 1.43 being used for the old dispersion, similar to what had been used for Appendix 5, but I'm going to go take another look. Maybe I missed something, but I did not see different runs using different values of overdispersion.

DR. PATTERSON: Yes, and you won't in that, Luiz, because that simulation is different than the population estimate, right? That simulation, the simulated population that was simulated using CKMRpop, was set up with an overdispersion parameter to produce the age composition of the data. We've talked about this quite a bit, but that's not the same as having an overdispersion parameter in the TMB code utilized to estimate population size for red snapper. That's never been there. It doesn't exist in other CKMR models, and I don't know how else to say it. It's never been part of the population estimation.

What Eric did, and, again, there's text in the revised Chapter 3, and so, instead of looking at Liam's Appendix 11, you should look at the revised Chapter 3. Eric actually produced a simulation that drove this overdispersion, and the way he did it was setting it up so animals that had high fecundity in a given year would always have high fecundity, and high reproductive success, across years, and, again, you can read the text of how it was done specifically, but, even with that pretty extreme example, it had a minimal effect on the population estimate, and, again, it's because almost all of the information is coming from the half-sibling pairs themselves.

DR. REICHERT: Thanks, Will.

DR. BARBIERI: Okay. Thank you, Will.

DR. REICHERT: Dave had his hand up, but, before I give you the mic, Dave, I feel we are kind of slowly morphing into more of a discussion, and so everyone hold those thoughts. I'll let Dave say what he wanted to say, and then we'll have public comment. We'll have a quick break, and then we'll come back and continue our discussion. Dave, go ahead. It's good to hear from you.

DR. PORTNOY: I was just going to say what Will said about the simulation, versus the actual estimation, and how Eric dealt with that. If you look at that chapter, or the revised chapter, and you look at Figure 316, you can see a version of the estimation in which we assume, as Will said, if you have high reproductive success in year-one, you have it for the rest of your life. If you have low reproductive success in year-one, you have it for the rest of your life, and so forth, and it makes the estimate go up a little bit, and it makes the precision decline. The CI, is wider, but, as Will said, it's not a huge effect, but he explained it well, and so I'm really sort of being redundant at this point.

DR. REICHERT: Okay. Thank you for that. I appreciate it, and so, before we go on a quick break, public comment. Anyone on the webinar that has his hand up, or anyone in the room want to make a public comment?

DR. CURTIS: If there's any members from the public that wish to comment on this topic, please raise your hand on the webinar.

DR. REICHERT: Seeing none, there's no public comment, and we'll take a break until 3:30, and then we'll come back and we'll continue our discussion.

(Whereupon, a recess was taken.)

DR. REICHERT: Welcome back. I want to remind the committee of the two action points. Actually, one action point, but two sub-bullets. Evaluate the response to the CIE and review panel recommendations from the review workshop. Sub-Bullet 1 is did the project team sufficiently address the review panel's concerns, and then Sub-Bullet 2 is are there other concerns not identified that could contribute to the uncertainty in the modeling approach and resulting estimates?

We've started kind of discussing some of that. I really hope that everyone made notes, so we can put those in our report, and so I will open the floor addressing these two sub-bullet points. Anyone relative to that first bullet point of did the project team sufficiently address the review panel concerns based on the provided information? Jim, and then Luiz.

DR. GARTLAND: I think it's pretty easy. Yes. Right? The original work that was done to me looked really solid, really comprehensive, very well thought out, and then the responses, in terms of the reasons why there had to be some, and I'll use clunky words, similar uses as to what was used in the assessment and the follow-ups that were done with simulations. I think, overall, it was all really well done.

DR. REICHERT: Thank you, Jim. Luiz, I show your hand up.

DR. BARBIERI: Yes, and thank you, Marcel, and, I mean, unfortunately, I have to disagree with Jim. My own opinion, having, you know, looked into this in detail, reread the materials, went

back to the consensus review report, the SEDAR consensus review report, and I do not find that those were appropriately met, but I'll defer to other committee members. If folks are sure that that's the case, and they have been sufficiently addressed, I concur.

DR. REICHERT: So, Luiz, I know, prior to the break, you mentioned a couple of things. Can you be more specific, in terms of what your main -- Or what your remaining concerns currently are?

DR. BARBIERI: Sure. I mean, I, at this point, don't feel, right, and we disagree, you know, meaning myself and Will and Dave, right, in terms of the importance of overdispersion and having to run different scenarios of overdispersion in a more comprehensive way, I mean, kind of like what we do for a lot of other analysis comes before this committee. I don't feel that, you know, it's been addressed, because we would have to have basically sort of different scenarios considered, right?

In the review report, the recommendation is to use small, medium, and large values of overdispersion, and so we could actually have an idea, the same way that, oftentimes, when we have a lot of concerns about natural mortality, we ask to see higher and lower values, so we can compare that with the outcomes, and I think that that is a major uncertainty within, and, by the way, you heard me when I was there doing the in-person review, that I think that there is a lot of great science here.

As you'll notice from the data inputs here, FWC has been a major contributor to this work, and I support this work wholeheartedly. At the same time, I feel that, in the process of peer review, I have to look at these things and actually point out concerns that I feel may be impacting the final outcome.

I think that the precision there of that estimate from CKMR is really, really underestimated, because a major uncertainty hasn't been properly evaluated, in my personal opinion, and I feel that the way that reproduction was handled within this study did not really account properly for red snapper reproduction.

In a study where, you know, remember, even though this is a tag -- It's a mark-recapture, right, study, and we never see the marked individuals, and so reproduction, as well as survival, recruitment and survival, are really critical. I understand Will's point about the actual number of half-siblings that were found to be driving this, but, as you may remember from when he first started the presentation on the CKMR, if you do not integrate all of this with a properly parameterized demographic model, you can have very different results, and so I feel that a number of issues that were pointed out in the review report were not properly addressed.

Will and Dave, you know, please don't take this personally. This has nothing to do with the quality of the work that you did. I just don't think you had the time, since the review was just in January, to complete all of those analysis and come out to an SSC meeting in April, after looking into all those different factors.

DR. REICHERT: Before I give you the floor, Will, I just want to get clarification here, and so you mentioned overdispersion, but just now you mentioned there were a number of issues, and so I want to get clear what exactly your main concerns were. Overdispersion was one of them.

DR. BARBIERI: Right.

DR. REICHERT: Was that the predominant one?

DR. BARBIERI: Well, that was --

DR. REICHERT: What are the others, so that we can address them, because, as you know, and a reminder to new committee members, we make decisions by consensus, and so, if there's a disagreement, then, obviously, we need to make very clear what those disagreements are, and so sorry to keep hammering on this, Luiz, but, as I said, overdispersion was one. Are there other concerns that are critical for you in terms of --

DR. BARBIERI: For example, the issue of over-dispersion, and Will pointed out that Appendix 11 addresses the CIE review report recommendation to rerun the simulation. The simulation is evaluating, right, the influence of life history parameters into the final outcome and what the sensitivity of the CKMR model would be to those parameters, but, when you run that simulation using fecundity, right, that was rejected by the last SEDAR data workshop, and then you produce estimates that are based on fish weights, female weights, the two are not directly comparable. They're operating at different scales, and they are not really directly comparable, and so, besides the issue of overdispersion -- It wasn't possible for the team to complete the additional analysis that would have to be completed using fish mass, as we recommended in our report, myself, that the values not be used for -- I mean, fecundity values not be used, that they be substituted with fish mass, and that wasn't done.

DR. REICHERT: Thanks, Luiz. Will, to that point, those points?

DR. PATTERSON: The simulation, Luiz, is an attempt to examine how sensitive the model is to different life parameters. That's entirely different than the population estimation in Chapter 3. Chapter 3 uses the function that came out of the most recent SEDAR, and so that's what should be evaluated, the most recent data workshop.

Secondly, you mentioned that we didn't have time to fully address the panel's, the CIE panel's, comments and concerns. There's a prologue to Report 3 that walks through how we actually addressed all of the concerns.

Now, you may disagree whether you think we did a sufficient job or not, but we addressed every single one of those concerns, and some of them were really like, you know, ideas about taking this to the next level, and not is this useful for incorporating currently into the assessment, but we still -- We went through, and we tried to sincerely address every single comment that was made.

Lastly, you indicated this idea of overdispersion again here about picking a high, medium, and low to examine the potential effect of overdispersion on the population estimate. The low is zero. That's the base model. The high is the sensitivity analysis that Eric ran that currently exists in Chapter 3, and so you can pick whatever in the middle for medium. We didn't actually run it, but the point is that the high overdispersion simulation run didn't show much of a bias at all, and so I would disagree with you that that wasn't addressed. It was addressed, and we report it, and we talk about it, and it's all right there.

DR. REICHERT: Thank you, Will. I see Chris's hand up.

DR. DUMAS: Luiz, thank you, my friend, for your comments. Unfortunately, my hearing is getting worse as I get older, and there's some distortion in the speaker in this room. I've heard you say overdispersion many times, but I have not heard you say overdispersion of what? Which thing are you talking about as being overdispersed? Which element of the model?

DR. BARBIERI: Right. Marcel, if I may.

DR. REICHERT: Yeah. Absolutely.

DR. BARBIERI: Hi, Chris. Thank you, and sorry if I didn't go into a lot of detail here, but this is reproductive skewness, right, and so one thing that has been discussed, and this is very well documented in the literature, you know, and there have been -- I can send you a list of papers besides the one that I raised since before, right, the SSC meeting.

I can send you a list of them that lists, you know, how -- You have to make assumptions about reproductive skewness, meaning that some species, especially fishing teleost high-level populations, widely dispersed, and they have indeterminate fecundity, right, and have a long spawning season.

DR. DUMAS: Luiz, are you talking about overdispersion of fecundity?

DR. BARBIERI: Of fecundity, yes, at age, right, and so, for example, the model has to make an assumption, right, and if you go to those equations there that they list both in Chapter 3 and in Appendix 11, you're going to see that fecundity matters, right, because all of this about kinship has to do with reproductive output, right, and so that overdispersion means that, even though they have an equation there that shows that fecundity increases, right, with fish age and length, right, you don't know about variability in fecundity and reproductive output of fish of the same age that are in different sizes, and we all know that red snapper has a high variability of sizes at age, right?

It has gone through major levels of population rebuilding, and so resource availability, and the investment of resources from somatic growth to reproductive growth has changed over time, and is changing until the population is fully rebuilt.

All of this -- Again, it's not that what they did, and I hope Will and Dave understand this, and I'm not saying it's wrong in any way. I'm just saying that, right now, the way that they are presenting this, and running the CKMR model, it's not clear what values were used, if any. I just heard Will say that, for overdispersion there was a value of zero, meaning there's no overdispersion.

If you read the literature, right, about multiple spawning fishes like this, and the likelihood of this happening for different sized fish within the same age class, right, because you have such a broad also spawning season, that you have fish being born at different times of the year, it's different than doing this in Canada, right, where you have a much narrower reproductive season, and growing season, right, and so you don't end up with as much variability in sizes at age. The reproductive investment is more.

DR. DUMAS: Luiz, excuse me, and I'm not disagreeing with you. I'm not arguing against you. I'm just trying to understand which variable, or which model parameter, you're talking about might be overdispersed, and, also, I'm trying to understand whether my understanding of the term overdispersion is the same as yours.

In my understanding, if you're modeling fecundity, which is, I guess, is a count of the number of eggs that a fish produces, and that can change with the fish size or age, but, if you're using a count model to model number of eggs per fish, that would be like a Poisson model, and a Poisson model has an overdispersion of zero, but then if you have -- If you do have overdispersion, then you'll use a negative binomial model to model count. Are you talking about that sense of overdispersion?

DR. BARBIERI: Exactly.

DR. DUMAS: So with respect to fecundity?

DR. BARBIERI: Yes.

DR. DUMAS: Okay.

DR. BARBIERI: Yes. Within age.

DR. DUMAS: Thanks. I just wasn't sure which model variable you're talking about. Okay. Thanks.

DR. REICHERT: Thank you. I have Matt and Dave Portnoy had their hands up. Matt, go ahead.

DR. DAMIANO: Thanks. My comment is pretty brief. My understanding is that the work that's still being done by Paul McLaughlin to integrate CKMR into the BAM does include exploration of using weight as a proxy for fecundity, and so I'm wondering whether that specific concern is something that needs to be dealt with on, you know, Will et al.'s end, or if that's something that, you know, can wait until the stock assessment integration component of the SARSRP is complete.

DR. REICHERT: Thank you for that explanation, or that comment, Matt. Dave had his hand up. Okay. Dave, go ahead.

DR. PORTNOY: I don't want to beat a dead horse on this, but I'm just going to repeat what Will said. Luiz, you said you should look at a low, a medium, and a high overdispersion, to see what happens. What Will was saying is the low overdispersion is zero. That's the base model. That would be a model where there's no overdispersion. Eric went and did a model in which high-fecundity individuals remain high fecundity individuals throughout life, and low-fecundity individuals remain low fecundity throughout life, which is what he called the worst-case scenario. The bias in the estimate was about 15 percent.

There's no reason to do a medium overdispersion model, because it lies somewhere between zero and 15 percent. Again, it's in the revised chapter. If there's a different way to model it, that's certainly something that we could think about, but, again, when Will was saying the zero percent, that's just the base model. That's just no overdispersion. That would be your low, and, Eric's 15 percent, that would be your high.

DR. BARBIERI: Okay. Got it, Dave. Thank you.

DR. REICHERT: Thank you for that. Luiz, was that you I heard online?

DR. BARBIERI: Yes, and that was me. Sorry.

DR. REICHERT: Okay. Sorry, and what did you say? I missed that.

DR. BARBIERI: I said thank you, Dave, and I got it.

DR. REICHERT: Okay. Thank you. So, in terms of consolidating this, any one of the SSC members want to address this before I ask Luiz another question? So, if we mention this, Luiz, as one of the potential concerns, but also mention Will's reply that some of the issues that you brought up were explored, and are in the report, does that currently satisfy your concerns? I just want to see how we can get to a consensus, and, of course, there's always an opportunity for individual SSC members, or a group of individual SSC members, to provide a minority report, but, for a committee as a whole, we need to come to consensus, and so I would like to hear from other members. Steve, go ahead.

DR. TURNER: I'm just thinking about the text on the screen.

DR. REICHERT: Okay.

DR. TURNER: I think the sentence that says that recommended fecundity values in SSB from the data workshop were not used, that is not correct, from what I heard from the presentation. I understood, from the presentation, that, in the Revised Appendix 3, they used the weight-based estimates of the biomass indicator of fecundity based on the data workshop. Am I correct, and so that sentence needs to be modified, or removed.

DR. REICHERT: Yes, and I think that was initially based on Luiz's comment, and I think, after that, Will mentioned again that, the SEDAR 90 data workshop recommendations, that was used in the latest model run, correct?

DR. PATTERSON: In every model run that we reported to CIE and here, that was used.

DR. REICHERT: Kai.

DR. LORENZEN: Just a minor edit, and so he said underestimated, but he means that the precision has been overestimated, or may have been overestimated. If the precision was underestimated, then -- He meant it may have been overestimated.

DR. REICHERT: Thank you. Amy.

DR. SCHUELLER: I'm just -- I mean, we had this -- Or there was a discussion that I listened to during this, and I feel like -- I don't know if we even need this bullet. I mean, I think the bullet that Matt Damiano said, where the use of SSB as fecundity could be explored in the assessment phase, and the stuff that I think Paul is still working on is fine to include, but I'm just wondering if

we need any of the rest of it at all, because there was no concrete and very specific thing that was requested.

I think Dave's response was that we did see sort of the worst and best-case scenarios bracketing what plausible bounds could be, that -- I guess I'm just -- In my mind, we save the one bullet that Matt Damiano put on and then get rid of the rest.

DR. REICHERT: I'm totally fine with that. That bullet was based on Luiz's comments, and so I want to make sure that everyone agrees with that, including Luiz. It would be good to confirm that, once again, the SEDAR 90, the recent SEDAR 90 data workshop, those parameters were used in the model, because there seemed to have been a little bit of confusion there, but it's clearly laid out, or it is laid out in the documentation, unless I'm completely mistaken. Steve.

DR. TURNER: It's not to that point, and more to this bullet.

DR. REICHERT: Genny.

DR. NESSLAGE: Thanks. Yes, I agree with Amy, but can we be clear and use the wording that Matt provided, which was weight as a proxy, and not -- Because some people call SSB egg production, and some people call it biomass, or, you know, it's based on biomass, and sometimes it's based on eggs, and I just want to be very clear, right, that he's talking about -- Instead of egg-based SSB, he's talking about fish. Thank you.

DR. REICHERT: Will, go ahead.

DR. PATTERSON: So I'm trying to be careful here not to interject in the South Atlantic SSC's deliberation here, but, as far as Matt's point about this, that is how the assessment is currently being parameterized. That is why the CKMR model was parameterized based on SEDAR, so the integration could occur seamlessly, because we weren't dealing with apples and oranges, and so, Matt supposing that this could be done later, the reason we did it was because it was already being done, is my point.

DR. REICHERT: Thanks, Will. Luiz, I don't want to put you on the spot, but, relative to what Amy just mentioned, in terms of removing that bullet, although Judd has been working on the text, but was it that first bullet that you were referring to, Amy? Steve.

DR. TURNER: If that bullet is going to stay there, then I would add, at the end, that the team did look at overdispersion and saw what appears to be a minor effect, and so that would be a sentence at the end of the first bullet. If over-dispersion is a concern, which is perhaps an important statement, and I'll leave that up to others to determine -- Go ahead, Amy.

DR. REICHERT: Amy.

DR. SCHUELLER: If we keep the bullet, I agree with Steve, but I also think, in addition to that, I think that we remove "select committee members disagree with this consensus view", and we write something like the committee discussed the following, because it's like much more neutral, and what's up there had a lot of value-laden statement to it.

DR. REICHERT: Thank you. I agree. Genny.

DR. NESSLAGE: I also would like to be precise about our use of the term “precision”, and so this says that the result is that the precision of the estimates could be affected, basically, but then -- Because then the 15 percent was bias, right, Will? There's a difference between precision and bias, and I'm more worried about bias than -- That would be more concerning to me, but they are different things, and so I think -- Is Luiz actually concerned about -- He talked about precision, which there is low and high precision in that estimate, which may be unrealistic, and it's probably not capturing everything, and I would agree with him there, but so is the assessment, but then bias is a totally different issue, and so what are we actually worried about here?

DR. REICHERT: Will, go ahead.

DR. PATTERSON: So I think if you look at the CIE report, the consensus report in particular, there were places where it was stated that the CV may be underestimated, but it's this issue that you're highlighting, when it's really talking about bias being the issue, and so what I think perhaps was intended was the idea that uncertainty isn't fully reflected by the precision estimate, as expressed as a CV, but that's putting words into people's mouths, but that's what I got from that. It was that uncertainty was the concern, and it was expressed as a CV. I could be totally wrong, but that's how we tried to address it, was based on that assumption.

DR. REICHERT: Thank you for that clarification, Will, and, again, Luiz, I don't -- Again, I don't want to put you on the spot, and you can certainly think about this a little bit, but I want to make sure -- As I said earlier, this is going to be a consensus decision, and a consensus report. If there's anything you want to comment on relative to the -- Well, can Luiz see the text? Luiz, if you haven't done that, you can follow the comments that Judd is writing in the Google doc.

DR. BARBIERI: Okay. Yes, and I'll do that, and, by the way --

DR. REICHERT: Sorry, because I had automatically assumed that you could follow what Judd was writing here, but you can only do that on the Google doc, and so I just want to make sure you're comfortable with that language.

DR. BARBIERI: I am, and, you know, to all the discussion, I'm going to defer to the committee, right, and actually agree, if the majority of the committee wants to, with whatever decisions the committee decides to go with.

DR. REICHERT: Okay. No, and I appreciate that, but it's still a consensus decision, and so it will then become your decision also, all of our decisions.

DR. BARBIERI: Exactly. Yes. That's what I'm saying. I don't have any disagreements.

DR. REICHERT: Okay, and we'll have an opportunity on Thursday to go through our notes and wordsmith this a little further. I think -- Are there -- Steve, go ahead.

DR. TURNER: The last word in the first bullet is “overestimated”, and I think what we mean is underestimated, and is it the -- If we're talking about precision, then it shouldn't be the estimates

in the associated uncertainty, and it should be the uncertainty in the estimates, but, you know, clearly it shouldn't be overestimated, and it should be underestimated.

DR. REICHERT: Yes, and this was leftover from imprecision, and so you're right. Uncertainty underestimated. That's because we started changing the text there.

DR. TURNER: Now, the context that we're dealing with is was this addressed, and so Bullet 1 doesn't say anything about whether it was addressed, unless we add the sentence that I was talking about, which is the committee examined it and found, what, low bias, and is that what they found, Will?

DR. PATTERSON: No, and we didn't find low bias. We found that, in the most extreme level of bias, we could imagine it had little effect on the estimate of population size.

DR. TURNER: Okay.

DR. REICHERT: That was the modeling effort in Appendix 11.

DR. PATTERSON: That's actually in the chapter itself.

DR. REICHERT: Okay.

DR. TURNER: The committee examined the effect of high overdispersion in fecundity, and not the committee, but the team investigated the impact of over precision in -- Overdispersion in fecundity and found that it had little effect on the estimates.

DR. REICHERT: If we want to be specific, we can refer to the chapter that's described in, and then -- What was it, 15 percent? Then remind readers to see Chapter 3, correct?

DR. TURNER: That's probably the revised final report or --

DR. REICHERT: Yes, and that's the revised report that was in our briefing book. \

DR. TURNER: Right, as opposed to the one that the CIE examined.

DR. REICHERT: Yes.

DR. TURNER: So that should be clear here.

DR. REICHERT: Yes, and we can refer to that to Attachment 8, and I think it was a or b. Yes, and we'll add that attachment in there, so it's clear what we are -- Okay. Thanks, Steve. Any other -- Any other comments relative to the first sub-bullet? Are you good, Judd? Okay.

The second sub-bullet, as a reminder, is are there any other concerns not identified, and I assume that that's not identified by the review panel, that could contribute to the uncertainty in the modeling approach and the resulting estimates. Anyone on the committee want to comment on that? I chaired the review, and so I'm always a little careful to start a statement there, but I haven't heard anything from any of the committee members relative to other concerns that were not

addressed. Anyone disagree with that? Seeing none, then that will be our statement. Okay. Steve, go ahead.

DR. TURNER: Just in the bullet under the sub-bullet under recommended fecundity values, the verb in the next-to-last line is “will”, and is that the correct verb? I don't know if we're recommending, but I'm not sure.

DR. REICHERT: (Part of Dr. Reichert's comments are not audible on the recording.) All right. Was that off the whole time? Could people hear me, what I said? Do I need to repeat it? Do I need to repeat what I said? No? Okay. So with that, again, thank you, Will, and we'll take a ten-minute break, and I'll talk with Judd and Wally a little bit about what we'll do until we recess today at -- Well, depending on what we'll do, but all right. We'll take a ten-minute break, and we'll come back at 4:20. Thanks, Will. Appreciate it.

(Whereupon, a recess was taken.)

DR. REICHERT: Judd, Wally and I had a little powwow. We are, fortunately, a little ahead of schedule, although we mixed some stuff up, and so we're going to mix some more stuff up. Judd will go through the SSC workgroups and SECAD panels, and that's Agenda 13, in the remaining time. If we have some additional time, we'll go into a work session, where you can work on the report, and you can drop text into the report in the comments. Judd sent out a link to that report a little while ago. If you have issues accessing that, let us know.

Then, tomorrow morning, we'll start off with the terms of reference for black sea bass and vermilion snapper. Then we will get the SEP meeting summary from Jennifer, and then Other Business, and we also have elections, and we'll spend some time working on the report, and so that is the plan for tomorrow morning. With that, I'm handing it over to Judd to talk with us about SSC work groups and SECAD panels.

SSC WORKGROUPS AND SECAD PANELS

DR. CURTIS: Thank you, Marcel, and so the first thing that you'll notice is that it is the SECAD panels, and this is brand new, and a little bit of background for this new name. That's replacing the SEDAR panels. In March, or really over the course of this past year, with all the new types of management-producing strategies and things, the management strategy evaluations, management procedures, et cetera, that are producing catch levels and advice in addition to more traditional SEDAR stock assessments that produce management advice, the SEDAR Committee, at the council level, decided they needed to broaden their scope to encapsulate all those different types of products that are producing that management advice.

Instead of having a SEDAR Committee named, they incorporated SEDAR into a new committee name, SECAD, which stands for SEDAR, Catch Advice, and Data Committee, and so that's just the rationale behind this name change, for all intents and purposes. You could still call it the SEDAR Committee, or SEDAR, and we'll know what you're talking about.

Then, next, I just want to go through the various SSC workgroups and provide any updates on ongoing work and projected upcoming work, and then also these new -- The old SEDAR, the new

SECAD panels, and I think we've got some members that may need to drop off of their previous duties, because of scheduling conflicts, and so we'll look to repopulate some of those upcoming review workshops for various assessments. Any questions before we launch into the workgroup grid?

DR. REICHERT: Seeing none, when do you want to do a public comment, now or later?

DR. CURTIS: Let's do it at the end.

DR. REICHERT: Okay.

DR. CURTIS: Okay, and so I've got an updated document that has tracked a few of the changes that I've noted since the start of this meeting, which will look a little bit different than what you received in your briefing materials. Indicated in gray are workgroups that have been completed, and reports have been generated for those, and then white groups are the extant, in theory extant, workgroups, even if work has been paused, or is still upcoming on these various workgroups, but you can see the membership of SSC members in each of these various work groups.

We talked a little bit about the data limited and unassessed stocks during the amendment updates, and hopefully, once we have the new calibrations from the MRIP-FES values, as well as the precision thresholds from the Southeast Fisheries Science Center final report, we can potentially begin convening this workgroup to start looking at some of these data limited and unassessed stocks that do not have -- Or need updated ABCs based on the new information and various new modeling procedures. We have Ecopath.

DR. REICHERT: If your list is on there, and you do not want to be part of that, or you can no longer be part of that, please make sure you raise your hand, so we can make the corrections, if needed. Go ahead, Judd.

DR. CURTIS: The Ecopath, Ecosim, and Ecospace workgroup hasn't met, or maybe met within the past year, and they're still -- The lead group is tasked with developing this MICE model, and they're still working on the modeling component for that, and looking at primarily black sea bass for this new updated model in this, and I don't know if there's any other members of the group that want to chime-in on their various inputs for that group and what work has been done.

DR. REICHERT: No, and I don't think we've met even in the last year. I do mention, and I've mentioned it before, that we still need a chair, and so I think -- What I would recommend is, next time we meet, before, or at the beginning of that meeting, we should have a brief discussion on who chairs that committee, and that then becomes important in terms of who is responsible for any reports that may need to be produced. If any of the committee members are volunteering right now, then I would love to see a hand. Seeing none, then we'll discuss that at our next meeting.

DR. CURTIS: All right. This regime shifts and low recruitment, this was another workgroup that's been put on hold, or a strategic pause, until some additional information becomes available. We have numerous workgroups that have been working on low recruitment issues for some of those grouper species, and the winter spawners, and so we're still waiting to get final information on those before that workgroup does convene.

DR. REICHERT: I have the same comment there relative to a chair, and so, whenever that group meets, I would love to see a brief discussion and see if we can come up with a chair. If anyone is dying to volunteer as the chair of that committee, then, once again, I would love to see a hand. Seeing none --

DR. LORENZEN: Are we on MSY proxies? No, and where are we?

DR. REICHERT: We are at the regime shift, but I'll remember that comment when we get to the MSY proxy working group. Okay, Judd.

DR. CURTIS: Okay. The protected species BiOp for shrimps, manta rays, and sawfish, Jared Flowers is a member of that, and I do not have any updates on that, unless Jared has any, if they've met.

DR. FLOWERS: Yes, and we met once so far, and it was just kind of the introductory talking about the charge, and kind of outlining Section 7 and how, you know, protected species -- How that factors in with Magnuson, and kind of basically what we're going to start working on, and it's just looking at interaction between great manta rays and juvenile sawfish and shrimp trawls.

DR. REICHERT: Thanks, Jared. Do you know when you guys are meeting next?

DR. FLOWERS: I do. I think sometime later, either late summer into fall.

DR. REICHERT: Okay, and is there a timeframe in terms of when you are supposed to wrap that up, or is this a standing committee?

DR. FLOWERS: There was a timeline, and I don't have my notes, but I think we were looking at finishing up next year sometime.

DR. REICHERT: Okay. Well, maybe we can add it kind of to our report, so we kind of know what's going on there. Thanks, Jared. Judd.

DR. CURTIS: The next group is this MSY proxies, and this is the joint with the Gulf. I've been in correspondence with Ryan Rindone, from the Gulf Council staff, and we've had a difficult time, shall I say, trying to get a schedule that is amenable for both Gulf and South Atlantic, and so we're still trying to put together at least just a kickoff meeting for this, that hopefully we can get in before the end of May, to be followed by a series of webinars. If you recall, we saw the draft kind of schedule and scope of work for that workgroup, and eventually culminating in hopefully an in-person meeting to hammer out the final decisions and documents for that, but stay tuned, members of that workgroup. I hopefully we'll have something for you before the end of the month on when we can at least have a kickoff meeting for that.

DR. REICHERT: Kai.

DR. LORENZEN: I just brought this up because I've just been asked by the New England Council to sit on a panel, and report to them about the great work that we're doing in the MSY proxy.

DR. REICHERT: So, Kai, I think, since you're on that, I think you would be an excellent chair of this committee. No, and, I mean, we can talk a little.

DR. LORENZEN: We can figure that out. I just realized that I'm on this panel, and we have never met, and I don't know what's going on.

DR. REICHERT: To that point, Judd?

DR. CURTIS: To that point, and so we had this conversation before and decided that there's not going to be a chair for this particular workgroup, that it was going to fall on staff to kind of be the lead for each of those, and so there's no chair.

DR. LORENZEN: A completely chairless process. That will be interesting.

DR. CURTIS: A ceremonial South Atlantic chair, I suppose, that then also reports to the New England SSC as well.

DR. REICHERT: That's a new position, a ceremonial chair.

DR. LORENZEN: It's almost as good as a Peace Prize.

DR. REICHERT: There you go. I think -- On a serious note, I think this is really important, because, as I think I mentioned before, black sea bass and red snapper, that's coming up, and that's definitely going to be an issue that's going to be coming up for those two assessments, and they will be wrapping up soon, and so thanks for lighting a little bit of a fire on that, Judd. I fully appreciate the difficulties in getting schedules together with a joint Gulf SSC, and so thank you for that.

DR. CURTIS: I had included the assessment technical team that we had formed in October, right, and, as of the updates that you all received at this meeting, this is no longer an extant workgroup, and so I've just crossed this off, and so you are freed from your obligations on that workgroup.

The next is a bluefin tilefish subcommittee, and we have one appointee SSC member appointed to this workgroup. This is a council-led initiative that is primarily comprised of council members from the Mid-Atlantic and South Atlantic regions, and then one SSC member from each of those respective regions, and the goal of this group is to look at how the regional allocations of the bluefin tilefish are split between the Mid-Atlantic and South Atlantic for that portion of the stock that is north of Cape Hatteras.

We are scheduled to have our first kind of kickoff meeting May 1st, and this will be followed-up by an in-person meeting, where they will discuss various allocation strategies and methodologies, for not only upcoming ABC setting and ACL setting, but also for future processes, when the next assessment becomes available.

Then, lastly, this FIMS CIE review, the Fishery Integrated Modeling System, I believe is what it stands for, and someone can correct me if I'm wrong, and Steve is sitting on that, and that is scheduled to meet next week to discuss the various processes and updates that are occurring on the

national level with this new fisheries integrated modeling framework, and I don't know, Steve, if you want to speak to it.

DR. TURNER: Yes, and I was strongly encouraged to volunteer for this group, and, if there's someone who has three full days free next week, I would be happy to have someone more qualified than me to sit on this committee, but, at this point, I am the member.

DR. REICHERT: We all think you're fully qualified.

DR. LORENZEN: Highly qualified, and we thank you for taking this assignment.

DR. REICHERT: Are those public meetings? Can people listen in, or you don't know? Chip, do you know by any chance?

DR. CURTIS: I believe they are, but, if not, I will correct that statement.

DR. REICHERT: Okay. If you have information, maybe you can forward that to committee members, anyone who has time, and wants to listen in, then they are able to do that, or, if not, let us know. That's it for this, and I have a quick question. The dolphin MSE review, is that under SEDAR? Okay. Thanks. Anything else that the committee has, any questions about relative to our working groups, and I really -- That's why I think it's important that we --

DR. CURTIS: We have the SECAD.

DR. REICHERT: SEDAR or SECAD. Anyway, I completely lost my train of -- Oh. Yes. That's why it's important we have chairs for these committees, because, if there are activities, we really encourage you, as chair, to provide a brief overview of the activities of the working group, and why I think that's important is because, if we have a working group there that hasn't met, and hasn't had any activity for a year, or several years, then I really think we should seriously consider, you know, thinking about why we have that workgroup, and so we've talked about it in the past, and so, anyway, on to SECAD.

DR. CURTIS: Okay, and so SEDAR 94 is the Florida hogfish assessment. That is currently in the assessment phase. Genny and Steve are serving as the assessment panel SSC representatives. The review, and I think I touched on this in the updates, is the review workshop will be held in Charleston from July 14th through the 17th. We had two members appointed to that. One was Kai, who is no longer able to participate during those dates, and so we have one vacancy. Alexei, you are also scheduled to participate in that review. Are you still good with the dates and location?

DR. REICHERT: What's the date again?

DR. CURTIS: The dates are July 14th through the 17th, and it will be held here in Charleston.

DR. REICHERT: Is anyone available and willing to take Kai's place? Who is chairing? Is it the Gulf? Luiz is chairing. Anyone? Genny.

DR. NESSLAGE: I just have to say that Chris is doing -- And his team are doing an amazing job. It's a really cool assessment, and I highly recommend that you be on the review panel, because it's going to be very interesting.

DR. LORENZEN: Do I hear a self-nomination?

DR. REICHERT: It's in Charleston, right?

DR. LORENZEN: You already are. Yes, and that's true.

DR. REICHERT: You can pencil me in, and I'll see if I can twist some arms and then see. I will see if I can twist some more.

DR. CURTIS: Okay. Thank you, Marcel. Well, you'll be done with your chair duties at that time, and so you'll have just an abundance of time on your hands.

DR. REICHERT: Yes, and that's why.

DR. CURTIS: The SEDAR 90 red snapper stock assessment is ongoing. We're in the assessment phase for this project, and you see the members there. We have a date for the review workshop now, and that is December 14th to 18th, and that will be held in Beaufort, North Carolina. We have members appointed for that. Genny, you've volunteered to chair the workshop, and then Chris Dumas and Alexei are the reviewers for the South Atlantic SSC. This will also be accompanied by CIE reviewers.

DR. REICHERT: Everyone good there? All right.

DR. CURTIS: Next, we have the dolphin MSE review panel. This is also going to be a CIE. We had Cassidy present, and Tom Carruthers presented on the updated model configurations, and they'll continue to develop that, and then it will go in for a CIE review. This will be towards the end of July, July 28th through the 31st. Jeff has volunteered already to serve as a review panel member, and so we're looking for one more review panel member, and then also a member to chair.

DR. REICHERT: As a reminder, the chair generally is not like a reviewer, although you, obviously, will participate, but you're responsible for leading the discussion and editing the report, and so please consider participating in that review. Do I see any volunteers? Thank you, Kelsey. Did you want to be on the review panel or chair? Okay. Then we are looking for a chair. Is anyone willing to chair that? It's in Charleston. Okay. We'll come back to this very, very soon.

DR. DAMIANO: Marcel, I can chair. This is Matt online.

DR. REICHERT: Awesome, Matt. Awesome. Thank you so much. Appreciate it. Thank you.

DR. CURTIS: All right. Thank you, Matt. The SEDAR 106, gag grouper, we're still waiting for an updated schedule on this assessment. It has gotten deprioritized. We have red snapper, and then the new black sea bass assessment will be conducted this year, and so this is still on hold. We have members already for the topical working group of reproductive dynamics selected for that.

The king mackerel update assessment, we do not currently need any participants from the SSC for this update assessment, but this will go to the full SSC for review once that has been completed, either in 2026 or in 2027.

Spanish mackerel, if you recall, we're going to hold a data webinar that will include some members from the Mid-Atlantic, and possibly the New England regions to get data streams from those areas, and so we'll hold a virtual data webinar, and we've got SSC members already selected to participate in that data webinar, and that is Jim Gartland, Jared Flowers, and Jeff Buckel. Are you guys all still good at this point? We do not, obviously, have any dates or times for this selected yet.

Then some of the other upcoming assessments are jotted down there, but we do not need to recruit members for these just quite yet, because we don't have a schedule in place for them, and so stay tuned. As we get closer to the start dates for those assessments, I'll come to the SSC to get recruits for members.

DR. REICHERT: Thanks, Judd. One thing I'm missing is isn't there supposed to be a sub-SSC group for black sea bass? Isn't that the procedure, like a subgroup, and then a -- That's a pretty important one.

DR. CURTIS: Yes. Thank you.

DR. REICHERT: No? Chip? Maybe I misunderstood, and it was in some of the documents that we received, I think.

DR. COLLIER: Right, and so there was -- When we were taking volunteers last time, there was -- At that point, SEDAR had the assessment technical team.

DR. REICHERT: Okay.

DR. COLLIER: Those assessment technical teams have been removed, and so that's --

DR. REICHERT: No, and on the -- I can pull up the document, and there is a -- In a document, it says there is a first review by a sub-group of the SSC, and that then goes to the entire SSC. I'm not sure if that plan has been abandoned, but that was my understanding.

DR. CURTIS: No, and that is still a plan. Sorry. I omitted that from the list of these SEDAR panels, but it is listed, and we'll talk about that during the black sea bass terms of reference and upcoming schedules, but I'll put a note for that there, and so we'll need probably two to three members, and I would say three members would be preferable, to serve as the review panel for this next upcoming black sea bass assessment, to get a chance to really dig into the finer details before it goes to the full SSC for full review.

DR. REICHERT: Remind me why this procedure was chosen, because I don't think we've ever done that before. It's either CIE review, SSC, or it goes to the full SSC, and so I'm curious why now there is a pre-full SSC review and then is the full SSC -- Sorry that I'm -- Is then the full SSC -- Like what we did with some of these projects, it's not supposed to be a re-review, and, anyway, can, can someone kind of elaborate on that?

DR. CURTIS: Yes, and so part of the thought process in utilizing this review panel, that's akin to what you discussed as like the CIE review panels, but this will be without CIE members, and I do believe we've had review panels that have not -- Have been just SSC members before, and not inclusive of CIE as well, but the idea here is to appoint a review panel -- Excuse me, and can you guys pay attention, please? Fred. Thank you.

The idea is for a select group of people to dig into the review of this next black sea bass assessment, to avoid what happened in the last situation of the review, where it had to go back and forth to the SSC numerous times, and so this would be akin to kind of an assessment panel and a review panel, to work out the kind of finer details in the modeling components and various parameters before it gets to the full SSC, in order to alleviate some of the back and forth that we experienced last time and to have the full SSC focus on adopting as best scientific information available and setting the catch level recommendations, as opposed to requesting additional model specifications.

DR. REICHERT: Okay, and I'm sorry I'm hung up on this, and so does that mean that when -- Once it gets to the SSC, those potential additional model runs are pretty much off the table, or can the SSC still request? I'm trying to kind of get a little ahead of what we as an SSC are facing and what that sub -- What the charge is of that subgroup, and you know what I'm trying to say here?

DR. CURTIS: Yes. Well, the hope is that the subgroup then identifies what some of those additional model runs should be, and that those can be tackled before it gets to the full SSC, so that then it's a ready product that can be stamped by the SSC as BSIA, and catch levels can be set, and then put into management.

DR. REICHERT: Okay. Thanks, and so we don't have to -- We will come back to this at the terms of reference for black sea bass, and then we can populate that group, and so I really want you to - - That's why I was asking for clarification, so the people who will volunteer kind of know what they're tasked with, and so I really encourage you to think about it and consider being a member of that review team. Okay. That's it? Thank you, Judd. I appreciate it, and so what I would like to do now is for the SSC -- It is ten until five.

We'll give everyone an opportunity to go into a brief work session, give everyone an opportunity, if you have any notes, to provide that to Judd. Judd said that he will work on that tonight, and provide kind of an update tomorrow. Thanks for that work in advance tonight, Judd.

Then that will help us tomorrow, when we go through the report draft, to wordsmith that a little further, and so, if you have any significant notes that are not already in that document, please provide them, and that means that we will go off the record and work on drafting the report, and then we'll recess around five, officially recess about five o'clock. Jim.

DR. GARTLAND: Just to be clear, you want us to add to the Google doc, correct, and not just dump notes?

DR. REICHERT: Yes. The Google doc. Yes, please use the Google doc, so we can all -- So you can see what others are contributing, so you're not duplicating notes that others already have provided, or duplicate stuff that Judd already put in the report. That was something we discussed in one of the previous meetings, and I think it was in response to a question Alexei had. All right.

Any other questions? If not, let's go into a work session, and then we'll go back on the record at 8:30 tomorrow morning.

(Whereupon, the meeting recessed on April 15, 2026.)

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APRIL 16, 2026

THURSDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Town and Country Inn and Suites in Charleston, South Carolina on April 16, 2026, and was called to order by Dr. Marcel Reichert.

DR. REICHERT: Good morning, everyone. Welcome to the last day of the South Atlantic SSC meeting. Sorry, I was a little late. My mouse ran away, but I caught it again. Today we will start off with our terms of reference for black sea bass and vermilion snapper. Then we'll have the SEP report by Jennifer, and remind me to make sure we have a break, so people can check out, if that's necessary, and we'll do our report review. Thanks to everyone who sent notes to Judd, and thanks to Judd for working on that this morning early. We have elections, Other Business, and then wrapping it up, and so, with that, I'll hand it over to Judd to talk us through the terms of reference.

TERMS OF REFERENCE FOR UPCOMING ASSESSMENTS

DR. CURTIS: All right. Thank you, Marcel. I'm going to pick up where we left off on Tuesday, when I was providing an update on the SEDAR schedule, and bring us down to terms of reference that need to be reviewed during this meeting by the SSC, and that includes black sea bass and vermilion snapper.

You see both those assessments are in purple boxes on the SEDAR grid, and that is indicative of no SEDAR involvement, and these will be center-led assessments, and then the SSC will be involved in the review process, but there will not be any data phase or an assessment phase, as you see with some of the other SEDAR products.

We talked a little bit about this, and we'll discuss this, or talk more during the discussion, but the proposed review for this, for the black sea bass next assessment, is going to be comprised of an SSC subgroup that will do the bulk of a review, akin to like a review panel, before those recommendations are then presented to the full SSC for determination of BSIA and setting of catch level recommendations.

We did this, or we thought this was an appropriate way to do things, in light of how the kind of back and forth with the last black sea bass assessment went during the previous SSC meeting reviews, and so there is oftentimes is not enough time to fully get into the details on some of the

parameters of the assessment modeling that we thought was really necessary to come up with an adequate review for the assessment.

Oftentimes, and I'll speak for Marcel, and I think we felt rushed in our review of the black sea bass assessment, and it did not -- It resulted in an insufficient review, and so hopefully this subgroup process, and a more explicit and specific review panel, that can really tackle and get into the weeds of some of the assessment modeling, will be a beneficial process before it goes to the full SSC.

DR. REICHERT: A quick question, Judd. Does this subgroup have a separate set of TORs, or has that been discussed?

DR. CURTIS: That has not been discussed. I think that could be -- We could draft specific TORs. The TORs you will see here I guess would be -- I guess that's up for the SSC's determination, if those would be applicable for the subgroup review and the full SSC review, or one or the other only.

DR. REICHERT: Okay. Let's, as a committee, keep it in the back of our minds. If there's anything in those TORs that should be different for that subgroup, then this is the time that we can add that, potentially.

DR. CURTIS: Before I do the schedule, I would just kind of like to remind the SSC of some of the major uncertainties that were identified in the last review of the SEDAR 76 update, and these were pulled from SSC reports, the review of the final assessment products and discussions around the table, and so some of the four critical uncertainties that were identified included the MRIP-FES recreational catch time series.

Of course, we're getting the recalibrated values after the results of the new survey information comes out. As I pointed out earlier, those are anticipated to be available August 31st, but that is kind of a linchpin of how this assessment, and the timing of this assessment, may unfold, and the review may unfold, but that's being -- That uncertainty is being addressed with the new calibrations.

The second major uncertainty was this direct estimate of MSY versus an SPR proxy. We had a lot of discussion over the steepness in the Beverton-Holt stock-recruit relationship, the profiling of it, and if that was adequate enough or if a mean recruitment model, using SPR values, would be more appropriate. This is also -- We also discussed, as part of this conversation, the issues with the recent low recruitment in the biomass that we've been seeing over the last ten or so years, and some possibilities of non-stationarity that is occurring, due to environmental influences and not just fishing effort.

The third major uncertainty was the magnitude and selectivity of the discards. If you recall from the assessment, discard selectivity for the general recreational fleet was combined with the headboat discard selectivity, and, if you know anything about how the black sea bass fishery operates, the size compositions of the shore mode are much different than you see further offshore, and so that likely had a pretty substantial impact in the selectivity curves.

We've also seen diverging trends in discards between the inshore and offshore modes, and so this was another major uncertainty highlighted that should be further investigated, and then, recently,

as in numerous assessments, we've heard that the commercial logbook is no longer a valid source of information for discarded fish, and alternate information needs to be identified.

Lastly, the SSC identified there could be some potential terminal year fishing mortality bias. The relationship between the high fishing mortality and low biomass was driving -- The low biomass was driving extremely high F values towards the terminal years of the time series, and this was then relayed into the projections, and having a large impact on projected catch levels, and so those are some of the uncertainties there. Obviously, these are all documented well in previous SSC reports and council discussions, and so, if you need me to point you to further information, I can dig those out later.

So, that being said, the preliminary schedule that we've put together, after talking with Dr. Erik Williams and Nikolai, the analyst who will be working on this assessment, and we're here in April reviewing the draft terms of reference for the SSC. A similar version of this presentation, and the plan for the review, was presented to the council in March, and they were onboard. They were looking -- They approved a process where we could get an expedited review of the terms of reference, so we didn't have to wait until the June council meeting to get the final terms approved, so that the analysts could get started on aggregating data that is available.

Once the SSC is comfortable with the language in the draft terms of reference that we'll review today, we'll send that on to the council for their approval and then to the Science Center for them to begin the assessment. June through August, the aggregation of the available data, and any potential new data that was identified, or could become identified, will be aggregated into the assessment model, and analysts will begin assessment model development. Now, this will, of course, not include any recreational catch data streams, as the MRIP-FES calibrations will not yet be completed.

Once those are completed, and on August 31st as a target date, and that's also kind of our target date for all data to be finalized, and so the plan is for everything to be incorporated into the assessment model, with the exception of those calibrated MRIP-FES values, and then those can be inserted into the assessment model as the last step.

From there, the analysts will develop the assessment model, integrating those new MRIP-FES data streams, and I'll point out those dates in the blue boxes are kind of the target dates, and then, in the parentheses, the weeks is the number of weeks following that August 31st date that it's likely to take to get to that step along the process, and so, four to six weeks after the MRIP-FES calibration values are available on August 31st, those should be integrated into the assessment model.

On November 1st, we would hope that a final assessment report would be submitted. That would then, of course, be six to eight weeks after August 31st, and the next step then is where we would be looking to convene this subgroup review workshop, consisting of probably three SSC members and a potential outside reviewer, and not necessarily a CIE reviewer, but potentially another SSC member from a different region, or from a different science center, to be part of the review workshop and review team.

Once that report is generated, we will circulate that to the full SSC. Because this will be right after October, obviously, and kind of in the middle between our October and April meetings, we would likely need to convene a special SSC meeting to do the final assessment review, determinations of

BSIA, and setting of catch-level recommendations for the council to be available for the March 2027 council meeting, and so I'll pause there. Any questions on what the schedule looks like?

Of course, as I mentioned, that linchpin, right, is really the MRIP-FES calibrations. If those can get done a little bit earlier, that may shift the schedule forward. That would be the best-case scenario. If they're not available by August 31st, things may shift a little bit later, which would be the worst-case scenario.

DR. REICHERT: Any questions? I have a couple of questions and comments. Do we already know the format, time, and location for that special, for the subgroup SSC meeting?

DR. CURTIS: No, we do not. Likely, we would probably hold this in Beaufort, at the analyst's home port, but that's up for debate, I suppose, and depending on scheduling, but, yes, to be determined still.

DR. REICHERT: Okay.

DR. CURTIS: Of course, the dates, you know, that's a tentative date, and a target date, based on if the schedule unfolds as-is. That may shift, depending on when all the data becomes available, but that would be our target.

DR. REICHERT: What I'm hearing from you is that's likely going to be an in-person meeting?

DR. CURTIS: That is the hope, and that is something I think both the SSC and the council vocalized, is having an in-person review, as opposed to doing this virtually, would be beneficial, and so that would be the preference. Of course, you know, scheduling concerns aside, it may be necessary to do some aspect of a virtual, but, yes, the preference would be to have this held as an in-person meeting.

DR. REICHERT: Okay, and, for the special SSC meeting, if I remember correctly, but please correct me if I'm wrong, the council made a comment about whether it's preferred to have that in a -- Either an in-person or a webinar meeting. Personally, given the difficulties we had with the previous black sea bass discussions, I would highly recommend that to be an in-person meeting, and so I'm not sure if anyone disagrees if they ask.

I know it has logistical and financial implications, and I fully appreciate that, but, if at all possible, I would prefer that to be an in-person meeting, and I'm looking around the room to see if others agree with me. I see heads nodding, and thumbs-up, and so we can put that in our report, again fully appreciating potential consequences of that, but this is an important assessment, and this will be an important review, and, again, let me know if you want to come back to that later.

I made a note here, and I've asked that question before, but I'm really hoping if someone can explain to me how the current ABC recommendation by the SSC fits in all of that, because the SSC made an ABC recommendation that would start in 2027, and, if I look at this preliminary schedule, our recommendation to the council is not going to happen until March 2027, and so that's already into the year that the SSC provided an ABC recommendation for, and so I'm really interested in knowing how this is all going to be approached, and so I'm not sure who would be best to address that.

DR. CURTIS: Yes, and so we've had internal discussions about that, that very thing, and so, assuming that the review workshop can convene before the end of the year and review a new assessment model, that, with the assumption that it's a better model, it would supersede the previous model as best scientific information available.

I know that's -- The final determination of that needs to come from the full SSC, but, from our understanding, if you're making steps towards working on a new product that could be considered BSIA over a previous product, that should be sufficient to then eventually replace what those recommendations are going to be, and so I don't think we'll be in a bind where we have a recommended value that's on the books that would need to be adopted while there's ongoing development of updated management advice.

DR. REICHERT: I'm a little puzzled but, because that means that -- Chip is coming to the table. Because there still is that ABC recommendation on the books, and so, even though we are working on the next assessment, that ABC recommendation is still in the books, and so maybe, Chip, you can clarify that a little bit.

DR. COLLIER: Yes, and so the council is still working on Amendment 56, which would be incorporating those catch level recommendations. They're waiting on this new information to do it, but it's not unheard of where you all put forward recommendations and it takes longer than originally thought to put everything in place.

Sometimes you make recommendations, and like take yellowtail for example, and we had a series of recommendations that never went in place, because it took too long through the assessment process, and the management process, in order to get things put in place in time, and so the council is addressing it. They're working as quickly as they can.

You know, I do also want to point out that it's not just a backlog at the council level. Even if they were to have moved forward with some of this stuff, there's other species, or other amendments, like what happened for scamp, you know, trying to establish that rebuilding plan, and that's still not in place either, and I feel like that was almost like five years ago that you guys were talking about that.

DR. REICHERT: No, and I agree, but, I mean, I think I think our ABC recommendations are a little different than other recommendations, and so, in case of the yellowtail, it may have included ABC recommendations, but there may have also be other recommendations, but, you know, ABC is a little more -- So I was just wondering how all of this works. If this is not a problem, I'm fine. For my own understanding, I was just trying to figure out how -- Where all of this fits, and so thanks for that clarification. Anything else?

DR. COLLIER: Well, it probably doesn't clarify anything. It's just sometimes it takes a long time to get these things in place, and, you know, the council is working on an amendment to put this through, and so, you know, we're going to continue to, or the council is going to continue to work on it, and then, you know, once these numbers become available, they'll be putting those into Amendment 56.

DR. REICHERT: Thanks. Steve.

DR. TURNER: So out of curiosity, what's the current basically allowable catch at this point, and what will it be come January 1, 2027?

DR. REICHERT: Well, that's a good question, and so are we referring to -- I don't have the number for our new -- For our most recent ABC recommendation, but, if that's not going to be in place in January, I think that it's our previous ABC recommendations going in into place, but there was also an action by the council to reduce the ABC, or the ACL, correct by 50 percent, or the ACT? It's ACT by 50 percent, correct, and that is on the books, or that's also still in the pipeline?

DR. CURTIS: That is correct, and so the council is taking steps to reduce -- Or set an ACT that is 50 percent of the catch, the current catch, in the most recent amendment process, and that is currently going through the amendment development process right now. Those values were based on not only recent catch, but then the pre-assessment results previous to SEDAR 76.

DR. REICHERT: It is expected that that will be in place, or that's completely unknown? Of course, I realize the pipeline issue, but okay. All clear as mud.

DR. CURTIS: The implementation of the ACT that is 50 percent of the catch levels is currently under secretarial review.

DR. REICHERT: So that's the pipeline issue that we discussed earlier. Okay.

DR. COLLIER: Yes, and it was the average of the three years, the most recent three years, of landing, and so if they're trying to address the catch that's going on. If you look at the ACL that's in place right now, for the 2021 and beyond, it's 643,000 pounds, but the ACT is looking at -- I can't remember the exact number, but it's --

DR. REICHERT: Yes, and so that's -- But that's still above the SSC ABC recommendation of January 1st, correct, or not?

DR. COLLIER: Yes, and, I mean, it's above the recommendation that came out.

DR. REICHERT: Okay. Thanks. Any other questions? I have Jeff, and then Steve.

DR. BUCKEL: Maybe Chip can stay. What's the -- You gave the what the current is, and what, you know, this new ACT, and what is the -- Over the last several years, what has been the landings in the fishery?

DR. REICHERT: Chip is pulling up the SAFE report, maybe. While he's working on that, Steve, can I go to you, or do you want to wait until that's being brought up?

DR. TURNER: I'm -- This is addressing the question, but I also want to know what it will be in the coming January. I assume the current will continue, but I haven't heard that.

DR. COLLIER: Yes. In January, if none of these amendments are adopted, it's still going to be 643,000 pounds.

DR. REICHERT: That would have been -- Because they are the amendment is still not approved. If it was any other amendment that would also be the case, normally. If the amendment isn't officially approved, then the current ABC would read it would remain in place until that was officially approved and implemented, correct?

DR. COLLIER: Yes. The ABCs remain in place till an amendment revises the ABCs.

DR. REICHERT: Okay. Fred, go ahead.

DR. SCHARF: So, Chip, and I don't know if Chip, or maybe Shep, can address this, just for just for our understanding, and so what are our -- What are the statutory requirements, you know, from Magnuson when we recommend an ABC, in terms of when that ABC is implemented? You know, based on what you just said, Chip, it's like, oh, well, the council is working on it, and that could go on forever, right, and so, I mean, what's the -- What are the -- You know, my understanding was that those recommendations are put in place based on the timing that was set when the ABC recommendations were made, and so can you guys clarify a little bit more about what the requirements are?

DR. COLLIER: So there's -- The requirement is to implement them as quickly as possible. It's a not defined time status, unless the council gets a notice of -- Is it overfished or overfishing? For some reason my brain is not working on it this morning, but there's --

DR. REICHERT: Overfishing, I think.

DR. COLLIER: Overfishing, you have to end within two years, and so that one does have a time limit. The others indicate that, you know -- For overfished, you have to do it as quickly as possible, but that doesn't have a timeframe that's associated with it.

DR. REICHERT: Thank you, Chip. Shep is coming to the table.

MR. GRIMES: Thank you. Well, aside from the statutory timelines associated with rebuilding and ending overfishing, the Magnuson Act says the councils have to implement catch levels that cannot exceed the fishing level recommendation from their SSC. That fishing level recommendation is your ABC recommendation. You have one on the books from the SEDAR 76 update. You deemed that best available, and you passed that motion, I believe in April of 2025. No action has been taken on that. The council is -- I mean, you're revisiting the assessment, but, at some point, if we come in, right, and we have an ACL, a catch limit, on the books that is above the most recent catch level recommendation from this body, you know, that that's an issue.

I think it would take litigation to force it that, you know, if you have a catch limit that's above that, and the fact that the SSC -- That the agency is redoing, or doing the next iteration of assessment, and hopefully you get some information out of that, right, and, if you come in and take action, come in and provide a new ABC recommendation based on that, I think Chip is exactly right. It's going to supersede what you had before, and then that's the new controlling ABC recommendation. Hopefully that would come out in time, you know, quickly enough so that, if we are in the situation where we have a catch level that's above that April 2025 ABC recommendation, that won't be the situation for long. Hopefully that made sense.

DR. REICHERT: But what do you mean in time? Does that mean that we may have to have that special SSC meeting in December?

MR. GRIMES: Well, I mean, by in time, before somebody sues and makes it a legal issue. That's what I meant by that, and it's you know, possible to predict, and Chip is exactly right that so we get out of sync on things, and there are clearly instances where we have -- You know, we have timing problems, and, you know, that's usually addressed, and so, maybe for six months, we are in the situation where we have a catch level that's above the ABC. We're legally vulnerable, to some extent, during that period, but let's remedy the situation as quickly as we can.

DR. REICHERT: Thank you. All right. Thanks for those clarifications. I appreciate that.

DR. CURTIS: Chip is -- I was trying to pull up the SAFE report that has the fishery-dependent and the recent catch information. Chip has got an updated model, and he's going to find that information, and send it all to the SSC, so you can see what the recent catch averages looks like.

DR. REICHERT: Would it be sufficient just to get a link to the SAFE report, so people can kind of look at that themselves or -- That's probably easiest way to approach that. Thank you.

DR. CURTIS: Okay. Any more questions on the preliminary schedule? Okay. I'm pulling up the draft terms of reference that that were included in your briefing book documents. It's pretty standard -

DR. REICHERT: It's Attachment 10a.

DR. CURTIS: Thank you. Attachment 10a, and most of it is pretty standard language based on the draft terms of reference that we've seen before, but please just raise your hand if you see anything that you have heartburn with, or any additions or inclusions that you would like to make. The first term of reference is just updating the 76 assessment model with data through a terminal year of 2025. Again, the statement that the data providers may include partial data, or preliminary data, and that's up to the discretion of the lead analyst, based on the quantity and quality of the most recent data.

DR. REICHERT: Yes, and it's this the -- Correct me if I'm wrong, but the SEDAR 76 update? Maybe?

DR. CURTIS: The nomenclature is a little bit funny, because there have been several updates, and so the 76 original model, base model, is still the report that is included on the SEDAR website and the last base model that was evaluated through the SEDAR process.

DR. REICHERT: Okay.

DR. CURTIS: So there are -- There's SEDAR 76 updates to updates, but 76 encapsulates all those, and there's three. There has been three updates, and, really, they haven't been true updates to the SEDAR process. They have been updates for the SSC, and so it's a nomenclature issue. It's the base model of SEDAR 76 is what we're updating here.

DR. REICHERT: Yes, and I don't -- As long as everyone understands what exactly is going to be updated, I'm totally fine with that, and Shep came to the table.

MR. GRIMES: Thank you, Mr. Chairman. Well, I would be -- I guess I'm a little concerned with this, and I would be careful with the record that we build. I've been here for every one of those black sea bass reviews, and that was actually why I was coming to this meeting in person, to get the next one, but the only one that this body accepted was the SEDAR 76 update, right, and that was the last iteration of the assessment. I know there were multiple tweaks or whatever, and so that's -- Our baseline record is that's what we have.

If we're reverting back to something different, and I am not the one to judge whether there is some big difference between update and SEDAR 76, but we just want to make clear in our record that, if we are stepping back to some prior iteration that was rejected by this body previously, we need to be cognizant of that and explain how that then it's still consistent with best available scientific information, in light of the past decisions. Thank you.

DR. REICHERT: Thanks, Shep.

DR. CURTIS: Okay. I'll make a note of that, that language there should reflect either the update, or at least the model version reviewed by the SSC in April 2025.

DR. REICHERT: Or maybe like approved version of, something like that.

DR. CURTIS: Yes, and that's -- I agree with you, Shep, that that's the latest model that was reviewed. The issue lies in that there was multiple other versions that the SSC saw that were also called 76 update, and so it's not specified, and so maybe some language then it that was reviewed and approved by the SSC in the April 2025 language is merited there. Okay. Off to a hot start.

Term of Reference Number 2 is incorporate the latest BAM model configurations, data calculation methods, detailing changes made between the SEDAR 76 update assessment model and the proposed assessment model. Provide a model run using the 76 update assessment configuration, including recent years data following NMFS Procedure 101-11.

Consider any new and updated information on life history, natural mortality, discard mortality, stock-recruit relationship, commercial and recreational landings and discards, and document any changes or corrections made and provide updated data input tables. 3a provide the commercial, recreational, and combined landings and discards in pounds and numbers. A statement here incorporating the calibrated time series for the rec landings and discards from the revised MRIP-FES estimates, as we talked about as one of those major uncertainties, and standard language for considering MRIP recommended approaches for rec catch data to reduce those PSEs below 50 percent.

3c is consider the newest and best methods for estimating natural mortality. I think there are some -- There are some new methods that have been used in assessments that were not used in the previous 76, and so they'll update those, and considering estimation of the natural mortality within the stock assessment model. Any questions? Wally.

DR. REICHERT: Wally, go ahead.

DR. BUBLEY: I know this is standard language for kind of our normal assessments, and do we need to modify this a little bit more, just because it's going to be this this new style, where it's going to be the desk assessment, essentially, because, I mean, some of the language with this one is what gives me heartburn more than anything, where it says consider new and updated information on life history, and what does that mean?

I mean, we've left ourselves wiggle room when we go through the normal process, because sometimes we come across something, and then we have a discussion, and then we say, okay, we want to be able to do this, but, in this case, it's going to be one person, or two people, doing this that are going to go through this process, and we don't see it until way later, and so do we just need to put some more -- A little more succinct language in there?

DR. CURTIS: Chair, I'll address that. Yes, and so you're exactly right, Wally, and this committee did have some discussion, and I think the SEDAR Steering Committee also has some discussion on if it was -- If it would be better to have separate terms of reference for these center-led assessments, versus ones going through the SEDAR process. We haven't landed on any resolution just yet. That is something I think we could discuss further at length for subsequent internally-led assessments, which will be coming up next, and vermilion snapper will be another one, and so I'll kind of defer to the committee to discuss if they think that is -- If that would be more relevant to come up with their own set of terms of reference for those types of assessments.

DR. REICHERT: Amy.

DR. SCHUELLER: Yes, and I wondered the same thing when I was reading through this, whether this was just like a standard set or -- I also wondered whether that diagram we were presented at the beginning was used for this, right, and, when I read these, I thought the exact same thing that Wally is saying, and it's like these just seem super open ended, but on a tight timeline, and we're supposed to be using this new process and diagram to sort of limit the scope of things, and so I think we do need to address that in these.

DR. REICHERT: A quick question, Judd, and so we made that recommendation to have a separate set of terms of reference was -- Maybe you mentioned it, and has that been discussed in the SEDAR -- Within the SEDAR Committee?

DR. CURTIS: My recollection is it was discussed briefly at the SEDAR Steering Committee meeting. It has not been discussed at the SECAD Committee of the council.

DR. REICHERT: Okay, and so what's the -- What's the feel of the committee as a whole? Should we provide some more clarified language, or are we recognizing that we may need to change that, but leave it as-is right now, and there's a couple of options. Anyone? Fred, go ahead.

DR. SCHARF: So, as written, this one feels like a bit of a hybrid, right, and I'm trying to decipher in here which pieces of this are very explicit to this, you know, update, with this new terminal year, and what specific uncertainties that were trying to address. Some of them are in here, but it's hard for me to figure out which ones are those, versus which ones are kind of boilerplate TORs, and so it would help -- You know, you could have a -- You could say boilerplate TORs, and then you could say some specific ones down below, but it seems like they're weaved in here, you know,

some of the ones about the new MRIP-FES, and some of the ones about some additional sources of uncertainty from the previous update, but it's hard to tease them out the way it's set up.

DR. REICHERT: I have Matt online.

DR. CURTIS: Yes, and if I could respond to that. Yes, and I agree with you, Fred, and, you know, there's -- When we were drafting these, and they gone through various SSC reviews, you know, we had broken this up so that 3 was kind of encapsulating some of the data inputs, and then, moving on to 4, those are more of the assessment modeling configurations, any deviations, and the result if you separate like that, right, like you have things that are intertwine, you know, old language for data, and then old language for the assessment modeling mixed in with newer language for each of those different sections.

That's the one way to do it, where we've landed. The other way to do it would be to tease apart kind of new and old boilerplate language, like you're suggesting, and then have a new update specific for this particular species in a different section, and that would include any new data inputs and new modeling and assessment configurations.

DR. REICHERT: Thank you, Judd. Matt, go ahead.

DR. DAMIANO: Thanks. Yes, and I've been wrestling with this same issue for state assessments, and so it's been on my mind a lot. I think a lot of this could be resolved by not calling it an update, and I've said, facetiously, that we could refer to these things as like update plus, or update max, because you're not just doing the data-only update of the model.

What you're really doing is revisiting assumptions of the model without changing the fundamental architecture, and so it really is that hybrid in between something like a data-only update and a benchmark, and so perhaps just recategorizing what this exercise is would allow for that mix and match of boilerplate and, you know, bespoke TOR that would be necessary for defining the parameters of the exercise. I hope that made sense. It makes some sense to me, and I want to say I've seen it called an operational assessment before, although I might be using that terminology incorrectly.

DR. REICHERT: Thank you, Matt. I think that, in terms of the terminology, that is a SEDAR -- I believe that is a -- What to call it is -- That's kind of a SEDAR-level, SEDAR Steering Committee-level discussion, and I think this is one of the one of the first in this new iteration, but, yes, I don't necessarily disagree with you, but, in terms of what to call it is I don't think up to us. I have C.J., and Chip came to the table.

DR. CURTIS: Just to respond to that, yes, Matt, you're correct. We had that nomenclature previously, and that was research track assessments, and then operational assessments, and that was changed, at the recent SEDAR Steering Committee meetings, and so now we're in a little bit of a limbo world, where everything is kind of called assessments, and we may need to get back to a place where we do have a more concrete categorization of them, and I don't know, but that's not for me to decide, but, yes, it is akin to an update lite, where you have -- You're not only just updating the data streams, but you are incorporating a little bit of new information into the model.

DR. DAMIANO: I'm giving you a thumbs-up.

DR. REICHERT: C.J.

DR. SCHLICK: For this, instead of doing that, or, well, instead of saying new and updated information on all of these different parameters, be more specific in saying consider new and updated information pertaining to uncertainties addressed in the last update, or laid out in the last update, so that it's all of these things that were specifically asked before, without opening the door to any and everything.

DR. REICHERT: Wally, to that point, and, Chip, do you want to -- Hold on. Do you want to reply to that, real quick, and then I'll got to you, Wally.

DR. COLLIER: Yes, and what I'll say is the reason that these are written up in in this fashion is to give the analyst flexibility to update information that comes in that might be unknown, or might come out after these terms of reference are even developed sometimes, and so there might be a new age and growth paper that comes out. If we say you can't update life history information, and there's a new paper that comes out, is that running some risks? Yes, because there could be a new age and growth paper out that might show this is what the length-at-age should be for this, and so we're trying to give the analyst flexibility to incorporate new information as it becomes available.

You know, it says consider and update, and it doesn't say you have to do it, and so, you know, it provides them the flexibility to look at certain things, and we provide a laundry list to give them the flexibility to do it. Then, you know, if you look at the sub-bullets that are generally in there, those are looking at some of the more bespoke things that are really in -- That are coming up, that we've seen as staff, and, you know, working with Science Center staff, these are some of the issues that have been identified in the past.

It could be an overarching issue, like MRIP, trying to address some of the -- You know, PSEs for black sea bass are usually pretty good. It's not anywhere close to 50. It's usually around 10, and so it's not -- That's not necessarily an issue for this species, but we're trying to get these pieces put in there, and making sure that they're investigated and discussed within the assessment, to make sure that, when it comes to you all, it's addressing some of the things that have been discussed around this table.

DR. REICHERT: I have Wally, and I think, also, that's where the assessment report is really important for us, because that's where can read what new information was included and the justification for including that information. Wally.

DR. BUBLEY: Basically what Chip said there was what was my concern. Like if some new information, some new data stream, some new something comes out, and you give one person leeway to make a decision to put it in this this model, what happens if the vast majority of other people wouldn't agree with that, and then we run into some situation later on, and that's my concern, is, because this is just Science center, and it's not the transparent --

It's not the discussion amongst multiple people, like we've had in the past, that, if we do give that leeway, we're going backwards, to kind of where it was beforehand, where it was just -- It's just an analyst that was looking at it, and they were the ones that were deciding what was best, versus

the way that some of these are set up, where we have specific things, and we say this is -- We want to explore this, this, this, and this. I think that's -- For this type of assessment, that's the way that you should be going with this, and not giving them broad range to change anything that they want because you have that boilerplate language in there.

DR. REICHERT: I see Jim, and Carolyn is coming to the table, but, Jim, go ahead.

DR. GARTLAND: I'll just make it quick. I agree with that, Wally, but I think TOR 7 is almost a safety on that, where it says that, you know, to convene an assessment technical team, including SSC and industry representatives and outside technical experts, to meet via webinar or in-person to review model development and provide guidance.

If something new came in, isn't that where the SSC could provide some input as to like, hey, yes, that new paper did come out, but maybe that's not exactly the best, or something like that like that, you know, and it is that kind of allowing the analyst flexibility, but providing a little bit of a safety on it?

DR. REICHERT: Yes. Carolyn, I'll go to you, but the dilemma there is the -- You know, and we've talked about this many, many times, and it's the, you know, speediness and expediency and thoroughness, and so that -- I know where you're coming from, but that that sometimes has -- It results in a more lengthy process, and particularly with black sea bass, and we discussed earlier why that may be a problem. Carolyn, thank you for coming to the table.

DR. BELCHER: So I'm looking at Erik too for this. This is us old codgers showing our age in this process. We used to do these updates similar in the form of what we're proposing right now, where you've got SSC members sitting there while the assessment is going on. TORs, I don't think we had formalized TORs, but, when you look at the report, it's pretty specific in how things were done, and it may be just going back and looking at how we approached those problems earlier. I mean, Erik, do you remember?

I was going back and looking at red porgy, and that's how long ago I know it's been, and we did updates in 2006 and 2012, but there are not specific appendices for TORs, but, when you look at the data review, it's very specific in what was done, and so I don't know if going back and looking at those earlier SEDARs would be helpful to get an idea on maybe -- Again, the TORs just are not -- They're too boilerplate for what we used to do these operational and those kind of things, where back then we had an assessment, and we had an update, and we didn't have all the derivatives that came after that.

I think that's one suggestion that I would make to the group, and I'm kind of looking to Judd. I mean, Chip and I were kind, off just the cuff, trying to find these things on the frontend, but I think go back and look at those early years of what we did with the SSC members sitting there, because we were actively part of that group sitting at the table, and going through discussions about whether it was growth curves or whatever, if they were being updated, and so it wasn't just an analyst talking to you about the assessment. It was more of the wheels were cranking around you as you were going through the process, but, Erik, I don't know if you want to add to that.

DR. REICHERT: Erik.

DR. WILLIAMS: This is kind of a -- You have to step back and go what is the purpose of the TORs, and what are we trying to do here? Are we trying to set guardrails to prevent, you know, the analyst from doing something wild and crazy, or are we trying to -- What are we trying to do with this, and that's where I think we're getting wrapped around the axle.

I think what we are really after is we're trying to do a fast assessment here. This is an unusual situation, and we're trying to put in as much flexibility as we can to address all the issues that were shown in the previous slide of the list of things that we wanted -- That the SSC agreed needed to be addressed. The way we address those is you can't pre-prescribe that, right, because there's going to be things that will pop up, and we need that flexibility to be able to address say a selectivity issue.

It's not -- You can't say a priori exactly how you're going to address that until you actually get into the model and look at the data, and work with it, and so I would say, you know, there's a trust element here, right, in what you guys -- What I would like to see, as, you know, the agency who is running the assessment, is give us the flexibility, and trust our judgment.

We're going to be bringing it to you to look at, and, if you disagree with some of the decisions, we can make adjustments at that point, but trust that we're going to make reasonable decisions, and we're not going to break the guardrails, so to speak, and do something harebrained with this assessment, because we're under a tight timeline, and I think that's the other important piece to always keep in mind, is that whatever is done with an assessment is always constrained by time and resources, always, and so we have limitations right out of the gate.

DR. REICHERT: Thank you, Erik, and so I have Luiz, and then Matt. Luiz, go ahead. Good morning.

DR. BARBIERI: Good morning, Marcel. Marcel, thank you. Actually, Jim has already addressed what I was going to bring up, right, and I agree with the points that Erik just made there about giving the assessment team, right, some flexibility to do whatever they need to do. Then, through that assessment technical team that's going to be convened, the SSC will have further opportunity for input.

Then, real quickly, in terms of assessment nomenclature, right and, Judd and Chip, correct me if I'm wrong, if I'm misremembering this, but my recollection, from the SEDAR Steering Committee discussions on this, is that the idea is that, by removing those more specific nomenclature issues from the types of assessment, that we will be giving folks the opportunity to incorporate more things, do all sorts of different things that need to be done, in terms of the types of assessment, and not be so constraining to say what is an update and what is not an update, but is an operational, et cetera, et cetera, right, and the definition of the terms of reference then would define what you want to have in that assessment. Of course, this is where the SSC can express what they want to see, and I think that having that Term of Reference Number 7 there provides the SSC a great opportunity for input.

DR. REICHERT: Thank you, Luiz. Matt, and then I'm going to propose something. Matt, go ahead, and then we'll go to Wally.

DR. DAMIANO: I don't have a ton more to contribute that Erik didn't already say. I think I would recommend that the SSC pursue as pragmatic of an approach as possible to seeing this exercise through. I want to express some deep concerns about the state that stock is in, especially given this the MARMAP and SERFS presentation that we got, and so, echoing the sentiment in the room, I would suggest giving the Science Center that flexibility, and maybe not getting wrapped around the axle too much on terminology, when the work is quite necessary, and needed, to address where black sea bass are at.

DR. REICHERT: Thanks, Matt. Wally, and then we're going to wrap this part of the conversation up. Go ahead.

DR. BUBLEY: Yes, and I'll just be quick. Erik, I'm not talking about handcuffing the assessment scientists. My issue is it was just so broad, and, basically, Number 3 was the one that I had this issue with, was because it brought up information, but it didn't relate it to the specific topic, and so if we could put language in there that said consider new and updated information on all of those things in relation to these topics, I'm find with that.

It's just it's so broad and open that it doesn't -- It doesn't lead to that expediency that you're talking about if, all of a sudden, the analyst is running around and looking at every single thing that's out there. We're looking at specific things, or specific problems, that were need to be addressed, and so I'm okay with it, and just a minor language change, and it's just it's so broad, and that was what my issue was.

DR. REICHERT: Okay, and so we can probably wordsmith this for a long time. My suggestion is, given the fact that the SSC had recommended perhaps a different set of terms of reference for these type of assessments, that maybe we can think about this, pick this up in one of our next meetings, if that's appropriate, and see how we could possibly adjust the language to make it more appropriate for these Science Center stock assessments. I think we made our points clear, in terms of concerns. Okay?

Not later today, but just for but a future SSC meeting, to see if it would be beneficial to take a good look at the generic terms of reference and see if we feel it's -- If we should be making some changes, and that also gives all of us kind of some time to think about where the issues may lay. Make sense?

DR. CURTIS: If I can respond to that. I like that idea, and developing then a different set of terms for the different types of assessments. It seems to be how the SSC wants to go. We do have the vermilion snapper assessment that we were going to review the TORs for right after this, and that could be the flagship attempt at a different set of TORs for that center-internally-led assessment model. We're kind of getting ahead of ourselves right now, in front of the black sea bass, but maybe what we can do for that then is postpone vermilion snapper TORs review after this, and I can draft another -- Some other version that can go to the SSC, so we can see what versions may be --

DR. REICHERT: Can we do the timeline-wise?

DR. CURTIS: Yes, and so we'll have -- I was thinking about that too, and we'll have likely a webinar meeting in late July or early August, and that would keep us on track for the council to be able to review those TORs in September.

DR. REICHERT: Okay, and that doesn't mess up the assessment timeline, and I like that idea. That gives us a little bit more time to really think about that, and so I like that suggestion.

DR. CURTIS: Correct, and, I mean, as this conversation was unfolding, I'm thinking, you know, in some cases, that is somewhat at odds then of this new idea where we're not labeling particular assessments though, right, and the terms of reference are supposed to dictate what goes into the assessment, and what the modeling capabilities are going to look like, and then, if we start developing alternate terms of reference for other types of assessments, we're coming up with a de facto label for that assessment, but, if that's the direction that the SSC would like to go, and we can get guidance from the council and from SEDAR, from the steering committee, on that as well too, and I see Emily is coming to the table, and so maybe she has got some insight on that.

DR. REICHERT: Emily, go ahead. I like that idea. As I said, it gives the SSC a little more time to kind of ponder these issues. Emily, go ahead. Welcome to the table.

MS. OTT: Thank you. Just two points, procedurally, and so the first one, talking about the different assessment labels, the whole reason Judd presented the infographic with the different kind of component decision tree was to really emphasize we no longer use specific assessment labels for the different assessment, and so it's more of a choose your own adventure approach for the cooperators, and that infographic is to display the components that you can choose from.

Then the second point I wanted to make was regarding Term of Reference 7, the technical teams. As Chip mentioned the other day, we are no longer convening any sort of assessment technical team, and so the lead assessment agency is welcome to reach out to individuals for feedback or guidance on the assessment, but we no longer are convening technical teams, which is why, as Judd showed yesterday, that role, and the people that had volunteered for that, was crossed out, and so I just wanted to clear up those two procedural things

DR. REICHERT: Thanks, Emily. Chip is coming to the table, and Judd.

DR. CURTIS: Well, so the option to convene an assessment technical team is still an option. They are not appointed by SEDAR or the council, is my understanding. The assessment, whatever we want to call it, the technical team comprised of SSC members and industry representatives, can be convened by a direct reach-out from the center, or the analyst, to get information and feedback on model development. They're just not appointed through the council and SEDAR process.

DR. REICHERT: Emily, and then Chip.

MS. OTT: So, at the steering committee, we agreed that we're no longer calling it assessment technical teams, but the cooperator is more than welcome to recommend individuals that they think would provide, you know, the technical expertise, and so that lead assessment agency can work with the cooperator to reach out to the appropriate individuals, but there's no technical teams anymore. We're removing that language from the SEDAR process.

DR. REICHERT: Chip.

DR. COLLIER: Yes, and I was thinking along those lines, and so 7 could be, as opposed to “convene”, to “recommend National Marine Fisheries Service reach out to SSC and industry representatives, as appropriate”, and so, at that point, if they have questions on certain pieces, like say let’s life history, you know, a perfect one to go to would be Wally. He works on life history quite a bit, and also Marcel, and so there’s different pieces of this.

If they have questions about what they’re changing, and why they’re changing it, I think that would be a good approach to it, and provide them the flexibility, and so I would also put “as necessary” in here somewhere.

DR. REICHERT: After “experts”, or “as needed”. Okay. Jason.

MR. WALSH: This is just a quick clarification question, and so this is -- Bullet 7 is outside of the SSC small group? Sorry. The Number 7 is outside of the SSC small group that we talked about? Okay.

DR. CURTIS: Correct, yes, and this step is replacing kind of what was previously the assessment panel stage, where we had appointed members that would convene, right, these assessment webinars, or assessment panels, and that would require a lot of time and preparation, and it would -- It seemed to be just more expedient to be able to have the analyst directly consult with experts, industry representatives, on any sort of model development and questions that they had, and so this is the kind of the compromise from having some guidance and an oversight, versus a very involved process from the assessment panel.

DR. REICHERT: Thank you, Judd. Let’s go -- I see no hands, and let’s go through the other 4, 5, and 6 real quick. We’ve seen some of that language before.

DR. CURTIS: One thing I just noticed that would need modification here is just this, on b, is recommend, or not recommend, but consider incorporating additional sources of information to that, if the committee is okay with that.

DR. REICHERT: Yes.

DR. CURTIS: Further elaborating on that point, while I’m there, and so there’s some additional source of information, including this ACCSP catch card project that is looking at discarded information of black sea bass from nearshore, or shore modes, and so that could provide some insight and information to inform the general rec selectivity curves, so they’re not having to be combined with the headboat selectivity discard curves that we saw in the previous assessment, and so any other information such as that, but that’s listed as an example, that could be beneficial for that use.

DR. REICHERT: Steve.

DR. TURNER: Yes, and I would just change general recreational fleet to recreational selectivity patterns. Rather than specifying one general selectivity fleet, I would want to allow the flexibility to expand that.

DR. REICHERT: Genny, to that point?

DR. NESSLAGE: (Dr. Nessler's comment is not audible on the recording.)

DR. REICHERT: Then let's finish this, and then we'll come back to you, Genny. Go ahead, Steve.

DR. TURNER: I would say "recreational sector", or like "recreational fisheries", rather than "fleet".

DR. REICHERT: Okay. Genny.

DR. NESSLAGE: I have a question about 4d, and I actually had something about 3c, but we got so wrapped around the beginning of 3, and maybe we could go back later, but, 4d, I remember there being a lot of discussion about different patterns inshore versus offshore, and I was wondering if -- I would like to talk science for a second, and if there's any possible way to do some sort -- I don't know if the data are adequate to do some sort of spatial fleets as areas thing, where you have an inshore rec versus offshore rec component, and are you guys thinking along those lines?

I'm seeing Erik nod his head, and I'm giving it two thumbs-up, which I'm very excited about, just because this says evaluate its impact, and I think I would love to give them a little more flexibility here to do what needs to be done to address those inshore versus offshore issues, and maybe change it to "and address" -- Sorry. It's the end of the week, and I'm blanking. I'll come up with language.

DR. REICHERT: If I read that, then it gives enough -- It's broad enough for the --

DR. NESSLAGE: Make necessary adjustments to the assessment, as needed. Would that work? Sorry to interrupt you. It came to my brain, and so I just said it. Thanks. Then, for 3c, I was just super interested, but also daunted by this one. We had -- I know you guys had difficulty estimating F in the terminal year, given how low the indices were going, and do you -- Where are you -- I'm a little excited, but also concerned about that one, and I was wondering if there's some -- I don't know, and maybe I guess I'll just wait and be surprised.

DR. REICHERT: Well, again, that goes back to how much detail are we going to provide them, and it goes back to what Erik earlier said. I mean, we said -- We specifically said addressing issues that came up, and that's one of the issues that came up, and so I assume that that will then be addressed, rather than, again, providing more and more language that seems to kind of more and more be limiting, or confounding, what they can look at, and is that -- Are you comfortable with that?

DR. NESSLAGE: I don't think anyone is comfortable with any of this, and that's part of the problem. Erik mentioned the word "trust", and I think trust has been lost between this body and the center, frankly, and that's horrible, because I consider everyone colleagues, and I really respect everyone, and I think, until we see this process work, we're going to be really nervous about all this.

I'm not suggesting additional specificity on this one. I'm just -- I think this is a case where I'm a little worried where folks, the analysts, will do some work and not have questions, because we keep saying they'll come to us with questions, but maybe they very honestly think they're doing the best, most appropriate thing, and they don't ask anyone on the SSC questions, and then we come to the review, and we have major concerns, and so I think maybe the wording about consulting us with questions isn't correct, and maybe the wording needs to be, if you're making major changes, consult with the people you think might actually disagree with you on the SSC, or have major concerns, because those are the -- You don't want to be blindsided by that. It's just going to gum up the process, and so I'm just being honest. Thanks.

DR. REICHERT: No, and thank you, Genny, for that. I really appreciate that, and I think several other -- I can see where others may have similar concerns, and I'm just, in terms of these terms of reference right now, and maybe we should wait with making adjustments until after this first -- I mean in general, of like a different set of terms of reference. Anyway, after this, to see how this process works out. I see Chris, and then Chris. Chris, go ahead. Steve.

DR. TURNER: I would just say consider the best method to estimate discards, including observer program and blah, blah, blah. I would just put, instead of a command, to apply, I would say to consider. It gives them more flexibility.

DR. REICHERT: Thank you. Chris.

DR. DUMAS: I was just going to respond to Genny's question earlier about the recreational -- About segmenting the recreational data. Those data are usually -- They should be available by mode, and also by state waters versus federal waters, I think, and so that should help segment by inshore versus offshore. Thanks.

DR. REICHERT: Yes, and thanks, Chris. Jared, go ahead.

DR. FLOWERS: Since Genny took us back to 3, I had a question about is it worth having another sub-bullet for talking about stock structure, since there's been that recent work, and it doesn't change anything, but it confirms what's there, and I don't want to be too constrictive, obviously, but, I mean, it seems to be like it might be worth mentioning here.

DR. REICHERT: Well, I don't know, and so you want to get a -- In terms of what language do you propose? In terms of consider new information about stock structure, because that that may have some real implications for this stock assessment.

DR. FLOWERS: Well, I mean it didn't -- I mean, correct me if I'm wrong, but it didn't change anything. It just kind of confirmed the existing model structure.

DR. REICHERT: Okay. Judd.

DR. CURTIS: Right, and so the SSC did see the analysis on the latest genetic study that showed that basically status quo. However, there are other issues concerns, and data sources, that may go into the stock identification workshop, right and so the consideration of all those different factors is usually why you have a stock ID workshop. Obviously, this format, and as an update, or

wherever you want to call it, is trying to get this out as quickly as possible, and we don't have time to do a stock -- A full stock identification workshop.

That is something we've thought about for the next assessment setup, right, is convening an entire stock ID workshop with some of the new genetic information that has been provided, as well as any tag information and other things, but, for this model version, I think that's a little premature to add all that stuff.

DR. REICHERT: Are you comfortable with that? I think it would definitely be good to keep in the back of our minds once we get to that next step, and so I agree with that. I have similar concerns if we add that to our to the terms of -- Or suggest that to the terms of reference for this specific assessment.

DR. FLOWERS: I don't want to open a can of worms I'm just thinking about being complete.

DR. REICHERT: Okay. Thank you. Appreciate that. Alexei.

DR. SHAROV: Very quickly, 3c is consider the newest and best methods for estimating natural mortality, and I understand what's being said here, but does it mean that before that we haven't used the newest and best methods, and we used the worst and the oldest ones? I mean, that's probably minor, but we could modify it a little bit, like --

DR. SERCHUK: Perhaps better methods.

DR. SHAROV: Who knows what is best in this case, seriously, but consider like a range of available methods, and identify the most appropriate, or something of that sort. Overall, it feels like that we're essentially writing up a ticket for the possibility of a full revision, and that is like a benchmark-level stock assessment, right, and so, I mean, we're saying that we can modify natural mortality, and we can modify the model structure, and so I'm just checking out that there are no limits to the modifications that the team would find appropriate, and I don't --

I personally don't find any problem with that, but it's just because we've spent so much time on discussing the formalities as to how to define this process, and I just wanted to make sure that that's -- That I understand it correctly, right, that these terms of references allow the assessment team to modify all principle input parameters, and not that they necessarily will be substantially changed. They don't expect that, but, if whatever did occur between last year and now on, a publication on estimates for mortality, or growth, or a revolutionary method of estimating MSY, et cetera, et cetera.

DR. REICHERT: Yes, and I think that another way to phrase that is to provide flexibility to the team to determine whether they should include some of this available information into this stock assessment, and so, yes, it does provide a lot of flexibility, but, you know, again, that's the catch-22 between -- Anyway, I agree with you, and I personally am fine. You said that you were okay with that, and, again, if any of the members have major heartburn, then this is the time to express that. Chris, go ahead.

DR. DUMAS: I just wanted to say that I support, you know, providing flexibility to the analyst team. That's what they were hired professionally to do, and so I think that's their role. One thing

that I would mention is, in the interest of expediency and efficiency, is that, if there are any particular model runs with particular specifications of parameters that the SSC knows ahead of time that we want to see, maybe include that, because what I think we would all like to avoid is the analyst team doing a whole lot of model runs, and spending a lot of time and effort on that, and those runs not being very informative with respect to what the SSC wants to see, and then the SSC actually wanting different model runs, and having to tell the analyst team to go back and do a lot more model runs. There will always be probably some of that, but, if we could limit it, I think that would increase the efficiency, and expediency, and make everyone involved happier, and, in general, I support that.

DR. REICHERT: Judd.

DR. CURTIS: Chris, I think, to something Erik said earlier, is like keeping the language broad will then allow the flexibility for the analysts to investigate those different model runs without being too prescriptive at this point in the terms of reference. This will be the role of that subgroup and the review panel, as they're going through the assessment model, to look at potential additional runs that might be recommended by the SSC, and get ahead of that before we get to the full SSC model, and so that's going to be the function of that subgroup

DR. REICHERT: All right. I'm going to interrupt the conversation briefly. Fred Serchuk informed us that he will step down from the SSC. Fred, I know we're going to miss you. You've been part of this body for a long, long time. I personally, and I can speak for the rest of the SSC, and we've always appreciated your input and your contributions to the discussions, your expertise, and your contributions to our reports, and so I really want to thank you for your years of service, and, as I said, we are really going to miss you, and we wish you well with your future adventures, and so thank you so much for all you've done for us. (*Applause*)

DR. SERCHUK: No, and I feel very lucky in many respects. One of the respects that I do feel very lucky about is that I started working at the Woods Hole Lab in 1976, and so there's a book by Dean Acheson, who was a member of the State Department, called *Present at the Creation*, and, in 1976, that's when the Magnuson Act first came in, and so I was there from the very beginning, and, fortunately, in my career, I was able to interact with the New England Council and the Mid - Atlantic Council, and I still serve on the SSC for the New England Council, but I'm going to also remove myself from that, and let somebody else do it.

I worked thirty-eight years, from 1976 to 2014, and I saw lots of changes. I started out as an assessment scientist, and I became the head of the Research, Evaluation, and Assessment Division, and the reason I mentioned that is there was a very special structure, because it was one of the only divisions that I ever came across that had three different groups. One was the assessment group, and one was a protected species group, and one was a social sciences group, and they were all together in one division. I don't think I've ever seen anything like that, but the point is it worked very well.

Now, after twelve years of retirement, I think it's time for me to step back and let someone else, with perhaps more recent experiences, come to the table here and help you out. In any case, thank you, all. I really appreciated working with you. It was an honor, and I think it's time for me to step down. Thank you. (*Applause*)

DR. REICHERT: Thank you, and, with that, let's take a brief break, so people can check out, and let's come back at 10:15. Thank you.

(Whereupon, a recess was taken.)

DR. REICHERT: Welcome back. We will continue finishing up the black sea bass terms of reference. As we discussed earlier, we'll postpone discussing the vermilion snapper until likely our webinar. It's my understanding that that does not have major impacts on the scheduling for that assessment. That gives us time to ponder some language there, and so my question is are there any other -- Judd, if you can bring up the terms of reference for black sea bass.

DR. CURTIS: Yes, and so, just to that point, Marcel, so the vermilion snapper assessment, as of the last SEDAR schedule, was scheduled to begin late in 2027, and so we still have some time before approval of the TORs, and so we'll still be on track.

DR. REICHERT: Thank you. That's very helpful, and so any other comments questions or changes to the terms of reference? I have one, and that's just a minor one, on 8. It seems like develop stock assessment report should probably be Terms of Reference Number 9. That's kind of different from convening a review panel, and that was just a minor one. I saw Steve's hand up. Steve, go ahead.

DR. TURNER: On 5a, it seems to me here that we're defining sort of two extremes, recent average recruitment and using the stock-recruitment relationship, and I think there's stuff in between those two. I really dislike average recruitment when you have rapid changes in recruitment, because very quickly you'll be wrong. If you add relatively static recruitment, that's fine, but, when you have declining or rapidly increasing recruitment, very quickly you will be off the trend, and so I suggest we provide more flexibility here. I don't have the exact wording that might be reasonable.

DR. REICHERT: Maybe after "relationship", "or other stock-recruit relationships"?

DR. TURNER: Or other -- Sure.

DR. REICHERT: Okay. That provides a little more flexibility, rather than -- Genny, go ahead.

DR. NESSLAGE: Maybe I'm not understanding what Steve's concern is, but I think what they're trying to say is that they will estimate average recruitment and then annual deviations from that, instead of -- In place of a stock-recruitment curve, so that, if they're allowed enough flexibility -- If you allow the deviations and the autocorrelation among them, if they specify or estimate that, and I'm going to let Erik give the details.

DR. REICHERT: Erik.

DR. TURNER: So --

DR. REICHERT: Steve, go ahead.

DR. TURNER: I'll interrupt, but so I'm bothered by "average", and so maybe we could deal with the trend in recruitment, and that would be that'd be acceptable to me.

DR. REICHERT: Erik, go ahead.

DR. WILLIAMS: How about a better solution? A better solution is how about just follow the projection methods working group recommendations, which covers all of that.

DR. REICHERT: Thank you. Yes, and that's also -- As Amy mentioned, that's also in 6, but that's okay, if we put it there and it's more specifically in 6. So explore the use -- Explore recruitment, conform the recommendations of the catch level projections working group, and is that what you were saying? That's under 6, and that's not -- Okay. Then can we just delete a? Can we delete a, because it's already captured under 6? Are you comfortable with that, Judd? Anyone else?

DR. CURTIS: So there's been a lot of discussion, right, over selection of a proxy over the MSY values, right, both at this committee and then at the council level as well, and that's why this language is written in there, is so that the analyst can explore those different stock-recruit parameters, and different model types.

In a lot of cases, and this kind of gets into b, but we need whatever the default proxy value that was used, or, if it was a direct estimate of MSY specified in the FMP, we need to run using those benchmarks to compare during the assessment, or, excuse me, during the amendment development process, and so that's why those are written in there. As far as the catch level projections workgroup, I think we initially had it up there at one time, and it was recommended to be moved down to 6, and so that's why it's there now.

DR. REICHERT: Is that okay, Steve? Are you comfortable with that, to just leave it as-is for now?

DR. TURNER: Or perhaps the thing to do would be to drop the first sentence and determine appropriate -- Well, no, and that's -- Go ahead, and I don't have proper wording, but I'm very uncomfortable with average recruitment. We've fallen into a lot of traps there.

DR. REICHERT: Wally.

DR. BUBLEY: I mean, Steve, would just removing "average" help that? That's exploring recent recruitment, and so that opens it up however you want to look at it.

DR. TURNER: Thank you.

DR. REICHERT: Thank you, Wally. Jim, I saw your hand.

DR. GARTLAND: So this is really just more of a clarification, and so, in terms of the SSC's role in this, it almost seems like there's three places where we come in, potentially, right? The first one could be at TOR 7, with the not assessment technical team, but the experts, right, that can be reached out to as needed, and the second is there's a review panel of SSC members. It's not the full SSC, right, that's going to review, and then the full SSC gets a crack at it before it's all said and done, and so, really, there are, you know, a minimum of two, and maybe up to three, possibilities for the SSC to be involved in this process, right? Okay. Cool. Just making sure I understood.

DR. REICHERT: No, and that's absolutely right. Alexei, go ahead.

DR. SHAROV: Thank you. Just to go back to recruitment and to finish up Steve's note that the second sentence -- You have to remove that "average" from the second sentence and say, "Determine, as appropriate, MSY proxy and time series for recruitment to be used in projections."

DR. REICHERT: Thank you, and relative to that, I think -- I had mentioned that I think twice before, and that's where our proxy working -- The feedback from our proxy working group becomes really important, and I mentioned both the red snapper and the black sea bass assessment, and so, once again, there's some urgency in that, but that's nothing to do with the terms of reference, but -- Okay. Anyone else?

Seeing none, then we will add this to our report, and, in our report, we'll say that we made recommendations to the terms of reference, and perhaps we can add some language to our report that we had extensive discussions about this, and the reason we recommended, or decided, to postpone discussing the vermilion snapper terms of reference to a later date is so we can think about potentially adjusting the language, and also get some feedback from the council and SEDAR Steering Committee in terms of whether or not a separate set of terms of reference would be good, as we have -- Would be good to have, as we have recommended in the previous SSC meeting. Judd.

DR. CURTIS: To that, Marcel, and thank you for outlining that process, and so what I'll do is talk with those entities and see if there is a decision made on that so far, and how -- If not, how that should be developed. If there is flexibility for having different styles of terms of reference for different assessment types, I can start -- I'll start drafting some examples for our vermilion snapper terms of reference, in addition to the one that you see in your briefing book, and that would be like a center-led only assessment terms of reference, and we can use those, and compare those, and that will be added to the briefing book for our webinar, summer webinar, meeting, if that sounds good.

DR. REICHERT: One more point is the appointing members for the SSC subgroup to review this before it comes to the full SSC, and remind me, Judd. The timeline for that was late -- Early next year? Let me pull up the -- I mean, there's a lot of uncertainty there still yet, in terms of -- But roughly that's -- Well, to be honest, I think it's more likely that that is going to be early next year, but there's -- Anyway, it's uncertain, and so is there anyone else who is interested in serving on this review panel?

Especially helpful would be people with some stock assessment background. Seeing none here, myself or others may reach out to some of you to see -- Steve. Thank you. Then we may reach out to some of you to see if you're willing to participate. I think it would be helpful once that dates are become available, and people may be more able to commit to that or not. All right. Is that it for this again item, Judd?

DR. CURTIS: That's it for the terms of reference, and thanks, Steve, for volunteering for the review panel. We'll need to get a few more members, and, once we have a better idea of the timeline for that scheduling of the review panel, we can make more of an effort in earnest to get members for that.

The other review panel, that we do have set dates for, that we need some members, is the dolphinfish MSE CIE review, and so, kind of skipping back over to the SSC workgroup and SECAD panels, if anyone has been thinking about if they would like to volunteer for that, we can go on this now. The dolphinfish MSE review workshop was July 28th through the 30th of this year. Jeff has agreed to be reviewer, and we still need a second -- And Kelsey. Excuse me. We need a chair, was the last remaining -- Excuse me. Yes. Okay. Never mind. Excellent job, everybody.

DR. REICHERT: All right. Thank you. All right, and so that wraps up the terms of reference for now. Next up is Agenda Item 12, SEP Meeting Preliminary Summary, and I'll hand it over to Jennifer to give us a summary of what the discussions were at the SEP meeting.

SEP MEETING PRELIMINARY SUMMARY

DR. SWEENEY-TOOKES: Thank you, Marcel. We started off with a Citizen Science Program update, and there were three projects in particular that we heard updates on. The first was the Release project. This is an angler use app that records to -- That they can use to record released fish, and, in this latest rendition, there were prizes and recognition and collaboration with Sea Grant, who provided those. The report is that everything is looking really good. It's very successful, by all the metrics, and positive. They're increasing participation. There's increased angler satisfaction with that process,

The SEP, of course, wanted some increased detail on a release date by location and mode of fishing, and we were also really interested in the scale of participation, especially after the end of the Sea Grant incentivizing, and so those were some of the discussion points we gave back to them.

We got an update of the FISHstory project, which I'm sure many of you have seen, and also really high metrics. They've had over 2,300 photos that have been digitized and archived from the South Atlantic from the 1940s to the 1990s. They are looking for more photos from the Carolinas, and so, if anyone has access to some of those older recreational and charter photos from that era, please reach out to Julia.

We also heard about the SMILE project, in depth actually, in a separate agenda item, but this is something being led by REEF, the Reef Environmental Education Foundation, and they're training citizen science divers to collect fish length data using low-cost, laser-mounted cameras, and they're focusing here primarily on data-limited species.

Their goal is to support reef fish management and conservation efforts by supplementing end users with some size data, and the SEP offered some feedback on the survey that was assessing the experience of the participant, and they also assessed potential new participants, who haven't taken any photos yet, but are possibly interested, and we gave feedback on revising future survey drafts, but also definitely warned that there's a great potential for survey fatigue in Florida, and so we don't want to repeat that one too often.

Then the last thing for citizen science was a wrap-up, a sort of an introduction summary of their program assessment that they're in the midst of. The CitSci Program has four key goals they want to guide the development of projects that support fishery management decision making. They want to facilitate the development of individual projects to address specific research priorities, and

they want to ensure that the data collected by projects are accessible, robust, and fit for purpose, and then, lastly, foster mutual learning, collaboration, and program engagement.

I urge you to take a look at the slides that were presented to us in our briefing book. There are some great indicators on each of those goals, some great demonstrated meeting the different goals of the programs, with lots of detail, and so I really do recommend you take a look at those, if that's interesting to you.

This is, of course, difficult to measure in some ways. The SEP would love to know whether or not that data that has been recommended for potential use has actually been used, and so that was something that we wished that we could know, but understand that it would be a difficult thing to assess, and so we really did commend Julia Byrd and her great team for their excellent work on this, all of these different projects.

The next item was a very brief overview of a new project. It's funded by SAFMC, and it is a contract that has the overall goal of increasing the council's capacity to effectively engage with fishing communities throughout the South Atlantic.

This project is still in the contracting phase. It has not started yet. The things are not all signed, but some of the biggest goals of this multi-phase, many component project, that has to take place over less than two years, is to summarize, organize, and operationalize all of the existing information relevant to this topic, to look at gaps between what exists already and what is needed, and then to really prioritize the, quote-unquote, best ways for the council to help fill gaps, and, by best, we mean here most achievable with the greatest impact in knowledge, communication, et cetera. Then, lastly, to create tools to enhance the council's practical capacity to better engage with fishing communities, and this is council and council staff.

The PI for this project is Ed Camp out of the University of Florida. The project team, you might know a few of us, and it's myself, and it's Kai, Bryan Fluech at UGA Marine Extension and Georgia Sea Grant, Tracy Yandle, who was a long-term SSC member, and Michael Jepson, who is a familiar name to many of you, Chelsey Crandall, who is also on the SEP, Angela Collins and Andrew Ropicki, and Joy Hazell out of the University of Florida, and so I'm excited to work with all of these folks.

Kai, if you had anything you wanted to add on the project, and poor Kai didn't even get warned that we were explaining it to the SEP until it was over, but that's just launching, and there's a great project oversight team to make sure we're on track as well. I believe it's confirmed, Chip, and can I say those names, the project oversight team for the communities project? That would be Christina Package-Ward and Jason Walsh and SEP member Kathi Kitner, who is rejoining the SEP after a long hiatus, but used to be on the council staff years back.

The next item we dealt with was the snapper grouper management strategy evaluation. We really were looking at the economics here. We got a presentation about adding the economic information to the snapper grouper MSE. The SEP talked about the appropriateness of discounting future benefits of kept and discarded fish, and ultimately gave recommendations on a discount rate to potentially use for consumer surplus forecasting.

They also provided guidance and caution about using presented willingness to pay estimates and directed staff to maybe -- To look at some research in New England that's producing more recent estimates of willingness to pay, specifically for black sea bass catch and discards, and I might pause there and see if there's anything Jason wants me to add, or, if there's any follow-up questions on the economics, I'll ask you to direct them to him. I should pause for questions, yes or no? Great.

The next thing we dealt with, because we didn't yet know that it was not moving forward, was that risk-value matrix, the economic and the social analysis, and so we, of course, had some concern about the economic contribution analyses. This is being estimated from input-output software, and it might be missing some essential fishery context. We asked to be involved in future discussions about the assignment of weights that are associated with the social scores and the economic values.

I spoke to the social values component yesterday, but I really want to emphasize that the SEP would really like this social values component to continue to be developed, with appropriate resources allocated to it, regardless of what happens with the rest of that entire endeavor, that the social values component has great value, and great potential.

We dealt with the fishery performance report -- Or we have a great new thing, actually. Fishery performance report text analysis, and so this is council staff has really seen an opportunity to incorporate fisherman knowledge into stock assessments, and so they have started some really interesting data analysis of the fishery responses to the standardized questions in the fishery performance reports, using textual analysis and thematic analysis, and so they're taking these really big datasets, which are kind of --

Not even kind of, but very much too much to handle in a traditional qualitative analysis protocol and trying to automate some of those procedures and finding ways to think creatively about how to incorporate that information. We offered methodological recommendations and really encouraged the continued development and exploration of how best to handle and incorporate this data. It's an exciting new direction.

Then we wrapped up with a new -- Council staff is developing a presentation that they are foreseeing will serve as an introduction to social science and economic work that's usually conducted as part of the fishery management process, and so they're putting -- They're in the beginning stages of putting together what they sort of foresee as being orientation material in a variety of settings, and MREP was mentioned, but it is sort of generically aimed at a fisherman or fishing community audience, with the intent of giving a clear practical introduction to how social and economic information is gathered, and how it's used to inform fishery management decisions.

They had a variety of topics here, starting off with things like why social science and economics matter to fishermen, but also to management, and what are social science and economics, why do fisheries managers need this information, what types of information is collected, how it's collected, how it's presented to the council, and then how does it inform or influence management decisions, and then, lastly, how fishers can provide social and economic information.

We spent a good amount of time discussing how to highlight the different components of each of these topics, ways to teach some of these things, sort of convey that some of this will be difficult

to explain, and we talked a lot about visual images, short videos, really changing up how things are taught. We also discussed conflict with pre-existing sentiments, or how to -- So how some of these topics might be more sensitive than one might think going in, and how to maybe approach it in a way that would provide reassurance and overall to manage expectations, right, that this is not going to be the cure-all for everything, but, again, overall really encouraged the continued development.

It's really good to repeatedly and consistently encourage stakeholder engagement with this process, and, the more that people understand about that, the better involved they can be, and the more successful we will all be, and so an exciting SEP this time. If there are any questions, I would love to answer them, Otherwise, I'll wrap up.

DR. REICHERT: Thank you for this overview, Jennifer. To remind the committee, the SEP report will be amended to the -- The SEP report will amended to the SSC report. Any questions for Jennifer or other members of the SEP? Seeing none, I think we originally had scheduled this under Other Business, but Jennifer, Judd, and I discussed that it would potentially be helpful, in one of the future meetings, to have some overlap in the meeting between the SEP and the SSC, especially for items that Jennifer and others identified earlier, like the MSEs.

Jennifer mentioned the wreckfish MSE, where perhaps we can have a better integration of the social and economic discussions with the discussions that the whole SSC has, and so I personally encourage that. Again, this may have some logistical and travel and financial implications, and so we'll, obviously, have to talk with council staff, and the council, but I am in favor of seeing if we can make that happen occasionally, and so, Jennifer, do you have anything to add to that?

DR. SWEENEY-TOOKES: Yes, and that was actually -- The joint meeting was sort of a new, exciting component that we haven't discussed, or thought of, until we sort of talked with the two of you. One thing that was striking to us is that we're sort of increasingly seeing this overlap and integration of the human and the biological elements in the discussions that we're having, and it did really hit home with wreckfish yesterday, when we were seeing that there's five minutes of slides, that none of us have seen before, but this entire process is based on this feedback that's being given by these unidentified stakeholders, right, and so I'm sure there's excellent work happening,

I see that their project oversight team is excellent, and I don't doubt this, but realizing that, yes, on one hand it would be great for the SEP to be able to see more detail about this, but, on the other hand, it would be good for all of us, as scientists, to see where this information is coming from, because that influences then how much weight we should be attaching to different components of it, and so I do encourage that we maybe not -- Not necessarily silo, right, and social and economic would be dealt with by the SEP, and the other science will be dealt with by the SSC, but, when there is natural overlap, we make sure all of the scientists involved in the scientific process are aware of what is happening and we have that opportunity for discussion.

DR. REICHERT: Thank you, Jennifer, and so I see some thumbs-up, and so I recommend that the ExCom will have a conversation with staff and council and see if and how we can make that happen, but I -- As I said, I'm really encouraging that, and so any other questions, or comments, relative to that? Jennifer.

DR. SWEENEY-TOOKES: I did want to add to that. I am not brilliant, and this was actually ideas that were presented by my fellow SEP/SSC members, who went, hold on, and who are the stakeholders right, and so this was something we've been discussing for this whole SSC meeting.

DR. REICHERT: Thank you. Appreciate that, and so anything else seeing? Seeing none, again, thank you, Jennifer, for that overview. We discussed the -- We've already discussed the working groups and the SECAD panels, Judd, and I think we completed that.

DR. CURTIS: Yes.

OTHER BUSINESS

DR. REICHERT: So next up is Other Business. I have one, and we talked about -- This is not a new topic, and we've talked about that over the years, and I don't think we need extensive discussion, but I really would like kind of a yes or no. We've talked about, you know, the late availability of some of the materials to the SSC for the briefing book, and my question to the committee is did you feel, this meeting, but other meetings, that the availability -- The late availability of briefing book materials has affected your ability to prepare for the meeting?

If this is an issue, then maybe we can continue conversations of that with staff, or within the SSC, and come up with ways to potentially address that, but, if it's not really an issue, and if the SSC still feels that it has sufficient opportunity and time to prepare for the meeting, then we don't have to, and so if I could see -- This is not going to be on -- Anyway. Jennifer.

DR. SWEENEY-TOOKES: I'll just reinforce the example I just gave. It's really interesting stuff, that none of us had slides of even during the presentation for wreckfish.

DR. GARTLAND: I mean, one or two things being late, you can kind of catch up on that, but, if you don't have any kind of, for lack of a better term, enforcement, and you start getting half of the things late, three quarters of the things late, and like most of us are traveling -- The SSC anyway are traveling, what Tuesday morning, and, if everything is coming in Monday night, and we're all on the road or in the air Tuesday morning, it's not going to be a very effective meeting, and so I feel like, yes, stuff happens, and I get it, but there needs to be some way to make sure the stuff is coming in at least a week or two ahead of time.

DR. REICHERT: Judd, to that point?

DR. CURTIS: Yes, to that, and so we typically have a two-week leeway time, right, for the majority of the briefing books materials we set, and that's kind of a first deadline. We do try to hold kind of a recent materials deadline of a week prior, or maybe that Wednesday prior to the start of the SSC meetings, and, you know, obviously, sometimes there are cases where things do trickle in after that, and it has been up to the discretion of the staff and SSC chair to include them or not at times, and, in some cases, certain materials were not presented that came in a little bit too late.

In other cases though, you know, we -- There may be recommendations that are needed to be made by the SSC, and so there are exceptions, and so it's a tight -- It's kind of a tight line, right, to decide

what should be allowable or not, but I just wanted to present kind of the two benchmarks, or timelines, or deadlines, that we try to adhere to for getting materials to you all.

Just on top of that, you know, for my job as presenting kind of the overview and tasking the SSC with the action items, it's, obviously, made easier if I can get materials in ahead of time, so I can tailor those action items to the actual materials that are presented, and sometimes we have to go a little off-the-cuff and try to predict what some of those action items to the SSC might be, and so, in cases where they're way off-base, we'll issue revised overview documents to try to reflect the materials, so that they're being presented better than they were maybe originally in the initial overview of the action items, but that's a tug-of-war, and a balance in itself as well.

DR. REICHERT: Jim.

DR. GARTLAND: I get, and, I mean, I really appreciate, you know, what you all do as council staff to get this stuff to us on time. It's really helpful, and, unfortunately, you know, someone said to me once don't bring me a dead cat without a shovel, and I don't know what the solution is for enforcement, and I don't have the shovel, but, yes, if there was some way -- I guess "enforcement" is a strange word to use, but some way to at least put a little bit of -- A way to prevent this from being a regular occurrence and the proportion of late projects increasing over time, because, like I said, it's not a huge deal now, but if it -- You know, if it trends that way, you're going to wind up with you don't have a quarter, or half, of your materials, and the meeting, I think, would be way less effective.

DR. REICHERT: Thanks for that feedback. Judd, do that point? Does anyone else want to -- Kelsey, to that point?

DR. ROBERTS: Just really quick, I guess, from my perspective, I think the level of complexity, like for example with the dolphinfish MSE, really necessitated at least two weeks, at least from my end, as I'm still kind of learning, and still new, and I would argue that the wreckfish also required at least a two-week minimum, to kind of fully grasp the materials, in order to provide any type of constructive feedback on that one.

DR. REICHERT: Thank you, Kelsey. I appreciate that, and so what I'll propose is that the ExCom will continue to have conversations with council staff and see ways to potentially address this, and it will likely be on a case-by-case basis, and, as I said, you know, we've been -- This is not a new issue. We've been struggling with that for years, but I just -- I was just wondering what the sentiment is of the SSC, and so thank you for that feedback. Judd.

DR. CURTIS: One of the things that council staff has been working on, because this is not just an SSC-specific issue, of course, right, but one of the things council staff has been working on is trying to come up with a more standardized -- Like a standardized form or something to submit for -- For potential presenters to submit to the various -- For various meetings that would have some detail on presentation title, topics, specific action items that they need to --

That they would like feedback on from the respective bodies, whether it's the SSC, the SEP, the various APs, the council, et cetera, in order to help our preparation for the materials and then for the action items that you all need to discuss, and so that's being developed right now, and that's not going to be the silver bullet, but hopefully that could help with some of these concerns.

DR. REICHERT: Thank you, Judd. Any other Other Business? Seeing none, next up is our final opportunity for public comment. Anyone online with hands up? Anyone in the room? Seeing no one in the room, and no one online, there was no public comment. Give me one second to confer with Judd, because next up is Consensus Statement and Recommendations Review.

I suggest -- I just asked Judd, and we feel that twenty minutes would probably be sufficient time for you all to read through that online document. If you need a link, I can ask Judd to resend that, and so we'll go into a work session, and then that gives you an opportunity to read through the current report, and make notes, and I think that's a little more efficient than putting it online, and then have us collectively read through it.

It is a 10:51. Let's come back at 11:15. and then I hope we can quickly go through that, because hopefully you guys have made some edits, or suggestions, online, and then -- Is that -- Is the committee okay with that? Genny.

CONSENSUS STATEMENT AND RECOMMENDATIONS REVIEW

DR. NESSLAGE: I know I had some additional thoughts about the dolphin MSE, and is that -- Is that closed? Is that discussion closed?

DR. REICHERT: No. That discussion is not necessarily closed, because we have the report, and so, I mean, would you like to open that before we go to the report? I mean, I'm fine with that. Would that be good to help us get through that report, or -- I mean, what's the pleasure of the group, or what's the -- What do you suggest, Genny?

DR. NESSLAGE: I guess, if we have notes, then we could finalize our report after the discussion, which may not be long, I hope, but --

DR. REICHERT: Okay.

DR. LORENZEN: If we already know that we need more discussion, I think we should do that now, because, also, I need to leave, and so --

DR. REICHERT: Okay. Judd, maybe you can bring up the dolphin.

DR. CURTIS: Genny, would you like me to bring the notes up here, the things that we've added, or do you have specific questions on the presentation and the slides within the presentation? What materials would you like me to show on the screen here?

DR. NESSLAGE: This is great. I think -- Can I just raise some concerns, and then maybe others don't share them, and then it will be a moot point, and we can go straight to closed session, and does that sound like a --

DR. REICHERT: Please do so.

DR. REICHERT: So I've had a chance to mull this over, and chat with folks, and sleep on it, and I'm growing increasingly concerned about the MSE. I just want to start off by saying that I think the modeling work itself is state-of-the-art. The Blue Matter crew are rockstars, and so that is not my concern.

What I'm worried about is not necessarily can we use this modeling approach, this MSE structure, to develop ABCs for management of the species, but should we, and the reason why I'm concerned about it is that there's this key assumption, which they have very clearly stated, that these are -- The available indices that they've presented are indices of abundance, and what I'm growing increasingly uncomfortable with is that assumption, because it looks more like it's availability and not abundance, and there's a very good chance that that's -- You know, what portion of the stock is available in U.S. waters is what those indices are indicating to me, potentially, and, if not's the case, that's great, and it's moot point.

If you look on Mandy's Quarto page, there's a Section 8, and there's options for indices of abundance, and there's a lot of nice description of them, but they actually go back and forth, a little disturbingly waffling between the phrase "abundance" and "availability", and that's a huge warning signal to me.

This I think would be especially problematic if we're exploring dynamic management procedures, which was one of the slides, but not a lot of detail provided on where that might go, and so I just wanted to give you some of my concerns, and so, for instance, if you're concerned about maintaining adequate spawning stock, which I think we all are, right, for example, if the stock is occupying -- If a large portion of the stock happens to be occupying U.S. waters in a given year, and you don't want to overfish them then while they're here, you would want the most strict regulations while they're in our waters.

Then, when only a portion of the stock is in our waters, and it's just the edge of them, then you could have open season, and that might be the actual -- A management procedure, but what was shown was this kind of conceptual graph of increasing availability equals increasing catch, right, and I think -- I went to -- Actually, Jennifer brought up the stakeholder report.

I read it, and I am not a social science expert, but my gist that I got from that was that that would be exactly the opposite of what stakeholders are interested in seeing for this stock, and that's where we get into the issue of what are the actual management objectives and what are the stakeholders -- What are they looking for to try and make sure there's a fishery for this stock that works for everyone and that they're not overfished.

I'm just concerned that, if these are indices of availability, and not abundance, we might be fooling ourselves into thinking that this sort of approach is going to actually achieve the objectives, and so, if I'm the only one who has this concern, I will shut up, and we can all go home, but, if anyone else shares that concern, I think we just need to maybe flesh it out in the report, or, if the group consensus is that this is a concern, I think we just need to make folks aware of it, and I'm sure that council is -- Needs to hear that as well. Thanks.

DR. REICHERT: Thanks, Genny. Anyone? Kai.

DR. LORENZEN: Yes, and so, I mean, I share that concern in principle. I think the way I was looking at it -- So, A, I've found, you know, we haven't had enough opportunity to really dig into the details of this, and this is why, you know, my suggestion was that, you know, wait for the SEDAR review, and then we should -- Because they will really be getting into the nuts-and-bolts, hopefully, and then we should revisit this, and we should have the opportunity to look at it very, very carefully.

I think it makes sense to highlight this concern, but I'm not sure we can do much more than, at this stage, than say, you know, this is one of the things that we maybe want to just draw some attention to, but, really, we need to, you know, see the SEDAR review and take more time to look at the nuts-and-bolts.

It's useful to highlight that now, because it's maybe something that can be explored by the MSE modeling team, because clearly, you know, there would be ways of exploring the, you know, the sensitivity of the MSE to assumptions about the concerns that you've raised, I think, and does that make sense?

DR. REICHERT: Thank you, Kai. Genny.

DR. NESSLAGE: Yes, it makes sense, but I just -- I thought one of our tasks was to advise on the management procedure structure and parameterization, and so I just want to make sure that it's clear that -- I don't know how to say this.

We really haven't provided any advice, and no suggestions have really -- Solid suggestions have been provided, and then it's going to go review, and I just worry, again, that this is one where, given we're the ones who would be setting the ABCs, using such management procedures, that, if we're not involved early and often in that, it could just be a trainwreck at the end, and so, again, this is one where I'm not sure we just want to let the CIE reviewers have the final -- They should review the technical details of the model, and how it aligns with the management objectives, absolutely, but, at the end of the day, they're not the ones setting the management procedures that set the ABCs, and so, yes, that would just be my only concern, but I hear what you're saying.

DR. LORENZEN: I'm hoping that we get CIE reviewers who think a little bit about the bigger picture too, and not just look at -- Because it seems to me, I mean, that's part of the remit.

DR. REICHERT: Thank you, and I agree with both you, Genny, and what Kai said, and, if nothing else, I think we should at least mention that concern in our report, and so I'm hoping you can provide some of that language. Anyone disagree, or additional discussion relative to this? Cassidy came to the table. Thank you, and I'm glad that you're still with us. Cassidy, go ahead.

DR. PETERSON: Thank you. Genny, really, really good points, and I really appreciate you bringing them up, and, of course, we, obviously, would love all of your feedback. We've thought about this, obviously, a lot, and we recognize that, because it's an internationally-exploited stock, the ability of the U.S. to really manage the entire stock is inherently limited, and so, in our perspective, maximizing management objectives is more about maximizing objectives regionally, based on the availability of fish that we're given.

Obviously, the MSE, we're modeling the entire stock. We will still be able to measure whether we're, you know, overfishing, or if we're failing to meet NS 1 Guidelines, and so that will still be an inherent must-meet criteria for our management procedures that we put forward, but we're more looking for how to maximize stakeholder objectives, given availability to our fisheries, and so, from my perspective at least, I don't think it's necessarily a bad thing that we're considering indicators of availability in addition to indicators that would probably be more representative of abundance. We're going to explore both.

I mean, we've done a lot of work to determine management objectives, and we obviously haven't operationalized them yet with hard numbers and associated risk tolerances yet, but there are things like -- Obviously, the key four are sort of stock status, stock safety, yield, and fishery stability. Those are sort of generic performance metrics in any MSE exercise.

Specific to dolphin, we also have things like by region, and by fleet catch rates, opportunity like probability of meeting the ACL and triggering a closure, or accountability measures, and average size of fish landed, and those are sort of unique characteristics of a predominantly recreational fishery, and we'll explore those, but we're more interested in sort of the regional differences and making sure that, you know, south Florida fishers and North Carolina fishers are equally unhappy, so to speak, but I think really good points, and we're, obviously, considering them, and, if you have any good, you know, recommendations, we, obviously, would love to hear them, but thanks for your thoughts, and thanks for letting me chime-in.

DR. REICHERT: Thanks. Cassidy. Appreciate that. Anyone else? Jeff, go ahead.

DR. BUCKEL: So, to this point, is there a way to, in some of these simulations, and I guess I was trying to think of it being the operating model, or the management procedure, and I guess the operating model, where you're modeling it where this is availability, like some -- Whatever changes you see is the stock overall stock is stable, but what we have in U.S. waters, and what's available for our management, is availability, and see how --

You know, use that, and see the different management procedures, and then do it the other way, where those changes are fully abundance, right, and it's the stock changes that are being reflected in the catch rate and see, right, how the management strategy changed, really, and would that get to -- Genny, would that -- So, in one case, you've got it's the -- It's fully availability, and, in another case, it's fully abundance, just to see how those management procedures and stock status would -- How the indicators would change.

DR. REICHERT: Genny, go ahead, and then I have Matt online.

DR. NESSLAGE: Yes, and Matt can probably speak to this better than I can, and so you are -- Is what you're saying that you would make an assumption in the operating model that the indices are abundance, and see how robust the model and the management procedures are to that assumption, and then also do it where it's some portion of availability, and that availability changes over time, so you would have some parameter for availability to scale the indices that way, and is that what you're saying?

DR. BUCKEL: Yes, and I think I think that captures it. Just to push it, right, in both extremes and see how that -- What the impact would be.

DR. REICHERT: Matt, go ahead.

DR. DAMIANO: Thanks, and so I have some stray thoughts that may or may not be helpful, which is sort of becoming my brand at this meeting, but one of the -- A couple of things I want to point out, based on the presentation for the dolphinfish MSE, and one of them is that the underlying patterns in abundance are essentially based completely on the VAST indices being correct, and like the operating models are conditioned on those. From the perspective of choosing an index of relative abundance, the VAST index would at least be internally consistent with the dynamics of the operating model.

Another thing that I found in that study that produced those indices was that a lot of the other data sources out there by region were remarkably consistent with the estimates of abundance that, you know, we carved up from this coast-wide index.

Then the last bit I wanted to point out, and Cassidy can say whether this is true broadly of the MPs that have been looked at so far, is nothing in the presentation looked like it was really moving the needle on spawning stock abundance. The only things that I saw that were actually varying were the landings by fleet, depending on which MP was chosen, and so guess I'm kind of wondering if the expectation we should have moving forward, when we see this again, is whether or not there's going to be any kind of change in SSB, you know, regardless of what recipe we pick for the MP.

DR. REICHERT: Thanks, Matt, for that feedback. Cassidy, I saw your hand up earlier to reply to some of these points.

DR. PETERSON: Yes, and Matt makes some great points. In thinking about the indicators that we have available for us, like the VAST index, we're thinking is an index of abundance, and the indicators that are probably more representative of availability are things like the ENSO index, or some sort of -- Like some sort of sea surface temperature metrics that we're exploring, and so we do have the capacity to consider both in our management procedure.

Hitting at Jeff's point, I don't know how directly we'll be able to specifically take that into consideration, but we are exploring changes in movement, which would simulate changes in distribution for example, which would be, you know, changes in availability more so than abundance.

Then I think, in some conversations that I've had with Jim and others, it might be useful to consider, you know, more maybe robustness scenarios, and potentially reference scenarios, where we're inducing different trends in the international exploitation rate, and that would have more of an effect on overall abundance, and then we could measure whether our management procedures are successfully meeting Magnuson and our other sort of more desired stakeholder management objectives in those contexts, and so not quite as directly, but still getting at changes in availability, versus changing changes in overall abundance.

DR. REICHERT: Thank you, Cassidy. Genny.

DR. NESSLAGE: I'm sorry that I'm not being very specific in my terminology, and probably not very clear, and so I guess I'm more worried thinking ahead to how we'll turn this into an ABC,

about the predictive indices of abundance from her Section 8, and so that's where that indices that are suggested are the rec landings as a proxy for availability, El Nino, right and so basically what you just said, and so, if our -- If we already know that those are availability indices, and not indices of abundance, I guess, when we go to set an ABC, we're like, well, it's not really based on --

I'm not saying this correctly, but usually we would make assumptions about going forward based on predicted recruitment, for instance, et cetera, and I guess projections, and we don't have projections, right, and so we would use one of these indices, which are indices of availability, to determine what the ABC would be over the next five years, and, if they're not actually abundance, I guess I'm still not sure -- I guess if there's some way that you guys can test for the robustness of how any of these things will work, given they're not what we think they are, that would be great.

DR. REICHERT: Kai.

DR. LORENZEN: So I'm listening to all of this, and, thinking about it, I'm wondering, and is this really a tool for ABC setting, potentially, or is it at the ACL level, and is this like a tactical management tool, rather than something that would really be used to set an ABC?

DR. REICHERT: You're right, and I think mentioned earlier that, for me, it's still a little unclear how the SSC's charge in recommending an ABC to the council -- How all of that fits in here, and that's not yet in our report, but I'm asking the committee whether that's just my fuzziness or whether others have similar questions, or concerns, in terms of the SSC charge to the ABC, and the same thing was true for wreckfish, and so, if the committee agrees, if that's the consensus of the committee, then we can add that language to our report, and I see nodding and thumbs-up. Correct, and so we need to make sure that we add some of that language to the report, and it's a question. It's not -- Anyway. Chip is coming to the table, and then I have Cassidy. I haven't forgotten about you.

DR. COLLIER: Well, I'm just wondering if you all request kind of a presentation on how MSEs can be used to inform ABCs, or how they can be used in other capacities, and, you know, probably looking at the person that's across the table from me now on that presentation, but I think that might be helpful on how this can work out. You know, it has been a little bit nebulous, exactly what all pieces of information could be valuable, and how it can fit into the management process, and I think Cassidy has been working on that, and, yes, we can get that presented to you all.

DR. REICHERT: I think that would be extremely -- I personally think that would be extremely helpful, but, also, I think it would be helpful, in that presentation, whether that's Cassidy or someone else, to -- It seems like the various MSEs have slight -- Maybe that's just my understanding, but slightly different objectives, and so it would be really good for us, for our understanding, how that then would fit in, because I feel the snapper grouper MSE, the dolphin MSE, and the wreckfish MSE are slightly different beasts. Anyway, Kai.

DR. LORENZEN: Yes, and that's exactly right. They are different beasts, and I think it would be very useful to have a presentation on that in general, and maybe also looking at those different cases, because I think the concerns we have about this one is not then -- They're partly sort of questions we have about how one would use the MSE to essentially do some ABC setting, but the other aspects are very specific here, because of the nature of this the stock, and the movements, and that a lot of sort of the action is outside of, you know, our purview and control, in in a sense,

and so I think there's something very specific about this MSE that makes it particularly tricky for the ABC, in the ABC setting context.

DR. REICHERT: Thank you, and I would like to add to that how the ABC control rule fits in that, or if it doesn't fit in that at all, because there's always an option for us to deviate from our ABC control rule, and so that that would be good, and, as I mentioned before, we've talked about having a conversation about our ABC control, and, you know, this may be Tier 4, or the deviation from our ABC control rule, and so thank you for that. Thank you for that suggestion, Chip, and I think that would be really helpful. I think it would be really helpful. Any other conversation or discussion here?

Since we are on this topic, Judd, maybe we can scroll briefly through this, so we can skip that when we go to the report, because we have been talking about this, and would it be possible to put it on the other stream, so members online can follow us, because I think the right screen is only for us, right? Yes, and so Judd will work on that.

I added, because I brought that up, and I want to make sure that the committee agrees, under the uncertainties, that one of the primary assumptions was a closed stock, and it is not a closed stock, and the team has acknowledged that, but I think it's very difficult to see how -- You know, uncertainty, as a result of that, is unknown. It's very difficult to estimate that, and I know, Cassidy, that you guys have acknowledged that, but I think it would be good to point out in our report, but here it is.

Let's briefly go through that. Genny, if the point that you were making is not fleshed out here, we will rely on you and Kai and others to provide some language there, and so take a brief look at that, and then Judd can gently scroll to through that, and thanks for everyone who has provided feedback. Are we okay to scroll down a little? The robustness, what exactly are we -- Is that a recommendation, or is that a concern? Maybe we should be more clear about that. Are we requesting a robust set of operating models? Was that presented? I'm not sure where that came from. Go ahead, C.J.

DR. SCHLICK: I think that was -- I had asked a question on the clarification of their choices in the robustness models. I don't think it necessarily is something -- It was just clarification from yesterday.

DR. REICHERT: Okay, and so we can delete that sentence. Okay. Thanks.

DR. CURTIS: Thank you. That was something I had a question on and highlighted.

DR. DUMAS: So I just want to ask a question to make sure I'm following what's going on here, and so, Genny, is your concern that the stock, part of the stock, is outside our jurisdiction and part is within our jurisdiction, and the part that's within our jurisdiction is called the part available to our jurisdiction, and so, when we set an ABC, are we setting an ABC for the stock as a whole, or are we just setting an ABC for the part that's under our jurisdiction, and so then how do MSE models work in that situation, where the whole stock is not available?

Are there any MSEs that have been made for stocks that are both in U.S. and Canadian waters, and we could look at sort of how those MSEs work, or how that is handled there, to maybe help inform

us here, and it seems like that there's a lot of those issues up there, and maybe that could help us out. Cassidy is nodding yes, and so I just wanted to offer that up.

DR. REICHERT: Kai.

DR. LORENZEN: As someone who is on the New England SSC, and so difference there is that the stocks are managed on both sides, and assessed on both sides, and there's a very elaborate way of connecting the two, and trading off, and then, basically, we have -- What we do in the area that is under consideration here, and there's really nothing -- Because, also, I think dolphin is not really covered by the tuna commissions or anything, and so there's really not a lot of information, and no other assessments. This this reminds me actually -- If anything, it reminds me of the Florida spiny lobster, where we know that a lot of the action is outside, and we sort of basically don't manage it other than through effort sort of controls.

DR. REICHERT: Thank you. Cassidy.

DR. PETERSON: I can reference some work that I did for my PhD, which is an internationally-exploited stock, and we actually built multiple -- We built multiple Implementation scenarios to reflect that we don't know how the unregulated fishing is going to propagate into the future, and so we can build scenarios in which, you know, unmanaged fishing pressure is high, medium, low, and we can make sure that we are developing management approaches that can, you know, successfully meet our management objectives, to the extent possible, given those uncertainties, and so, again, I think that's something that's important to build in here for dolphin.

DR. REICHERT: Thank you. Well, let's scroll a little further here. Again, you will all have an opportunity to take another look after the meeting, and provide comments, and I just want to make sure that we captured the key points here.

DR. CURTIS: These are new bullets here, that I just added, that have highlighted, based on the conversation around the table just now, and so please flesh those out in the report, before we circulate that around, if there's additional detail that's needed.

DR. DUMAS: Genny, did Cassidy's last comments address -- Did Cassidy's last comments address the issue that you were concerned with regarding abundance versus availability, or did you have something different in mind?

DR. NESSLAGE: I think I have something a little different in mind, but I like what she's saying as well. I'm excited to see that happen too, and I guess, if I understand -- I may not be understanding it correctly, but the idea is that you would -- To implement a management procedure, you would need to make some assumptions, as always, about what's going to happen going forward in the next few years over which you would set that ABC, and how you do that, what information you use to do that, it sounded like they were going to suggest using either an index of recreational landings, which is dependent on availability in large part, as well as the ENSO, which correlates with recreational landings.

It's really just another index of recreational landings, which is an index of availability, I fear, and, if that's the case, then I guess I still don't understand how that's all going to play into how we set an ABC that will ensure we're not overfishing, because that is, at the end of the day our job, as I

understand it, under Magnuson, and so I guess I would appreciate some illumination on how this sort of MSE will work in this particular situation, which is a little bit of an oddball, and does that make sense?

DR. DUMAS: Not overfishing the stock as a whole or not overfishing the portion of the stock that is available within our jurisdiction?

DR. NESSLAGE: Yes.

DR. REICHERT: Cassidy, and then we need to -- In the interest of time, we need to start wrapping this up, because there's a couple of other items that we need to get through, and so, Cassidy, go ahead.

DR. PETERSON: I'll be quick. I'll be quick. Just to be clear, we will be measuring whether or not we are overfishing the entire stock with this MSE, but we are only going to be exerting management controls on what is available to the to the U.S., and so we will -- I mean, I'll work with Tom to address your concerns, because they are they are useful, but, again, you know, our ability to manage the stock is inherently limited, because we're not controlling all of the exploitation, and so we'll make sure that we're appropriately linking availability to underlying stock dynamics. Tom is actually working on that right now. I'm corresponding with him throughout the meeting on this, and we'll still be measuring whether or not we are overfishing the entire stock, and so that will be captured. Thanks,

DR. REICHERT: I was talking with Judd a little bit about -- You know, given our discussions, I think it would be really helpful for the SSC to see this again, and we'll have an opportunity to do that, and there's that first sentence under that bullet to evaluate the results, and so, anyway, we will have an opportunity to discuss this again, and with the advantage of then also having the CIE comments on that, and so I would like to wrap it up here, unless someone has really a burning question.

In the interest of time, I initially said let's go to a work session, where we can read through the report, and I conferred with Judd real quick, and maybe we can just scroll through the report. You have an opportunity to pull that up online and see if we have some areas of discussion, or additions to the report, and so please, if you would, bear with us, and let's scroll through the report, real quick.

We discussed the resilient fisheries, and we had some notes on SEDAR. Those were generally informational, some recommendations, some questions we had, but, resilient fisheries, we discussed that. Please take a look and let me know if you have any additional comments or things that we missed that we discussed, and please stop Judd if we are scrolling too fast, and, again, you can follow this online also, on the Google doc.

Again, thanks for those who have provided comments already, and usually, when I send that report out to the committee, I generally add some comments, and so, if you see that, please address those comments, and, as I asked before, after I sent it out, and you don't have any comments, please let me know that you don't have any, and so that will help me completing the report. Okay. No comments or additions?

Now let's skip over the dolphin. We have talked about it extensively just now. The framework, I've asked the committee -- I mentioned yesterday the disappointment that we weren't informed earlier, and I just want to make sure that the committee as a whole agrees with that statement. Steve.

DR. TURNER: Despite your desires, I want to go back to dolphin. We have a bullet that says request presentation on how -- The role of the SSC in ABC setting.

DR. REICHERT: Yes, and I agree we need to wordsmith that sentence a little bit, and so, once you get the report, please take a look at that and see whether that's good. I realize that, yes.

DR. CURTIS: I think we have a bullet here for recruitment variability, and that could use some additional details, and so I forget who was -- I think this was part of a broader discussion, but, if someone charged with reviewing this agenda topic could add some detail there, that would be helpful.

DR. SHAROV: I really don't want to bring it in, but this discussion about the overdispersion and, the statements that are going next to each other, they're kind of contradicting, and so the first one was raised by Luiz that there is a possibility for overdispersion, and we agreed that, all right, we should address the fact that we discussed it, but then we're saying, however, the project team investigated and showed there is a little effect.

If we're convinced that there is little effect, why are we talking about this then? This bullet point, in the point above, we're saying that there could be an overdispersion, which may affect the bias estimates that lead to the underestimation, and, in the second point, we're saying, but the team actually did investigate this, and they showed that there is no overdispersion, and there is no effect, or little effect, of that, and so, if there is no effect, or there is no overdispersion, that's what we're concluding, right, and do you need the first statement above that? Am I not clear?

DR. REICHERT: No, and, I mean, that's a matter of wordsmithing, saying there was a question about over dispersion, and then -- Is that what I'm hearing from you, is a response of a question about the potential overdispersion, and I'm not sure if I understand what you're trying to say here.

DR. SHAROV: What I'm saying is, yes, we have an answer that the project team investigated the impact of both no overdispersion and extreme overdispersion and fecundity and found that it had little effect on the overall estimates, little effect, and so, if we disagree with their finding, then we essentially have to remove this discussion, the statement about this discussion, because first we stated that that we need to be concerned, but then we're saying but actually there is no reason for concern. They're eliminating each other.

DR. BUBLEY: Alexei, is the confusion here -- Because, if you look at the bullet just above that, where it says the committee discussed the following as potential concerns, and so it's not it's not a statement that overdispersion and fecundity-at-age could result -- Well, it's I don't think it's something that the SSC is agreeing that overdispersion is a concern. It's just saying that we discussed if overdispersion could be a concern, and then it lists the points. I think they're just trying to capture the discussions that we had during that portion, and not necessarily make a statement, and is that what the concern was?

DR. SHAROV: Yes, and, I mean, that's fine. I mean, if you just simply want to report what we've discussed, yes, I mean, that can stay, but I guess what's, in the end, important is the outcome, and the outcome is that the issue is not important. Anyways, well, thanks for clarification. If all others believe that we should report this, I have no problem.

DR. REICHERT: Okay. Thank you. Amy, and then Jim.

DR. SCHUELLER: I mean, I'm in this document clearly right here, and so I'm going to suggest this, that maybe we just move this whole piece up, like out of this action item, and does that help, Alexei, because, I mean, I think we're -- We left it in here to reflect the discussion, but it doesn't really go under that section, maybe, and so does that make sense?

DR. REICHERT: Okay. Yes, and I think it's good to -- Even though -- Even in cases where the concerns were explained, or ended up not being concerns, it's good to at least reflect the discussion we've had as an SSC. Jim. No? Anyone else?

DR. DUMAS: Should the section that Amy just moved up, should it instead be --

DR. REICHERT: Hold one. We are trying to address some technical issues here, and so hold on hold on to that thought. Apparently people on the webinar cannot hear us, and I'm not sure whether that's the other way around too, and so, if anyone has a comment, we may not be able to figure that out.

DR. DAMIANO: This is Matt. I can hear everybody just fine.

DR. REICHERT: Okay. Good. That's good to know. Excellent. Thank you for that, Matt. We were just concerned that we had some issues here. Okay. Apparently we've solved it, and so I'll go back to Chris. Do you still remember what you were going to say?

DR. DUMAS: Yes, and I was just going to say the section that Amy Schueller just suggested that be moved up, to get it out of the response to CIE, should it instead be moved down and go under the section of are there other concerns not identified by the review panel that could contribute to the uncertainty in the modeling approach and resulting estimates?

DR. REICHERT: I don't believe so, because that was clearly identified during the review.

DR. DUMAS: Very good.

DR. REICHERT: Luiz, please correct me if I'm wrong, or he's not -- Okay. Amy.

DR. SCHUELLER: Also, I think no, just because the word -- The use of the word "concerns" is flying around here, and I think that the point of the moving it was that we're not saying it's a concern. We're saying this is a discussion we had, and there's just a language difference there, so that there's not any perceived miscommunication occurring.

DR. REICHERT: Thank you. We appreciate that annual update for us, and so, other than that, I think we really captured the discussion here. The SEP report will be added to the SSC report, and we'll add there the request, or the desire, for an occasional joint meeting, and practically in April, for instance extending the SEP meeting until -- A full day on Tuesday may accomplish that, but, as I said, it has some logistical, and also financial, consequences, and so we'll discuss that with the SEP and council and council staff.

We discussed working groups, and Judd will update that, and it may be good to, again, attach that to the report, so we have that, and I'm not sure how we did that in the past. Amy.

DR. SCHUELLER: Can we go back to SERFS report presentation, Bullet 7? It's says, for the presentation, female maturity was calculated as 50 percent maturity-at-size, and almaco jacks and gag had commercial minimum size limits smaller than A50, and I just think -- I know I'm the one that said this, and so, if people don't agree, that's fine, but we need to set another sentence here, because I think we need to say something about that this is problematic, and that, you know, the council should think about addressing the fact that we have minimum size limits that are smaller than the age of 50 maturity, and, biologically, that's not a good place to be, and so I just wanted to add a sentence in here, but I didn't want to do it directly without at least putting it on the record to make sure everybody else agreed with that before I did it.

DR. REICHERT: Thank you for that, and so I'm looking around the room, and I don't see anyone disagreeing, and so if you could provide some language to the report, but it's -- I appreciate that you are asking the committee whether everyone agrees, and I -- As I said, I don't see anyone disagreeing with it. Okay. Thank you, Amy. Jennifer, go ahead.

DR. SWEENEY-TOOKES: Sort of in the same vein as what Amy was just saying, and I don't want to put this on there unless other people thought this, but I did add a comment, which I don't think is visible to you, just sort of accentuating what we had said, that, you know, moving forward, we, and we being at least the three of us sitting over here would like, but I didn't know what the rest of the room thought about that the SSC also be provided some of the human dimensions context when it's key to the projects or tasks being presented and considered, so that SSC input -- So that they can assure that it's not completely separate from and irrelevant to the SSC decisions, because often it's not, and so I don't know how other people thought about that, or if anyone else agreed, and that was just sort of our corner of the room over here thinking we need to get this in there somewhere, right, and this is separate from, and divorced from, possibly SSC and SEP joint meetings.

DR. REICHERT: Thank you, and I agree. I have no problems with that. I'll look around the room, and I see no one -- No hands up, and I see thumbs-up, and so that's good. Thank you. All right. Any other comments or additions to the report? Seeing none, our next agenda item is Elections. Sorry, go ahead.

DR. BUBLEY: The dates?

DR. REICHERT: Yes, and so I am -- Because of some schedules, I would like to see us send a report to you no later than April the 20th. Judd and I will work a little bit on that. Then, April 24th, and that's kind of a quick turnaround, and I would really like to see if you guys can get that -- Get

the comments to me, and then I'm hoping to provide the final report to Judd by May 1st, because I'm leaving the country on May 4th.

If that schedule doesn't work, Wally and I and Judd have already talked about, if we need a little more time, then Wally will take over in completing the report, and then I will provide a presentation to the council, a report to the council, at the June meeting. Is that okay with -- Sorry. Go ahead.

DR. CURTIS: Not so much other business, but just an announcement, and so we do have reappointments coming up for members that three-year terms have completed. We have done this a little bit differently this year, where a staff member, and previously it was me reaching out just by email, and we've done it through a different system, and so apologies that it seems like some people did not necessarily get an email saying that they were up for reappointment, and so we'll make sure that that gets remedied.

You still, obviously, have time, and the deadlines are not due for your reapplications until I think May 8th or so, and so there's still some time there, but I just wanted to bring that to everyone's attention, and I certainly encourage everyone on the committee to reapply for the another three-year appointment, and so I'll follow-up with that, and let people know, and, again, once applications are in, they'll be reviewed by the council at the June 2026 meeting.

DR. REICHERT: Thank you, Judd, for that. Typically, SSC appointments, or reappointments, are made in the June meeting, and so that's why this is coming up now. All right. Anything else? All right.

Normal terms for chair and vice chair are two years, and the current terms for Wally and myself are up at this meeting, and so, besides Agenda Item 18, the upcoming meetings, this is the last order of business for this meeting, and so let's first do the election of chair for a two-year term. Are there any nominations? Jeff.

ELECTIONS

DR. BUCKEL: I nominate Walter Bublely.

DR. REICHERT: Wally, do you accept that nomination?

DR. BUBLEY: I accept.

DR. REICHERT: Thank you so much. Are there any other nominations from the floor? Seeing none, I'm asking if anyone is opposed to electing Dr. Wally Bublely as SSC chair by acclamation. Seeing no objections, seeing none, Wally, you're elected SSC chair. Congratulations. *(Applause)*

Next up is election for vice chair for a two-year term. Are there any nominations? Genny.

DR. NESSLAGE: I would like to nominate Dr. James Gartland for vice chair.

DR. REICHERT: Thank you, Genny. Jim, do you accept that nomination?

DR. GARTLAND: I accept. Thank you.

DR. REICHERT: Are there any other nominations from the floor? Seeing none, I am asking if anyone is opposed to electing Dr. Jim Gartland as vice by acclamation. Seeing none, Jim, congratulations. You are elected vice chair. (*Applause*)

This means that Jeff will rotate off the ExCom, and I'll become the new past chair as member of the ExCom, and, before I hand the gavel to our new chair, I want to sincerely thank all of you for your trust in me as an unexpected chair for the last two years. I really appreciate all your contributions to the meetings, and also to the report, and it was a privilege, and so thank you very much, and hereby I'm handing the chairmanship over to Wally. Wally, you're in charge.

DR. BUBLEY: Judd.

DR. CURTIS: Thank you, new chair, and just, on behalf of council staff, and the council, I would like to thank Marcel for his service. He's been an excellent chair for the last two years, and I was glad that we could pull him out of SSC retirement at least, even if he's still fully retired from SC DNR, and so thank you for your service, and I look forward to you being on the other side of the table as a member of the SSC.

DR. REICHERT: Me too.

DR. BUBLEY: Yes, and, I mean, I would like to thank Marcel with all of this as well. Obviously, he dragged me into this as the vice chair, but I learned a lot from him moving forward, and so you can blame him if I have some issues over the next two years, but, from that, we should move on to the next meetings, correct?

NEXT MEETINGS

DR. CURTIS: Yes, and thanks, and so, as we've discussed, we'll likely hold a summer webinar, either a half day or full day, sometime probably late July or early August, and probably early August if we have the dolphinfish CIE reviews scheduled for a week in the late summer, in late July.

October 20th through the 22nd is our next SSC meeting in Charleston, and we're still figuring out the finer details, but this may have a joint with the Gulf component, if we are reviewing the black grouper management procedure and the hogfish SEDAR 94 stock assessment, and so there may be a day that is joint, and then the members of the Gulf that are involved the joint committee would leave, and we would resume our normal South Atlantic business after their departure.

Then we have dates already for the 2027 meetings on the calendar as well too, and so please mark your personal calendars with that, and reserve that time aside, and then, below, you have the South Atlantic Fishery Management Council meetings in Florida, North Charleston, South Carolina, and Beaufort, North Carolina coming up this year, and that is it.

DR. BUBLEY: All right, and so is there any other -- If there's nothing else to go over at this point, and I think we've covered it, and so we'll now adjourn the April 2026 SSC meeting.

(Whereupon, the meeting adjourned on April 16, 2026.)

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Certified By: _____ Date: _____

Transcribed By
Amanda Thomas
June 15, 2026

SSC Tue 4/14/20

Prefix	First	Last	Affiliation
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Dr.	✓ Luiz	Barbieri	Florida Fish and Wildlife Conservation Commission
Dr.	Lio	Cao	North Carolina State University
Dr.	✓ Chris	Dumas	University of North Carolina Wilmington
Dr.	✓ Jared	Flowers	GA Department of Natural Resources
Dr.	✓ James	Gartland	Virginia Institute of Marine Science
Dr.	✓ Kai	Lorenzen	University of Florida
Dr.	✓ Matt	Damiano	North Carolina Division of Marine Fisheries
Dr.	✓ Genevieve	Nesslage	University of Maryland, Center for Environmental Science
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Dr.	✓ Amy	Schueller	NOAA Fisheries, Southeast Fishery Science Center
Dr.	✓ Fred	Serchuk	NA
Dr.	✓ Alexei	Sharov	Maryland Department of Natural Resources
Dr.	✓ Steve	Turner	NA
Mr.	✓ Jason	Walsh	North Carolina Division Marine Fisheries

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SSC Tue 4/14/24

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Gary	Borland		
✓ Amy	Dukes		SC DNR Marine Resources Division
Judy	Helmey		
Francis (Dewey)	Hemilright		
James	Hull	Jr.	
Kerry	Marhefka		
Tom	Pease		Seventh Coast Guard District
Charlie	Phillips		
Tom	Roller		
Robert	Spottswood	Jr.	
Andy	Strelcheck		NOAA Fisheries Southeast Region
Deirdre	Warner-Kramer		Office of Marine Conservation OES / OMC
TBD	TBD		U.S. Fish and Wildlife Service Representative

SSC-Tue 4/14/26

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Carolyn	Belcher		GA DNR Coastal Resources Division
Gary	Borland		
Amy	Dukes		SC DNR Marine Resources Division
Judy	Helmey		
Francis (Dewey)	Hemilright		
James	Hull	Jr.	
Kerry	Marhefka		
Tom	Pease		Seventh Coast Guard District
Charlie	Phillips		
Tom	Roller		
Robert	Spottswood	Jr.	
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SSC Wed 4/15/26

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SSC Thurs. 4/16/24

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April 2026 Scientific and Statistical Committee Meeting

Attendee Report:

Report Generated:

04/17/2026 10:18 AM EDT

Webinar ID

378-107-435

Actual Start Date/Time

04/14/2026 12:17 PM EDT

Last Name

Council

First Name

South Atlantic

Attendee Details

Last Name

Barile
Bianchi
Bradshaw
Brouwer
Byrd
Carruthers
Coffill-Rivera
Collie
Curtis
Curtis
Damiano
Dancy
Del Valle
Dukes
Fender
Figueroa
Foss
Gaichas
Grimes
Hadley
Huber
Iberle
Karnauskas
Kellison
Kersting
Klasnick
Klibansky
Klibansky
Klibansky
McMullen

First Name

Peter
Alan
Christopher
Myra
Julia
Tom
Manuel
Jeremy
Judd
Christina
Matt
Kiley
Rafael
Amy
Jackson
Alena
Kristin
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Nikolai
Ryan

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Murphey	Trish
Neer	Julie
Newman	Thomas
Ott	Emily
Package-Ward	Christina
Peterson	Cassidy
Reichert	Marcel
Salmon	Brandi
Schlick	CJ
Sharov	Alexei
Silvas	Rachael
Smart	Tracey
Smith	Leah
Spanik	Kevin
Spencer	McKenna
Stanley	Sydney
Stasser	Katie
TURNER	STEVE
Walsh	Mick
Walter	John
Wamer	David
Withers	Meg
Zapf	Daniel
colby	barrett
collier	chip
vincent	matthew
Barbieri	Luiz
Caton	Julia
Dumas	Chris
Finch	Margaret
Gartland	Jim
Helies	Frank
Hostetter	Nathan
Howard	Jodi
Markwith	Anne
McCombs	Rachel
Muffley	Brandon
Offner	Tia
Ramsay	Chloe
Sedberry	George
Thomas	Suz
Vecchio	Julie

Whitmer
thomas

Morgan
suz

April 2026 Scientific and Statistical

Attendee Report: Committee Meeting

Report Generated:

04/17/2026 10:19 AM EDT

Webinar ID

378-107-435

Actual Start Date/Time

04/15/2026 07:45 AM EDT

Staff Details

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Brouwer

Brown

Byrd

Chagaris

Coffill-Rivera

Collie

Curtis

Curtis

DARDEN

Damiano

Dancy

Doherty

Dukes

Fields-Rivera

Finch

Foss

Griffin

Helies

Hostetter

Howard

Howard

Howington

First Name

Dustin

Jordan

Luiz

Peter

Alan

Whitney

Christopher

Myra

Hunter

Julia

David

Manuel

Jeremy

Christina

Judd

TANYA

Matt

Kiley

Brian

Amy

Kayla

Margaret

Kristin

Aimee

Frank

Nathan

Jodi

Sarah

Kathleen

Huber	Jeanette
Hunt Cecelski	Catherine
Iberle	Allie
Kellison	Todd
Kersting	Anne
Klibansky	Nikolai
Klibansky	Lara
Lamb	Izzy
Makovitch	Max
Markwith	Anne
McClair	Genine
McCombs	Rachel
McMullen	Ryan
Mehta	Nikhil
Meyers	S
Moore	Jeff
Murphey	Trish
Neer	Julie
Newman	Thomas
Nowlis	Josh
Ott	Emily
O'Meally	Conor
Package-Ward	Christina
Patterson	Will
Peterson	Cassidy
Portnoy	David
Ramsay	Chloe
Reding	Brandon
Reichert	Marcel
Rogers	Walt
Salmon	Brandi
Schlick	CJ
Silvas	Rachael
Smith	Leah
Spanik	Kevin
Stasser	Katie
Stemle	Adam
Stephens	Haley
TURNER	STEVE
Vecchio	Julie
Walsh	Mick
Wamer	David
Whitmer	Morgan
Wilms	Olivia

Withers	Meg
Zapf	Daniel
collier	chip
thomas	suz
vincent	matthew
Carruthers	Tom
Caton	Julia
Dancy	Kiley
Del Valle	Rafael
Dumas	Chris
Fender	Jackson
Figueroa	Alena
Gaichas	Sarah
Gartland	Jim
Grimes	Shepherd
Hadley	John
Karnauskas	Mandy
Klasnick	01Kelly
Klibansky	Nikolai
Muffley	Brandon
Offner	Tia
Sedberry	George
Sharov	Alexei
Smart	Tracey
Spencer	McKenna
Stanley	Sydney
Thomas	Suz
Walter	John
colby	barrett

April 2026 Scientific and Statistical

Attendee Report: Committee Meeting

Report Generated:

04/17/2026 10:20 AM EDT

Webinar ID

378-107-435

Actual Start Date/Time

04/16/2026 07:30 AM EDT

Staff Details

Last Name

Council

Collier

First Name

South Atlantic

01Chip

Attendee Details

Last Name

Addis

Barbieri

Barile

Bradshaw

Brouwer

Byrd

Carmichael

Coffill-Rivera

Curtis

DARDEN

Damiano

Doherty

Foss

Griffin

Grimes

Helies

Howard

Howington

Iberle

Jensen

Klibansky

Klibansky

Marhefka

Mehta

Meyers

Murphey

Neer

Offner

Ott

First Name

Dustin

Luiz

Peter

Christopher

Myra

Julia

John

Manuel

Judd

TANYA

Matt

Brian

Kristin

Aimee

Shepherd

Frank

Sarah

Kathleen

Allie

Sophia

Lara

Nikolai

Kerry

Nikhil

S

Trish

Julie

Tia

Emily

Package-Ward	Christina
Peterson	Cassidy
Reding	Brandon
Reichert	Marcel
Rogers	Walt
Salmon	Brandi
Schlick	CJ
Silvas	Rachael
Smith	Leah
Spanik	Kevin
Stasser	Katie
TURNER	STEVE
Vecchio	Julie
Walsh	Mick
Withers	Meg
Woodall	Andrew
Zuniga	Emily
thomas	suz
vincent	matthew
Bajema	Jordan
Bianchi	Alan
Boss	Whitney
Brown	Hunter
Carruthers	Tom
Caton	Julia
Chagaris	David
Collie	Jeremy
Curtis	Christina
Dancy	Kiley
Dancy	Kiley
Del Valle	Rafael
Dukes	Amy
Dumas	Chris
Fender	Jackson
Fields-Rivera	Kayla
Figueroa	Alena
Finch	Margaret
Gaichas	Sarah
Gartland	Jim
Hadley	John
Hostetter	Nathan
Howard	Jodi
Huber	Jeanette
Hunt Cecelski	Catherine

Karnauskas	Mandy
Kellison	Todd
Kersting	Anne
Klasnick	01Kelly
Klibansky	Nikolai
Lamb	Izzy
Makovitch	Max
Markwith	Anne
McClair	Genine
McCombs	Rachel
McMullen	Ryan
Moore	Jeff
Muffley	Brandon
Newman	Thomas
Nowlis	Josh
O'Meally	Conor
Patterson	Will
Portnoy	David
Ramsay	Chloe
Sedberry	George
Sharov	Alexei
Smart	Tracey
Spencer	McKenna
Stanley	Sydney
Stemle	Adam
Stephens	Haley
Thomas	Suz
Walter	John
Wamer	David
Whitmer	Morgan
Wilms	Olivia
Zapf	Daniel
colby	barrett
collier	chip