GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

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

WEBINAR

MAY 3-4, 2021

STANDING SSC VOTING MEMBERS

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

SPECIAL REEF FISH SSC VOTING MEMBERS

Jason Adriance.....
Judson Curtis.....
John Mareska.....

SPECIAL MACKEREL SSC VOTING MEMBERS

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

SPECIAL SHRIMP SSC VOTING MEMBERS

Thomas Shirley.....

SPECIAL SOCIOECONOMIC SSC VOTING MEMBERS

Jack Isaacs.....
Andrew Ropicki.....

SPECIAL ECOSYSTEM SSC VOTING MEMBERS

Cam Ainsworth.....
Mandy Karnauskas.....
Paul Sammarco.....

STAFF

Assane Diagne.....Economist
John Froeschke.....Deputy Director
Jessica Matos.....Document Editor & Administrative Assistant
Ryan Rindone.....Lead Fishery Biologist/SEDAR Liaison
Bernadine Roy.....Office Manager
Carrie Simmons.....Executive Director

OTHER PARTICIPANTS

Juan Agar.....SEFSC
Leann Bosarge.....GMFMC
Shannon Cass-Calay.....SEFSC
Michael Drexler.....Ocean Conservancy
Alisha Gray.....NMFS
Akbar Marvasti.....SEFSC
Michelle Masi.....SEFSC
Julie Neer.....SEDAR
Skyler Sagarese.....SEFSC
Katie Siegfried.....SEFSC
Jessica Stephen.....NMFS
Mike Travis.....NMFS
Bob Zales.....Panama City, FL

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PAGE 113: Motion that the SSC reviewed the material with respect to the joint red snapper grouper tilefish IFQ and finds it acceptable for review by the AP panel and the council. The motion carried on page 115.

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Special Mackerel, Special Shrimp, Special Socioeconomic & Special Ecosystem Scientific and Statistical Committees convened via webinar on Monday morning, May 3, 2021, and was called to order by Acting Chairman Kai Lorenzen.

INTRODUCTIONS AND ADOPTION OF AGENDA

CHAIRMAN KAI LORENZEN: Good morning. My name is Kai Lorenzen, and I welcome all of you as the Acting Chair of the Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council. We appreciate your attendance on this webinar and input into this meeting. Representing the council is Leann Bosarge, and council staff in attendance are Ryan Rindone and Jessica Matos.

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

This week's meeting will include the following topics: Adoption of the Agenda; Approval of the March 30 to April 2, 2021 Meeting Minutes; Scope of Work; Selection of SSC Representative for the June 21 to 25, 2021 Council Meeting; Management Considerations for Using Interim Analysis; Review of Gulf Red Grouper Updated Indices of Abundance; Review of Gulf Penaeid Shrimp Working Groups; Review of Gulf Royal Red Shrimp Index; SEDAR 74 Participant Solicitation; Joint Grouper-Tilefish and Red Snapper IFQ Review; Allocation Review Guidelines; Review of ABC Control Rule Tier 1; Gulf Gray Triggerfish Age Validation Challenges and Recommendations; Public Comment; and Other Business.

One item originally noticed for this meeting has been withdrawn, and that's the NMFS Policy Document Determination of Best Scientific Information Available in the Southeast Region, and so we will not be covering that at this meeting.

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

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

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

MS. JESSICA MATOS: Lee Anderson.

DR. LEE ANDERSON: Lee Anderson.

MS. MATOS: Luiz Barbieri.

DR. LUIZ BARBIERI: Luiz Barbieri.

MS. MATOS: Harry Blanchet.

MR. HARRY BLANCHET: Harry Blanchet.

MS. MATOS: Dave Chagaris.

DR. DAVID CHAGARIS: David Chagaris.

MS. MATOS: Benny Gallaway.

DR. BENNY GALLAWAY: Benny Gallaway, here.

MS. MATOS: Bob Gill.

MR. BOB GILL: Bob Gill.

MS. MATOS: Doug Gregory.

MR. DOUGLAS GREGORY: Doug Gregory, here.

MS. MATOS: Walter Keithly.

DR. WALTER KEITHLY: Walter Keithly.

MS. MATOS: Robert Leaf. Kai Lorenzen.

CHAIRMAN LORENZEN: Kai Lorenzen.

MS. MATOS: Camp Matens.

MR. CAMP MATENS: Camp Matens, here.

MS. MATOS: Jim Nance.

DR. JIM NANCE: Jim Nance is here.

MS. MATOS: Will Patterson. Sean Powers. Ken Roberts.

DR. KEN ROBERTS: Ken Roberts is here.

MS. MATOS: There we go. Are you able to see anything yet, or no?

DR. ROBERTS: No, I'm not able to see anything. I'm still trying. Thank you.

MS. MATOS: Okay. Steven Scyphers.

DR. STEVEN SCYPHERS: Steven Scyphers.

MS. MATOS: Jim Tolan. Jason Adriance.

MR. JASON ADRIANCE: Jason Adriance.

MS. MATOS: Judd Curtis.

DR. JUDSON CURTIS: Judd Curtis.

MS. MATOS: John Mareska.

MR. JOHN MARESKA: John Mareska.

MS. MATOS: Kari Buck. Jack Isaacs.

DR. JACK ISAACS: This is Jack Isaacs.

MS. MATOS: Andrew Ropicki.

DR. ANDREW ROPICKI: Andrew Ropicki.

MS. MATOS: Peyton Cagle. Thomas Shirley.

DR. THOMAS SHIRLEY: Thomas Shirley here.

MS. MATOS: Thank you. Cam Ainsworth.

DR. CAM AINSWORTH: Cam Ainsworth, here.

MS. MATOS: Mandy Karnauskas.

DR. MANDY KARNAUSKAS: Mandy Karnauskas.

MS. MATOS: Paul Sammarco.

DR. PAUL SAMMARCO: Paul Sammarco, here.

MS. MATOS: Leann Bosarge.

MS. LEANN BOSARGE: Leann Bosarge is present.

MS. MATOS: Thank you. Okay. We're all good, Kai.

CHAIRMAN LORENZEN: Okay. Thank you. The first point of business is the Adoption of the Agenda. Are there any comments, questions, or additional items for the agenda?

MR. RYAN RINDONE: Under Other Business, I would like to solicit the SSC for participants for the review workshop for the SEDAR 68 assessment of Southeastern U.S. scamp.

CHAIRMAN LORENZEN: Okay. Anything else? If not, we're looking for a motion to adopt.

MR. GILL: Move adoption as modified, Mr. Chairman.

DR. NANCE: I will second that, Mr. Chairman.

CHAIRMAN LORENZEN: Okay. Any objections? Okay. The agenda is adopted. Then Approval of Verbatim Minutes and Meeting Summary for the March 30 through April 2, 2021 Webinar Meeting. Are there any questions or comments?

APPROVAL OF VERBATIM MINUTES AND MEETING SUMMARY FOR THE MARCH 30-APRIL 2, 2021 WEBINAR MEETING

DR. ROBERTS: Mr. Chairman, I cannot raise my hand, and can I have a moment with you, please?

CHAIRMAN LORENZEN: Yes, of course.

DR. ROBERTS: I noticed a difference between Ryan's summary, which is excellent. The verbatim, we spent 450 pages of typed work discussing motions, and the thing that I am troubled about is in that whole paper, starting about page 300 and ending at the end, when we voted on motions, there is no highlighting of what motion it was that we were voting on.

I know the meaning of verbatim, and it's being typed, probably by a word processor, or somebody listening on a microphone, but I think it would be best if we could get the actual motion, like Ryan has them in his summary, highlighted, actually inserted into the verbatim minutes, because I read through the verbatim

minutes, and it easily was an hour-or-half or two that we spoke about motions, and the motions probably went up on the screen, but they were not actually inserted into the minutes, so you would know what actual motion it was that you were voting on, and so that's just a recommendation. Thank you.

CHAIRMAN LORENZEN: Thank you.

MR. RINDONE: Kai, we're talking about that. Give us just a second here, okay?

CHAIRMAN LORENZEN: Yes. Doug, go ahead.

MR. GREGORY: I have noticed the same thing in previous meetings, and I think what the problem is, it's that we're not repeating the motion just before we vote on it. We're looking at it on the screen, but nobody is reading the motion, and so, if we start doing that, that would solve the problem that Ken is talking about and that I have observed. That way, the minutes would get the motion that we're voting on identified. Thank you very much.

CHAIRMAN LORENZEN: Thank you, Doug. I also think, as long as it's made clear that we're inserting the motion for clarity, and it wasn't said in that way at the time, I think it would seem to me that we should be able to insert that as an explanatory note, but, Ryan, please chime in.

MR. RINDONE: Sure. Dr. Simmons actually said the same thing that Mr. Gregory said, about reading the motion in, and so that will just be something that we need to stay on top of, so that, right before a vote is actually made on anything, or something is adopted without objection, the Chair needs to read the motion in first, and then that will show up right before any tabulation of the vote.

CHAIRMAN LORENZEN: Okay. In the line of that, should we approve the minutes as they are or inserting the motion after the event, just for clarity?

DR. ROBERTS: I move acceptance.

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

MR. GILL: Seconded.

CHAIRMAN LORENZEN: Any objections to approving the minutes and the summary? Hearing none, the minutes and the summary are

approved, and, next up, we have the Scope of Work. Ryan.

SCOPE OF WORK

MR. RINDONE: Thank you, Dr. Lorenzen. We'll go through that step-by-step, before each of the agenda items, and so the first thing that is up to bat is the management considerations, or, actually, it's selection of the SSC representative for the June 21 to 25 council meeting that's going to be held in a hybrid fashion in Key West.

The SSC will need to put forward a representative to talk about all the fun things that you guys are going to discuss over the next few days, and this person can attend virtually or in-person in Key West, and so, Mr. Chair, if you would like to solicit the membership.

SELECTION OF SSC REPRESENTATIVE FOR THE JUNE 21-25, 2021 COUNCIL MEETING

CHAIRMAN LORENZEN: I will start by saying that I will volunteer, unless there are other volunteers, but just step forward, if anyone is interested in doing that SSC rep. Hearing no volunteers --

MR. RINDONE: All right. We'll put you down. Maybe you can talk Doug into riding his bike over and saying hello one day.

CHAIRMAN LORENZEN: Okay. The next item we have then is Management Considerations for Using Interim Analyses, and that goes back to Mr. Rindone.

MANAGEMENT CONSIDERATIONS FOR USING INTERIM ANALYSES

MR. RINDONE: Council staff will give you guys an overview of the management considerations and uses for the interim analyses tool, and this was developed by the Science Center to provide interim catch advice in between assessments.

Red grouper is going to be used as an example here, because we get an interim analysis from the Science Center annually for that species, and the presentation is going to give you an overview on where we currently are with Amendment 53 and just show how we've used the interim analysis to update catch advice for red grouper prior to that amendment. You guys should provide feedback on staff's approach and for recommended improvements and considerations for using the interim analysis tool.

CHAIRMAN LORENZEN: Thank you, and so we're looking for the presentation, and that's Dr. Simmons, right?

MR. RINDONE: Correct.

EXECUTIVE DIRECTOR CARRIE SIMMONS: Good morning, everyone. Thank you, Mr. Chair. As Ryan mentioned, we put this together just to kind of think about, holistically, how we may want to use this tool moving forward.

In this case, we're going to use red grouper as an example, because that's what we have currently, what the council is working on on the agenda, and it's at the forefront of everyone's mind, but what I would like folks to think about, and try to help us with, is timing of these tools, and particularly after we have a formal stock assessment that's been completed, and the council may have not, perhaps, decided yet on the catch advice, and what is the best way to use this tool, moving forward, that we have available to us from the Science Center?

Perhaps, as I'm working on this, and we're thinking about our schedule, which we also included in the briefing book agenda items on the website, what is the goal for utilizing these tools, moving forward, and when should we ask for catch advice to be updated, versus perhaps just an update of the indices of abundance, to perhaps just get a health check of the stock? These are the kinds of things, I think, that would be useful for both the council and the SSC and staff as we move forward, so we're not just chasing our tails with these tools in the future.

Everyone probably remembers this, but, in October of 2019, SEDAR 61 was completed, and it was reviewed by the SSC and provided to the council. At that time, there was still a great deal of concern about red grouper and recruitment and the vulnerability to red tide, and so the council passed the following motion for Gulf red grouper. They asked that the Science Center conduct an interim analysis of red grouper annually, and they wanted that to start in 2020.

Dr. Skyler Sagarese is going to go through this in more detail, but, just as an overview, the interim analysis uses a harvest control rule, and, for red grouper, currently, the ABC from the assessment that you recommended was the 4.9 million pounds gutted weight, but you also recommended a range of ABCs that you will see in a minute, with the corresponding different sector allocations that the council is considering.

This ABC is in the MRIP-FES units, and, for this particular analysis, the future catch projections assume the 2019 landings, with the commercial ACL equal to the 3.16 million pounds gutted weight, which is the CHTS units, and I know that seems weird, because it's commercial there, but that is in the MRIP-CHTS units for the commercial sector, and for the 2019 recreational landings equal to the 2018 landings, in numbers of fish, that were then converted to pounds, and that was from the SEDAR 61 assessment.

I know this is slide is a little bit busy, but there's a couple of things that I wanted to point out, and hopefully everyone can see it on their computer, and just keep in mind that there were a couple of big management changes, and I think we're even going to talk about some of these later on in the agenda, with the IFQ program, and it was implemented in 2010, with the commercial sector. ACLs went into place in 2012, and that was big change in the way that we manage both the recreational and the commercial sector.

For the recreational sector, you see the highlighting in yellow. In 2013, the recreational sector exceeded -- The landings exceeded the ACL, and there was a payback measure put in place, and, in 2014, that recreational sector was managed to the ACT instead of the ACL, because of that payback, and then, in 2015, there was an in-season closure for the recreational sector.

I think Dr. Sagarese is going to get into this some more, but the commercial 2021 landings are through April of this year, and the recreational landings are not available yet for red grouper in 2020 or preliminary 2021. Since 2012, when the commercial ACT has been put in place, it has not been reached, and the recreational sector has been below the ACL since 2016.

What are some limitations, or perhaps a better way to word this would be management considerations, of an interim analysis? This assumes the council will implement the 4.9 million pounds gutted weight ABC, and that's based on the current sector allocations, which is the 76 commercial and 24 percent recreational allocation. You can see that's Alternative 2, but that's not the council's current preferred alternative. The council's current preferred alternative is Alternative 3.

The reason I went through the landings is the recreational and the commercial ACL have not been reached in recent history, and I question whether we should be using the ABC of 4.9 million pounds currently for that catch advice or if there's some other method the Science Center and the SSC thinks that we should be

using for this interim catch advice, if we're actually going to change the ABC for this species.

You will get to this in the next presentation, but, with the reduced size from the bottom longline survey, you will see that the 2020 catch advice indicates that the ABC could be increased by about one million pounds, and that should be gutted weight, from the 4.9 million pounds gutted weight, but that's not based on the council's current preferred alternative, because you have to decide on the sector allocations, and then the Science Center is running that through the stock assessment, to get the corresponding OFLs and ABCs.

Essentially, you would have to do this four more times, to keep this updated and for us to consider this in the current amendment, and so, until the council decides on sector allocations and the corresponding catch advice, the OFLs, ABCs, and ACLs from SEDAR 61 should not be used to modify this catch advice, in our opinion.

Instead, we think this interim analysis could be used as a health check, and the Science Center has indicated that they could provide updated indices of abundance annually without consideration of modification of the actual ABC and catch advice, and so future interim analysis, after the council decides on this, could be updated and then give the council the opportunity, after the SSC reviews it, to change the catch advice, if warranted.

We are considering, perhaps, other ways to try to streamline this process other than a framework action, and we're looking at what other councils may be doing to try to move this through the process a little faster, but we think, after the council makes its decision, then this tool should be used to modify the catch advice. With that, I'll stop there and take questions, or maybe we want to talk about the schedule. Thank you.

CHAIRMAN LORENZEN: Okay. I think are there any questions directly on this presentation, or comments? Mr. Gill.

MR. GILL: Thank you, Mr. Chairman. I guess I have a comment, and that is, if the end result of these considerations are a bifurcation of the use of interim analysis, my suggestion is that you don't call both of them "interim analysis" and that we have different names, depending on what their usage is. Otherwise, the confusion factor will be much higher than it ought to be. Thank you.

CHAIRMAN LORENZEN: Thank you. Dr. Sammarco.

DR. SAMMARCO: Thank you, Mr. Chair. I agree with this excellent presentation and the data which have been presented in it. I think it's very good, and it's very sort of sobering, and I was wondering, while listening to it, why would the catch limits -- Why would the catch not be at the catch limits?

This fishery, it's a pretty popular fishery, and people are pretty good at catching what they want to catch in there, and I wonder whether if one of the mechanisms by which this could happen is if the population has gotten to a level, to a low enough level, where the fish actually behave in such a way that they're more difficult to catch at these densities.

You can try and try and try to drive that catch up, but you hit your own ceiling before you hit the catch limits, and so I don't really know, and I'm not a grouper expert, and it's just population biology, and so I do agree with the reanalyzing and taking another look at the statistics in analyzing this particular fishery, and congratulations to the presenter. Thank you very much.

CHAIRMAN LORENZEN: Thank you, Paul. Dr. Cass-Calay.

DR. SHANNON CALAY: Thank you, Chair. I wanted to remind the group that, for red grouper, there is a particular confusion, because the council has not yet determined their preferred advice, and so our interim assessment approach, as written, does require the acceptance of the management advice from the SSC and the action of the council, and so that's why, in this particular case, because there is no preferred allocation determined from the council, we can do little more than give you kind of an updated health check, but it is the Science Center's position that, if we have an assessment with accepted management advice, it is preferable to be able to adjust that catch advice based on the behavior of the recent indices of abundance.

It is the Science Center's position that one way to provide more current, and more numerous, management advice is to use this interim assessment tool, and so we do hope that this case of red grouper, which is complicated by the fact that the allocation had not been determined by the council, does not become the norm.

CHAIRMAN LORENZEN: Thank you. Mr. Gregory.

MR. GREGORY: I agree that this does present a conundrum. Maybe

we shouldn't get an annual interim analysis when the council is in the middle of considering changes to management, and we could avoid this particular type of issue.

Now, I went it and looked at the table that Carrie and staff put together and presented, and, if you ignore those years that had the unusual ABC, from the I think SEDAR 42 that they later discovered an error in it, if you ignore those years, and you look at the commercial harvest, and I say commercial because we only have one recreational year that we can look at the large ABC, and that shows the 75 percent harvest, and recreational. Prior to that, it was like 90 percent, or 95 percent, harvest, and so there's a decline.

On the commercial side, say from 2010 to 2015, you average that, and they caught 84 percent of their allocation. From 2019 to 2020, they caught 73 percent, and so there is, on average, a 10 percent decline, and it is a decline.

Now, inversely, in 2010, with commercial landings only through April, or March, the first quarter of the year, the commercial landings are half of what they were in the previous three years, and so, if that's any indication for this year, the commercial harvest is going to increase dramatically from the previous three or four years, and so that adds to my confusion about this.

I don't really have a strong feeling which way to go, but we can't always punt on an interim analysis because the council hasn't made a decision on management from the previous recommendations, and so we definitely have a challenge here. Thank you very much.

CHAIRMAN LORENZEN: Thank you, Doug. I think, looking at this, we're getting into the details, and I think, if we want -- I think, if we are going there, we should perhaps see the presentations about the updated indices of abundance before we visit that topic, and so I would say comments and questions to do specifically with the situation we have here, where, because the allocation review hasn't been completed, we can't quite produce the management advice that we should, whereas questions more specifically about the situation of the stock I think maybe we should ask later. Dr. Chagaris and Dr. Ropicki, I don't know whether you're looking to comment specifically on the issue with the interim assessment here or the actual assessment, if you like.

DR. CHAGARIS: Thank you. I just have a general comment, and I

think it's the right approach to use the interim analysis as sort of a health check, as you suggested, especially for red grouper, but we may want to think about that being the default for other species, because, with the exception where you actually use it as a harvest control rule, only in cases where we know the index is proportional to the stock and that it's responsive and is a good indicator of future stock conditions, and so, I mean, I think we might want to think about this more broadly and how it could apply to other species as well. Thank you.

CHAIRMAN LORENZEN: Thank you. Andrew.

DR. ROPICKI: I just had a kind of general comment as well. On Slide 7, you mentioned using this interim analysis as a health check, and I think that's a good idea, but I also think we're missing a piece of data that's out there that could be helpful as a health check, and that's what is going on in the IFQ allocation market for red grouper, because, last time around, when we had that big decline in catch levels, and it looked like the stock was in trouble, the allocation and landings market had information available, if we had just been monitoring it in real time.

Basically, what happened was you had a big divergence in those two prices. The allocation price dropped substantially, while the dockside price stayed high, and so it kind of indicated that there was still demand for red grouper dockside, but the low allocation price said the cost of catching it went way up for those fishermen, and so some means of monitoring that relationship can provide a very easy, and hopefully pain-free, health check as well.

CHAIRMAN LORENZEN: Thank you. Shannon.

DR. CALAY: Thank you, Chair. I wanted to remind the group that the intention of the interim assessment is to update the management advice once an assessment has been accepted, and that implies also that the managers have determined what the allocations will be, and the kind of conundrum we find ourselves in now is that it's being used as an exploration tool. It's being used to test the different allocations and the different assumptions about the indices of abundance, and, right now, the Science Center doesn't have the automation, or the capacity, to use the tool in that fashion.

It is our intention to use this tool once the management has been determined, and we are able to hand off this tool to

council staff and the council, if they do want to use it to explore, but that automation really has not been completed yet.

CHAIRMAN LORENZEN: Thank you. Harry.

MR. BLANCHET: This goes back to I believe it was Bob's point that we've got one tool, and two different applications, that don't really fit, and, to Shannon's point, if you're taking this tool and trying to apply it to management, but you have no guidance, in terms of where to go, you're wasting an awful lot of valuable analyst time, but the council wants these interim reports.

My suggestion is that the kind of -- If we don't have management advice to frame the analyses, then we probably should not be using that same exact title for both what is essentially a health report, and I would prefer to call it an indices report, rather than "health", and a management report, and so I think something that provides that, that this is an interim analysis, and so this is not a full assessment in any way, but it has two purposes, and it is either A or it is A plus B, so that, if you have the management, then, obviously, you would need to incorporate the indices of abundance and any other variables, such as what Dr. Ropicki pointed out, that might be indicative of the health of the stock.

I think just something to split them at the title, so that, when the council member picks it up, they know what to expect, whether they're going to be looking at catch advice or whether they're going to be looking at this is what is going on with the stock.

CHAIRMAN LORENZEN: Thank you, Harry. It seems to me, given the back-and-forth we've had, that using that analysis as a health check and using it to actually modify management advice are quite similar, in terms of the onus they place on the Science Center to provide that advice, and, indeed, it seems that we have to consider how much is the general health advice worth to the council, versus more analyst time that could be spent on assessments, and, of course, these are quite substantial undertakings, and I understand, and they may be eventually be more automated, as I understand it, but, right now, that is not the case.

I'm wondering, seeing no further hands, Dr. Simmons, and there certainly is useful feedback here, and it seems we can't take it much further at this stage, and so, unless there is anything additional now, I suggest we move to -- Are we reviewing the

interim analysis schedule next?

EXECUTIVE DIRECTOR SIMMONS: Mr. Chair, I suggest that maybe Dr. Sagarese give her presentation, and then we could circle back.

CHAIRMAN LORENZEN: Okay. That sounds good.

REVIEW OF GULF RED GROUPER UPDATED INDICES OF ABUNDANCE

DR. SKYLER SAGARESE: Thanks, everyone. Just a caveat, and I'm kind of having my first COVID two-shot brain, and so I'm hoping what I'm talking about makes some sense, but, if anything seems unclear, just please ask me to repeat, or just feel free to ask some questions.

Today, we're going to give you an update. Back, I think it was the end of 2020, we were asked to update the interim analysis for red grouper, because it's been one of the species that we looked at in the last few years pretty consistently, and so we did that interim analysis at the time, and then, as we'll talk about later on, in 2020, there were concerns with sampling and COVID, and so we went back and redid the interim analysis using another index, but I think red grouper is a good example.

I think it kind of highlights how this process could potentially be used, and I do -- How can I say this? I do worry that this is a poor -- As Shannon mentioned, this really is not going to be the normal.

I think because the red grouper -- Because of the issues in the allocation, as soon as we have an ABC that's been approved by the SSC, it's very easy to do this analysis, and so now it's just a matter of we've got all these iterations, and a final allocation hasn't been set yet, and so we've got too many iterations at this point, but, ultimately, the goal really is to get this nicely coupled with what comes out of the assessment, and then, every year, we would be able to update the catch, and so that's kind of where we're going.

The first red grouper interim was conducted back in 2018, and, since then, we've been able to conduct the interim analyses each year. As a reminder, and it seems like ages ago, but SEDAR 61 was finished in I think mid-2019. The terminal year for that assessment was 2017, and, if we remember too, with red grouper, the 2018 was the year where there was a pretty severe red tide. At the time, we weren't quite sure how to treat it, and so, for the projections at a least, we assumed that the 2005 event was as severe as the 2018 event.

We ran multiple projection scenarios for that assessment, showing those different assumptions, and one of the strengths of potentially using this as a health check, as has been mentioned, is that, when we did the follow-up interim in 2019, when we've compared the expected index with what the assessment predicted for that index, for the bottom longline survey, we actually saw pretty good agreement, in terms of that assumption that we made, and so I believe we all felt pretty comfortable with that decision, and we went with that the 2018 red tide was as bad as the 2005, and so that's just something to consider.

We're a couple years past now from the terminal year, and there has been a lot more going on with the environment, and I'm glad to hear that there seems to be some positive discussions lately of some recruits.

Basically, just plotting what Carrie showed in her presentation, if we look at -- This plot is just showing the left-hand side is commercial, and the right is the recreational, and so the thick black line at the top are the quotas that have been set, and the dashed lines are just the realized landings, and so the landings estimates, and these are million pounds gutted weight.

On the bottom, it's just showing the percent of the quota that's been landed. The red line shows when there were closures, and then the one thing to -- Well, there's a couple of things to note in this figure. First of all, the commercial landings were only available through April 29, and so I went to the IFQ database last week to update those, and so those are as final as we currently have, and it's about almost 40 percent of the quota landed for 2021.

For recreational, it's a bit more complicated. The data that were on the SERO website ended in -- They were only available through June of 2020, and so the 2020 recreational landings, I believe, just got released by MRIP either last week or the week before that, and I know, at SEFSC, they're in the process of doing their weight estimation and providing the ACL files for the CHTS and FES to SERO, and so that data hopefully will be getting released fairly soon, but, unfortunately, we didn't have it for this presentation.

Just for context, 2021, obviously, it's not a full year, and the 2020 recreational we're still missing, and then the other change to note is that, in 2019, the emergency ACL went into place, and that 2019 ACL was based on the landings from 2017, and so we've gotten much closer to the quotas, but you see in that 2018 --

That was with the older quota, and that was set based on SEDAR 42, which was much higher than the emergency one.

Yes, there's been some years where the fisheries are not hitting their quotas, and so there has been some cause for concern, and, again, we had that red tide in 2018, and, again, that really wasn't -- We didn't have the data to incorporate that in the assessment, and so there's still some potential issues going on behind why the fishery has been unable to get their quotas, but it sounds like things might be changing, and so that's good. At least the assessment had predicted a recruitment event, I believe in 2013, and so it seems like that's starting to show up now.

For the purpose of this presentation, we're going to show the bottom longline survey index, and so the reason why we don't have any other indices to show is the groundfish that was used in the stock assessment was not conducted in the summer of last year, because of COVID and other reasons, and so we don't have that updated. The FWRI repetitive time drop survey that we had entered into the stock assessment for red grouper is no longer active, and then the combined video survey is an aggregation of the three different labs, and so Pascagoula, Panama City, and FWRI, and those video surveys -- It takes some time to read the videos and then process the data and then develop the index, and so we don't have those indices, and so, at this point, the only index we're going to show is the bottom longline survey,

Normally, what we do is we would have a representative index that we've talked about in the past, and that was the bottom longline survey for red grouper, where we would have an index that we can update each year fairly easily, and then we have essentially the expected index of abundance that's predicted from the stock assessment. In this figure, it's the blue, and so that's essentially the forecasted index of abundance that the assessment saw, given the historical model and then the assumptions we made in our projections.

What we want to do is where we look at where the assessment thought the stock would be and then where we actually see the index, and so the red line is what we initially produced, and the red line was using the bottom longline survey just normally, using the entire spatial area, using all the data that we had, and that's what's been used in the past, but, when we did that analysis, and we saw this big uptick relative to the last year of 2019, there was some concern, because, when you looked in --

If you look back in the documentation, if you look back at Adam

Pollack's paper, where he describes the development of the index, the bottom longline survey did not cover the entire spatial range in that year of 2020, and so they actually stopped a little bit beyond Tampa, and so we were concerned that, because the survey didn't go further north, and it didn't hit a lot of those areas where they generally have zero landings, zero catches of red grouper, that it was artificially high, and so that 2020 value is artificially high, because of the incomplete spatial coverage.

In addition to the potential of COVID, with that 2020 value, there were also weather and other issues behind why that survey didn't cover the full range of the area, and so what we did was we went back, and Adam developed an index of abundance, using that spatial area that had been covered in 2020, and restricting all of the years to that same spatial area, so that we had an apples-to-apples comparison, so we could see what that 2020 value would have been compared to the other years, and that, in this figure, is the green line.

When you reduce the spatial area so that it's consistently been collected across all these years, then what we saw was we saw that 2020 was similar to 2019, and it wasn't -- We didn't see that big jump, and so that kind of was support for the concerns that we had initially voiced in the first interim analysis report that we put out using the full index.

The one thing that I wanted to note is that, in this figure, all of these indices that we're showing, they have been normalized to a mean of one so that it's easier to visualize the differences, but the actual values of the observed and forecasted indices are in Table 1 of the interim reports.

Just further digging into that 2020, and so the initial concern was that the observed index was higher than it should have been, and, on the right, you're looking at the spatial coverage for 2020, and so the red grouper -- The red dots indicate where they were caught, and then it looks the blue crosses are areas that were sampled during the survey, and what you can see is that, basically, north of Tampa was not covered in 2020, whereas, in all the other years, you can see that, for the most part, the survey has extended all the way out to the Panhandle. That was the reason behind basically using a full index and then using the spatially-reduced index.

What we've done then, as Carrie had mentioned, we've conducted an interim analysis using -- At the time, it's the SSC-recommended ABC value that came out of SEDAR 61, and that was

assuming 76 percent commercial and 24 percent recreational allocation in the projections, but, again, this analysis can be run on any one of those ABC values, and what we do is we compare the observed and the forecasted index of abundance, and we account for -- This beta is a function of a scalar that allows, or adjusts, the responsiveness of the catch advice that comes out of the harvest control rule and the standard error of the index.

Beta is equal to the scalar times the standard error, and the intent of this analysis was to change the ABC every other year, and I think part of the reason for that was that stakeholders would not want highly variable changes from year to year. They would prefer more stability.

What we're showing now, again, this is using the 4.9 million-pound gutted weight ABC that came out of SEDAR 61, and that ABC is also based on the 2018 red tide equivalent to 2005, and what we're showing now is the effect of that beta parameter, and so the scalar -- We test values ranging from one to nine, and what we see is that, when you plot this -- This is just a plot of the time series of the projected catch advice, what would have been set if we had used this approach in the past, and then different colors -- Red indicates a beta of one, and purple is a beta of nine, and so what you can see, from these figures, is that, the smaller the beta, the more that this catch advice would track your index of abundance, because you see much more variability, in contrast to, the higher the beta, and so a beta of nine, you see that it doesn't diverge very much from the baseline ABC that it used in that value.

Those decisions had initially been set when the first interim analysis have been reviewed, and what we end up seeing in this case -- This table is showing the catch advice for the reduced area index, and using the same choices in the past, the beta of one, what this interim would have shown is that the ABC could be raised to about 5.9 million pounds, over the current ABC, which is 4.9 million pounds.

The one thing to consider, and I think the concerns -- Ultimately, the choice of beta really drives -- It's really driven by how much your index of abundance -- How representative you think it is, and so, for example, in this case, where there were some concerns over that spatial representation, it's possible that that choice of beta would maybe want to be reevaluated, and maybe, because of the concerns over that relative jump that we had initially saw, maybe this is something where you would want to say, you know what, for this time

around, here are the reasons why we want to choose a different beta, because we're concerned about that sort of change, and so that's one thing that could be used in the future, is to kind of look at how some of these factors are interacting and how that could drive some of the decisions that we actually haven't come across in the past.

This figure, this slide, we're just showing -- Really, the reason for this interim was, when we first did this, using the full index, and using that 2020 value that was higher than 2019, what we ended up seeing was that, in those cases, the ABC, using the beta of one, the increase would have been up to about 6.5 million pounds, but, again, we highly caution that value, because of that 2020 index of abundance value.

It's a smaller spatial coverage, and there's concern that it was artificially high from missing some of the stations, and so, as we put that information out there, we also went back and decided to try to remove the effect of that spatial area influence, and we did that, and we still see a fairly high increase in the ABC that could be provided, and so we just wanted to caution that, that, unfortunately, 2020 seemed like a very abnormal year, and this is likely not the only stock where this will be an issue.

That is all I really had for that. Ongoing work, the interims are still working on getting the tools to develop the MSEs, to help us look into potentially other harvest control rules, or other decisions, other combinations of the -- For example, the beta values, or other types of harvest controls that are applied, maybe for other species, and, in the future, we'll continue to update these interim analyses for red grouper, and hopefully -- Ultimately, these will be used to adjust the ABC advice, and that's hopefully where we're going, and that's all I have. I'm happy to take any questions.

CHAIRMAN LORENZEN: Thank you. Are there questions? Doug.

MR. GREGORY: Thank you. That was a good presentation. On Slide 3, I have a request that a change be made. When you look at the landings, the top part, I think it's misleading to include the 2021 point for commercial, since it's only a partial year, and it's misleading to include 2020 and 2021 for recreational. I mean, the landings are going down, but those partial year points are quite misleading, in my opinion. Thank you. Otherwise, I think everything looks great, as far as the analysis.

DR. SAGARESE: Thanks for that, Doug. I mean, that's definitely

doable. I just included everything I had up to that point, to kind of highlight and try to caveat, with red text and stars, to kind of indicate that, but we could definitely only show the final estimates. I just think the problem we get there is requests for, well, why don't you show what you have, but we can certainly just keep it to final estimates.

MR. GREGORY: Well, yes, because the image is comparing the dotted line with the solid line. I mean, that's the visual we have. Thank you.

CHAIRMAN LORENZEN: Thank you, Doug. Harry.

MR. BLANCHET: To the same point, if you remove that last point in that line, but then put a single dot at the terminal data point, which is the incomplete year, that separates it from being part of the trend, but it does provide the same information, something like that, and I was just trying to -- The same as Doug, but I was trying to say here it is, but it's not the same.

DR. SAGARESE: Thank you very much for that input. We will -- Certainly we can either indicate it with a different point or just remove it altogether, because that's certainly not the biggest thing we want people to take away, is the incomplete years.

CHAIRMAN LORENZEN: Luiz.

DR. BARBIERI: Thanks, Kai, and it might be better to have Dr. Simmons go ahead of me, if she has something specific to this presentation. I don't really have a question for Skyler, and I really enjoyed the presentation, and thank you, Skyler, and I think it helped us understand, and I was going to make a comment relative to this topic as it ties to the previous discussion, based on Dr. Simmons' presentation and the questions the council has used for the interim analysis, and so, if she has something related to this, I think it makes sense for her to go ahead of me.

CHAIRMAN LORENZEN: Okay.

EXECUTIVE DIRECTOR SIMMONS: Go ahead, Dr. Barbieri. That's okay.

CHAIRMAN LORENZEN: Dr. Simmons, I think --

EXECUTIVE DIRECTOR SIMMONS: Okay. Thank you, Mr. Chair. I

guess, Skyler, you're suggesting, it sounds like, perhaps when we are ready to look at making changes to catch advice again, that we take another hard look at the betas, it seems like, for this species, and is that something that you think we should do, especially when the landings aren't reaching the ABC?

DR. SAGARESE: I think it's certainly something to consider, and I would leave that to the SSC's expertise though, to consider how -- Essentially, your choice of the beta just would come down to how much trust you have in that index of abundance, and that, if you see a high increase in your index, are you comfortable that that's -- Would you want to potentially buffer for that in some way?

I think that it's -- I feel like, with these types of analyses, any of those choices could be on the table, but I think, by what we did with this analysis, by focusing on the reduced spatial area, to get an apples-to-apples comparison, I think that kind of gets us away from having to reevaluate the betas, perhaps, and so that's certainly something that I think could be considered down the road, but, again, it really is a mix of how much you trust that index, what kind of stability, how stable would you want the landings, because, as I show in that figure, the higher beta tends to keep a bit more similarity from year to year with your catch advice, as opposed to the lower betas kind of lead to much more variability, and so you might have some good years, but, alternatively, you might have some lower years.

EXECUTIVE DIRECTOR SIMMONS: Thank you.

CHAIRMAN LORENZEN: Thank you. Dr. Patterson.

DR. PATTERSON: Thanks. The only thing that kind of concerns me about these approaches is that the analysis is done to predict what the ABC should be, and it seems to me that really what we should be doing here is trying to predict what the overfishing limit should be, using some type of interim analysis tool, and, sure, the beta can be adjusted, and even the way it's computed can be adjusted, so that you are basically reducing, based on that proportion, what the ABC estimate would be, relative to the previous estimate and then scaled to whatever the index is doing, but, as Skyler mentioned, that just adds variability to the system, and it doesn't really allow the SSC to make any type of inference, and then advice, about what we perceive to be scientific uncertainty.

All it does is create more noise in the output, and the thing that concerns me most here is that, in recent years, the ACL for

this stock has dropped substantially, and we see, for the years of complete data, when that drop occurred in the quota, it went from 30 to 40 percent of the quota being landed to about 80 percent, and so the fishery still isn't taking -- In the years where the most recent data occur, the fishery still wasn't landing the full allocation, and that's after a pretty drastic, like 70 percent, cut in what the quota was, the ACL.

It just seems to me that we should be talking about here, really, is trying to predict the OFL, and then the SSC, based on scientific uncertainty, could use that information to then set the ABC accordingly, or use some modification of the control rule to do that, in an objective way, and then warn the council that, while this is the advice that comes from the procedure put in place, you still have this issue of the fishery not landing the allocation and some concern about whether the assessment is fully capturing stock dynamics, because we're, obviously, overpredicting what the catch would likely be.

Getting back to Andrew Ropicki's comment earlier, there could be socioeconomic issues that could be driving -- The what are we missing component, I think, is missing from this, and it could be socioeconomic, or it could be other issues related to what's going on in the ecosystem at-large, outside of just the dynamics of red grouper, but, anyway, it just seems, to me, that we should really be talking about OFL, instead of ABC, here.

CHAIRMAN LORENZEN: Thank you, Will. Bob.

MR. GILL: Thank you, Mr. Chairman. Thank you, Skyler, for the presentation. I have two questions, one on Slide 3. What are the units of recreational landings on Slide 3?

DR. SAGARESE: The same as the Y-axis on the left. They're million pounds gutted weight, and so both of them are in million pounds gutted weight.

MR. GILL: I was referring to CHTS.

DR. SAGARESE: Yes, CHTS, what's currently used for monitoring.

MR. GILL: Okay. Thank you. The second question is relative to Slide 5. How was the northernmost point in the 2020 survey treated, as an outlier, so that, as you indicated, the line was roughly Tampa Bay south, or was that point up there by Cedar Key actually utilized?

DR. SAGARESE: I would have to go back into the paper to see the

exact latitude where Adam subset the data. One second, and I can do that. All the data were limited to those south of 28.5 degrees North.

MR. GILL: It's hard to see from here, but that sounds like the northernmost catch point, or thereabouts.

DR. SAGARESE: Yes, and so it looks like -- I believe that one zero spot looks to be the 29, and so 28.5 is about halfway, about, and so that would be -- I'm not quite sure where that corresponds to, and it's a little north of, I guess, maybe Tarpon Springs.

MR. GILL: Okay. All right. Thank you.

CHAIRMAN LORENZEN: Thank you, Bob. Luiz.

DR. BARBIERI: Thank you, Kai. Going back to how this ties, I think, into Dr. Simmons' previous presentation on this topic of the use of the interim analysis during this time when the council still hasn't made a decision regarding the allocation, and actually approval of what they consider would be the catch levels that they want to see, to me, this ties into the appropriateness of the tool for the job at hand here.

I am drawing from memory here, but my recollection is that, back then, a few years back, the council asked for this annual interim analysis, really kind of sort of as a health check. Because there were concerns about the condition of the stock and the impacts of red tides, they wanted to stay on top of this, to kind of keep their finger on the pulse of the stock, and then, if needed, adjust.

If something additional happened to impact the stock, or the stock condition got worse, they would adjust the catch advice accordingly, and so, now, the Center is in the situation of providing the interim analysis, which kind of sort of provides a health check, but it also updates the catch advice when we can't use the catch advice yet, and so, agreeing with what Bob Gill mentioned earlier, perhaps we can just adjust this request to the Center, and I don't know, and I would have to hear from Shannon and other Center people, whether it will be more or less work for them to simply provide the council, annually, I guess, with a review of the indices of abundance, so the council can have an idea, with advice from the SSC, on how the council -- I mean, how the stock is doing.

If this is going to be really a health check, it could,

actually, integrate in that same process, what Andrew Ropicki brought up, which would be some review of the commercial IFQ program, so that we have more context for interpreting the landings information.

I don't think that this here hurts anything, but it creates this kind of sort of conundrum, because the catch advice is being updated, and we can't use it, and I wonder if we call this something different, and, instead of conducting a full interim analysis, they just provide an update on the indices and the landings information and the health check can be completed. Thank you.

CHAIRMAN LORENZEN: Thank you, Luiz, and I guess Shannon has some answers for you.

DR. CALAY: I mean, I tend to agree with that, Luiz. We could certainly provide updated fishery-independent indices, and we have invested in the automation of the fishery-independent indices, and we could provide what landings information are available, and that might be of interest to the SSC, to determine if a stock warrants additional intention.

CHAIRMAN LORENZEN: Right. Shannon, would you be able to sort of give us some idea of what sort of workload is involved in producing the regularly-updated indices of abundance, versus the full interim analysis, versus sort of an operational assessment, because I think that's one of the things we and the council should be thinking of.

DR. CALAY: Sure. Kai, maybe I will hand this one off to Katie, because I think she is probably more knowledgeable about the time it's taking the staff to conduct various components, if she's prepared to speak.

CHAIRMAN LORENZEN: Thank you. Katie.

DR. KATIE SIEGFRIED: Thanks, Shannon. I'm actually pretty excited about some of these suggestions to work with the economists and other social scientists, and we do have something going on in the Center where we want to start collaborating more between assessment scientists and the social scientists, and just so you know that that's going to get underway here with our strategic planning.

As for the time it takes to conduct these various analyses, Adam Pollack has automated, and his team have automated, those indices of abundance, and it doesn't take long to get those

going, once the datasets are complete, and it's a matter of days to complete those runs, and we can update the reports.

The interim analysis depends on which index is used, and let me know if I'm not answering your question directly enough, Kai, but the video indices take longer to analyze than those automated indices, and so it can be a couple of months, depending on how long Kevin Thompson at FWRI has in his schedule, and he's very tasked, as I'm sure Luiz can attest to, and so that could take a month or two to get that index to us, depending on his workload, but the actual interim runs, like what Sky just showed, are a very short turnaround time, and it takes longer to write the report and get the presentation together.

An operational assessment, we're still trying to figure out how streamlined that can be. It depends on how many working groups there are, the topical working groups, and we're hoping it's somewhere between six months to a year, at the most, and it depends on, again, the timing and the topical working groups.

CHAIRMAN LORENZEN: I think that is useful, and so it's interesting that, once things are automated, I guess you're suggesting that the indices, the updating of the indices, with the possible exception of video indices, and the interim analyses can be done quite quickly, much more quickly than the operational assessments, for sure.

I also note though that we are spending a lot of time discussing the ins and outs of the indices and the interim analysis, and so I guess, if that remains a major topic with every time the indices and the analyses are presented, of course, that may add time and going back to assumptions and so on. Thanks very much, Katie, and I see Doug Gregory.

MR. GREGORY: Thank you, Kai. Katie answered, I guess, my thought about incorporating the socioeconomic stuff and explaining landings trends, but none of that explains the fishery-independent index. It stands alone. Both information is helpful, because we're interpreting the index based on looking at the landings trends relative to ACLs, and so it's good to know that, well, did the implementation of IFQs change the behavior of the commercial fishery and did the 2010 movement of longlines out to a specific area change that, because the longline fishery is the primary gear used to catch red grouper, and commercial catches about 80 percent of the total ACL, or ABC.

It's good to know what other things, regulatory and economic, might be influencing landings trends, so that we don't do a knee-jerk reaction on something, but the index stands alone, and so, to me, the real question is for us to revisit the beta at some point, because I don't fully understand that.

To me, it's an arbitrary decision, and I'm leaning towards let's pick the middle beta, the averages, the projection from the last assessment, along with the index, because we know, as scientists, in doing field work, there is a lot of variability in our catches, particularly relative to what commercial fishermen or a high-liner recreational fisherman can do, and so maybe we shouldn't be following the index that closely. Thank you very much.

CHAIRMAN LORENZEN: Thank you, Doug. Will.

DR. PATTERSON: Could whoever has control put up page 4, please? In looking at this figure at the bottom here, where you have the SEDAR 61 forecast and then the interim update full area and interim update reduced area, and so I know the intent here is to try to focus on whether the reduced area, in the last year, was sufficient to capture the trend in the data, but, as I look at this, when you look at the assessment result, or projection, and then what we see from the different time periods, or across time, with the full area in particular, the first thing I would question here, as far as scientific uncertainty, is does the interim analysis line capture the trend that we see from the assessment, and the answer is yes. When one goes up, the other goes up.

The second is can you accurately predict the assessment result from this analysis, which is using one survey, or one piece of information, and the answer is, no, you can't. Oftentimes, they're going in the same direction, but the magnitude is quite a bit different, and, as part of that, trying to think about scientific uncertainty here, when you look at the years 2014 to 2020, the fact that the uncertainty in the index is not being carried forward here into this interim analysis I think is really important, because, if you look at the variance around the estimates from the various surveys, it can be quite large.

From 2014 to 2020, I doubt any of those years are statistically significantly different in the analysis, but, in the last year here, when you go from 2019 to 2020, and you have that uptick, that is what is driving this, because we're trying to predict ABC in this analysis, and that's what will be driving this potential increase in the ABC that was coming from the SSC.

I think we just have to be careful here. One, what we're actually predicting here, and should it be ABC or OFL, and the second this is, you know, we're just not even capturing the uncertainty in the information that's advising this fit, and so we're pretending that we have perfect knowledge of the survey, or the perfect ability to predict the survey results, and we don't. There's quite a bit of uncertainty just due to process error, and potentially some measurement error, in that estimate.

CHAIRMAN LORENZEN: Thank you, Will. Shannon.

DR. CALAY: Thank you, Kai. Will, we suspect you're correct. We've had similar conversations at the Science Center, and we do think that this analysis could continue to be improved, and we do recommend doing some MSE work on it to further develop it, and so we are listening to your criticisms, and we do plan to continue to explore this analysis.

CHAIRMAN LORENZEN: Thanks, Shannon. Paul.

DR. SAMMARCO: Thank you, Mr. Chair. Could we please go back to Slide Number 3? If you look at both the commercial and recreational, your gutted weights, this species started showing problems in about 2015 or so, and we have a precipitous drop in landings, in gutted weight, from that time to present, and, also, if you look at your quota, it's going in the opposite direction, but I was wondering if there is some way, since we somehow here seem to have missed the boat, is there some way to incorporate a measurement, in doing one's predictions, to incorporate a measure of slope, and intensity of slope, with a limit on that that says red flag, this needs to be reviewed a little bit more heavily.

It's sort of like having an eighteen-wheeler going down a hill that loses its brakes, and suddenly the brakes click on, because there are other physical things for this, with actually elevators, believe it or not, but, also, there are physical oceanography models that use this, and other models as well. I was just curious, because it might be a heads-up, a way to get a heads-up, a little earlier on, before these things become more difficult to deal with. Thank you very much.

CHAIRMAN LORENZEN: Thank you, Paul. Luiz.

DR. BARBIERI: Thank you, Kai. Kind of trying to go back to the bottom line of this discussion that integrates these two presentations, perhaps we can make a recommendation to the

council that they update their request to go from getting that interim analysis to getting this updated indices, so that it can actually provide them with information on trends, and, yes, there is error that we know that exist with these types of information and analysis, but at least they get some idea of how the trends are, and we can revisit the request for an interim analysis after the council actually makes this decision on the sector allocation and how they want to proceed with the catch advice.

The thing is, and I think -- I guess I can understand the conundrum that the council, and perhaps the Center, is finding itself in here, and it's producing an interim analysis, because it was requested that it be put on the schedule, and that gets presented to us, and it might generate expectations for people that, given an interim analysis, like what was conducted, the catch advice is going to change, when, in reality, the council is not ready to make that change just yet, and so perhaps just proceed with this, in terms of our suggestion, or recommendation, to the council.

CHAIRMAN LORENZEN: Thank you, Luiz. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I guess, if the SSC as a body thinks that's a good approach, perhaps staff could work on that schedule and kind of parse that out a little bit better for the various species and bring that back to the SSC and the council and then be more cognizant, when we're asking the Science Center for this type of information, whether we're asking just for updated indices of abundance for the SSC and council to take a look at or if we're perhaps ready to actually make changes to catch advice.

CHAIRMAN LORENZEN: Yes, that makes sense. Doug.

MR. GREGORY: Thank you. I understand the discussion here, but, in the technical sense, the council can set an ACL lower than the ABC, and so we could go forward with this and recommend whatever increase, based on the beta we decide on, and the council doesn't have to do it. The only restriction the council has is they cannot exceed any ABC we present, and so the council can move forward with status quo and thank us for our advice and just move forward and ignore the advice until the next index, next year, and see if the landings are increasing as dramatically as they appear in 2021.

Of course, 2021 could be an anomaly, as a result of the pandemic, and so like increased travel is an anomaly over last

year, and so we could do it, and it wouldn't disrupt the council at all, and it doesn't force them to change their ABC or ACLs. Thank you.

CHAIRMAN LORENZEN: Thank you, Doug. My understanding is we haven't been asked to provide an updated ABC or ACL, and that's because of the -- Because the allocation review hasn't been completed.

MR. GREGORY: Well, I just assumed that, when we're given an assessment, we're expected to do this. Now, I know that we've been asked by council staff, and I don't know if that was a council request, and the request by the council staff is reasonable and logical, but I don't know if that was an actual council request. If so, they could have asked NMFS not to do the interim assessment. Anyway, it's not a big deal, but we can go either way.

CHAIRMAN LORENZEN: Maybe, Ryan, you can go back to the scope of work here.

MR. RINDONE: Sure. We can do that, if you want to pull the scope of work up, Jess. Just, while she's doing that, just for everyone's edification, when the council had initially requested the annual interim analysis for red grouper, it was to keep a finger on the pulse of the stock, post-SEDAR 61, to try to see just how the stock recovered in the wake of the 2018 red tide event.

I'm sure some of you will recall, and a little history lesson for those who perhaps don't remember, but, after the 2005 red tide event, which we had estimated probably knocked out about 30 to 35 percent of the red grouper stock, 2006 was the best recruitment event on record, and then, after the 2014 red tide event, which also took a wallop on the stock, there was another pulse in recruitment, and not near the magnitude, but still, and so red grouper, despite these subsequent recruitment pulses, seems to have quite the susceptibility to red tide, and qualitatively, perhaps, more so than some other species that the council is responsible for managing.

Just to try to keep a bead on what's going on with the stock, that was why these interim analyses were requested annually, and it wasn't with the impetus that the council is going to try to change the catch limits, and so this is the scope of work for this particular item.

Dr. Sagarese has done a good job putting this information in

front of you guys, and it's just to help inform you about the condition of the stock, which, again, is in keeping with the memo that the council sent to the Science Center with the initial request, and so you guys can evaluate this information and provide any relevant feedback for management consideration and for any future use of the interim analyses for red grouper. This annual request still stands, and so you guys will still get these every year for red grouper, until the council calls it off, but your input, of course, is of great value.

CHAIRMAN LORENZEN: Thank you, Ryan. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I was just going to reiterate, I think, what you said already, and that is that the current catch advice that is produced in both documents that Dr. Sagarese presented is based on the sector allocation that's currently on the books, and so the council is looking at a different preferred alternative, and so I don't know that we want to make recommendations on different catch advice right now, until they make that decision, which is why I think we're requesting that we wait on this, and that's why we're bringing this to the SSC and the council, for their consideration of this approach.

CHAIRMAN LORENZEN: Yes. Thank you, and that's what I understood, and so it seems to me that we have plenty of feedback here that we will summarize, but we are not really expected to go beyond that. There's a long list of hands coming up. Okay. Let's see. Luiz.

DR. BARBIERI: Kai, I will make it brief, and it's basically to reiterate what I said before, and you just said as well, that, basically, the SSC doesn't really disagree with this approach of looking at the interim analysis as a, quote, unquote, health check, and not necessarily use it, at the moment, for changes in catch advice, because the council hasn't completed some of its allocation analysis, as yet, or decisions as yet, and so the council is not ready to make that change. Thank you.

CHAIRMAN LORENZEN: Thank you. Harry.

MR. BLANCHET: This is perhaps in a broader context, but one of the issues that I have with the interim analysis is that you have defined an index of abundance that characterizes what goes on in the stock, as best it can, and, often, we have several other indices of abundance, which may represent what's going on with different aspects of the stock or with parts of the fishery.

If we're talking about something that is a report on the health of the stock, to me, I think more than a single index of abundance is important, but, if we're talking about an interim analysis, then we do have to maintain a single -- As the Center as built, and so I think the multiple indices of abundance gives some representation of different aspects of the stock, as well as, like Will pointed out, some of the uncertainty about where that stock is going that you may not see when you look at a single index. Thank you.

CHAIRMAN LORENZEN: To your point, Harry, in addition to multiple indices of abundance, yes, that health check could also include economic information and so on, and so it could be developed, as the Science Center has suggested, into a broader health check than we're getting strictly from what we would be getting for the interim analysis. Leann.

MS. BOSARGE: Thank you, Mr. Chairman. Just two comments. Well, a comment and a question. Generally speaking, I would say that the council had hoped to use these interim assessments to actually produce catch advice in between our regularly-scheduled, full-blown, let's call them, stock assessments.

Now, I completely understand all the rationale and everything that's been talked about with red grouper, and this is kind of an outlier situation that we had not expected, and so I'm not trying to ask anybody to produce catch advice in this situation, but I did hear a lot of commentary about it being a health check, generally speaking, and these sorts of things, and so I did want to kind of circle back and give that feedback from the council, that we do actually want to use these for catch advice.

I think that was a lot of the impetus behind the Science Center developing these, is because the council kept fussing about the timing of assessments, and we don't get enough assessments, and we like to fuss about things like that, and so the Science Center came up with this approach to give the council more timely catch advice in between the larger, more in-depth assessments, and so that's just one comment.

Then the question that I had, and I guess it's for Skyler, and so the catch advice that you were showing, is it in CHTS units or FES units? I only ask because I know that you have that one page, and I think Bob Gill asked what units that was in, and you said it was in CHTS, and so is the catch advice, that five or six-million-pound quota, or ABC, is that CHTS or FES?

DR. SAGARESE: Thanks, Leann, for that question, and so the Slide 3, when I show the quotas, that was the only CHTS information, because that's currently how red grouper are managed, but all the results that we show for the interim are from the stock assessment, and, since we used the FES data in the assessment, any catch advice derived from the stock assessment, the OFL and the ABCs, are all in units of FES.

MS. BOSARGE: Thank you.

CHAIRMAN LORENZEN: Thank you, Leann and Sky. Shannon.

DR. CALAY: I did want to comment on what Leann Bosarge said. I mean, that is certainly the reason why we chose to develop an interim approach, was to give more timely and more frequent management advice. It is one of the underpinnings of our ability to give more timely and more frequent advice, because the operational and research track assessment are simply, currently, still too time consuming.

We do hear the criticisms, the constructive criticisms, of the SSC, and we will look back at the feedback we've received and see what we can do, through the MSE process, to improve the approach, but I did want to give that plug, that this is something that the council requested and supports, and it's certainly something that the Science Center would like to see remain in our toolbox, but perhaps with some feedback and some improvements to be made.

CHAIRMAN LORENZEN: Thank you, Shannon, and that was my understanding, and I think, when we bring this discussion back to the council, I think that would also give the council, obviously, the opportunity to re-emphasize their intent with the interim analysis as a health check or catch advice. Bob.

MR. GILL: Thank you, Mr. Chairman. Leann brings up a good point, and that is, in this age of different currencies roaming around, I would suggest that, when a presentation is made, that it uses a common currency and that currency be identified, and I understand that landings are in one, and the advice is in another, but trying to have comparisons between one and other on the fly, frankly, just adds to confusion and misperception, and so my recommendation is a common currency in any presentation and have that identified at the outset. Thank you.

CHAIRMAN LORENZEN: Thank you. Doug.

MR. GREGORY: Thank you. To Bob's point, I stumbled into this

looking at king mackerel and historical landings, and you have to use CHTS units historically, because the ABCs were calculated in those units, and you can't convert an ABC from CHTS to FES without rerunning the assessment with FES data, and that is impractical, or it doesn't work, and so we're stuck looking at historical landings relative to ACLs, and we have to use CHTS, and that's why we just can't convert everything to FES, because historical ABCs cannot be converted. Thank you.

CHAIRMAN LORENZEN: Thank you, Doug. It seems we've reached the point where we are ready to more or less close the subject, but there's one more -- Will. After that, Carrie, you had a brief presentation about the interim analysis schedule plan, and is that correct?

EXECUTIVE DIRECTOR SIMMONS: Yes, and thank you, Mr. Chair. We do, and I would be happy to talk about that, or we could bring something back to you at the next meeting, whatever you prefer.

CHAIRMAN LORENZEN: Okay. Let me take Will as the last discussion point here, and then I would suggest that we do look at your schedule, and then we break, and then we come back to talk about the shrimp issues. Will.

DR. PATTERSON: Thanks, Kai. I will be brief. Whether this is being used as a health check or this approach would be utilized to actually base catch advice, and so, if it's the ABC, then the SSC would have to sign-off on that, because we're the ones who actually estimate the ABC.

In that case, whether the council is looking at this for a health check or using this to inform ABC in the interim between two assessments, whether it's five years or however many years between assessments, basically, what we would be asking is do we have new information, in this case based on this one index, which would suggest the stock is performing differently than the values projected since the last assessment.

When you have fluctuations, from year to year, that could be plus or minus 50 percent, but the variance is greater than that, we would have no information to actually change course and say, within the scope of uncertainty, that the stock has performed differently, in a positive, or even a negative, direction from before, and so that's my sort of hang-up with all of these approaches, is that we're taking an index value, but we're not actually taking its variance, and whether we would then change our previous advice, even projected out multiple years, which we don't like to do, would our catch advice, in the form of ABC,

change, based on this new information, and I just think, without actually having the variance in that information, then it would be tough to sign-off on it.

CHAIRMAN LORENZEN: Thanks, Will. Okay. Let's move to Dr. Simmons on the schedule.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. Jess, could you pull up the interim analysis schedule? I guess, based on the discussion, what we would do is try to perhaps flesh this out a little bit further, after we get a stock assessment and when we're working on perhaps the sector allocation decision and the corresponding catch advice, and see what we may be doing for these other species until that's implemented, in the near-term, and try to come up with a way to differentiate that on this schedule that makes sense, to make it more clear when the council is requesting an interim analysis with corresponding catch advice, versus perhaps just updated indices of abundance and any information that's available on socioeconomic considerations.

CHAIRMAN LORENZEN: Okay. That sounds good to me. Any questions or comments? Hearing none, and seeing no hands, I would suggest that we take a break now, and so we have a fifteen-minute break scheduled, and I would say we'll come back at ten minutes after eleven, Eastern, and so then the next topic will be review of the penaeid shrimp working groups. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN LORENZEN: Our next agenda item is Review of the Gulf Penaeid Shrimp Working Groups, and, Ryan, if you want to just briefly take us through the scope of work.

REVIEW OF GULF PENAEID SHRIMP WORKING GROUPS

MR. RINDONE: The SSC will be presented with an update on the NMFS shrimp working groups, and they're tasked with evaluating various shrimp data processing and estimation methods for things like life history and environmental data and fishing effort and the SEAMAP trawl indices of abundance, catch data and estimation, and bycatch. You guys should consider the presentation and ask questions. It doesn't require any formal SSC action, but your input is appreciated.

CHAIRMAN LORENZEN: Thank you, Ryan, and the presentation is by Dr. Michelle Masi. Michelle.

DR. MICHELLE MASI: Thank you, Mr. Chair, and good morning, everyone. I'm Michelle Masi from the Southeast Fisheries Science Center, and I just want to take a moment to note that, like Skyler, I received my second COVID this weekend, and so I'm dealing with some lingering side effects, and so please just bear with me if I need to take a moment to catch my breath or anything.

In this presentation, I'm going to show you some of the exciting updates from the five technical shrimp working groups, and, as a reminder, these working groups began in late 2020, in an effort to better understand some of the data inputs and estimation procedures for the three penaeid shrimp stock assessment models and other related shrimp analyses at the Science Center.

The first working group to update you on is the Shrimp Fishery Effort Estimation Working Group, and this one is pretty easy, because it's currently on hold, as we're waiting for the final council decision on a new shrimp effort data collection method to replace the existing ELBs. Then, once a new shrimp effort program is established, and the data begins transmitting back to us at the Center, then this working group will convene.

The second working group is the SEAMAP Shrimp Indices Working Group, and this working group has recently concluded, and we're currently wrapping up the final working group report, and there were four primary objectives for this working group, which are listed for you here, and the first was to review the history of the SEAMAP survey, as well as the current shrimp abundance indices, including the methodology, data exclusions, and survey area utilized.

The second was to verify if the SEAMAP survey is operating along similar spatial and temporal scales as the fishery, and third is to explore alternative methods for deriving the indices of abundance for shrimp, using the SEAMAP data, and the fourth is to determine if the SEAMAP survey is a representative index of abundance for these penaeid stocks, and, if so, to provide best practice and research recommendations for moving forward.

To summarize some of the key points that the working group documented on the history of the SEAMAP survey, the first is that this FIN bottom trawl survey has been conducted annually since 1972, but all surveys were unified under the SEAMAP umbrella in 1987.

Since 1987, the SEAMAP survey gear and trawl configurations have remained largely unchanged, and we're using the data from the

SEAMAP summer and fall survey to derive the FIN indices of abundance in the brown, pink, and white shrimp stock assessment models.

In reference to the current methods, data exclusions, and survey area utilized, from 1987 to 2007, the spatial coverage of SEAMAP was Brownsville, Texas to Mobile Bay, Alabama, or Stat Zones 11 to 21, and that is shown in the bottom figure there, in green. There were some minor modifications to the survey that occurred in 2008, moving forward, where the time-of-day stratification was dropped from the survey. All trawls are now conducted for thirty minutes, in order to reduce sea turtle mortality, and the survey became a true random stratified sampling design.

Also, in 2008, thanks to new funding, SEAMAP began sampling along the West Florida Shelf, and so, from 2008 onwards, SEAMAP now surveys Stat Zones 2 through 21, as is shown in the figure there, and so, again, in some of these minor modifications to the survey design, the working group documented that the catchability of shrimp may have actually changed in 2008.

Although there were some minor modifications to the survey in 2008, the SEAMAP survey has used a consistent trawl gear and trawl configuration since 1987, and that includes a 12.8-meter semi-balloon shrimp trawl with 12.8-meter headrope and wooden doors, consistent trawling speeds of 2.5 to three knots, and no TED or BRD is being used or has been used.

The relative abundance of brown, white, and pink shrimp is derived using a delta lognormal model, or DLN, and the data included in each species-specific DLN model is summarized for you here, and so, for brown shrimp, the data for 1987 to 2008 is including Stat Zones 11 to 21, and then, in 2009 forward, Stat Zones 8 through 10 are included as well, and that's just because remember that, in 2008 forward, SEAMAP began sampling along the West Florida Shelf, and so you can see that there were some areas off the Panhandle there, in the distribution map of brown, that got picked up in the later years.

For white shrimp, since 1987, the stat zones included in the indices have been, and still are, Stat Zones 11 to 21, and that's just based on the spatial distribution of the stock. However, the index is limited to depths of less than twenty-five fathoms, as there are just little to no white shrimp observed beyond that depth.

For pink shrimp, since SEAMAP wasn't sampling along the West Florida Shelf until after 2008, and even then it wasn't actually

completing sampling the West Florida Shelf down to the Dry Tortugas until 2010, the working group recommended that the delta lognormal model be limited to the data from the years 2010 to present, and it was also recommended that the delta lognormal model only use Stat Zones 2 through 11 for pink, as these are the stat zones encompassing the primary spatial distribution of pink shrimp in the Gulf of Mexico.

The second objective of the SEAMAP Indices Working Group was to assess the spatial and temporal overlap of the survey and the fishery, to ensure that the SEAMAP indices are representative of the fishery, and so, to do this, we used the electronic logbook data, and, in this figure, I am showing ELB tow start locations, and, essentially, this is the area fished by the Gulf shrimp fishery for the summer between the years of 2009 to 2018.

Then overlaid on top of that is the SEAMAP trawl start locations for the summer survey for the same years, and so what you're seeing in the figure is, where the two colors line up, the color appears the darkest green, and, overall, the survey does align pretty well with where the fishery is operating in most areas of the Gulf.

There are some minor divergences that exist along the West Florida Shelf, where you can see the SEAMAP survey expands a little more westward than the fishery is operating, and, also, that SEAMAP is unable to trawl as far inland as the inshore fishery does, and so, along Louisiana inshore waters, you see a little overlap between the two, but SEAMAP is still capturing the extent of the adult white and brown shrimp population off of Louisiana and Texas, and so the working group deemed that the indices are reliable in tracking changes in abundance at the population level.

This figure is identical to the last, except, here, I'm showing the overlap between the SEAMAP fall survey and the ELB data in the fall, and, again, the figure is just indicating that, overall, the survey is doing a good job of operating along the same spatial and temporal scales as the fishery.

The third objective of the SEAMAP Shrimp Indices Working Group was to explore alternative methods for deriving the relative indices of abundance for brown, white, and pink shrimp, and so the first alternative model that was assessed by the working group was VAST, and, if you're unfamiliar, VAST stands for vector autoregressive spatiotemporal model, and it's quite a mouthful, and so I'm going to stick with VAST, as most of you are probably familiar with that acronym anyway.

What VAST does is it allows us to predict variations in species abundance across space, time, and categories, and then it predicts the total abundance across spatial domain, and so some advantages of using VAST models include improved prediction ability for data-poor areas, the ability to weight abundance by abundance by area, and the ability to estimate range shifts, and results from the exploration so far have shown really no significant deviations from the delta lognormal modeling approach. Remember DLN is what is currently used to derive the shrimp abundance indices.

On this slide, I'm showing the preliminary VAST model predictions in the top figure, and so, in the figure, the current SEAMAP model, the DLN model, is shown in purple, and VAST, the non-spatial version of VAST, is shown in green, and it's agreeing pretty well with the DLN method, and then the VAST S-T, or VAST spatial temporal model, is shown by the yellow line, and, overall, the figure shows there is a pretty good comparison between the standardized indices developed with VAST and the delta lognormal model.

The VAST spatial and temporal model is showing a little less precision in the early and later years, but noting, of course, that the model development is still in the early phase, and the bottom figure is just showing the coefficient of variation among models, with the non-spatial VAST model having a much higher CV than both the DLN and the spatial VAST models, and, again, the research is ongoing to better understand these different nuances among the different modeling approaches.

The second alternative modeling approached explored by the SEAMAP Working Group is empirical dynamic modeling, or EDM, and EDM is an equation-free inference tool that allows the model predictions to be based on non-linear dynamics, and so for, example, things like food availability, that we know can drive abundance, but are often incompletely observed in reality, and so, with empirical dynamic modeling, these non-linear dynamics can be extracted from previous points in the time series itself, using time lags of the observables, things that we can measure, like catch per unit effort or temperature.

There is a long list of advantages to using empirical dynamic modeling for shrimp, in my opinion, and the first advantage that I will talk about is that it allows us to track annual changes in stock dynamics using just one data source, the SEAMAP index, and this could potentially be much more efficient for monitoring shrimp, given that it's an annual crop, especially given the

current technical concerns among the stock assessment models.

Another advantage of EDM is that EDM can readily incorporate environmental drivers, and so, for example, temperature, and so, therefore using empirical dynamic modeling, with correlated environmental predictors, would allow us to achieve an ecosystem-based fisheries management approach for shrimp, and that's pretty exciting, given that we know that shrimp are a bottom-up driven species.

In addition, EDM provides the National Marine Fisheries Service with the ability to forecast one year into the future, therefore allowing us to provide managers and stakeholders with more timely information about stock status, and recall that the annual shrimp stock assessment outputs are based on information at a two-year lag, and that's for an annual crop, and so, by the time I'm presenting that information at council meetings, those shrimp individuals are mostly gone from the system, and so EDM could potentially shorten that time lag, through its ability to robustly forecast one year into the future.

For example, instead of coming to this year's council meeting to report on 2019 terminal year data with the stock assessment models, I could come with predictions of 2020, and potentially preliminary predictions of 2021, depending on when we got the SEAMAP data. Another thing is that those forecasts could have associated uncertainty bounds around the point estimates, and so, again, this is something that was not capable with the historic configurations of the Stock Synthesis models, which provided only deterministic point estimates of the current biomass and fishing mortality for the three penaeid stocks.

Another great advantage of empirical dynamic modeling, which is the last one that I'm going to list today, but not the last advantage by far, is that we can use this new cutting-edge spatial hierarchical EDM approach to explore stock dynamics over space and time, and so one question that I had, in particular, is why have we historically attempted to use a Gulf-wide stock assessment model to track stock dynamics for penaeid shrimp when we know that their population dynamics will likely vary, and potentially dramatically vary, across small spatial and temporal scales?

With this hierarchical empirical dynamic modeling, we can begin to explore these biological and ecological divergences across small spatial scales, in order to determine if we should instead be using a spatially-explicit stock assessment model for these shrimp stocks, moving forward.

That brings me to the final objective of the SEAMAP Shrimp Indices Working Group, which was to determine if the SEAMAP survey is a representative index of abundance for the three penaeid shrimp stocks, and the good news is that all the working groups participants agree that it is.

Concluding this working group, working group participants established some best practice and research recommendations, and a few of them are highlighted for you here, and so, for now, working group participants agree that we should use a split DLN index for brown and white shrimp, in order to account for the possible change in catchability that occurred with the minor sampling design changes in 2008.

Also, that we continue to limit the white shrimp index to less than twenty-five fathoms, given that they're not found beyond that depth, and, for pink shrimp, to just use the years 2010 onward, and, through some simulation testing in the next stock assessment model review workshop, to assess whether we could just use the summer survey instead of the fall, as the fall actually doesn't start fully sampling along the West Florida Shelf until 2014.

For research recommendations, the working group recommended that the National Marine Fisheries Service continue to explore the catchability issue and the indices, both pre and post-2008 survey changes, and that's just to see if we can continue to use the full index, instead of having to use the split index, and also to continue exploring the development of the empirical dynamic models and VAST alternative modeling approaches.

Now to update you on the third of the five shrimp data and estimation working groups, the Shrimp Life History and Environmental Data Working Group, and so there are three primarily objectives for this working group, which, for Objectives 1 and 2, were to collate inshore state survey and in situ environmental data, and then, for Objective 3, we plan to retain the environmental data for future stock assessment model improvements, but we are presently using the state survey data to attempt to update the life history parameter inputs in the three shrimp stock assessment models.

The reason for initiating this working group is that the current life history inputs in the shrimp models are based on studies from the 1970s, and there is really not much more current information out there in the literature, and so we're hoping the outputs from this working group will allow us to update those

stock assessment parameter inputs.

Then, simultaneously, for Objective 3, we're evaluating the spatial and temporal distributions of the three penaeid shrimp stocks, in an effort to better represent changes in catchability over space and time.

For Objectives 1 and 2, we have already received inshore survey and in situ environmental data from our four Gulf state partners listed here, and I really just want to take a moment to acknowledge those state reps, who not only volunteered their time to attend the working group meetings so far, but have also been really great about answering any questions that I've had about the datasets that they've provided and doing so promptly, and it's been super helpful, and so I sincerely appreciate those folks, and thank you very much.

As an update on Objective 3, for the Life History and Environmental Data Working Group, I am currently developing length frequency distributions with the state survey data, and so, in the figure here, as an example, I am showing Florida pink shrimp survey data, where here I'm plotting the length frequency of pink shrimp for all Florida bays sampled in 2019 across all twelve months.

The intention is to use these length frequency distributions to identify and then track modal progression from month to month. In other words, if there's a peak in that October distribution, for example at ten millimeters, and that peak then shifts to say fifteen millimeters in November, that would be a modal progression and something that could be used in a length frequency analysis to estimate the von Bertalannfy growth parameters that are used in the stock assessment models.

Now, whether we can successfully do this or not has yet to be determined, and this workgroup was mostly developed as a data-mining group, in order to try and update those life history parameter inputs, as I mentioned.

Finally, to understand any spatial and temporal deviations in catchability for Objective 3, I am also plotting these distributions by bay and across years, to try to identify changes over smaller spatial and temporal scales, and, since I developed this presentation, about a month ago, I have actually worked through all four state survey datasets, in order to develop the length frequencies for each state, and, last week, I also derived the mode of the density functions, both monthly and the mean mode across all years sampled for each state, and so

the next phase will be the length frequency analysis.

I can tell you, at least on an annual average scale, it's looking like this will be a successful venture, and, not only that, but I've learned a lot about penaeid shrimp recruitment timing, which, based on the state survey data, actually deviates slightly from what is found in the literature, and I think that, most of all, really highlights the importance of working with our state partners and colleagues to expand our knowledgebase, and also our data limitations at the Center, whenever it's possible. This working group has really been quite useful for me so far, as I begin thinking about future stock assessment model improvements.

The fourth working group to update you on is the Shrimp Catch Estimation Working Group, and this one was led by Dr. Dave Gloeckner at the Center. This working group has actually concluded, and the final working group report should be included in the meeting materials for you today.

There were four objectives for this working group, and those are to, one, revisit the value stream mapping process for shrimp data, and, if you're unfamiliar, the value stream mapping is just an outline of the data processing at the Center for trip ticket and Gulf shrimp data.

The second objective was to work with the Office of Science and Technology to alter the due date for the Fisheries of the U.S. publication. The third objective was to update the commission participants about the need for more timely shrimp landings information, and the fourth was to hold a data workshop to assess the best source of landings information for use in management.

As I mentioned, all objectives for this working group happened, and you can refer to the final working group report for specific details, but, to summarize here, the working group met in September of 2020 to discuss shrimp data collection processes at the Center, and, at the time, the working group deemed that port agent data collection is actually duplicative to the mandatory state trip ticket data collection, and so, therefore, the working group concluded that the trip tickets are the most complete source of landings data for shrimp.

Now, although trip tickets are the most complete source of landings data, there are still remaining quality and timeliness issues with this data source, and so the primary timeliness issue is that data is often received at a three-month lag for

shrimp, and the primary quality issues are that the vessel ID and the shrimp size fields are not being consistently recorded. Both of these fields are needed to adequately meet shrimp reporting requirements.

We think that these data quality and timeliness issues could be improved by adding Gulf shrimp dealers to the Gulf and South Atlantic dealer permit, which would require weekly reporting.

As a path toward making improvements, the Shrimp Catch Estimation Working Group, led by Dr. Gloeckner, presented the timeliness and quality issues at the Gulf States Data Management meeting in September of last year, and, at the time, the Gulf state reps agreed to work with us to reduce the tag lag from three months down to two months, or to work with us to develop estimation methods for any incomplete data.

Getting to the future, with Dr. Gloeckner taking us there, based on my picture there, all shrimp assessments and analytical outputs will be based on state trip ticket data, moving forward, and the National Marine Fisheries Service will continue to improve data quality and timeliness issues, as they continue to improve the shrimp data estimation and collection programs at the Center.

The fifth and final working group to update you all is the Shrimp Bycatch Estimation Working Group, and this working group has two primary objectives, and so the first is to review the draft report from the 2017 workshop, to evaluate data inputs and methods for estimating reef fish bycatch in the Gulf shrimp fishery, and the second is to develop best practice guidance, documenting, and justifying any revisions to the previous working group's recommendations and conclusions, as needed.

Regarding Objective 1 to review the draft bycatch estimation report, the working group has made use of the expertise of the working group participants, during several two-hour webinars, and they have successfully accomplished reviewing the bycatch estimation data inputs and methods from that 2017 workshop report.

The working group participants generally agreed that both the current bycatch model and data inputs need to be more fully evaluated, and so, therefore, the larger working group split into smaller, more focused sub-working groups, which include a model evaluation sub-working group, led by Dr. Xinsheng at the Center, and a data input sub-working group that I am co-leading. These sub-working groups intend to report back to the whole

working group periodically.

Some key findings by the Bycatch Estimation Working Group so far include that the quality of catch data may vary by species, and so, for example, with gray triggerfish, the data shows that observers have been recording these as finfish, rather than to the species level, and that, of course, is problematic for bycatch estimation.

Another documented concern is that it may be more practical to divide the full observer time series of data into two to three distinct periods, so that these time periods could be treated differently in the bycatch estimation model. Also, the working group participants have generally agreed that the SEAMAP data should only be used for the time period where observer coverage is lacking. The reason for excluding the SEAMAP data in the more recent years is to reduce any potential bias with the years where there is more observer coverage.

Also, the bycatch model appears to be sensitive to some priors, and working group participants felt that this may be a result of the model trying to estimate too many parameters for rare and data-poor species. More recently, the bycatch model sub-working group determined that the bycatch model needs to go through a more detailed technical review than what the current sub-working group has the ability to do, and the data sub-working group has completed a thorough investigation of all data inputs and assumptions into the bycatch model, and we're now evaluating whether it's actually appropriate to estimate bycatch using catch information from the observer program and shrimp effort estimates coming from the fishery.

In reference to the second objective, overall, the Shrimp Bycatch Estimation Working Group is progressing, though slowly, towards the second objective, which is to develop best practice guidance for shrimp bycatch estimation. However, the sub-working group leads have informed Center leadership of the need for a dedicated bycatch analyst to help progress this effort more effectively, but, until someone is brought on, the sub-working groups will continue to make progress, as time permits, and then update the whole working group periodically.

That was a lot to update you on, and hopefully you all found it as exciting as I did, and I just want to thank you all sincerely for listening to these exciting updates, and, also, I want to say a special thanks to everyone who is involved in these shrimp working groups. They have been extremely informative, and definitely highly productive, and so, with that, I open the

floor to any questions or discussion.

CHAIRMAN LORENZEN: Thank you, Michelle, for that tour du force, and it's great to see so much collaborative review and so much innovation in the shrimp area. Are there comments or questions to Michelle? Jim.

DR. NANCE: Thank you. Michelle, I appreciate the presentation, and I appreciate being able to be on some of those working groups, and I really feel very comfortable with what's being done for the SEAMAP, and I feel like it's a great index for the estimation of shrimp abundance and things, and I appreciate being able to sit there and listen to how it's being done, and I think it's a very good start there.

Also, I hope we can get, with the shrimp catch, getting to where we're able to get that catch data in a more timely manner. You know, that two-year timeframe certainly needs to be updated, so we can get a better indication of what the shrimp catch is, but I appreciate being on those working groups, and thanks for the presentation.

DR. MASI: Thank you, Dr. Nance. Yes, I agree.

CHAIRMAN LORENZEN: Any other questions or feedback? Leann.

MS. BOSARGE: Thank you, Mr. Chairman. First, a kudos to Dr. Masi, and you've done a great job with all those working groups and populating them and logistically getting everybody on the same page and pointed in the same direction and spearheading some discussion, and I think it's been great.

I think there's an amazing transfer of knowledge that is happening, in addition to the other objectives that you mentioned for each of the shrimp working groups, and I mentioned this during the Shrimp AP meeting, but this is actually probably the more appropriate venue to mention it, and so I will just mention it again, Michelle, but I'm hoping that, when you get a little closer to wrapping up, at least four of the five working groups, that maybe we could have a presentation where all the different workgroups are able to participate and listen in to the findings of each of the individual ones, more of a holistic, thirty-thousand-foot view, for the participants that may have been on some workgroups, but not on others, because, as you know, each of these different workgroups is dealing with something that really is interconnected, in some fashion or another, with another workgroup, and so it all sort of comingles together.

I hope that you'll be able to make time to have that larger meeting, and I don't think it will be completely overwhelmingly, from a participant level, because a lot of the participants do overlap between the workgroups, and so I just hope that you can do that, and I think it would be great. Thanks.

DR. MASI: Just to respond to Ms. Bosarge, she did mention that at the Shrimp AP, and I am planning to do that, and so thank you again for mentioning it here.

CHAIRMAN LORENZEN: Thank you both. Cam.

DR. AINSWORTH: Michelle, I'm sorry if you've already explained this, but what is the best -- I would like to learn more about the bycatch model, and is there a technical publication that you can direct me to?

DR. MASI: Yes, and I don't know if there's anything available to the public, but I might be able to share something with you after I speak with my supervisor, and so let me get back to you personally on that one.

DR. AINSWORTH: Thanks.

CHAIRMAN LORENZEN: Thank you. Harry.

MR. BLANCHET: Thank you, Mr. Chairman. I had a question about the -- So you made a point about suggesting that the Gulf shrimp dealers might be added to a Gulf and South Atlantic weekly reporting permit, and my concern, from the state perspective, is that we then end up with dealers that are double, or in some cases triple, reporting catch, and I am not sure -- I have certainly seen a reluctance, among some of the dealers, to give both -- To do that kind of effort, and so I would like to see what is the real benefit, in terms of adding them to that permit system, versus the issues with adding them to that permit system, just because of that double-reporting type of a thing, adding confusion to the system.

DR. MASI: Thank you, Mr. Blanchet, and so I just want to comment that, of course, we wouldn't be able to do that with any council action, and, also, I think, from what I am hearing, the benefit would just be that we would get that information more timeline, and I think a lot, or most, of the species are reported weekly, whereas shrimp is a monthly reporting requirement, and so being under that Gulf and South Atlantic permit would just require that weekly reporting.

I think that's sort of the benefit. Given that we are actually reporting on shrimp on each year, having the data coming in more timely would be really beneficial, but, also, being able to ping people, when they don't provide the information that we need for reporting, like the things that I mentioned, would be something that would be able to be handled with a dealer permit in place.

MR. BLANCHET: I am concerned about the data quality versus the timeliness, because there's always a tradeoff, and it seems like there's more of a tradeoff here than normal.

DR. MASI: Yes, I appreciate that concern, and it's something that we'll definitely discuss internally, but, again, there's no decision being made here today on that.

CHAIRMAN LORENZEN: Thank you. Any other questions or comments on this? If not, I suggest we move on to the royal red index, and so we're staying with the shrimp topic.

REVIEW OF GULF ROYAL RED SHRIMP INDEX

DR. MASI: Thanks, and so now I'm going to be presenting the 2019 royal red shrimp index-based assessment. This figure shows the trend in royal red landings by year since 1962, and, in this figure, the confidential years are excluded, and so recall that an ACL for royal red was established in 2011, and that's at 337,000 pounds of tails, and that corresponds to the year in the time series with the highest level of landings on record, which is shown here as 1994, with the landings in recent years approximating the annual landings that we saw in the earlier part of this time series.

Just to try to give you a little bit more information, given that confidentiality issue, this figure is showing the same royal red landings trend as the previous slide, but, here, the confidential years are shown as the mean landings over the span of confidential years for those two different periods, and the legend there shows what those periods are, but, just to explain, it's the mean landings over 2002 to 2004, and the mean landings between 2013 to 2019 are those essentially flat horizontal lines there.

We are just trying to come up with a more effective way to show this trend, but it is difficult, given that it's a small fishery, and we run into data confidentiality issues in the recent years, and that's the end of this presentation, and so I will open the floor to any questions.

CHAIRMAN LORENZEN: Thank you. That was quick. Are there questions or comments? Bob.

MR. GILL: Thank you, Mr. Chairman. As Michelle and others know, I have issues with this presentation, and my basic issue is that it provides very little information, and not enough, for example, for a discussion, much less a decision, and I do understand that we're not here for decision-making on royal reds today, but the previous version of the briefing book document showed from 1994 to present, and I would argue that that's potentially even misleading, which is perhaps the reason it went back to 1962 in the current version, but, nevertheless, you can see, from the slides we saw, that, from 1994 down, there's a pretty consistent downward trend in royal red landings.

There are those who would conclude from that that, uh-oh, the stock is in trouble here, and we can't catch the shrimp, and we haven't hit the ACL for a long time, and we've got a shrimp stock problem, and, well, I would argue that, number one, given what's presented, we know nothing about stock status, and, therefore, we know -- We can draw no conclusions about ABC, or ACL, and I guess that's where this is headed, in terms of the council, and what's missing is the context.

It's the other factors that are driving those landings, and, in this case, in my mind, a major portion of that is socioeconomic, and there is no information that we have in this presentation relative to that, and, yet, that is vital to understanding what we're seeing, and there's a number of things that could be utilized, and I don't need to get into those, but I think a one-sided, one-dimensional presentation such as this is not helpful, and it allows -- No, it drives people to misunderstanding what's going on.

I would suggest that, if this presentation is intended to go to the council at their June meeting, that it be provided with the contextual elements that help the council understand what's going on with this fishery, so that any discussions relative to ACL can be given some basis, which is not currently present.

I would argue, as it stands, that the ACL cannot be derived from this, on any basis at all, and so I think we're missing a whole lot here, and I frankly am quite surprised, coming from the Science Center, but, without that context, what we're seeing is not helpful. Thank you.

CHAIRMAN LORENZEN: Thank you, Bob. Paul.

DR. SAMMARCO: Thank you for that presentation. It was very interesting, and I would echo some of the points that Dr. Gill has brought up, and they're very good, and I guess a couple of things. The ACL, basically how is it set? Is it simply set by the largest limit, the largest catch, identified for that period of time, sort of a convenient thing, because I'm not sure that that's the way to go for that, and, obviously, the population has a high variability, or at least the catch does.

It seems to me that it's very interesting data, but there appears to be a lot more analysis that needs to be done on it, and maybe that ACL needs to be revised, particularly for today, but I guess the primary question is how was it arrived at, if you know, back in the day? Thank you.

DR. MASI: If I can just respond really quickly, before Shannon or Katie go, I just want to say that, first of all, recall that the only information that we have, besides landings, from this fishery is from ELB data, and we have ELBs on only about a third of the vessels, and so the number of ELBs that we have on vessels that were fishing just royal red are going to be pretty limited, and probably, most likely, not very representative of the actual effort for this fishery.

We run into a lot of data confidentiality issues, given the fact that is a small fishery, and you can see that I had to exclude some of the years, and so, when we start to think about the socioeconomic data, and providing information like that, you're going to run into those similar issues, and so those are just some things that I would suggest keeping in mind as we talk about providing more information on the fishery.

To answer the question, yes, the ACL was set on just the highest level of landings over the time series, given just a lack of data for this fishery.

CHAIRMAN LORENZEN: Thank you. Shannon.

DR. CALAY: Thanks, Kai. I am going to defer to Katie.

CHAIRMAN LORENZEN: Katie.

DR. SIEGFRIED: Thanks, Kai, and thanks, Shannon. I appreciate your comments, Bob and Paul, about the presentation that you received. I did talk with you, Bob, a little bit offline about some of these concerns, so that the Center could address them, when time permits and when staffing permits.

One of the things I wanted to make clear, with what we provided here, is we were trying to adhere to the scope of work, which specifically requests what Michelle showed, which is comparing the royal red index to the ACL, and we weren't tasked with anything else, and we would need to set up a time to work with the sociologists and economists to address questions, given we knew what the questions were, and so, with a fishery where the highest catch is the metric for the ACL, what other things would we be tasked to look at, and then would we have the staff to do this?

I mean, as you see, Michelle has already presented on four species of shrimp, and we can't have one analyst in charge of all things shrimp, and so, if we can get a better handle on what the council wants the SSC to review, then we would be able to let you know if we could prepare those data and those analyses and by what time. Thanks.

CHAIRMAN LORENZEN: Thank you. Mike.

DR. MIKE TRAVIS: I wanted to add a little bit more into what Michelle said earlier about the difficulties that we're likely going to run into in trying to provide the additional information that Bob and others are looking for.

It's not that we wouldn't want to provide that information, but, again, we're going to run into small number confidentiality issues quite a bit in this case. In addition to what Michelle said, keep in mind that the ELB sampling program is not stratified in any way to specifically target the royal red component of the fishery. Similarly, when we do our economic surveys for the shrimp fishery, we do not stratify specifically for the royal red shrimp fishery.

Even if we did that, based on those vessels that have endorsements, I don't think that that would help matters at all, because we typically have more than 300 vessels that have endorsements, but, in any given year, you've got six or fewer vessels in the fishery, and so you still may miss them, and, in our case, with the economic surveys, we're generally only sampling 20 or 25 percent of the permitted vessels in any given year, and so I don't want to say that we can't provide anything, but I think what we may be able to provide is going to be very constrained, because of small numbers and the sampling.

CHAIRMAN LORENZEN: Thank you. Are there more comments? I will say that I sort of share Mr. Gill's concern about using this for

the ACL setting, but I also can't see a good way forward for that at the moment, and any bright ideas are welcome. Paul.

DR. SAMMARCO: Thank you, Mr. Chair. Just a brief comment, sort of to tag on. It should be evident, partially, from the landings, the comparative landings, of the royal versus the more shallow-water shrimp, that these populations are probably smaller than those on the shelf. If so, they may be more sensitive to take, to catch, and I was just wondering whether they are treated in such a way in the analyses or by the institution. Thank you.

CHAIRMAN LORENZEN: Thank you. Leann.

MS. BOSARGE: Thank you, Mr. Chairman. I think there might could be a few pieces of information that could be pulled together fairly easily, without a whole lot of staff time, that could be helpful in understanding these graphs a little bit better, and so Dr. Travis went over some of the difficulties in trying to pull out these numbers on royal reds.

However, we should be able to see the permits that are landing royal reds each year. I mean, you have royal red landings, and you should be able to at least come up, I would think, with the number of boats that landed them that year. Now, what the whole universe is, well, that's harder to say, but, if you can at least track that, well, we have two boats that landed royal red that year, and we had seven that landed the other year, that may help explain some of your fluctuations, because this is a very small fishery, and a small number of participants.

Then the other thing is just simply tracking -- As we know, imports are a big deal in the shrimp industry, and, depending on the species and what period in time you're looking at, it can most definitely drive some of the trends that you see in the shrimp fishery, and the same goes for royal reds.

I'm sure everybody has seen the Argentine red shrimp. Well, that's essentially the competition for our domestic wild-caught royal reds, and so I just, briefly, went on Google and looked up some prices, and I saw the Argentine shrimp at about $13 a pounds and the domestic shrimp at $24 a pound, and, of course, the different sizes, and so there can be discrepancy in the prices, which can drive consumers to pick one over the other, right, which can drive the fishery to prosecute that fishery harder or not as hard in a given year, right?

I think that we need to maybe just follow some of those prices

that can generally be found online, and not any huge data-mining effort, but just track something across time, to give a little more perspective, because, as Bob said, there are a lot of socioeconomic factors that drive this fishery, more so than others. Thank you.

CHAIRMAN LORENZEN: Okay. Well, it seems that, unless there are -- Mike.

DR. TRAVIS: I just wanted to comment back on what Leann said, because we had thought about that as well. Again, one of the problems with the import data is that, unfortunately, we cannot -- We don't have the ability to look specifically at the red shrimp coming out of Argentina in our important data, which is, presumably, the species that is competing most directly with royal reds in the Southeast, and so I wish we had that ability, but, unless I'm not aware of something, it's just not broken down to that specific species.

CHAIRMAN LORENZEN: Thank you, Mike. Well, what I suggest is we will summarize this feedback, with respect to the royal red index and its use for ACL setting. Unless there are further comments, I think we can leave this subject, and my suggestion is to have the lunch break now, as scheduled, and then do the last item for this morning, the participant solicitation for SEDAR 74, right after the lunchbreak, and the reason is, although it's a relatively short item, I think we should have time to have a little bit of discussion there, because it's a very important assessment, clearly, and so, unless there are any objections, I would say we should recess for lunch and come back at 1:00 p.m. Eastern. Thank you.

(Whereupon, the meeting recessed for lunch on May 3, 2021.)

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May 3, 2021

MONDAY AFTERNOON SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Special Mackerel, Special Shrimp, Special Socioeconomic & Special Ecosystem Scientific and Statistical Committees reconvened via webinar on Monday afternoon, May 3, 2021, and was called to order by Acting Chairman Kai Lorenzen.

CHAIRMAN LORENZEN: Good afternoon. Let's get going, and so our next topic is the solicitation of volunteers for SEDAR 74, and so that's the red snapper research track assessment, and I wanted to preface that, briefly, because what this is, of course is, I guess, the first research track assessment for red snapper in the Gulf, but also it's where integration of the Great Red Snapper Count information and all the other information we have previously used in assessments is meant to happen.

Reflecting on the discussions we've had about that topic over the last few weeks, it seems to me that it would be good to -- As we assemble the assessment development team here, and the members for workshops, to think about having a representative group, in terms of the diversity of views that were expressed over the last few weeks, but, also, thinking about the fact that this will require some innovation, in terms of the assessment modeling and the use of that information, and I think, also, it would be good to have representation from people, particularly on the assessment development team, who are assessment modelers and not necessarily experts on red snapper, and so that's just some broad thoughts about this.

With that, shall we have -- I see some hands up already, and so maybe we can have those, Benny and Jason's comments, and then I will pass it over to you, Ryan, to get into the meat, and does that make sense?

MR. RINDONE: If that's your pleasure.

CHAIRMAN LORENZEN: Okay. Benny.

SEDAR 74 PARTICIPANT SOLICITATION

DR. GALLAWAY: My request was honored, and I've been unmuted, but I do volunteer for the data workshop panel. Thanks.

CHAIRMAN LORENZEN: Okay. Jason, is that also volunteering?

MR. ADRIANCE: Yes, Mr. Chair. That was volunteering for the data workshop.

CHAIRMAN LORENZEN: Okay. So we have two volunteers already for the data workshop, but I will pass it back to Ryan to go through the motions, but it's not only the data workshop, but it's the ADT as well that we're looking at, right?

MR. RINDONE: That's correct. The assessment development team

is kind of like the sheepdog for this assessment process, and so the ADT would be a part of the assessment from now all the way through the end of the review workshop, and they would oversee the development and make a lot of the decisions that are necessary along the way to move the assessment process forward.

The data workshop panel, as many of you are familiar, evaluates all the data that are considered for the assessment, prior to them being incorporated into the model, and, like Dr. Lorenzen had stated, there's a lot of new stuff coming out for our most data-rich species, including the Great Red Snapper Count, and we have the data that Dr. Gallaway's group is working on for Louisiana that are pending, and many other things that are being considered for this assessment, like the state survey information for the recreational data collection for the private vessels for red snapper.

The data workshop is going to be a big lift, and it's going to be really interesting to see how all these data can integrate into the model. Jess, do we have the memo with the schedule and all that? There we go.

We do get a fair number of appointees here, and the Assessment Development Team will be composed of five people, and, again, this is -- The Assessment Development Team is the biggest time commitment, because you're expected to be involved throughout the research track process, which carries through 2023. The data workshop panel will be comprised of the Assessment Development Team, and, again they're participants in all of it, plus the fifteen participants that will be comprised of SSC members, AP members, state data folks, other academics, et cetera.

When you're thinking about for which you're going to volun-told yourself, keep that all in mind, and the data workshop, right now, is scheduled to be in person in New Orleans from November 1st through the 5th, and appointees to the data workshop panel will have their travel and meals and whatnot covered by SEDAR. Mr. Chair.

CHAIRMAN LORENZEN: Thank you, Ryan. So we're looking for, I guess, volunteers for both, right, the ADT and the data workshop panel?

MR. RINDONE: That's correct.

CHAIRMAN LORENZEN: So let's start with the ADT, and so that's the big commitment, the biggest of many big commitments, here.

Luiz, is that a volunteering?

DR. BARBIERI: Yes, Mr. Chairman. I am volunteering to participate in the ADT.

CHAIRMAN LORENZEN: Thank you. We need at least four more. Will Patterson.

DR. PATTERSON: There is your second volunteer.

CHAIRMAN LORENZEN: Great. Jim Nance.

DR. NANCE: Yes, sir.

CHAIRMAN LORENZEN: Are you volunteering?

DR. NANCE: Yes.

CHAIRMAN LORENZEN: Thank you, as is Dave Chagaris, I presume.

DR. CHAGARIS: That is correct, yes.

CHAIRMAN LORENZEN: Great. That would be good. I will also volunteer myself.

MR. RINDONE: Mr. Chair, if there is anyone else that would wish to volunteer, and I know sometimes people's logistics make things difficult for them to continue to participate, and this is a multiyear commitment here, and so, if there's anyone else that would like to volunteer, please don't be shy.

CHAIRMAN LORENZEN: Yes, please, and I guess what you're saying, Ryan, is, even if you can't volunteer right now, send us a note, and we'll add you to the list?

MR. RINDONE: Yes, just because sometimes -- Again, this is 2021, not quite halfway through 2021, and we expect this to carry through 2023, and so, in the event that someone is no longer able to participate, it would be -- The council would certainly appreciate having an additional name or two held in reserve, if someone needs to step back.

CHAIRMAN LORENZEN: Correct.

DR. GALLAWAY: I volunteer as a reserve for the ADT.

CHAIRMAN LORENZEN: Great. Thank you. Okay. I guess then we can move to the data workshop, and I know you already had a very

long list of potential volunteers for the data workshop, and, given the -- How many volunteers are we looking for for the data workshop?

MR. RINDONE: Ultimately, the council SEDAR process will determine the makeup of the portion of the SSC, the AP, and other data providers, but we have fifteen slots that will be funded by SEDAR for travel and per diem, and this is -- Again, this is in addition to the ADT, and so, if you're on the ADT, then you don't need to also be on the data workshop panel, and you're kind of already included.

CHAIRMAN LORENZEN: Okay.

MR. RINDONE: I have Dr. Gallaway down on the data workshop panel, and so I will keep you there for now, Benny, and then I also have Jason Adriance on the data panel, for their previous saying that they would volunteer, and so, as many other SSC members as want to volunteer, please feel free to do so, and the council will ultimately populate that list.

CHAIRMAN LORENZEN: Okay, and so we will interpret shows of hands now as volunteering for the data panel, and, Will, obviously, assuming that you will be on the ADT, you will already be on the data panel.

DR. PATTERSON: Right, and I was just going to say that the ADT, as the volunteers came in for this, is pretty Florida-centric, and I'm not sure that matters at all, but it may matter to the council, and I don't know, and I think it would be important to have Sean or myself, or Judd, potentially, be part of the ADT, just because I think there are going to be questions about the Great Red Snapper Count methodology and data that come up throughout the process on the ADT, but, if somebody else wants to step up to the ADT, I would be happy just to do the data workshop, but, anyway, that's my two-cents there.

CHAIRMAN LORENZEN: Thanks, Will, and, yes, again, I think, if there are more volunteers for the ADT, please step forward, either now or send Ryan an email, and then the council will eventually populate that ADT. Okay. We have Judd. You're volunteering for the data workshop or the ADT?

DR. CURTIS: Thanks, Mr. Chair. Based on Will's comments, I'll put my name in the ring for a reserve member for the ADT, if it comes down to that, and then certainly for the data workshop, if not.

CHAIRMAN LORENZEN: Great. Thank you. Steven.

DR. SCYPHERS: I was going to volunteer for the data workshop, but I'm happy to help wherever I fit best.

CHAIRMAN LORENZEN: Great. Thank you. We still have relatively few data workshop volunteers here, and so, if anyone else feels so moved, let us know.

MR. RINDONE: Mr. Chair, one thing I wanted to add, just pointing to some things that are on the schedule, and so the data workshop is November 1st through 5th, but there are some data deadlines that SSC members and some people who are likely listening in will probably need to be made aware of, primarily that the deadline for unprocessed data, like length and age data, for the data workshop, is September 30, and the deadline for the recreational and commercial harvest data, like from MRIP and TIP, et cetera, is October 15, with all preliminary data products due to the analysts by October 29, and so just dates to make sure that folks have written down.

CHAIRMAN LORENZEN: Great. Thanks for that reminder, Ryan. Any more volunteers for the data workshop now, or, if not, send -- John.

MR. MARESKA: I will volunteer for the data workshop.

CHAIRMAN LORENZEN: Great. Thank you. Okay. I guess, if there are more -- Doug.

MR. GREGORY: Thank you. I'm not volunteering, but I do have a question that doesn't have to be answered today, but that is I'm familiar with the basic assessment workshop and the data being contributing, the length and weight and all that stuff, and catches and indices, and how is the Great Red Snapper Count data going to be presented?

Clearly, the assessment needs to look at more of the actual data than what we've seen to-date, and that may be a tall order to answer today, but it would be nice to get some feedback on how that's going to be integrated into the data workshop. Thank you.

CHAIRMAN LORENZEN: Thanks, Doug. I don't know if anyone, maybe from the Science Center, has a response for that, and I agree that it's maybe a tall order to do that in the context of the recruitment of participants here, but, if there is anybody that can illuminate that question.

MR. RINDONE: I can help a little bit, Mr. Chair.

CHAIRMAN LORENZEN: Okay. Thank you.

MR. RINDONE: As many of you are aware, when you're generating your information that you're going to submit to the SEDAR process, you generate working documents, and these tend to be subject specific, such as age frequency and reproduction and movement, for the serranids, and hermaphrodism, things like that.

The same will be true for the data for the Great Red Snapper Count, and those data will -- As they are worked up in more detail, ahead of their individual publications and manuscripts and whatnot, they will be submitted as working documents, just like all the rest of the data that are submitted to the SEDAR process, for SEDAR 74.

The finalized Great Red Snapper Count report will also be submitted as a reference document, since, at that point, that document will have been published, and further revision to it is not likely expected after its June publishing date, but all of the other data that went into the project, by region, et cetera, by all the different principal investigators, we fully expect there to be a lot of publication work coming out of that, and so that stuff would be expected to be submitted as working documents.

MR. GREGORY: Thank you.

CHAIRMAN LORENZEN: Thank you. Okay. I suggest, if there are further volunteers for the data workshop, get in touch with Ryan directly, and I think then that completes this agenda item, and we can move on to the grouper-tilefish and red snapper IFQ review.

MR. RINDONE: Mr. Chair, we have one more hand.

CHAIRMAN LORENZEN: Sorry. Leann.

MS. BOSARGE: Thank you, Mr. Chairman. I was just wondering, and I guess this will be for Ryan or Dr. Simmons, and so we just populated the SSC members that will be part of the various workgroup meetings during this assessment process, and when will we also populate the fishermen that usually participate in the assessment process and are at most of these meetings as well?

Since this is a research track, it's a little different schedule than what we're used to, and have we already made those appointments, or are we in the process? I just want to make sure that the fishermen are included in all the steps that they normally are included in, which, it's my understanding, it's usually the meetings that our SSC reps would attend for this particular SEDAR.

MR. RINDONE: Hi, Ms. Bosarge. We'll go through the same process that we always do for appointing everyone to these workshops, which, of course, does include the fishermen, and we tend to look to our advisory panel members and the other members of the SEDAR Technical Committee, which the list of those individuals is on the council's website, for we'll call it inspiration for people to ask to participate, and some people won't be able to, and so usually we have a pretty lengthy list that we work through with the Executive Director, Dr. Simmons, and with the Chair, Dr. Fraser, and recommendations for people come from other fishermen, from staff that work with these folks, and we'll have a very solid list, I'm certain, to put together of folks to recommend that are actively engaged in the fishery, in different sectors and capacities.

MS. BOSARGE: Thank you.

CHAIRMAN LORENZEN: Okay. I guess then we are ready to move to the IFQ review.

JOINT GROUPER-TILEFISH AND RED SNAPPER IFQ REVIEW

DR. ASSANE DIAGNE: Thank you, and good afternoon, all. We are going to present a joint review of the red snapper and grouper-tilefish IFQ programs that we have here in the Gulf, and, for our presentation today, you will have four presenters, and it is a combination of council staff, myself, and SERO staff, Alisha Gray and Mike Travis, and also Science Center staff, Akbar Marvasti. We will let Alisha, Ms. Gray, start us off, and then we will all play our part when the time comes.

This is a pretty lengthy presentation, and so, SSC members, if you have questions, feel free to raise your hand or stop the presenter and ask your question as we go. If you have remaining questions at the end, we will also address those. Thank you. Ms. Gray, if you would like to start.

MS. ALISHA GRAY: All right. Thank you, Assane. I'm Alisha Gray with SERO, and I'm going to walk us through roughly the first half of this presentation, and so let's dive right in.

The NMFS guidance for conducting reviews of catch share programs was published in April of 2017, and it requires that we review programs within the first five years and then every five to seven years thereafter. The review goal is to evaluate progress in meeting the goals and objectives of those programs, and it requires that specific elements of the program be analyzed.

The two individual fishing quota programs that we have in the Gulf are the red snapper IFQ, which was established in 2007, and the grouper-tilefish IFQ, which was established three years later in 2010. Both of those programs have already gone through their initial review, and we're currently doing a second, and now joint, review for both of them, and this review covers the time period of 2012 through 2018.

With the SSC and through those reviews, we identified program goals and objectives, and we're including both goals and objectives for both of those programs in this review, and those goals were to rationalize effort, eliminate derby fishing, reduce overcapacity of the fishing fleet to achieve and maintain optimum yield, and then, through those, the anticipated benefits were expected to be to increase market stability, eliminate season or quota closures, increase flexibility for fishing and improve safety-at-sea, as well as profitability for the commercial fishermen, to reduce discards and create cost-effective and enforceable management, and then, finally, to balance social, economic, and biologic aspects.

I am going to give you a little bit of background on the IFQ program, to give us the foundation before we dive into the data, and so the most basic principle to understand with the IFQ is how we divvy up the quota across the participants, and so there are the shares, and that is a percentage of the commercial quota, and all of those shares sum to 100 percent, and those are divided per share category.

Those shares will then equate out to annual pounds, and that's what is distributed to shareholders, and that's done at the beginning of the year, and based on the share percentages that are held within each of those accounts and on the quota. At the beginning of the year, those pounds are distributed and is what is used to harvest species, and those allocation which are not used will then expire at the end of the year.

This gives us a nice graphical example of how this works, and so, again, a share is a percentage, and each year there is a quota, and, when you multiply that quota by the share percent,

you get the actual pounds that that equates to, and so, for instance, if an account holds 1 percent of shares, and the quota was set at three million pounds that year, then the equivalent allocation would be 30,000 pounds.

If, following a stock assessment, that quota is reduced to, in this example, one million pounds, then that same 1 percent of shares would then equate out to only 10,000 pounds of shares, and so this is important to know.

I mentioned that these shares are relevant to the different share categories, and, across these two programs, we have six share categories. There is the red snapper IFQ, which has just the singular red snapper share category, and then grouper-tilefish is made up of multiple species across five different share categories, and those include the red grouper, gag, deepwater grouper, tilefish, and other shallow-water grouper share categories. As you can see, the bottom three share categories include multiple species.

Because this review includes 2012, I included the species that have since been removed, and they were removed in 2012, but, following, from here on out, we'll only be focusing on the ones that are still in the share categories.

Within the grouper-tilefish IFQ, we have flexibility and multiuse measures in place, and these are important, because it helps reduce discards in a program that has lots of co-existing species.

The first is the multiuse, and that is for red grouper and gag, and so, on quota release, a percentage of the gag or red grouper allocation is converted to multiuse, and that multiuse allocation can be used to land either gag or red grouper, and the way that we determine how much allocation is going to be proportioned out to the primary allocation, as opposed to the multiuse, is based on a percentage that we get out of a formula that uses the ACL and the quotas of the two species.

This helps us kind of visualize that concept, and so, at the top, you see the formula that was derived by the SSC in 2013, and the structure of this formula was created so that, regardless of how the multiuse allocation are used, neither the gag nor the red grouper ACLs will be exceeded, and so, in this specific example, gag being the secondary species, that difference between the ACL and the commercial quota is divided by the primary species, and then, of course, multiplied by 100, and that gives us our percentage of how we will portion out

multiuse from primary allocation.

To point out the graphic we have below, red grouper shares, the 100 percent, is going to be converted to allocation based on the quota, and then, using that formula, we're going to create the two different primary allocation and then the multiuse allocation, and, again, that goes for gag as well.

Another flexibility measure that we have, the example here is scamp, and it is primarily a shallow-water grouper, and that, in certain instances, can be landed as a deepwater grouper, or using the allocation of deepwater grouper, and, in the reverse, speckled hind and warsaw grouper, those are primarily deepwater grouper, but, in certain instances, they can be landed using shallow-water grouper allocation.

For these flexibilities, as well as the multiuse, the opportunity to use these flexibilities exists when the primary allocation has been exhausted within that account, and so, once all the primary allocation is exhausted, then the opportunity to use these measures takes place, and this is controlled by the system automatically and is done at the time of landing.

The first type of account that we have in the IFQ program is a shareholder account, and so these are each account that are held by unique entities or a combination of entities, and these accounts may hold shares and/or allocation, and they can also transfer shares and allocation, and these shares may also be associated with multiple vessel accounts, if they are associated with a permit, or multiple permits, and, in order to obtain these accounts, the participant must be a U.S. citizen or permanent resident alien.

The second type of account, which, again, is a sub-account of the shareholder account, are the vessel accounts, and so these accounts are related to a specific shareholder account, and the vessel permit name must match the names on the shareholder account exactly, in order for them to link, and the vessel account is what is used to land IFQ allocation. In order to do the landings, sufficient allocation must be in the vessel account prior to landing.

The final, and third, account in the IFQ program is the dealer account. These accounts must always be associated with a federal dealer permit, and these accounts are used to complete landing transactions, as well as collect and submit cost recovery fees, which are collected from fishermen, and, to be very clear, these accounts do not hold shares or allocation.

An important concept to know is that each shareholder account is held by a unique set of entities, and the first example is that an account may be held by a single individual or multiple individuals, and so an example here would be that John holds his own account, or John and Jane together hold an account.

The second example is that a single business, or multiple businesses, can also be named as an account holder, and so, for example, John LLC could be one account, and then a separate account could be John LLC and Jane LLC, and then the final combination that we sometimes do see is a combination of individuals and businesses, and so it could be John and John LLC hold an account together, and so these entities can be related across more than one account, and, when we collect -- When businesses open an account, we always collect down to the entity level as well, and this is important to know, because each of these accounts are seen as separate accounts, regardless of how much relatedness exists between them.

Once a participant has an account within the system, in order to go fishing, the way that they will do is they must first declare a fishing trip, prior to leaving, and they will do so via their VMS unit or via the VMS call service, and then, three to twenty-four hours in advance of landing, they must submit a landing notification, and that is done via their VMS unit, again, the IFQ website, or the SERO call service, which is 24/7.

Then, once they notify their intent of landing, they must then land at an approved location, and that location must be approved ahead of time, and then they can offload with an IFQ dealer between the hours of 6:00 a.m. and 6:00 p.m., and a dealer then must complete an IFQ landing transaction, either on the day of offload or within ninety-six hours of notification. Once that transaction is complete, the allocation will be deducted from the vessel account.

Now we're going to start talking about the review, and this is our first element, the data collection and reporting. The IFQ program uses an online electronic system through which all of the participants can report, and some of -- The website is used to complete transactions, including allocation and share transfers, landing notifications and transactions, the registration of new landing locations, and it's also where participants can view and pay cost recovery fees.

While going through this review, we were working to identify data gaps and areas of improvement, and one specifically that

was identified was in our collection of shares and allocation prices.

To begin, we collect -- At each share transfer, we collect the price, and it's reported by the transferer, and that was a mandatory reporting as of 2010, and so that encompasses the entire timeframe of this review, and, using an established methodology that was approved by the SSC, we identify which of those prices are within an expected range and what we will then consider a valid share price.

There is a number of reasons that we see some prices that are reported that we consider valid or not, and some of those reasons could be that there are sometimes misreporting, and so, for instance, a price per pound value is given, instead of a total value, or a decimal was misplaced, and then, also, sometimes we see that package deal values are provided, and so, for instance, when shares are being sold along with a permit, and then we get these values that are outside of the expected range.

Here, I am giving a proportion of the prices that we receive and how many of those we consider valid, and you can see that there's a lot of fluctuation throughout the years, and I am breaking it down by share category, and so, red grouper, interestingly, seems to do the best, but, overall, there's lots of fluctuation that goes between 30 and 70 percent, and so this is definitely an area that we see for improvement, and, possibly, we could do some more outreach to emphasize the importance of this data, and so it's an area that we're hoping that, with some time, we'll see improvement.

One of the things that we had done was, in 2013, to try to tease apart some of the reasons that we're seeing for these different price reporting, was we implemented that transfer reasons be incorporated into the share transfer process, and then that share transfer reason was mandated in 2015, and we'll talk about that shortly.

That was broken down by share category, and now I'm showing the percentage of share prices that are valid that we see across the program, and so you can see, across the program, that we're seeing a pretty similar story, with grouper-tilefish being maybe slightly higher than what we're seeing in red snapper, but that they're hovering in the 50 to 60 percent range, and you can also see that, just in general, there are a higher number of share transfers and valid share prices that we're seeing in grouper-tilefish, but that, of course, is because there are five share

categories, as opposed to just the singular red snapper.

Like I mentioned, to try to get at some of that room for improvement that we were hoping to work on, we incorporated the share transfer reasons into our transfer process, and some of the most frequently reported reasons that we were seeing was primarily sale to another shareholder, which we were expecting, but then it was followed by no comment, and so this wasn't helping with our valid share price reporting, and so, again, this is another area for improvement.

Then, following, the third most frequently reported transfer reason was transfer to a related account, and this is a concept that I want to touch upon really briefly, because it's going to become a recurring theme, and so we are aware that a lot of our accounts have a relatedness across other accounts.

This could be that they have entities in common, or it could be that businesses are cooperating, or it could be familial relations, but, even here, we're seeing that there is a relatedness that is happening between the accounts, and this is a data point that is very difficult to get at, because it's not data that we collect explicitly, and so it's something that is a very manual process, to identify how much relatedness is occurring between the accounts, and it's something that changes every year, and so, while I don't have any specific numbers or data to present here today, unfortunately, it's something that we're hoping to continue to investigate and analyze, and possibly even incorporate some data in for the document, in time for the council meeting, but I wanted to bring that up, because it's going to start showing up in some of the trends that we see in the future slides.

That was the grouper-tilefish that I was showing you, and now we're looking at red snapper specific and the reasons that we're seeing for these share transfers, and this paints the same story. The most commonly selected transfer reason is sale to another shareholder, followed by no comment, and the third most frequent is transfer to a related account.

We went through share transfers and transfer prices, and now we're going to go over allocation transfers, and we did a very similar process to identify allocation prices that we considered valid, and we want to point out here that there does seem to be an improving trend in the prices that we're getting, which is great to see, but it still is lower than we would like to see, and it's actually a bit lower than what we were seeing with share transfer prices, and so, here, you can see there is some

fluctuation, but it goes between 25 and, at best with red grouper, like 55 percent.

I also want to mention that these allocation transfers are between accounts, and these are not allocation transfers from the shareholder account to the vessel account, for instance.

That was the share categories broken down, and then, here again, we're going to look at them program-by-program, and you can just see, right off the bat, that there are just much more allocation transfers, as we would expect, but, again, here you can see that around like 40 to 50 percent of the prices are only those that we would consider within a valid range, and so, while we have room for improvement here, I do want to make a mention that, as of December 2020, and so very recently, we actually made allocation price reporting mandatory, and so hopefully that will also show some improvement, as a result of that.

Now to go into grouper-tilefish allocation transfer reasons, this was also incorporated in 2013 and then mandated in 2015, just as the share transfers were, and, here, unlike the share transfers, you can see that the most reported transfer reasons for allocation was no comment, and so this is an area where we definitely could see some improvement, and we're not getting a whole lot of data here. This could be a hesitancy to report, and so maybe some more outreach would be helpful here.

Following no comment, again, similar to the share transfer, transfer reasons was sale to another shareholder and transfer to a related account.

Then, here in the red snapper program, you can see, again, the same sort of story, with no comment being the most frequently reported, and then, again, the sale to another shareholder and transfer to a related account.

Now we're going to move into eligibility and participation, and so really look at the IFQ activity that we're seeing, and so people who wish to participate in the IFQ program must contact IFQ staff to obtain an account. For the first five years, a commercial reef fish permit was required to obtain a shareholder account.

The dealer accounts, however, require a federal dealer permit, and still require that federal dealer permit, in order to obtain a dealer account. However, for a shareholder account, after those first five years of each program, public participation was opened up, and then those accounts could be opened up by

submitting an application with all of the relevant information completed, and that includes name, address, birthdate, citizenship, and such. To be clear, in order to land, a permit is still required.

Now we're going to dive into the data that we get out of the program and then some of the trends that we're seeing, and so, to start, I broke down the accounts with shares and whether they were small, medium, or large, and, here, you can see that the majority of our accounts are considered small accounts, and that means is that they hold less than 0.05 percent of the shares, or within each account, and this makes sense, and is in line with what we saw previous to the IFQ program, because, at the beginning of the IFQ, the shares were distributed based on landing history.

One trend that you can also see here is that there has been a decreasing number of accounts that hold shares across all share categories, and that typically occurs in the small accounts, and that could be due to attrition, and it also could be that they were moving over into the medium-sized bin.

While that was all share categories, now we're looking at the program-by-program, and, here again, you can see that there are almost double the number of accounts in the grouper-tilefish, as opposed to the red snapper program, and this is just a result of there just being much more share categories in the grouper-tilefish program.

One analysis I did was to actually compare how many shares each account was holding and how many of them held multiple share categories, and so, here, you can see that the majority of accounts hold three to five different types of shares, and that could be any combination of share categories, and, typically, an account that holds -- Sorry. The fewest number of accounts that hold only one share category was always the lowest percentage, but, interestingly, we are seeing a trend that it's been increasing in time, and so this is a trend that we want to keep an eye on and continue to look at.

Part of the benefit of these accounts having multiple share categories was, as I mentioned before, a lot of the species co-exist, and so that can help with discarding.

While that last analysis -- I wasn't able to incorporate red snapper into it, unfortunately, in time for this meeting, but I do want to point out that the grouper-tilefish and red snapper programs have a very high degree of overlap, and, not only is it

a high degree, but it's been a growing overlap, and so, here, you can see that, in 2012, it started at 77 percent of vessels that were landing grouper-tilefish were also landing red snapper, and that has increased to almost 90 percent.

Here, we're looking at accounts with shares by permit status, and so these are all the share categories broken down, and you can see that the accounts that hold shares primarily also hold a permit, but we are seeing, over the course of time, that there does seem to be a declining amount of accounts with shares that are holding a permit, and, across all of the share categories, we're seeing a roughly 70 to 30 percent split.

Earlier, I mentioned that we have data that's suggesting that there is a relatedness, and we have done some preliminary analysis that suggested there is a high degree of relatedness between these accounts, and so I want to point that back out, that, while this does look like there is a disconnect of accounts with a permit and accounts with shares, that there is a lot of relatedness happening that can also help explain some of this, and so we're aware that, a lot of times, the shares are being separated from the account with the working vessel, and so this could be to separate assets, to remove those shares from that working vessel, or it could also be that an individual or businesses that hold multiple accounts are consolidating all of the shares into one account that may or may not hold a permit.

Here, we're looking at the grouper-tilefish program to the red snapper program, and you can see that they are pretty similar across the programs, and, again, it's a roughly 70/30 split.

We looked at shares, and now accounts with allocation, and so these numbers are higher, and so these are any accounts that either received allocation via shares or transferred allocation into the account, and so they touched allocation at some point in time, and I wanted to look specifically at how many accounts received at least a portion of their allocation via shares, and, here, you can see that the majority of accounts that held allocation received at least some of that allocation, via shares, but, again, there does seem to be a declining rate, and, over time, there seems to be accounts that are receiving their allocation from other sources, which would just be by transferring it in, but I want to remind us, again, that, as much as the story of the separation of the shares from the working vessel, that would also play out here.

As the shares are being moved away from the working vessel, that means, inherently, that the allocation will have to start moving

across more and more accounts, and then it will make that trend very similarly play out here.

Again, we're looking at program-by-program, and, here, you can see that there's a little bit of a difference here, where, just in general, grouper-tilefish has far more accounts than red snapper, again, because there's just much more share categories, but it also looks like grouper-tilefish -- There's a higher number of accounts receiving their allocation through shares, whereas red snapper is closer to 60 percent, which has been fairly consistent across that timeframe.

Now we're looking at the dealers in each of the programs, and so here, in grouper-tilefish, you can see the total number of dealers, and I broke them down by small, medium, and large, depending on how much of the landings they report, and you can see that there has been a very slow and gradual increase over time, and a lot of that increase occurs in the small bin, and what we are seeing, and also what we're hearing from the industry, is that a lot of fishermen and participants are becoming their own dealer, and so that plays out with that trend.

Here it is for the red snapper program, and it's a very similar story, where there's a slight increase in the number of dealers that we're seeing, and that is happening in the small bin, and so, again, participants are becoming their own dealer is a common reason for this trend.

Now we've talked about the number of share transfers and some of the prices that we're seeing, and so now we're going to talk about the volume of shares by permit status, and so here you can see that the amount of shares being transferred does still tend to be highest with accounts that also hold a permit, and, across the share categories, you can see that there is a roughly 80/20 split, with the exception of deepwater grouper, which is closer to 70/30, and then red snapper, which is also 70/30.

Here, we're seeing landings by share status, and so, again, a similar sort of trend, where, in 2012, you can see that the majority of landings were being done by accounts with shares, but there has been a declining proportion of accounts with shares that were doing the landings, and so this one is a little bit more pronounced, where now we're seeing a 50/50 split of the accounts landing that have or do not have shares, and this goes back, like all the other trends that we've been seeing, where there is some relatedness happening, where the shares are being split from the working vessel, and so the 50/50 split is pretty

consistent across all the share categories.

After that, I wanted to look at quota utilization across the share categories, and something I want to point out is that there are some share categories, like deepwater grouper and red snapper, where a lot of the quota is being landed, and then there are some other share categories, like red grouper, gag, and tilefish, where there is lots of fluctuation across the years, and, typically, that fluctuation is a response to a change in the quota, or sometimes catchability rates, and it can also be fishing behavior and market and stock status changes, and so there's a lot of things that can be going on that can affect how much of the quota is being landed.

One thing that I want to point out, specifically, is that, in 2016, red grouper had a very large increase in quota, and, before that time point, a lot of the red grouper quota was being landed, but, starting in 2016, with that quota increase, the red grouper quota went down that was being landed, and that's going to have an effect that we're going to see shortly, and just to note that the text that is in red designates that there was an in-season increase in the quota.

You can also see here that red snapper, interestingly, had lots of in-season changes, and those would specifically be increases, and, regardless of whether there was an increase, and whether it was towards the end of the year or not, they still were able to land most of the quota.

This is a comparison, again, between the programs, and, like I alluded to earlier, the red grouper -- That quota is quite a bit larger than the quota for the other share categories, and, with the increase in 2016, and then the declining utilization, we are seeing the trend of the grouper-tilefish quota being landed less and less, and, again, that was lowered in 2019, and so these values become very different, but, here, you can see that the red snapper is always nearly landed, and then the grouper-tilefish is a little less so, particularly during those years when the red grouper quota was particularly high.

That is some of the activity that we're seeing in allocation and shares, but I want to make a note that, within our system, we have some ownership caps, and so, for instance, we have the share cap, and that is for each category, where it's a maximum percentage of shares that can be held by any entity or account, and then, in the grouper-tilefish IFQ program, there is also an allocation cap that is across all categories.

The total amount of pounds that can be held at one point in time corresponds to the allocation equal to all share caps combined, and the reason we don't see this in the red snapper IFQ was simply because the red snapper was implemented before this was a requirement.

Now let's dig into some price data, and so, here, I'm giving the number of share transfers, and these are total share transfer numbers, and these are not just the ones that we considered valid or not, and then the average prices that we were seeing, and these average prices do -- They only include the valid prices, and they are inflation adjusted with 2018 as the base year. Here, you can see that there is some fluctuation that tends to be in response to quota changes and catchability, and you can see that red snapper typically is the highest.

Now, I can show you allocation and ex-vessel prices. Again, these are average annual prices that are inflation adjusted, with 2018 as the base year, and you can see the allocation price is always lower than the ex-vessel, and, as that margin becomes tighter, it will therefore become tighter for the fishermen, and so you can see that that is especially true in red snapper.

We looked at share transfers and the amount of those occurring, and, here, I wanted to point out allocation transfers, and so you can see that, for intuitive reasons, there's a lot more allocation transfers occurring, but I want to really point out that the percentage of quota, and so the amount of allocation being transferred, exceeds the quota, and so that means that these allocation are being transferred multiple times before being landed, and it's just something to see, that there's a lot of movement happening within the program for allocation.

Now we're moving into discards in the program, and so, here, you can see we did just gag, red grouper, and red snapper, and we identify, or we estimate, discard ratios by gear, because that seems to have the greatest effect, and, depending on the species, vertical line tends to have the lower discard ratio, as opposed to longline, but I want to caution, however, that these data are obtained from the reef fish observer program, and so this is a reef-fish-wide survey, and so it may not be totally reflective of IFQ specifically, and I also want to caution that sometimes the sample sizes are low, and so that's something to keep in mind when looking at these.

Then here are some of the discard reasons that are given for some of the IFQ species, and so, here, you can see that there are some species, like gag, where not legal size and other

regulations are reported pretty evenly, and other regulations -- In terms of IFQ species, they may likely refer to a lack of allocation, and so gag is pretty evenly split. Red grouper, and scamp, on the other hand, they tend to have not legal size, and it's the most commonly reported reason for discards, and then there are other species, like speckled hind, where it's the reverse, where other regulations, which, again, could refer to lack of allocation, is the most commonly reported discard reason.

Then I want to also caution that, again, this is a supplemental discard logbook, and so that is a reef-fish-wide survey, and this is not IFQ specific.

Now we're going to point out the multiuse for red grouper and gag, and so, in the upper table, you can see that's the proportion that was designated as multiuse for gag and red grouper, and you can see, in 2012 through 2014, there was no red grouper multiuse, and that was because gag was under a rebuilding plan, and then, in the table below, we broke out how much of that multiuse was used to land each of the species, and, in both instances of red grouper and gag multiuse, gag was the most commonly landed species, using both multiuse allocation, and that makes sense, because the red grouper allocation was much higher than gag, and so it was mostly used to land gag, in both instances.

We also reviewed monitoring and enforcement, and, here, I am giving the number of IFQ cases that enforcement handled and how many of those resulted in seizures of grouper-tilefish or red snapper species, and, as you can see, very few of the cases resulted in seizures, and they have been declining over time, and so to the point that, in 2017 and 2018, there were actually zero seizures, and then, as of June 2019, the Southeast Region summary settlement schedule added penalties for grouper-tilefish and red snapper IFQ-specific violations, and so that was an improvement in streamlining the enforcement of the programs, and that was an improvement that we were happy to see.

Then the final thing that I'm going to touch upon today is our cost recovery fees that we receive, and so, here, I have the aggregated expenses of 2010 to 2018, but a similar trend is seen across the years, and the bulk of the cost recovery fees are used for management of the program, and so labor, and that you can see in purple, and then enforcement was the second-most used for the cost recovery fees, and that you can see in the bright blue.

Then I want to also mention that, in 2019 and 2020, a good chunk of the fees that were submitted and collected were then used to modernize the IFQ system, and this was a very exciting modernization of the website, because it allowed us to push ourselves over onto a cloud-based system, so that we have fewer outages, due to the hurricanes, and it allowed us to improve some of our flexibilities, and so, for instance, we can report landings with prices, and it also allowed us to incorporate a new loan program module, so that we can -- For the loan program that we've established and connect accounts to those that hold loans.

That I all I'm going to cover today, and I believe we're going to move into the economics of it, and I believe that Mike Travis is going to take us through that.

DR. DIAGNE: Before Mike starts, just to ask whether SSC members have questions for Ms. Grey.

CHAIRMAN LORENZEN: Bob.

MR. GILL: Thank you, Mr. Chairman. Alisha, thank you for the presentation, and the data is rather overwhelming, but, on Slide 46, could you tell us what percentage of the expenses are covered by the 3 percent?

MS. GRAY: Thank you, Mr. Gill. This is just a percentage of how we use that 3 percent, and it's a breakdown of how it's used, and could you perhaps rephrase that for me, or repeat that, and maybe I can understand how exactly you want me to answer it?

MR. GILL: Well, the 3 percent is the max that can be charged for the management of the program, and the assumption is that, at this stage, it does not cover all the costs of the program, and so my question is directed at understanding a little better how much of the cost of the program does the 3 percent actually cover.

MS. GRAY: Okay. Thank you. I actually failed to mention, and so thank you for bringing this up, that the cost recovery does fully fund the IFQ program, including that we had the ability to modernize the system, using those funds.

MR. GILL: You blanked out there for a moment, and so I missed most of that response, if you could repeat it.

MS. GRAY: Sorry. The cost recovery does in fact fully fund the

IFQ program, including the labor, law enforcement, printing, supplies, and communication, and so it fully funds the program, and it also allowed us to modernize the system, and so I was saying that it's fully funding the program, yes.

CHAIRMAN LORENZEN: Thank you. Jim.

DR. NANCE: Thank you, Mr. Chairman. Thanks for the presentation. I've got just a quick question. On Slide 15, and others, but I see, in the percent of valid share prices, there is a large decrease in 2018, and several other slides, and 2018 seems to be an outlier, and can you explain what's happening there?

MS. GRAY: Thank you, Dr. Nance. I actually did notice that as well, and I looked into it, and the percentage of valid share prices did recover in 2019 and 2020, and they were in a much more expected range, and so 2018 did seem to be an interesting downturn during that specific year, and I believe some of that might be 2017, at the end of the year, was a very active hurricane season, and that was Irma and Harvey, and we did, in general, just have fewer share transfers in 2018, and so it could also be a little bit of a sample size, which could be just a reflection of the active hurricane season the year before.

DR. NANCE: Okay. Thank you.

CHAIRMAN LORENZEN: Walter.

DR. KEITHLY: Thank you for the presentation. It's a very ambitious amount of work that you've conducted, and it was raised this morning that these prices, share prices and allocation prices, contain some very valuable information, and you've done some work to try to only include the valid prices in your analysis, which I appreciate, because you have a lot of, as you said in the text, just transfers, and, in I believe it was 2013, you started giving seven categories or whatever of reasons for the transfers.

What you're interested in, on the prices, is just those that are conducted at an arms-length-type transfer price, and so, if you have gifts and some of those others, like no comment, which is oftentimes, at least on the shareholders, trying to avoid capital gains taxes, I would think, or some of them at least, and I don't know how prevalent that is, but have you looked at the prices just on the transfers from one shareholder to another shareholder? You may still have to do some trimming there, but it seems that would be the only valid category, where you had

actual, potentially, arms-length transfers, of all the categories that I saw. Thank you.

MS. GRAY: Thank you for that, Dr. Keithly. I might defer to some of our economists, to see if they have some specific comments to that point.

DR. DIAGNE: I will take a stab, and hopefully Mike or someone else will jump in, and that's a good point that Dr. Keithly is raising here, but, at the end of the day, even a transfer from one account to another account would not fully capture the fact that -- Let's say I could have an account, under my name, and then be part owner of an account that was established in the name of a corporation or an LLC, and we can have transfers.

Under what you are suggesting, that would be from one account to a different shareholder, because the two entities, or persons, if you would, would be different in name, but I would be part owner of the other one, and so that's an interesting avenue that we should explore in the future, but this is one of the challenges, really, of the program, to have a handle on the transactions.

You can think about it, I guess, as anything short of granting the agency the right of first refusal on these transactions would be lacking, when it comes to collecting the prices for these, and maybe Mike or somebody else would like to add to that.

DR. KEITHLY: Just as a follow-up, if you don't mind, Mr. Chairman, it's been years since I've worked on these transfers, and, when we were doing I guess the red snapper IFQ, and I can't remember the -- Or, in the analysis that I did, at the time, there were a couple of brokerage firms, and one of them sent me a large amount of data on the prices, the share price transfers, or the prices of shares that were transferred, as well as the allocation, and have you attempted to compare this data to what some brokers may have?

Again, I bring this up only because I do consider this to be, potentially, a very useful piece of information in the future, in terms of looking at the status of the stocks and all, based on the fact that, as described this morning, if dockside prices are going -- If dockside price is staying the same, yet the share, or allocation, prices are falling, that tells you that, potentially, if costs are staying the same, fuel costs and so forth, that tells you that there may be a declining catch per unit of effort. Thank you.

DR. DIAGNE: About the suggestion of the data held by brokerage organizations, if I could call it that, those typically are fairly limited, in terms of the sample size, at least if we consider the time interval that we are looking at for this review, but we are going to continue to look at other sources of information, to get a better handle on prices, because that's really one of our, I guess, major challenges, when it comes to the program, the two programs, the IFQs. Thanks.

CHAIRMAN LORENZEN: Thank you. Will, you're next, but I'm wondering though -- Are you -- Is your comment related to this, or is it separate, because it seems to me that maybe the next hands up are still related to the points that Walter Keithly brought up.

DR. PATTERSON: It's totally unrelated.

CHAIRMAN LORENZEN: So I will keep you in mind then, if there are direct follow-ups from here, and, Jessica and Andrew and Mike, feel free to go first. Jessica.

DR. JESSICA STEPHEN: I just wanted to comment too, along those lines of looking at the accounts. We did some preliminary analysis, looking at sort of the related accounts, which is kind of getting at the arms-length thing, and we did notice that, a lot of times, transfer to a related account was selected as a reason, yet there was no visible relation between those accounts, either by entities, even thinking all the way down to who owns a corporation, and so we still have that work to complete for the review, looking more into the related accounts, and that might hope to add some more information to this as well.

One of the things we also had, in the past, is we used to get some information from industry members as well, and I actually haven't gotten those in a couple of years, but, when we were getting it, it was coming in really close to what our average prices were, by the time we were done with those outlier techniques, and Mike Travis might have a little bit more to add to this.

DR. TRAVIS: I do, and so Walter is quite correct that we really want to be looking at prices in what the literature reviews to as arms-length transactions, and, theoretically, it's clear, and it's discussed in the literature, in a number of papers.

However, attempting to determine what is an arms-length

transaction, in practice, is not quite as easy as one might hope, because, thinking back to the example that Assane gave, you can have one particular individual being involved in two accounts, and so those accounts would be related, but they're still, potentially, distinct businesses, and that person may not have a major ownership share in both of them, or even one of them, and so, just because they're related, or the term I like to use is "affiliated", that may not mean it's not an arms-length transaction.

I think that we need to do more research into looking at the percentage of ownership, or the control of ownership, between these entities to determine which ones are actually affiliated and which ones are not, or I should say maybe strongly affiliated, to the point where, if they're strongly affiliated, it would not be an arms-length transfer, but, if they're not strongly affiliated, it could be, and so you're actually going to have a transfer of shares for money, or annual allocation for money, in those cases. It's going to require a lot of data digging, I think, before we can get a better handle on this.

CHAIRMAN LORENZEN: Thanks. Andrew, and then we'll get back to Will.

DR. ROPICKI: Mine was kind of unrelated, and so Will can go first.

CHAIRMAN LORENZEN: Okay. Thanks, Andrew. Will.

DR. PATTERSON: Thanks for the presentation, and it's really interesting information. As more on the biology side of things, we hear information about the IFQ fisheries and how they operate, but I think this is a really great synopsis of a lot of information. Some of it I couldn't follow as well as I would like, and there were some tables that maybe could have been figures, but, you know, that's just, I guess, personal preference.

I am curious about the tables on Slide 24. The way this is broken out by small, medium, and large, they're pretty broad ranges for each of these categories, and, I mean, the small ones, obviously, are quite small, less than 0.05 percent, but the large accounts, if this is greater than or equal to 1.5 percent, could be up to -- I think the highest was maybe 14 percent was the max for an individual shareholder, I think for tilefish, if I remember correctly, but, even for red snapper, the max is like 6 percent.

I'm curious if you have a distribution, and so let's just take deepwater grouper for 2018, and there were 344 shareholders. If you have a distribution that has, across the X-axis, the percentage is -- If you have it broken out here by 0.05 percent, and so you would have 200 categories along the X-axis, and then, along the Y-axis, the number of individuals, and it seems like we're missing some information here.

Given the percentages that an individual can actually have, as far as the total quota, for a lot of these, if the large shareholders had the full amount, then that's over 100 percent of the total quota, and so I'm just curious how concentrated the fishery is, as far as the shares among the shareholders, and then, also, how that has changed across time. Then, lastly, do you see the percentage of folks that are toward that upper bound -- Has that percentage changed among folks who have a license to fish?

I think, for red snapper, the breakdown was 70 percent have a reef fish license, and 30 percent do not. If, over time, you have seen that dynamic shift, where more folks that have that 30 percent are actually investing in the marketplace, so that their holdings are toward that 6 percent maximum, and so, anyway, lots of -- I guess that's three main questions that I asked, and I can break them apart one-by-one if you would like, but I'm curious if you have that information.

MS. GRAY: Thank you. The reason that these ranges seem very wide is because we were consolidating all of the share categories together, and that was just a way to do so, because, like you said, there is a very different share cap for each of the different share categories, and so, in order to define them all, this is how it played out the best.

In terms of consolidation of shares, I believe you said, we do have, in each share category, one or two, but mostly just one, person that has reached that share cap, but, otherwise -- Am I -- You mentioned a couple of questions, and so I think I've addressed at least two of them.

DR. PATTERSON: The first one was, and you answered that, the least common denominator, and this is the easiest way to put it all together in one set of tables. The second one was do you have -- Could you present distributions for each of these six IFQ fisheries that actually show what the breakdown is, as far as the percentage of shares, by participants?

Really, the idea is like how much of the fishery, for each of

these is held -- I am going to make this as easy as I can, and so, in 2018, there were eighteen shareholders in the deepwater grouper fishery that are the large category. What percentage of the fishery did those eighteen shareholders actually control?

MS. GRAY: That isn't something that we've really looked at. We do have a table in the annual report that could look at that, but it's something that we would have to kind of look into, and something that I can work out with you.

DR. PATTERSON: Okay. Then the second question is I'm curious, like over time, have you seen the concentration -- Like, maybe in 2012, for deepwater grouper, those fourteen folks that are in the large category, they only had, among them, like 20 percent of the fishery, but then you get to 2018, and the number grows to eighteen, but it's actually now 50 or 60 percent, and like do you see that kind of consolidation, and so the high-liners are purchasing more shares and controlling more of the fishery that way?

MS. GRAY: Again, I believe we have a table in the annual report that I would have to go look at, and I don't know it right off the top of my head, but I think Jessica or Assane might hopefully be able to speak to this a little bit more.

DR. STEPHEN: Alisha, I do have that for red snapper, and I can pull it up for grouper-tilefish next, but, if you look at red snapper, where we have the large shareholders, seventeen to nineteen of them, and, in general, they held around -- It was just under 50 percent of all the shares in the program, and is that what you were looking for?

DR. PATTERSON: Yes, and that 50 percent -- From 2012 to 2018, was that pretty consistent? Was there much shift in that?

DR. STEPHEN: No, there wasn't much shift, and so, in red snapper, they started off at 37, but, within that very first year, it jumped up to kind of 46 percent, and then it has differed between 46 to 49 percent for red snapper, and, if you give me a moment, I can probably pull grouper-tilefish too, if you're interested.

DR. PATTERSON: Okay. So, when you say the first year, that's back in the mid-2000s, was when it first went into place?

DR. STEPHEN: Yes, and it was 2007 for red snapper and 2010 for grouper-tilefish.

DR. PATTERSON: Okay, and then like the last question then was, of those folks, for red snapper, that seventeen to nineteen, are those generally the same fishers across time, or are you swapping out individuals and some of them have a license to harvest and others don't?

DR. STEPHEN: I'm going a little bit on memory here, but most of the red snapper guys are the same over time, and there are, occasionally, ones that come in and out, and we've had one or two, I think, major shareholders come out of the fishery, and that allowed someone else, probably, to move up towards that mark.

Then I do have -- The grouper-tilefish, I have it by different share categories, and so one thing to keep in mind with the large shareholders in the different grouper-tilefish categories is it does differ, and so deepwater grouper, for example, was anywhere between 40 to 57 percent, whereas, for gag, the large numbers were really more between 6 to 23 percent, and so of that is, I think, what you were talking about, how we had to kind of simplify small, medium, and large across all share categories that you get those differences, particularly with where the share caps are in those two different share categories.

Typically, what we've seen, in most of them, is that there's been slight increases, potentially, in the percentage of all shares held by the large share categories over time, and we could create the graph, or show you those two, in our annual reports, and they are listed in each report, the detailed information.

DR. PATTERSON: Okay. Great. Thanks.

CHAIRMAN LORENZEN: Assane, was that to the same topic?

DR. DIAGNE: Yes, Mr. Chair. Just very quickly, at the core of Dr. Patterson's questions, or, actually, one of the questions is the issue of market concentration in the share market and then, secondarily, in the allocation market, and we can continue also to think about concentration in the landings market.

Mike Travis is going to speak to that issue and use, I believe, concentration indices and talk about things of that nature, and so I just wanted to say that market concentration in the share market, as well as in the other markets, has been looked at by the team, and probably Mike would like to answer that. Thank you.

CHAIRMAN LORENZEN: Mike, on that topic?

DR. TRAVIS: Well, yes, and I will be talking about that shortly, but I wanted to offer another option that I have looked at in response to Will's comments, and so what Alisha has done here is looked at definitions of small, medium, and large within each share category, and it's also in terms of percentages.

I have done some work, and this is coming from an economist, where, if you are wanting to look at entities that are small, medium, and large within the IFQ programs in total, then what you do is you convert those shares into value estimates, based on the average share prices, and then you get total values of their shares by entity, and then you can look at the distribution and see which entities look to be large, medium, and small, based on -- There's an assortment of distributional analyses that you can do. Personally, I think that that's a more accurate representation of entity size, in terms of share ownership.

CHAIRMAN LORENZEN: Thank you. Will, does that answer your questions?

DR. PATTERSON: Yes, and I guess I jumped the gun, and I look forward to what Mike presents. From just what he said there, it seems like it's still categorical, instead of continuous, as far as the percentage of shares, and so, anyway, I look forward to hearing about it.

CHAIRMAN LORENZEN: Great. Andrew.

DR. ROPICKI: I guess I kind of have a two-part question. First, did I hear correctly about the fisheries finance program, and does it cover Gulf of Mexico IFQ purchases?

MS. GRAY: Yes, we have the loan program now, which can be used to purchase any IFQ structures or shares or permits, and it's through the NOAA Finance Office.

DR. ROPICKI: Okay. I would just say one other thing, and the NOAA website still only lists the Northwest halibut and sablefish and Alaskan crab fisheries as eligible online, but is there any chance, at some point, that the data on loan usage for IFQ share purchases and things like that might be made public, in an aggregated format, because I think there's valuable information.

MS. GRAY: Thank you. It is listed on our website specifically,

but I can definitely send you some more information, and it is something that is public, but we've only completed one loan thus far, and so it's still really new.

CHAIRMAN LORENZEN: Thank you. Seeing no other hands, let's move on to the economics part.

DR. TRAVIS: I am going to talk about three topics, and the first topic I want to talk about is the potential effect of IFQ programs on ex-vessel prices, or, actually, even broader than that, catch share programs on ex-vessel prices.

The theoretical literature has been around for a while that suggests that catch shares are expected to lead to an increase in ex-vessel price, holding all other things constant, but recent evidence, based on three studies, is rather mixed, in terms of whether that expectation will hold, and so the first study, which was done by Walter Keithly, who is on the SSC, was done for the grouper-tilefish program.

His results indicated that the grouper-tilefish IFQ program did not affect the ex-vessel prices of Gulf grouper species, likely because the race to fish, as we call it, and the related shortened seasons really did not exist, for the most part, for grouper species prior to implementation of the program.

However, he also found that ex-vessel prices have been more stable for grouper species since the program was implemented, compared to before the program's implementation, and that's probably because the landings have been more evenly distributed over time within the year, and so you're avoiding that market glut situation.

Contrary-wise, a group of academics and NMFS economists, and I will refer to this as the Birkenbach study, found that the red snapper IFQ program caused a statistically significant increase in the ex-vessel price of red snapper. Now, they also found that the magnitude of that increase was likely mitigated because of the shift to ten-day monthly mini-seasons in the years just prior to the program's implementation.

They also concluded that part of the ex-vessel price is probably due to the 30 percent reduction in the commercial quota that was implemented the same year as the program, and so now, like Keithly, the Birkenbach study also found that the grouper-tilefish IFQ program did not cause a statistically-significant increase in the ex-vessel price for any grouper-tilefish species. In fact, it found that the program caused a slight

decrease in the price of red grouper, ex-vessel price.

They also admitted that their findings may be confounded by the effects from the oil spill, and this has been a common theme for a lot of the grouper-tilefish research, because the grouper-tilefish program was implemented January 1, 2010, and then the oil spill kicked in on April 20 and lasted for several weeks, but here's what they found in a little bit more detail.

For four of the five grouper-tilefish species, there was an additional price increase following implementation of the program, but then there was a sharp reversal in prices after the oil spill began, and, based on some other research that was done, this was probably a response by consumers who had concerns over seafood contamination following the oil spill.

The Birkenbach study actually went beyond red snapper and grouper-tilefish and was a study across all U.S. catch share programs, and they found three primary general findings across all U.S. catch share programs. Now, I'm not saying that these findings are true in every case, but I'm just saying that they apply most of the time, and so the first general finding was that species that experienced an ex-vessel price increase were generally found to supply higher-value fresh product to markets that discouraged market gluts, and so, in those cases, the catch share program ended, or at least slowed, the race to fish, in those particular cases.

Second, for species that experienced an ex-vessel price decrease, the economic benefits from the catch share program accrued in the form of improvements in technical efficiency, in other words cost reductions, as the season length increased, and, third, for species that experienced basically no change in ex-vessel price, those were found to supply frozen or canned product markets, and so the timing of within-season landings apparently did not influence ex-vessel prices.

The third study was conducted by Frank Asche this past year, and he came up with six key findings, and so, similar to a study that I will talk more about later by Glen Mitchell in 2016, Frank determined that there is not a specific market for domestic red snapper, or rather the market is for all snapper species and product.

Second, the red snapper IFQ program did not lead to a shift in demand between snapper species or product. Third, the higher demand for red snapper that was noticed post-implementation of the program was caused by an increase in the total demand for

all snapper species and products.

Fourth, fresh and frozen imports, which are thought to be almost entirely red snapper, are good substitutes for domestic red snapper, but other domestic snappers are not found to be good substitutes for domestic red snapper.

Fifth, the demand for red snapper became less price sensitive, or more inelastic, after the IFQ program was implemented, and then, lastly, the red snapper IFQ program increased the red snapper ex-vessel price, and it also caused the ex-vessel price to be more stable across the year, and so the take-home messages are that the red snapper IFQ program did lead to an increase in ex-vessel price, but the grouper-tilefish program did not. However, both programs led to more stable prices within the year.

The second issue I'm going to talk about is market concentration and market power, and so, when we look at market concentration, the Herfindahl-Hirschman Index, or what I will call the HHI for short, is the most common metric that economists use to look at market concentration, and it is specifically used and recommended by the U.S. Department of Justice and the Federal Trade Commission, and its use has been approved in multiple court decisions.

We look at market concentration because concentration and competition are inversely related, and so, in other words, what we expect is that, as market concentration increases, competition will decline.

Now, the most key concept in these types of analyses is what we call market power. Market power is the ability of a firm, or firms, to increase prices above and restrict output, or production, below competitive levels, and, when a firm, or firms, have the ability to do that, that leads to losses in economic efficiency, and so, of course, economists don't like that.

Now, in terms of the markets that we looked at, we looked at the markets for landings, and we looked at the markets for quota shares and the markets for annual allocation, and, in these analyses, one of the most critical decisions is to establish the boundaries of the market, because previous research has shown that your results are going to vary, and sometimes significantly, depending on how you define the boundary of the market.

Now, it's most important here to -- In quota share and annual allocation, it's not quite so difficult, but, in the landings markets, it is difficult to determine the proper market boundary, and that is generally because it's difficult to determine which other products are considered good substitutes by consumers, and then, even after you do, you have to have data on those other good substitutes, and so this gets us into not just fish species, and not even just seafood, but potentially other protein sources, and, often, we have difficulty getting good, detailed data on other protein sources.

The Justice Department, and the Federal Trade Commission, have provided guidance on how to use and interpret the HHI. If you get an HHI that is above 2,500, that is considered a highly-concentrated market, and so these are the markets where we have the greatest concerns with market power being exercised and anti-competitive behavior.

If the HHI is between 1,500 and 2,500, the market is considered moderately concentrated, and so you might have some concerns with market power being exercised, and maybe some anti-competitive behavior. If the HHI is below 1,500, that's an unconcentrated market, and, generally, we would not have any concerns with market power being exercised, and the markets would be considered competitive.

Specifically, in our situation, the research has found that it's preferable to estimate the HHI at, and Alisha already referred to this term, at the lowest known entity level, rather than the IFQ account level, because the -- If you do it at the lowest known entity level, that will account for an entity's ownership across multiple IFQ accounts, and we have a number of entities that have ownership interest across multiple IFQ accounts, and so, if you were to measure the HHI at the IFQ account level, that would systematically underestimate market concentration and overestimate competition in the market.

Now, specifically for the landing markets, you can estimate HHI based on landings, or production, or revenue, and previous research has indicated that it is best, or most appropriate, to estimate the HHI based on revenue rather than production.

What have we found, in terms of market power determinations? Mitchell's analysis found that grouper-tilefish allocation, and the grouper-tilefish and red snapper share caps, do not limit landings. That shouldn't be overly surprising, because there are not caps on landings.

Some of the U.S. catch share programs do place caps on landings, and, as a result, what we found is that some entities possess market share in the landing markets that are above, and sometimes well above, the caps. We also found that the grouper-tilefish allocation cap does not constrain market concentration, and it really has no functional use, as far as we can ascertain.

Second, Mitchell and the NMFS economists found no evidence of market power in any of the landings, shares, or annual allocation markets in any of the share categories, as well as for all IFQ species and all reef fish species combined in the landings markets, and so what this means is that, at the lowest known entity level, the HHIs were all less than 1,500.

However, Mitchell, and I agree with him, concluded that the HHIs should be estimated at the affiliated entity level, as that most closely approximates the unit of independent economic control that is most suitable for market power analysis, and we say this not just because it's our conclusion, but that's been the conclusion in other similar analyses.

Affiliation exists when one business controls, or has the power to control, another, and so the problem with estimates at the lowest-known entity level is that they do not account for affiliation between entities, and, therefore, they underestimate market concentration and overestimate competition. We need to do more research into the data that we have to look at this, and we have started down that path, but we're just not quite there yet.

Mitchell also pointed out that our current estimates do not account for vertical integration, and vertical integration, one example of it, is where dealers and processors may also own, or control, shares and own harvesting operations, and so, in response to that criticism, NMFS recently began collecting ownership percentage data for dealers, to further investigate the issue. Again, we haven't been collecting it that long, and so we don't have the results yet.

The bottom line is that HHIs and market concentration that we currently estimate are likely underestimates of actual market concentration, and so, although we concluded that there doesn't appear to be any market power being exercised in any of these markets, we need to exercise some caution in that conclusion, until we look at the affiliation and the vertical integration issues.

The last topic that I'm going to discuss is measuring inequality

of distributions, and so the Gini coefficient is the most common metric that we use to look at inequality in distribution, and the range of the Gini coefficient is between zero and one, or zero percent and 100 percent, where zero indicates perfect equality, and so, when we have perfect equality, that means all entities have the same amount for whatever it is that you're measuring, and one indicates maximum inequality, and so, in that case, one entity would possess the entire amount of whatever it is you're measuring.

Now, somewhat unfortunately, there are no thresholds to determine whether a particular distribution is too unequal, similar to the thresholds that the Department of Justice and the FTC have established for the HHI, and so, often we evaluate the Gini coefficient and the distribution relative to other comparable distributions.

First, we looked at the Gini coefficients for shares, and the distribution of shares at the lowest known entity level is highly unequal in every share category, ranging from 0.78 to 0.9. Second, the Gini coefficients for shares were mostly stable between 2012 and 2018, in both share categories. However, the coefficients for red snapper and shallow-water grouper decreased by about 4.3 percent and 3.5 percent, respectively, during this time, and so those two distributions became slightly more equal during that time period.

In general, the distribution of shares are the most unequal in the deepwater grouper-tilefish and red snapper share categories, followed by red grouper, and then they are the least unequal for gag and shallow-water grouper.

Then we look at the Gini coefficients for landings and revenue, and so, for landings and revenue across all grouper-tilefish species combined, the Gini coefficient at the vessel level, and you can only look at this at the vessel level, increased by about 7 percent from 2012 to 2018, and so, although the distribution of landings and revenue in the grouper-tilefish IFQ program was already highly unequal at the vessel level, it has become even more so during this time period. In addition, most of this change was due to the distribution of red grouper, and particularly gag grouper landings, becoming more unequal after 2012.

When we looked at Gini coefficients at the lowest known entity level, they are about the same for both landings and revenue within each share category, with tilefish being the exception, and this actually relates to some research that was done by Jeff

Pulver and Jessica Stephen, and so I want to give that a plug, because I think it's an important piece of research.

What we found is that the Gini coefficient for tilefish revenue is noticeably higher than the Gini coefficient for tilefish landings, and that is because some entities are better at targeting fish that command a higher ex-vessel price, either due to the species, such as golden tilefish gets noticeably higher prices than blueline tilefish, or size, and so those entities end up controlling a higher percentage of the tilefish revenue than the amount of the tilefish landings that they control.

In addition, the Gini coefficients for revenue are higher at the lowest known entity level compared to the vessel level in each share category, and that result is expected, because multiple vessels can be, and are, owned by a single entity.

This is where we get into our comparative analysis, and so two colleagues of mine, Ayeisha Brinson and Eric Thunberg, did an analysis, and they looked at Gini coefficients across all U.S. programs, and they looked at more than that, but this is what is important here, and so they looked at Gini coefficients for the distribution of revenues at the vessel level across all U.S. catch share programs, and there are five main findings relevant to the Gulf IFQ programs.

Number one, the effects of implementing the red snapper and grouper-tilefish IFQ programs did not differ significantly from the effects seen in most other catch share programs. Number two, the most striking result is how unequal the revenue distributions across vessels were prior to implementation of the red snapper and grouper-tilefish IFQ programs relative to other U.S. catch share fisheries.

Third, the Gini coefficient averaged only 0.45 at the time of implementation in other U.S. catch share fisheries, and we ranged anywhere from 0.25 to 0.62, depending on the program, and so the Gini coefficient in the red snapper and grouper-tilefish programs were anywhere from 58 percent to 84 percent higher upon implementation, compared to the other U.S. catch share fisheries, indicating the distributions of revenues across vessels in the red snapper and grouper-tilefish fisheries were much more unequal at the time of implementation.

Because the red snapper and grouper-tilefish IFQ programs effects were not significantly different from most other programs, the revenue distributions at the vessel level are still much more unequal in the red snapper and grouper-tilefish

IFQ programs compared to other U.S. catch share programs.

The take-home message there is the inequality in these distributions existed at the time the programs were implemented, and they are not primarily caused by any effects that occurred after the programs were implemented, and that is it for me, and I'm happy to take questions.

CHAIRMAN LORENZEN: Okay. Any questions on this part? Andrew.

DR. ROPICKI: Just quickly, the Gini coefficients being higher prior to IFQ implementation, was red snapper the 84 percent higher, and grouper-tilefish the -- Well, was red snapper the 84 percent, is my question.

DR. TRAVIS: That's a good question, Andrew. I would have to go back and look, because it depended on -- With grouper-tilefish, because it's composed of multiple share categories, and even more species, I would have to go back and check, and I don't want to necessarily say that the 84 percent was for red snapper, though I understand why you would ask that and think that.

DR. ROPICKI: I was thinking Class 1 and Class 2, and we kind of already had a system that was --

DR. TRAVIS: Yes, and so your very educated guess -- I would say it's probably on target, but I would need to go back and verify it.

DR. ROPICKI: Then just one other quick one, and is the Asche 2020 study available? Is that a published paper? I just haven't seen it.

DR. TRAVIS: That report -- We had hoped for Frank to provide that to the SSC, and, unfortunately, one of the hurricanes prevented it in one case, and then Frank became ill the next time, and so it exists. It has, unfortunately, not been presented to the SSC at this time, and I will also say there's a lot of additional information in Frank's report that has management implications, beyond what I have covered here, but that paper can be shared, as far as I know, and so, if you need a copy, I'm sure we can get one, and it looks like Juan wants to speak to that, and so I will be quiet.

DR. ROPICKI: Okay. Thanks.

CHAIRMAN LORENZEN: Juan, if it's to that point, go ahead.

DR. JUAN AGAR: We're happy to share that paper, and it will probably get revised slightly. Frank is working on a revised version for peer-reviewed publication. Give us another few months, and we'll provide you with something that's a bit more polished.

CHAIRMAN LORENZEN: Thank you. Mandy.

DR. KARNAUSKAS: Thanks, Chair. Thank you to the presenters for this really thorough presentation. I found it really interesting, and I've learned a lot from this work today. I am trying to interpret some of the information you presented, in light of comments and concerns that we've heard in the course of some of our field work in the past few years, and one of the things we've heard from fishermen is that getting access to quota has become increasingly difficult, and I'm not quite sure what forces are driving this, and we have also heard some concerns about some communities as a whole seeing reduction in ownership of shares and that, once shares are lost in a community, it's very difficult getting them back.

I recall listening to some comments that the ownership of shares is sort of central to the cultural identify of fishing communities, and there was some concern that loss of shares was having negative social and economic impacts on these communities, and so, along these lines, I had two questions.

Firstly, I'm curious if you have looked at how the trade markets are working, how open the trade market actually is, and I'm curious why there's this perception that access to quota is challenging, and does this have to do with some of the issues like the underestimates of affiliation in the vertical integration, or are there other factors?

Then my second question is I'm curious whether there's been any analysis of sort of how geographically the quota has been shifted, and so are there areas that have historically had large working waterfronts, and are you seeing the quotas being sort of exported out of the areas? Thanks.

DR. TRAVIS: I will go ahead and try to tackle some of that, and this is me speaking on my own behalf. My sense is that even -- Well, let's see. I don't want to get too far ahead of ourselves here, but, after we make adjustments to the analyses to control for affiliation, which I think is the bigger issue, but also vertical integration, I don't know that the HHIs would increase to the point where we would have highly concentrated markets.

Possibly moderately concentrated, but it's -- I know this sounds like a fine line here, but, to me, it's not a market concentration issue. The issue here is distribution, and distribution, to me, is what's driving all of these concerns that you talked about, and, now, you also talked about the geographic, or spatial, distribution aspect of this, which I did not look at.

I know it has been looked at in the past, using social network analysis, and I don't believe that particular analysis was updated for this review, but it was done for the grouper-tilefish review, and that would be another way to look at some of the concerns that you raised, and I think I'm forgetting another part of your comment, and so I apologize for not responding to whatever it is I'm forgetting, but I think Jessica wants to jump in too, and so maybe she'll remember.

DR. STEPHEN: Mandy, I can help answer some of this too, and I do have then a question back to you, if you felt that this was more a comment coming from red snapper or grouper-tilefish fishermen, but we did have work that did show that there is quite a large amount of movement of transactions, at least with allocation, and I think also the same was true of shares.

One of our problems, in looking at the geographic distribution, is the way that our permits system has recorded addresses over time, and so, in the past, they overwrote addresses, and so I particularly one annual report I was doing where it looked like a huge shift in shares went from Florida to Texas, or the other way around, and it turned out that it was the same shareholder, but he just moved his location, what state he was residing in, and, when I went to look back in time, it looked like it had always been in the new state.

Since then, I think somewhere around 2015 or so, we updated the permits system so that we can track every time an address changes, but we haven't really looked at geographical distribution since that point in time, although that is something we can go back and look at, if needed.

CHAIRMAN LORENZEN: Thank you. Andrew.

DR. ROPICKI: I just wanted to ask Mandy, and, with what she's heard, is it mostly share or allocation that they're having trouble locating, or both, and I was just really curious about that.

DR. KARNAUSKAS: I can answer Jessica's question, and I don't

have all the details, but we had done some workshops with snapper grouper fisheries in different communities on the West Florida -- Well, throughout Florida, really, and so, again, we didn't delve into details, but these are just some of the comments that I remember hearing, but, in general, they would reflect the perspectives of snapper and grouper fishermen in Florida. To Andrew's point, I really can't remember, and I would have to go back and check whether it's the shares or the allocation, if I even have that information.

CHAIRMAN LORENZEN: Okay. Thank you. It seems that, unless there are -- There are no more hands up, and I think we still have safety-at-sea and fishing capacity to go through, and so I would suggest we go back to the -- Emily.

MS. EMILY MUEHLSTEIN: I'm sorry to jump in, but I just wanted to address this question from my perspective as the Public Information Officer for the Gulf Council. I do spend a lot of time speaking with the fishermen, and sort of some of the reasons that I'm hearing, and I would just remind you that this is anecdotal, and I don't have any studies to back it up, but it is what I'm hearing, and so, as far as buying the shares themselves and why they're not accessible, it's because they're an amazing investment, and, once you own them, there's not a lot of reason to get rid of them.

They are continuously producing, what is it, like a 10 percent return on your investment a year, I think a lot of those fishermen that own it -- There's not any impetus to get rid of it, and so I would say that that might be one of the reasons that you're not seeing any turnover in actual ownership of the shares.

When it comes to the allocation and ownership of that, or the leasing, as I guess the fishermen would refer to it as, there's a lot of situations where, at this point, the fish house owners are the ones that hold the shares, and they will only give allocation to those that fish exclusively for them, and so there are sort of these networks that have developed where, if you are an owner of the shares, you can control who you sell or lease your allocation out to.

I think that's also one of the issues, and I think there's a lot of independent fishermen that don't want to be beholden to one dealer, and I think that that sort of creates a supply and demand sort of problem, at some point, and so I just wanted to chime in and let you guys know that that's what I am hearing directly from the fishermen as to why these things are

happening.

CHAIRMAN LORENZEN: Thank you. Mike.

DR. TRAVIS: I just wanted to follow-up a little bit on Emily's observations, and I'm not sure if Alisha -- She may have pointed to this, or at least alluded to it, in her presentation, but the kinds of issues, with regard to access -- Because there is two different types of access issues.

One is people aren't willing to sell, and so it's not on the market, and it's not available. The other issue is the price, where people are concerned about getting access, because they think the price is too high, and that's because, if they pay that amount, they're not going to make any money, and, in fact, they could lose money, and so, if you go back, and I don't remember which slide it's on, but I know that Alisha showed that, in most cases, the ex-vessel price is way above the allocation price, with the notable exception of red snapper.

I know her data goes through 2018, but I think, if we go another year or two to now, I believe that that difference between the red snapper allocation price and the red snapper ex-vessel price has continued to shrink, and, as that happens, the fishermen who are buying and harvesting -- It becomes less and less profitable for them to buy the red snapper, to buy the red snapper allocation.

In effect, what you're doing is, at some point, you're going to give them an incentive to discard, rather than buy the allocation, and that leads to a whole host of other issues, but that difference between the allocation and the ex-vessel price is really important with respect to access, in terms of affordability.

CHAIRMAN LORENZEN: Thanks, Mike. Okay. Should we go back to the presentation on safety and fishing capacity?

DR. AKBAR MARVASTI: Good afternoon, everyone. This is Akbar Marvasti, and I'm ready for the presentation, if you bring up my slides on safety-at-sea. Thank you for the opportunity to allow me to present the result of four of my studies in the last few years on safety of commercial fishing, primarily in the Gulf of Mexico, except one other study, the fourth one.

First, to begin, just to point out the significance of safety, or lack of safety, in commercial fisheries of the United States, on average, the number of fatalities per 100,000 full-time

equivalent workers is more than eighty in the fisheries, whereas, in the rest of the economy, it's 3.3 percent, and so it's hugely different.

What I would like to do, in the next few minutes, is present the results of four studies, as I mentioned. First, I would like to point out a few different types of regulations, government regulations, that have some sort of bearing on safety-at-sea.

Obviously, as most people know, the Magnuson-Stevens Act has, as one of its objectives, one of quite a few, as safety, and, also, we have learned, over time, that quotas and fishing seasons are often associated with an increase in risk-taking behavior, taking trips under poor weather conditions, when especially there are short fishing seasons, causing that is called fishing derbies.

On the other hand, another government regulation, management tool, that we have is IFQ, and IFQ has done the opposite, by eliminating fishing seasons and allowing fishermen to choose the timing of their trips. There are a couple of other government regulations, or activities, such as the observer program, that also has some bearing on safety-at-sea, as well as commercial fishing vessel safety examination certificates, which are provided by the U.S. Coast Guard. This research, however, this chain of research that I'm going to discuss, concentrates on the IFQ programs.

The first study uses basically time series analysis, examining the effect of red snapper as well as the grouper-tilefish fisheries. Each of the studies involved lots of model building and analysis of the data and discussing mostly the results of the study.

In this case, the presence of the red snapper program, the IFQ program, has reduced the number of fatalities in the fishery by 1.25 per 100,000, while the grouper-tilefish IFQ program has reduced the number of fatalities significantly more, seven per 100,000. By the way, prior to the IFQ programs, the number of fatalities per 100,000 FTEs was nineteen.

What we observed was that the expansion of IFQ programs in these multispecies fisheries has increased safety a lot more than the IFQ program in the red snapper fishery alone, and so our observation, or the result of the data analysis, showed that fishermen are more careful about making their decision to take a trip, taking into account the wind speed, which is a factor that captures the weather condition, than they had done prior to the

IFQ program, because they didn't have to worry about the season ending or worry about the situation with the quota. Also, we observed that, in the fatality equation itself, the weather conditions, the wind speed, played a less significant role.

I followed this up with another study to examine the robustness of this finding, and this study uses panel data. In the panel data, I have two groups of fisheries, and one is the red snapper and grouper-tilefish fisheries, which is known as the treatment group, fisheries that are subject to the IFQ program, and then the control group is the shrimp fishery, and so the objective is to check the robustness of the finding based on this natural experiment design that the difference-in-difference approach offers.

Now, I am aware that the control group could be argued whether it's the best, and it has some pluses and minuses, and some have suggested that the red snapper and grouper-tilefish fisheries from the South Atlantic is a better control group, and that might be the case in terms of similarity of the fisheries, similarity of the gears.

However, the bodies of water, in general, are more similar in the Gulf, even though the shrimp fishermen may not exactly do fishing in the same area as the red snapper and grouper-tilefish fishermen would, but another reason that I have not chosen the red snapper and grouper-tilefish in the South Atlantic was that the number of incidents, fatalities and injuries, given that those fisheries in the South Atlantic are significantly smaller, were too few to allow a robust analysis. I am considering revisiting that, because of advice to resubmit from a journal, and so I need to respond to that.

The finding here was basically confirming the finding from the time series analysis, only pointing out more that there was actually, apparently, a trend, and that's the objective of this method, the difference-in-difference versus the time series data, because the time series data misses when there is a trend in all fisheries as a whole, and, actually, this is referred to as sometimes the missing variable situation, and that is there could be a general trend in the indices, and, if the model doesn't capture that, we may be convinced, or arrive at the finding, that indeed the IFQ has caused that, where another variable may have influenced that.

The difference-in-difference approach controls for the general trend in the fisheries, but the results find that still the IFQ programs have been effective in reducing injuries. However, the

red snapper itself, in 2007, was not really as effective, and the results were somewhat mixed, but the results were far more robust with the introduction of the grouper-tilefish IFQ programs.

I thought, to point out the importance of safety issues at-sea, that I would present the results of one of my studies on the value of the statistical life and the value of statistical injuries. Now, these are concepts that may not be commonly understood, and so I would like to very briefly explain them.

To explain them, I will give you a couple of examples. If one uses what is called the product market situation, where you see some commodities that are likely to improve our safety, and we can look at the willingness to pay of consumers to pay for them. For example, airbags, which is a more current situation, relatively, to say seatbelts. Imagine if they would require, and that is the automotive manufacturing companies, for consumers to pay additional money, and say $500 or $1,000, for airbags. Now, our willingness to pay this additional money for an automobile to have airbags will reflect the value that we place on added safety, or reduction in the risk, of say fatality or injuries.

Government institutions typically perform this, and they have been doing that for a long time, government organizations like EPA or the Bureau of Labor Statistics, and so it's a common practice for them to estimate the value of a statistical life.

To give you another example, when we purchase homes, and there are models that we call them the hedonic prices, and so our willingness to pay for a house in a neighborhood or in parts of the city or the country with better weather conditions, or better air, I should say, or even, for that matter, noise pollution, would reflect the value that we are placing on our health, safety, or quiet. For example, houses that are across from the airport, you would expect them to have a lower value.

Here, however, we are looking at not product market, but the labor market. In the labor market, we have a concept of theory of compensating differentials, and that is we look at different kinds of jobs, and it may have occurred to you that, in jobs such as construction, some of which is going on these days outside of my apartment, and you may have heard some noises, and I apologize for that, and I don't have control over that, and so, in the construction and mining industries, the pay is higher than most other industries for a similar type of work.

This is a reflection of additional risk that workers in those industries are undertaking in order to perform their tasks, and so they need to be compensated, and so, using these basic concepts, through modeling, I have estimated the value of a statistical life, so to speak, for fisheries in the Gulf of Mexico, and this was for shrimp, but I am just pointing out how large these losses are, and so that is $9.7 million, as opposed to the value of a statistical injury, which is $0.7 million.

Moving on to the fourth study, that raises the issue of, if the safety-at-sea is a cultural issue, is a behavioral issue, whether fishermen underestimate the risk associated with their activities, and, actually, the FAO, a couple of decades ago, had made a statement that the acceptance of high risk of loss of life and injuries, as a part of commercial fishing culture, is an obstacle to improving safety-at-sea.

Is it a behavioral issue? Data in the Gulf of Mexico for risk perception does not exist, but I was fortunate to find survey results for the Maine lobster fishery, the American lobster fishery, and so I have used that data to do some analysis of risk perception and adjustments to the actual level of job-related physical risk.

There are a few concepts, like risk perception and attitude towards risk, and there are some who argue, as I mentioned earlier, that fishermen may be actually risk lovers, and there is some attraction that may exist among some fishermen, drawing them to this type of business, and that is linked to the next concept, known as job sorting, and that is individuals sometimes would select their occupations based on their preferences towards different matters, in this context, towards risk.

Now, whether or not that is the case, the issue is, when they learn about the actual incidents occurring, how quickly they would respond, and accurately, towards the actual riskiness in their business, and how much learning occurs? How quickly do they adapt their perception of riskiness to the actual risk?

This is being tested here in this study, and some argue that actually cognitive ability and risk perception are correlated, and they give some examples. For example, people who have low cognitive abilities, and this is an area of psychology more, tend to smoke more, commit crime, and drink alcohol excessively, and so, accordingly, they argue that it’s an issue here with fishermen and that that explains a higher rate of injuries.

Another concept is risk normalization, and do fishermen get used

to the high risk of their occupation, commercial fishing, and is that the reason that they typically underestimate the risk of commercial fishing? To give you an example, people who choose to live in areas of California that are prone to fires, and this happens year after year, or they live in coastal areas where there are mudslides, and, even if the disastrous conditions happen, they continue rebuilding those houses.

Lastly, I have looked at the actual risk and the money tradeoff with the reduction in risk, because there is a tradeoff, right? If commercial fishermen go out there fishing, they receive an added income, but they are exposing themselves to risk, and how is that assessment different between the actual risk versus perceived risk?

The results, to wrap up, I did not find any evidence supporting a relationship between risk perception and cognitive abilities, and that was good news. The variable used for examining that, and that's the only one that was available in the survey analysis, was education, basically, and so, basically, lower-educated fishermen were not necessarily more prone to having accidents.

Also, captains actually do adjust. They adjust to the actual rate of injuries over time, and so the adjustment does occur. However, the learning was non-linear, and that is the adjustment to the increase in actual riskiness was higher initially, and the level of risk going up, the actual number of injuries going up, they slowed down in their adjustments.

Also, the relationship was such that those who actually believe in the survey, those who believe that their business is rather safe, they tended not to adjust much, really, to the actual numbers, and they were stubborn in believing that it still is safe, and those that believe the level of risk is fairly high adjusted, and they were more cautious.

Normalization, the test of normalization, did not confirm that fishermen are using normalization as a coping mechanism to their riskiness of the business, and, finally, the value of reductions in perceived risk is estimated at about $87,000, and the reduction in actual risk was nearly double, at $143,000.

The summary is that, yes, indeed, IFQ programs have been demonstrated to improve safety-at-sea, and that is enhancing he welfare of the fishermen and the value of the statistical life and injuries, and so this is an important matter, in terms of the market value of these losses, and, importantly, because of

the multispecies nature of these fisheries, the reef fish fisheries, the more IFQ programs we have in these fisheries, the safety effect is enhanced, and, also, risk perception and safety are relevant, and the results of this study that I have done shows that risk perception influences their behavior, but they do adapt to the new data, at least most of them do. Thank you. Any questions?

CHAIRMAN LORENZEN: Thank you. Are there any questions on the safety-at-sea? Paul.

DR. SAMMARCO: Thank you, Mr. Chair. Firstly, I would like to congratulate the speaker on a really fascinating talk and one that really needs to be aired, information that really needs to be aired, and so thank you for that, and that is very encouraging information.

A lot of us sitting -- I was going to say sitting around the table, but what table, and a lot of us sitting around the country have spent a lot of time at-sea and can relate to a lot of the issues that you're talking about. A couple of points that I would like to say in passing.

For your data that you mentioned that it was difficult to analyze, because of the low frequency of the data that you have, it probably is analyzable if you use a Poisson distribution, which is designed to handle -- You would have to use a transformation on the data, but it's designed to handle rare data, where you have a lot of ones and twos and a lot of zeroes, and so that's just a heads-up there.

A point of information, and this just comes from things that I picked up over the past few years, and that is risk, and there is some data now that show that risk is genetically based, in a lot of people, that their wish to engage in risky things is genetically based, and there's a gene for it, and so there you are.

Really, risk, while at-sea, particularly with this program, is -- The program is great, and it really comes down to the skipper and one other probably, maybe the cruise leader, say in my case, or the mate, the number-two person, but, generally, it's not so much up to the crew as up to the -- Except for following the rules, but the decisions made as to whether a cruise is going to be cancelled or postponed or aborted or whatever really lays in the skipper's hands, or maybe the mate's hands, and sometimes they want to go in, and sometimes they don't. It's kind of interesting, but those are just some points in passing, but

thank you for a very interesting talk.

DR. MARVASTI: Paul, thank you very much for your comments. I appreciate that. Yes, the Poisson distribution method -- I will follow-up on that, and I have not gone back to that paper to revise it, and, incidentally, two variables that existed in the dataset for risk perception, age and experience, showed that the risk perception actually goes up, and that is they appreciate risk more, the older the captains are, and also experience. The more experienced they are, the more they appreciate the riskiness of the business.

Furthermore, kinship, and, when they have relatives onboard, they apparently get a higher value for riskiness of the business, rather than when they did not have their relatives onboard. As far as the gene is concerned, no, data, and, since I don't have data -- However, I acknowledge that those whose perceived risk was very low were not convinced, even when the data came out of how risky the business is, and still they did not adjust their risk perception.

CHAIRMAN LORENZEN: Thank you. I would like to suggest that we do a short break now, before we go into the rest of this presentation, until 3:45, if that works, and so just over ten minutes. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN LORENZEN: Okay. Welcome back. I suggest that we proceed with the remainder of the IFQ review presentation and then entertain any questions that are remaining on any parts of the presentation, including the safety-at-sea that we just discussed.

DR. DIAGNE: Thank you, and I will present the remaining slides in our joint review. I will start first by talking about operational changes, and, by that, we mean the performance of programs.

We have included, in the presentation, just for reference, definitions for fishing capacity, capacity utilization, excess capacity, and overcapacity, just so that we can refer back to it, if needed.

When it comes to operational changes, you may recall that Doctors Parmeter and Agar had an opportunity to present their study on fleet dynamics in the Gulf of Mexico, and one of the things that the SSC did request, at the time, was to have the

paper when it is available. You will realize that we have included it in the appendix of the review draft of the article that they have written, and that article is under review.

You recall that they did offer two model arrangements, and they looked at a red snapper IFQ model only, and they also looked at a combined model, Gulf reef fish IFQ model, to be able to look at the performance of the entire reef fish fishery.

For the red snapper IFQ model, just to remind us of the results, their study did suggest that technical efficiency increased by 6 percent post-IFQ and that excess capacity and overcapacity are still high in the fishery. Their results also showed that about 20 percent of the vertical line fleet, if operating at full efficiency, could harvest the entirety of red snapper quota, and, here, we can point out that this result is consistent with the result of a previous study that was conducted by Solis and Agar and other authors, which also found that, at the time, about 20 percent of the red snapper fleet could have harvested the entirety of the quota.

The combined model, or the Gulf reef fish IFQ model, the results from that model suggested that technical efficiency improved by 5 percent post-IFQ, and evidence of excess capacity was also found.

For the combined model, the estimation of overcapacity was challenging, because the fleet did not harvest all of the quota, and, early on, during the previous parts of the presentation, it was mentioned that the red grouper quota was increased significantly in the past, and so, after that, the fleet was not able to harvest the entirety of the quota, but, however, an estimate that was provided would show that about 57 percent of the Gulf reef fish IFQ fleet, assuming that they operate at full efficiency, could have harvested the entirety of the quota.

Now we will just look at some of the conclusions that are offered by this review. By and large, we can conclude that the IFQ programs, the red snapper program as well as the grouper-tilefish program, have been relatively successful in meeting their objectives.

One of the challenges would be the fact that the initial objectives for both of the programs did not specify quantified benchmarks and targets. For example, when we say, “improve safety-at-sea” or “reduce overcapacity”, there are really no quantifiable benchmarks against we which we would say, okay, we have been successful, yes or no, and so, to the extent that

progress has been made in those directions for the objectives, we can conclude that the programs have been relatively successful in meeting their objectives.

This has been discussed during the previous portion of this presentation at length, and the collection of prices, share as well as allocation prices, although it has improved since essentially adding those transfer reasons as options for the participants to select, but this continues to be one of the challenges, an area in which, in the future we expect that more tools will be available to collect better information here.

When it comes to operational changes and participation, overcapacity has declined a bit, and capacity utilization has increased, and the technical efficiency of the fleet has increased. Consolidation and efficiency gains within the bottom longline and the vertical longline sectors, we've seen that, but further consolidation is possible, because fishing capacity remains relatively large, when you compare it to the available quota.

When it comes to share and allocation caps, the distribution of shares and landings by share category have not changed a lot since the establishment of the IFQ program. Something that Dr. Travis discussed with us is market power does not exist in any of the markets that were looked at, be it the market for shares, the landings, or the market for annual allocation. On top of that, existing share and allocation caps that we have are not constraining landings.

Looking at prices, share prices and allocation prices and ex-vessel prices, the analysis of share and allocation prices have been, I guess, limited, if we can say that, by the missing data, and this takes us back to the challenges that we have when it comes to collecting the price information.

The conclusions that we have, and which were discussed earlier, would be that the red snapper IFQ program appears to have increased the ex-vessel price for red snapper. We cannot say the same thing for the grouper-tilefish program. The program does not appear to have had an appreciable effect on ex-vessel prices, when it comes to Gulf groupers.

We could also point out the fact that the flexibility that these programs have afforded to the fishermen have improved the profitability of fishing operations, because operating costs have been reduced, and, therefore, that would impact, positively, net revenues.

Looking at catch and sustainability, these programs have provided year-round fishing opportunities to participating fishermen for all of the species included in the IFQ programs. The gag and red grouper multiuse shares are not really effective, considering all of the, quote, unquote, difficulties that they bring, in terms of just programming and adding that to the system, and so it would be a plus if the multiuse shares were to be eliminated, and the programs could be streamlined.

When it comes to discards, the primary reason for discarding IFQ species is primarily due to minimum legal size and other regulations, and, on top of that, would be, of course, the lack of allocation to land the IFQ species in question.

To conclude, some observations, I guess, on what Dr. Marvasti presented to us, the IFQ programs have improved the safety-at-sea of participating fishermen, and there have been significant decreases in the number of fatalities, as has been suggested by the results of his study. At the core of it, these programs have allowed fishermen to select more favorable weather conditions to plan fishing trips.

Ms. Gray did talk about administration and cost recovery, and, during this review period, the collected cost recovery fees have fully funded the IFQ program, and this includes enforcement activities, salaries and benefits of the staff working on the program, as well as the improvement and modernization of the IFQ system, the online platform. I believe that is the last slide in our presentation, and so thank you very much, and we'll take questions, either directed at me or to the group of presenters.

CHAIRMAN LORENZEN: Thank you, Assane and all the presenters, for that very comprehensive review. Before we open the floor to questions and comments, just a quick reminder that our scope of work for this topic is to discuss and review the information presented and provide feedback, as warranted, and to provide any recommendations that SSC members would like to provide, and so I will open the floor. Dr. Keithly.

DR. KEITHLY: Just in terms of where this goes now, Assane, am I correct that this is now going to be taken to the AP, the Reef Fish AP, and then to the council?

DR. DIAGNE: Yes, Dr. Keithly. Our next step will be to give a presentation to the IFQ AP.

DR. KEITHLY: The reason that I ask that is there are still some

things that bother me, and it may all be 100 percent valid, but that you had a large influence on price with the introduction of the red snapper IFQ, but you did not with the grouper IFQ, and I remember, when I did some of that work, I argued that you really never had a derby, with respect to the grouper fishery, and, as I recall, and, again, it's been a number of years, you had some possible with grouper, but no large-scale derbies like you did with red snapper.

Therefore, I wasn't surprised that you see a large price influence from the red snapper IFQ but not the grouper IFQ, yet, when you look at the safety-at-sea issue, the study that said that the fatality rate dropped -- I don't have the numbers, but much greater, sevenfold greater, in the grouper fishery than in the red snapper fishery, and it just seems counterintuitive that you would have that large effect if in fact you did not really have any derby, or large-scale derby, and maybe I should put it that way, in the grouper fishery.

I would like to see what the fishermen input is, in terms of whether there was a significant derby effect with grouper, in the grouper fishery, and so that's my main comment about this, and I do have one or two other questions, if the Chair would give me a minute or so, ones that I wrote down while I was reviewing the report last night and then as we were going over it today. Mr. Chairman, may I ask another question?

CHAIRMAN LORENZEN: Yes, you may.

DR. KEITHLY: Thank you, and this goes back to Alisha. You showed that the allocation transfers were far in excess of 100 percent for red snapper and so forth, and is there a way to kind of look to see how much of the allocation transfers were -- This may not make sense, because I haven't figured out how to word it, but were actually used in the harvesting of the fish, rather than me buying it and then selling the allocation to somebody else and then re-selling it for a third time, and is there a way to kind of cut through the middle part of that chain and just look at the initial seller of the allocation and then the person who used it to harvest the red snapper?

CHAIRMAN LORENZEN: Any responses to Walter's question?

DR. DIAGNE: About first the derby, definitely, definitely, we are not suggesting that the derby condition that existed in red snapper was the same as what we saw for the grouper and tilefish fisheries. I mean, in the red snapper, we know that we had those mini-seasons, I guess ten, or nine, days at the time, et

cetera, and so there is nothing that we have that compares to that.

We have, in the objectives of the grouper and tilefish IFQ program, and I believe what was said there was to be, I guess, proactive and to prevent derby conditions from developing in the future, and so that, perhaps, is something to keep in mind, and, as far as the safety-at-sea, and maybe Akbar would like to add to this, but it would make sense that, once you implement a second IFQ program, meaning the grouper and tilefish program, then you have a multispecies group, including red snapper, and the red snapper program did not stop because we implemented the grouper and tilefish IFQ, right, and, given the overlap that we have between the two fisheries, and I have forgotten the statistic, and I think Alisha showed a table to discuss that, and so the same folks catch red snapper and also prosecute the grouper and tilefish, and so it would make sense, at least I think, intuitively, that the combined effect of safety-at-sea should be greater the more programs you implement, especially if you add a multispecies program on top of the red snapper one. That is just my perspective though, and so I will stop here, and if someone else would like to add to this.

DR. STEPHEN: I can help answer some of the other questions about the allocation transfers, and so one thing to keep in mind is, within the system we're at, we don't serialize the allocation transfers, and so it's very hard, Walter, to kind of do what you were talking about, of figuring out if what they transferred in they immediately used to harvest or then transferred out, because it kind of all goes into one big kind of bucket, or pool, if you remember some of our presentations in previous years.

Just to kind of give you the scope of this too, I just pulled up say red snapper in 2016, and, out of the six-hundred-and-some accounts, we had 406 that have allocation transferred into them, and so there's a high percentage of accounts that are at least getting some allocation transferred in, which makes it a little bit difficult also to tease that out.

DR. KEITHLY: Okay. I was just wondering, because I remember somebody gave a presentation some time ago, and I know it was in excess of 100 percent, and it made sense, after I thought about it, but it just would be nice to tease out how much of the allocation transfers were actually used for catching the fish. Thank you.

CHAIRMAN LORENZEN: Dr. Marvasti, was that also on Walter

Keithly's question? In which case, I will let you go first, before we get to Jack Isaacs.

DR. MARVASTI: Thank you. Yes, and I was just going to comment on derby fishing in the grouper and tilefish fisheries, and the data for occupational injuries, which comes primarily from the U.S. Coast Guard, and a variation of that also come from the CDC, but the fishery type is kind of aggregated into grouper-tilefish, its entire group, and you cannot sort it out by species necessarily, and I would suggest that looking at quota, percentage of quota, that is filled is a good indication of possibility of derby fishing pressure on going out there to land the fish before the quota is exhausted. The question to raise is whether or not the quota is binding, basically, like it is for red snapper, typically.

CHAIRMAN LORENZEN: Okay. Thank you. Let's move on Jack Isaacs.

DR. ISAACS: I really enjoyed reading through this, and it was quite an education. I loved the information on the participation in the different fisheries, and that was fascinating. One thing I noticed was the different values for the maximum catch shares in the different programs, and how did those values come about?

MS. GRAY: I can speak to that, briefly. The historical landings, and where the distribution was of those before the IFQ programs, was how they were originally set.

DR. ISAACS: Thank you. I was just curious.

CHAIRMAN LORENZEN: Thank you. Ken Roberts.

DR. ROBERTS: Assane, I have a question for you. One of the findings of this presentation was improved profitability, and the question I've got is it looks like the study period was eight years, and I can't recall exactly how long the duration of the study period was, but is there any information that tells us whether the improved profitability occurred near-term, after the implementation of the IFQ program for red snapper, and then it's just been on a plateau of no change, or has it occurred more recently towards the end of the time period? I am interested in the time series of the thing, if you can help me out any. Thank you, Assane.

DR. DIAGNE: Thank you, Dr. Roberts. The observations for this would cover the study period, which is, for this review in

particular, covers from 2012 to 2018. In the previous reviews, let's say if I take red snapper as an example, we did look at that also, and, over there, the study period was the inception of the program until 2011, and we also, if I recall, for the first review, did find that the profitability improved post-implementation of the IFQ for that review period, and so the conclusion that we are offering here is only applicable for the 2012 to 2018 time series, which is the period that we looked at.

DR. ROBERTS: Okay. In response then, so we had some initial -- From that point, through 2011 or 2012, the next study period, we gained even more improvement in profitability?

DR. DIAGNE: Yes, and so, essentially, the profitability improved over time, because it's not only potentially on the revenue side, but on the ability to reduce the costs, if you would, the cost reduction measures.

DR. ROBERTS: Great. Thank you, Assane. I appreciate it.

DR. DIAGNE: Thank you.

CHAIRMAN LORENZEN: Okay. Anything else on the IFQ review, questions or comments or recommendations? Walter.

DR. KEITHLY: Thank you, Mr. Chairman. Just one more question, and it's quick, and I think probably Juan Agar, and I saw that he was on, may be able to answer it, and it's based on something that Mike Travis said with respect to some of the indices that we looked at, but we showed -- Results showed an increased efficiency post-IFQ for red snapper, and did, by chance, anybody look at whether efficiency was increasing in that fishery even before the IFQ was implemented? Thank you.

CHAIRMAN LORENZEN: Mike, is that in response?

DR. TRAVIS: Walter, just to clarify your question, are you basically asking whether efficiency improved during the time when we had the ten-day mini-seasons each month and the Class 1 and Class 2 license system? Is that what you're asking?

DR. KEITHLY: Mike, I did not really have a time period in mind, but, you know, we always look at things pre and post-IFQ, and it's something you brought up, and I can't remember what it was, but it got me to thinking if we ever looked to see if there's been a change in whatever factor we're looking at, even before the IFQ is implemented.

We attribute all these changes in efficiency and all to the IFQ, but maybe we had -- I don't know why it would be the case, but you might have had an increase in efficiency even before the IFQ was implemented for some other reason, and it could be the ten-day seasons or the Class 1 and Class 2 vessels or whatever. Thank you.

DR. DIAGNE: If I may, Mr. Chair, for the capacity study that was presented to the SSC, Walter, if you recall, the pre-IFQ period, I think, covered from 2002 until 2006, because red snapper was implemented in 2007, and, comparing those two, it showed the improvement in efficiency, and so are you suggesting that, in future studies, that people go even further back, to look at essentially what happened?

DR. KEITHLY: Assane, I'm not sure if I'm suggesting anything, but it's something that triggered me, in terms of thinking that we always -- On all of these studies, it's pre and post-IFQ, and we attribute all this change, be it efficiency in prices or be it in safety-at-sea, to the IFQ itself, when possibly you've been having improved safety-at-sea for fifty years, and it's just ongoing after the IFQ, or prices or efficiency, and so it's not that I'm really suggesting it, but I just was wondering if anybody has looked at any of those factors.

DR. MARVASTI: In terms of the safety, the difference-in-difference approach that I used in the follow-up study to the initial time series data analysis would actually take that into account. It would take into account a trend in the fishery as a whole as well as pre versus post-IFQ, and so I will be happy to share that paper with Assane, who can forward that to you.

Also, I have a paper under review that examines the fleet size and issues of before and after IFQ, in terms of the fisheries structure, that might be of interest, and I will also share that with Assane.

DR. KEITHLY: Thank you. I would like to see them.

CHAIRMAN LORENZEN: Okay. Anything else? I believe the two hands up are still from the last topic, right?

DR. TRAVIS: No, actually mine was not, but --

CHAIRMAN LORENZEN: Okay. Please go ahead.

DR. TRAVIS: I understand why Walter is asking the question, and I think I'm going to have to defer to Juan Agar on that

particular issue, but I understand why he's asking it, because, in one of the analyses that I worked on, with the price effects, we definitely did determine that the effect of the red snapper IFQ was mitigated by the fact that we had already shifted to the ten-day mini-seasons per month, and so, in other words, if you had not had that change before the IFQ program, the effect of the IFQ would have been much greater, if we had not already shifted to the ten-day mini-seasons. In terms of the technical efficiency capacity, I cannot speak to that, because I have not worked on that specific issue.

CHAIRMAN LORENZEN: Thanks, Mike. Paul.

DR. SAMMARCO: Thank you, Mr. Chair. I just sent a message across through the chat system for the speaker, and it's just giving some details about analysis of low-frequency Poisson data and how to transform it so that you can deal with it statistically, and I've also given a reference of a chapter in a book which covers this particular thing, and so it's not talked about a lot, and there's some controversy about the way to handle it, but it's basically a Box Cox transformation and the square root, but, in any event, whoever is handling the chat system has it, and so for your information. Thank you very much.

CHAIRMAN LORENZEN: Thank you. Okay. Well, it seems we've come to the end of this topic, and I'm not seeing any more hands.

DR. DIAGNE: Mr. Chair, before we leave the topic, if the SSC would consider, I guess, passing a motion, or approving a motion, with regard to the review, to give an indication to the council as to what it is that you think of the work presented to the body.

DR. MARVASTI: I would like to add a note. Thank you, Paul. I am familiar with the Cox Box method, but I appreciate the reference that you have shared with the Chair, and I would like to see that. Thank you.

DR. SAMMARCO: You're welcome.

CHAIRMAN LORENZEN: Okay. Does anyone feel moved to offer a motion? Walter.

DR. KEITHLY: Thank you, Mr. Chairman. **I will make a motion, and you can wordsmith it any way you want, but I'm going to keep it simple. The SSC reviewed the material with respect to the joint red snapper and grouper-tilefish IFQ report and finds it**

acceptable for review by the AP panel and the Gulf of Mexico Council.

CHAIRMAN LORENZEN: Okay. Is there a second?

MR. GILL: Second, Mr. Chairman.

CHAIRMAN LORENZEN: Okay. It's seconded by Bob Gill. Is there discussion? Ken.

DR. ROBERTS: My comments are that we ought to support this, I think, and it's an important omnibus piece of material, and that's the only caution that I have, is that might be some parts of it that are stronger than another, but I think, for the way it's worded, that it's being offered for review past the SSC committee, I think that's a fair statement. Thank you.

CHAIRMAN LORENZEN: Thank you. Any other discussion? Seeing no hands and hearing no discussion -- Will.

DR. PATTERSON: I just don't understand what this actually would mean for the council, that we find it acceptable for review by the AP panel and the council. I mean, I guess that Walter offered the motion, and so maybe the question goes to him, as to what the intention here is about that, the way that's phrased.

DR. KEITHLY: Thank you, Will, and I'll be glad to answer that. Again, I find the report, overall, a solid piece of research, and I do have concerns with parts of it, and, as Ken brought up, I find some parts stronger than other parts, and I am not willing to say it's the best information available or anything, but I think all my statement is trying to imply is that we reviewed it, and we find it acceptable. We do not reject it outright, and we find that it's acceptable to pass on to the next group for their consideration.

DR. PATTERSON: Okay. Thanks. So that's kind of a lukewarm endorsement, which is what I read in the text, and I just wanted to make sure that's what you intended.

DR. KEITHLY: Yes, that is what I intended.

CHAIRMAN LORENZEN: I guess we were not required to make a motion on this, and I think Assane asked that we do provide something, in addition to all the comments that will be summarized, and so I guess that's the genesis of this motion. **If there are no further hands up, I guess the question is, is there any objection to this motion? Hearing none, the motion**

carries with no opposition.

DR. NANCE: Mr. Chairman, did we want to read the motion first, before we did that?

CHAIRMAN LORENZEN: Yes, you are correct. I'm sorry. I should have done that. **The motion is the SSC reviewed the material with respect to the joint red snapper and grouper-tilefish IFQ and finds it acceptable for review by the AP panel and the council. Let me ask again whether there is any objection to this motion. Hearing none, the motion carries with no objection.** Thank you.

Now we have about thirty minutes left in the day, and my sense is -- So the next issue is the allocation review guidelines, and that was given one-and-a-half hours, and my sense is that we don't have enough time to really give that the attention it deserves, and so my proposal would be that we actually tackle this first thing tomorrow morning and use the remaining time to take care of the Other Business, which is the recruitment of a SEDAR 68 review panel member, just because we only virtually have a half-hour left today, and I don't think we'll be using all the time allocated to the ABC Control Rule tomorrow, and so my proposal would be to take care of Other Business, but, Assane, if you see that differently, let me know.

DR. DIAGNE: Yes, Mr. Chair, and I just wanted to say that, when we budgeted the time, perhaps we were a little overambitious for this agenda item, just to be safe, and what I have for the SSC is a very quick update on where we are when it comes to the allocation review, and the thirty minutes would be plenty for us to cover that, and so, if possible, we could proceed and just have me provide that to the SSC.

CHAIRMAN LORENZEN: Okay. If that's the case, then let's go ahead.

ALLOCATION REVIEW GUIDELINES

DR. DIAGNE: All right. Thank you. For this short presentation, we would just like to update the SSC and keep you informed. You recall that, I believe it was last year, that we spoke to you about allocation review procedures.

When we discuss the allocation review guideline procedures and policies, I typically like to start with these two definitions, because, oftentimes, we combine these two things in one set, but, at this stage now, we are considering these separate steps,

and the first one is the allocation review, and that is simply determining whether starting an amendment, an FMP amendment, to look at allocation options is warranted, and so the allocation review is, if you would, the preliminary step, the first look. Then, depending on the conclusions reached, there is an evaluation of allocation options, and that is done, typically, in an FMP amendment.

As you recall, the council has selected time-based trigger as our primary trigger, and the council also elected to use its own public comment process as the secondary trigger. These suggested triggers, even though they are the core of our allocation review policy, will not prevent the council from initiating allocation reviews and amendments whenever the council sees the need for it, and, in fact, we have initiated additional allocation reviews/amendments without waiting for the schedule, as directed by the policy.

In terms of the allocations that we have in the Gulf, we have a variety of allocations, again. There is commercial versus recreational allocation, within the recreational, the for-hire and private angling, between different zones and gear types, between different councils, and, in this case, between us and the South Atlantic, and, finally, between different states of the Gulf of Mexico, thanks to, for example, Reef Fish Amendment 50, which allocated between the states.

These are essentially the dates that we are looking at, and this is just for background material, and this was presented to the SSC in the past, and, according to this schedule, the very first allocation review would be in April of 2023 and then, essentially, it would be staggered, and, every year, we would have something to review, going forward.

I did mention that the council doesn't need to wait for the schedule planned by the policy to review allocations, and, in fact, we now have several actions that are looking at potential reallocation. In the red grouper, we have Reef Fish Amendment 53, and it is looking at the recreational and commercial allocations. For the red snapper, it will look at recreational and commercial, as well as the for-hire and private angling component allocation, and this would be Reef Fish Amendment 52.

CMP Amendment 32 for the Gulf cobia is going to consider potential changes to allocations between the zones, and, in general, because of, I guess, the recalibration and the changes, or the move, from CHTS to the FES, we should expect that several of our amendments, or documents, that would address the

conversions and the recreational data would also have an allocation component.

What we have been considering is an allocation review in tiers, and we will have two tiers. The first tier would be for the allocations that were established to facilitate the grouper and tilefish IFQ quota distribution, and this would include the commercial and recreational allocation for shallow-water grouper, deepwater grouper, and tilefish, and Ms. Gray did talk to us about the species that were included, and I think I repeated those in the next slide. The tier, the second tier, would consider all remaining allocations.

These are the species that would be included in the aggregate, and the allocations that we have in the books for commercial and recreational for the shallow-water grouper aggregate are 77 percent commercial and 23 recreational. For the deepwater grouper aggregate, 96.4 percent goes to the commercial sector, and about 3.6, I guess the difference, to the recreational sector. For tilefish, essentially, the entirety, 99.7 percent to the commercial and just a sliver of a difference to the recreational sector.

For this Tier 1 allocation review, for those species aggregates, essentially, the allocation review could be limited to four things. Number one is a discussion of the Reef Fish FMP objectives, and the next is changes in the ACLs and quota, and number three is looking at recreational and commercial landings, historically, and looking at the trends, and, finally, looking at the quota utilization rates by sector.

With these four elements, the council could have enough information to decide, or determine, whether the next steps is warranted, and, by next steps, we mean the initiation of an FMP amendment to consider reallocation. For the Tier 1, this is pretty simple, by virtue of the nature of those allocations.

For the Tier 2, meaning all the remaining allocations, those would be, potentially, more controversial and would require more resources and time to complete, and we can foresee challenges, due to data unavailability, to be able to conduct all of the analyses that we would want.

Here, we could take an approach that would specify a pre-determined list of analysis and evaluation to complete, but that may be too prescriptive, and that perhaps may take away some of the flexibility that the council has.

An alternative approach could be, on a case-by-case basis, to set the review criteria for each particular allocation, and, essentially, the criteria would be specified in the terms of reference for each review, and so, prior to each review, we would draft the terms of reference, and, in that, in consultation with the council of course, we would include the criteria and evaluation that the council would require at the time.

Before I conclude, essentially, we have an allocation review workgroup, which is scheduled to meet by the end of the month, I believe around the 25th of this month, of May, and we, as a group, will take up the issue of looking at the more controversial, quote, unquote, or involved allocation reviews for the second tier, but we just wanted to keep the SSC informed, so that, next time we come with the products from the allocation review workgroup, you will have some background information already as to the genesis of this. Thank you, Mr. Chair. That's all I have, and I will try to answer questions, if the group has any.

CHAIRMAN LORENZEN: Thank you, Assane. That was quick indeed, and so any questions or suggestions on this material? Dr. Roberts.

DR. ROBERTS: Thank you, Mr. Chairman. Assane, this is way off the scale, probably, but it's on my mind about, if you have an ACL, let's call it of a million pounds, and the allocation is 80 percent to some group and 20 percent to another, and then, the next stock assessment, the ACL can go up to 1.5 million pounds, and could you have a separate allocation for that additional 500,000 pounds? What I mean is you won't upset the original 80/20 that people have invested and gotten accustomed to, but could you have a separate allocation for the additional 500,000 pounds and then work it all into a season?

DR. DIAGNE: Well, I guess that this is a hypothetical example, but it seems to me that the council, within a plan amendment, can determine how it sees the apportionment of the resources, but that would have to be done within a plan amendment and looking at a reasonable range of options, et cetera.

DR. ROBERTS: Thank you so much. I appreciate it, Assane.

DR. DIAGNE: Thank you.

CHAIRMAN LORENZEN: Any more questions or comments? Will.

DR. PATTERSON: Thanks, Kai. Assane has not really presented anything here for us to review, as far as the science goes, but I just think we have to be really careful, as a body, when talking about allocation reviews or the potential for reallocation,

These issues have come before the SSC a couple of times in recent years, and it appears, based on what Assane has talked about here and what the council has talked about recently, that there will be future reviews of current allocations, and the council, potentially, will be looking to change some of the allocations among sectors for given species, and I just think that things that are put before the SSC need to be science based, and we need to -- You know, if our opinion is asked of things, it should be asked about the scientific basis for how decisions are being made and not to in any way attempt to gain our endorsement about an allocation decision.

I think we have to be pretty guarded here that we comment on science and not policy, or management, per se, or politics, in particular, of these reallocation types of decisions, but, instead, that we restrict our comments and our reviews to things that are really the science going into helping the council make informed decisions about what the implications of certain decisions might be, but not necessarily commenting on the decision itself.

DR. DIAGNE: Mr. Chair, again, to point out that allocation reviews do not determine shifts in allocation. They don't. This is just the preliminary look as to whether the council will consider developing an amendment where it will make, potentially, changes to the allocation, if warranted, and this is just the first step, and the only reason why this is coming before, I guess, the SSC, the body, is that, in the process of the allocation reviews, a series of criteria may be considered to help the council make that determination.

For example, we talked earlier about, I guess, a very short and simple set of criteria, including quota utilization rates and trends in historical landings, et cetera, and it could be that someone would have suggested a different criteria and say, well, maybe you should also look at X, or Y, or Z, and that is all that we are after, but nothing else, and, again, you have to separate the allocation review from the evaluation of reallocation options, which is where the council makes that determination.

CHAIRMAN LORENZEN: Okay. Any other questions or comments?

Seeing no further hands, thank you, Assane. I think we have covered this topic as well, and so we have about fifteen minutes left, and I'm wondering -- Ryan, do you want to go ahead and deal with SEDAR 68, since we have a bit of time left?

SEDAR 68 PARTICIPANT SOLICITATION

MR. RINDONE: For the review workshop for the SEDAR 68 research track of scamp is going to be held in Charleston from August 31 to September 3, and each cooperator is responsible for putting up some members of their SSC for the review workshop, and so, for the Gulf, we're looking for one chair and one review panelist from the SSC, and, if you have participated in the data or assessment stages, then you cannot also be a reviewer during the review workshop, but, if you participated in say the stock ID portion, that would be all right, I think.

Also, members of the assessment development team, who are Doctors Jim Tolan, Will Patterson, and Sean Powers, cannot also be reviewers, and so volunteers, please.

CHAIRMAN LORENZEN: Katie, I presume this is a comment, and I don't think you can volunteer for this.

DR. SIEGFRIED: I think it's virtual, Ryan. I was working with Julie to get the letters to the CIEs, knowing that it would be virtual, and we made our schedule as such.

MR. RINDONE: I stand corrected then. It will be virtual.

CHAIRMAN LORENZEN: Okay. We are looking for virtual volunteers.

MR. RINDONE: Not all at once, folks.

CHAIRMAN LORENZEN: Ryan, do you have any incentives?

MR. RINDONE: Luiz will send you lots of guava pastries, and Kai will give you advice about German cars.

CHAIRMAN LORENZEN: I am the technical chair of the assessment, and so I guess I'm excluded, even though I don't seem to be part of anything either.

MR. RINDONE: Kai, I think, in that respect, in the past, we have allowed an attendee from the assessment portion to be the chair of the review workshop, since it's primarily the duty of the chair to guide the review process, so that it follows the

terms of reference, et cetera, into work with the review panelists to compile the review workshop report, but, typically, the chair isn't the one that's making the decisions about what's actually happening at the review workshop. They just guide that process, and I think Luiz has done this a couple of times for us, and he may be able to speak a little bit to that experience, if you're interested in that.

CHAIRMAN LORENZEN: Well, let's see if Dr. Barbieri is about to volunteer as the chair, in which case that would be preferable.

DR. BARBIERI: Well, I'm not sure just yet, but thank you for the thought, both of you, but my question is -- Ryan, I am being a little lazy here, and I didn't pull up the red snapper SEDAR 74 schedule, but, since I volunteered to be on that ADT, I'm wondering if there is any overlap here, just because of workloads, and you gave us the impression that being on that ADT is pretty time intensive.

MR. RINDONE: You mean for SEDAR 74?

DR. BARBIERI: Yes, for SEDAR 74, right.

MR. RINDONE: There's going to be a data scoping call for the data workshop on August 2, and there's going to be a webinar, more than likely, to discuss the Great Red Snapper Count data the week of September 20, and so I would think that there's a window there for you, since this is at the end of August, and you should be able to participate, based on what I'm looking at for the SEDAR 74 project schedule.

DR. BARBIERI: Sounds good. Thank you. In that case, I will volunteer to serve on the review panel. Kai, you know, because of other things that we are involved in, that there is like an intense period coming up in the late summer and early fall, as far as completion of that NAS study and things that will ensue as a result of that, and so I'm not going to step up to the plate and serve as chair, mainly because, serving as chair, you end up with the responsibility, which is not overwhelming, but it takes some time, to actually put together the review report.

CHAIRMAN LORENZEN: Correct, yes. It's also the start of term for me, and so I have -- I would really love someone else to step up for the chair. I guess, if we can't do anything right now, I guess we might revisit this topic tomorrow, and so I would urge everyone to sleep on it and see if they can't fit in a little review workshop chairing at that time of the year.

MR. RINDONE: Sure. We can revisit tomorrow.

CHAIRMAN LORENZEN: It seems we're not getting any more volunteers right now, and so let's revisit it tomorrow. Thank you, Ryan. I think that closes our agenda for today, unless there is anything else, in which case we shall recess and meet again at 9:00 a.m. tomorrow morning, and thanks to all, all the presenters in particular, and the SSC members and the council staff.

(Whereupon, the meeting recessed on May 3, 2021.)

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May 4, 2021

TUESDAY MORNING SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Special Mackerel, Special Shrimp, Special Socioeconomic & Special Ecosystem Scientific and Statistical Committees reconvened via webinar on Tuesday morning, May 4, 2021, and was called to order by Acting Chairman Kai Lorenzen.

CHAIRMAN LORENZEN: Good morning, everyone, and welcome to the second day of our SSC meeting. We will try to avoid the scenario that is being suggested here in the picture today. We have a day of unstructured time, which I guess is always a little dangerous, but we will navigate that as efficiently and effectively as possible.

Our topic for today is a revision of the council's ABC Control Rule, and specifically Tier 1, and I will hand it over to Ryan, to start with, to remind us of the scope of work for this item, and then I will talk a little bit more about the materials and the general schedule of what we're doing today, and so, Ryan, over to you.

REVIEW OF ABC CONTROL RULE: TIER 1 SCOPE OF WORK

MR. RINDONE: Good morning, everybody. We have been talking about making revisions to the ABC Control Rule for -- Well, some would say since the last one was put in place, and so this is the first real swing at trying to take a crack at this, and we

were going to have a separate working group of SSC members that were going to work on this and then present something to the group as a whole, and, at a previous meeting, I think Mr. Gregory had suggested that why don't we just take a swing at Tier 1 first, since it's the one we use the most, and so that's what we're going to try and do here.

Since all of you, ultimately, have to sign-off on it, we'll just do it all together, and so you guys are going to review a presentation that the Science Center has put together on an alternative approach to the current control rule, and this is -- This approach that they're going to show you has a lot of similarities to what's being proposed in other regions as well, and having some parity between regions certainly creates efficiency.

For those that aren't that aware, our ABC Control Rule is responsible for characterizing scientific uncertainty, and it's what helps the SSC to establish the difference between the OFL and the ABC. The current control rule has been around since 2011, but there's been some room for improvement.

Specifically, the current control rule sometimes doesn't result in buffers between the OFL and the ABC that do a good job of fully characterizing the scientific uncertainty inherent in the assessment, and sometimes that uncertainty in the assessment doesn't always translate apples-to-apples into the projections.

You guys are going to review these presentations and the background materials and focus on Tier 1 here and make revisions and recommendations, as appropriate, and, ultimately, any modifications to the control rule will have to be incorporated into a plan amendment and approved by the council. Mr. Chair.

CHAIRMAN LORENZEN: Thank you, Ryan, and I want to add to that one thing. The ABC Control Rule does two things, really. It characterizes the uncertainty, and it incorporates the council's sort of risk policy, or risk tolerance, in decision-making, and so it really has a science component and a policy component, if you like, and we will come back to that.

I wanted to briefly review the item under a here, which is the ABC Control Rule Scope of Work, the old version, which is basically what we've put together for the -- That's the first one in the materials for today, and, as you can see, this is something we put together when we thought there was going to be a working group, and we have decided not to do that, for the reason, as Ryan explained, that, when we do have a working

group, usually we do everything twice. We do it in the working group, and then we take it to the full SSC, and people will want to discuss everything again, and so we've decided to give it a shot and just do it in the whole SSC.

What I want to draw your attention to here is the overall schedule, because what we had outlined here is -- This was a three-webinar schedule to revise the ABC Control Rule, and, at the first webinar, we had planned a review of the existing control rule and rules used in other regions, and basically a proposed control rule developed by the Science Center, and that is basically what we're going through today.

So we have an outline proposal from the Science Center, and not for a single control rule, but for a set of options, if you like, and so we will go through that, and we will then have another probably two meetings in the SSC about this control rule, and so we will look to make some decisions today and then ask for further analyses that will inform subsequent meetings about the control rule.

Also, in this process, at some stage, we have to bring this to the council, and the way I would envision that, at the moment, is that we will deal with the SSC's perspective today, and at a forthcoming meeting, following some further analysis, and then we will take probably several options for the control rule, with different essentially risk policies embedded in them to the council, to get their feedback on basically what they want to do about the risk policy element of this, and then we will finalize the control rule, and so just remember that this is part of a multistage process in the SSC that will also involve the council at some stage.

With that, going back to the materials that we have for today, we have a presentation by Dr. Cass-Calay about their alternative for Tier 1, and, as Ryan pointed out, we are looking to focus on Tier 1 at this stage, which is the most frequently used tier for us.

Associated with that presentation, there is a large amount of background material that you can see in the meeting materials, and most of those are older presentations and documents, and so we will not be going through those in detail, and they are provided as background, and then there is a second brief presentation that I put together to provide a bit of a bigger-picture perspective on what we are trying to achieve here with the ABC Control Rule revision, and I put that together partly to help us in our subsequent discussion and partly with a view to -

- Knowing that I will have to take this to the council in a few weeks and explain what we're doing, and so it's sort of looking to add that element of explanation into the deliberations that we have here.

My suggestion is that we will go through Shannon's presentation and ask any questions specifically related to that presentation, and then I will then follow that up with my brief presentation, and, again, entertain brief questions, and then we will start the actual discussion.

There is also -- Shannon has prepared further materials that we can go through, and, essentially, those are spreadsheets that allow us to explore certain options, and I think we will discuss, after my presentation, whether we want to make some -- Have some general discussions first or look at those tools first, and we'll decide that when we get to that stage.

Unless there are questions or comments at the moment about the general outline of things, and I will give you a few moments, we will move on to Dr. Cass-Calay's presentation about the Tier 1 alternative.

PRESENTATION ON TIER 1 ALTERNATIVE

DR. CALAY: Thank you very much, Dr. Lorenzen. Some of you, these slides will be quite familiar, but, for others of you, they might be new, and so I thought that I would go ahead and introduce these concepts, quickly. This is a presentation that was prepared by Clay Porch and myself and has been presented to this SSC previously, and now I have added some content as well.

Essentially, the ABC Control Rule -- I wanted to briefly describe the roles and responsibilities and some of the lingo, and so we have an overfishing limit, which is defined as the catch that is expected when fishing at MFMT, which, in most cases in our FMPs, is F SPR 30, and so it is that catch that corresponds with a 50 percent chance of exceeding the OFL, as determined by a stock assessment.

The buffer between OFL and ABC is intended to reflect the scientific uncertainty, and so it is reduced from OFL by an amount that accounts for scientific uncertainty. Therefore, it is a catch, again, with less than a 50 percent probability of exceeding the true overfishing limit.

There are other buffers that the council has the prerogative to set, and they are the annual catch limit, which is the level of

catch that invokes accountability measures, such as fishing closures or other management regulations, and there is the annual catch target, which is the catch reduced below ACL to account for management uncertainty or, in some cases, to achieve optimal yield.

The ABC Control Rule is simply a procedure which is agreed upon by the SSC and adopted in a fishery management plan for setting the ABC for a stock, or a stock complex, as a function of the scientific uncertainty, and any other scientific uncertainty. Each council does establish its own ABC Control Rule based on the science advice from its SSC.

The SSC must recommend an ABC Control Rule to the council, and the SSC may recommend an ABC that differs -- Okay. This is a key point. The SSC does not have to follow the ABC Control Rule, but, if it differs, it must explain why, and it must provide some narrative justification, and, in some cases, an ABC can be a data-limited process, and it can also involve complex drivers based on measured stock biomass, measured uncertainty, forecasts of environmental effects, and even, in some cases, results from, for example, PSA analyses have been included in the creation of ABC control rules.

The actual ABC control rules vary by council, and some rules -- Some councils have adapted one framework for all of their FMPs, while others have a different framework for each FMP that might be created by a council. Most councils have attempted, to various degrees, to set the ABCs below OFL in a way that reflects the scientific uncertainty, but how they've actually gone ahead to do that varies a great deal between the councils.

This is just an example of the Western Pacific Fishery Management Council's control rule, which could now be obsolete, because these things do change, and the points that I want to make about this, really, are that they have a tiered control rule, much like the Gulf, South Atlantic, and the Caribbean, and the top tier is essentially expected to be stocks where they have the best data richness, and then the tiers, as they reduce, are for less and less well-known results, so to speak, higher uncertainty.

This is Tier 1 of the existing Gulf of Mexico ABC Control Rule, and so, in our case, Tier 1, the conditions for us is that there is a stock assessment estimate which produces MSY reference points and a PDF of OFL. The choice of the P*, in the current rule, is based on the level of uncertainty considered in a risk determination table, and we sometimes call that the tiers and

dimensions table.

That tiers and dimensions table includes elements such as the level of assessment and the use of MSY proxies, for example F SOR 30, and it contains a type of characterization of the scientific uncertainty, but it's pretty much limited to whether the uncertainty has been fully integrated within a stock assessment, has been characterized by sensitivity runs, or whether it has not been addressed. I will remind you that, in the case of all Gulf assessments, we do not really ever fully integrate the scientific uncertainty.

We also examine the severity of retrospective patterns and apply a larger buffer if those patterns are severe, and we look at the use of environmental covariates.

The OFL is the yield that is produced when fishing at F SPR 30, generally, or the maximum fishing mortality threshold, and the ABC is simply the yield at the P* percentile from that projection of, in the case of stocks that are not overfished, F SPR 30, or the maximum fishing mortality threshold, or, in the cases of overfished stocks, we often apply the P* percentile to F rebuild, although that does vary, to some extent, from assessment to assessment.

This is the tiers and dimensions table that I spoke of, and I think most of you are quite familiar with it, and so this is actually how we have gone about characterizing P*, and the point to make here is that this is the only lever we really apply, in the Gulf, to the uncertainty, because the PDF that comes out of the stock assessment itself is relatively narrow, as many of you have noted, and I will explain some of the reasons for that in subsequent slides.

Now I will describe, briefly, the Science Center's proposal for Tier 1, and, first, I will discuss some of the reasons why the Science Center is proposing this ABC control rule, and one reason is that the Southeast Fisheries Science Center serves three different fishery management councils, and each one of those fishery management councils has a variety of FMPs, and we are attempting, to the extent that we can, to create some harmonized practices, so that, when we do conduct a stock assessment, they are more similar, or at least as similar as possible, when we create management advice for the three councils. Right now, each council uses quite a different control rule, and so that's one reason.

The other reason, you will understand more later, as I'm showing

you examples, but the other reason is to avoid situations where we have to create specific rebuild scenarios that may differ, depending on the council's direction, and so it may be that the council wants us to explore numerous rebuilding scenarios that rebuild to different targets over different periods of time, and a simplified control rule would essentially alleviate us of that responsibility, while assuring that the stock could rebuild within the specified amount of time, within an appropriate rebuilding period.

That being said, ABC control rules, in general, should have these properties, we believe, and so fishing mortality, the MFMT -- That fishing mortality should decrease as the stock size declines, and so you should not -- Basically, you'll see what I'm talking about, but we should apply a lower fishing mortality as the stock size approaches zero.

It would behoove us to consider imposing a B critical value that reduces the F to zero at some level of depletion, and this would prevent stocks from reaching a level below which reproduction limitations could become severe. It is certainly the Science Center's strong recommendation to divorce the concepts of P* and sigma, P* being the risk of overfishing, which typically is a prerogative of the council, and sigma, which is the width of the PDF on OFL, or, essentially, the scientific uncertainty, and the Center recommends that the SSC focus on characterizing the scientific uncertainty, which I may call sigma during this presentation.

The Science Center also continues to recommend that we impose a tiered system, where, as the data quantity or quality decline, the sigma increases, therefore assuring ourselves that, as the data quality declines, larger buffers would occur between OFL and ABC in the lower tiers.

This is a picture of kind of what this general guidance looks like, with the exception that I have not illustrated this particular example of that B critical value, but the ABC control rule should consider reducing that fishing mortality as the stock declines towards the origin of the plot, and so, in this case, I'm showing an example based on our previous parameterization of the minimum stock size threshold, or MSST, which was, essentially, for most stocks, the minimum stock size threshold was one minus M, or the natural mortality rate, times the biomass at MSY.

That black dotted line, vertical, is the biomass at MSY in this example, and the red-dashed line is the MSST in this example,

and that small buffer is the one minus M, which prevents triggering it over a rebuilding plan, if the stock is just experiencing natural variability, say in recruitment, for example, or natural mortality, and so this ramping feature down to the origin is essentially what I am describing when I say that the fishing mortality rate should decrease as the stock size declines.

This also occurs in our current control rule when we put a rebuilding plan in place, and so everything in this pink region here, on the left side of this plot, is, in this example, considered overfished status and would require an F rebuild, a rebuilding plan, and so we do something like this already.

Now we have actually introduced a new definition of MSST, which is most frequently used in our FMPs, which is that the minimum stock size threshold, or the level of biomass that triggers a rebuilding plan, has often been set at 50 percent of the BMSY, and a stock is not considered overfished now until you are less than MSST, and so this is what the shape of the new ABC control rule might look like, where you essentially fish at F 30 percent SPR, or MFMT, until you get to MSST, which triggers a rebuild plan, and then you fish at a lower F, essentially, as the stock size declines.

Now, the tricky bit about this control rule is that it can require large reductions in F and catch and relatively long rebuilding plans compared to the previous guidance, because you're not essentially acting on -- You're not acting to reduce fishing mortality until the stock is less than 50 percent of BMSY.

Here is what the new guidance from the Science Center might look like, and so I have shown two examples here. To reduce the likelihood of long or harsh rebuilding plans, the SSC could consider reducing F whenever you're below BMSY, and so, basically, the control rule would be apply F, and it's very hard to say all these acronyms, but apply F at, for example, SPR 30 until you get below BMSY, and then you're already starting to reduce the F, until you get to some B critical level, here drawn at 100, biomass equals 100, at which point the fishing mortality would be set to zero, to prevent the stock from declining to such a level where reproduction is inhibited.

A second example, which is also a little bit closer to what you're doing now, is to retain fishing at MFMT until you get to the minimum stock size threshold at 50 percent of BMSY, typically, and then ramp down to zero, F equals zero, at B

critical. Those are essentially the two control rule examples that I will be showing you in the spreadsheets, with a number of, essentially, decision points that you can evaluate.

A little bit more general guidance, and so the determination of ABC should be based, when possible, on the probability, and I am going to read this, that a catch equal to the stock's ABC would result in overfishing with a P* probability, and so that is not actually very well written, and so I will just clarify that OFL, again, should be the catch that corresponds to a 50 percent probability of overfishing.

Then there should be some buffer, which we have typically called P*, although this particular figure has been interpreted differently in different councils, but, in the Gulf Council, we most typically reduce -- We actually create the buffers between OFL and ABC by determining P*, through our tiers and dimensions table, and then applying that P* value, which corresponds to a lower risk of overfishing, say 40 percent probability of overfishing, and we apply that directly to that PDF, which is created from the projection of F SPR 30, for example, to create that buffer between OFL and ABC.

Now, the problem with this approach is, and many of you know this very well, is that the width of the PDF, as derived from our stock assessments, is a gross underestimate of the true scientific uncertainty, and so that creates very narrow buffers between OFL and ABC, even if you apply a much larger P*, and the buffers are quite small, and I will just let you know that the sigma that are coming out of our typical stock assessments are close to 0.1, which is quite low.

The reason for that is, typically, that we are creating a number of fixed parameters in the stock assessment, and we're not drawing from a prior with a distribution, for example, and we're considering only one model, and so we're not looking at the variability that occurs when you make different assumptions about, for example, data inputs or model structure.

DR. ANDERSON: Shannon, can I make a comment? I think the P*, as indicated in this deal, is the distance between 50 and 40, and isn't normally the P* would be the 40 percent and not the difference between 50 and 40?

DR. CALAY: Yes, and, I mean, I think that's correct. I think we would typically call P* that value that is derived from our tiers and dimensions table, and so you're correct, and the thing I'm trying to show here, I guess poorly, is that we use that to

create the buffer, which we assume to reflect scientific uncertainty, and, in fact, that buffer is an underestimate of the true scientific uncertainty.

Yes, we could call this -- In this particular case, if you use the tiers and dimensions table, and P* was 0.4, then, yes, 0.4 would be the probability of overfishing, and you could put P* here, and this thing that I have indicated, this bracket with the P* to the right, we could call that, instead, something like a buffer to account for scientific uncertainty. I think it's clear, but I'm happy to take another stab at it, if folks still are desiring more information. Okay.

Here's Clay's favorite Donald Rumsfeld quote about how we know certain unknowns, but there are also unknown unknowns, and the ones that we don't know we don't know, and it's the latter category that tend to be difficult, and so it's just getting to the point, really, that we only -- We only use a very small fraction of the total scientific uncertainty in our stock assessment approach, and it really comes only from inverting the Hessian matrix, which is very much like bootstrapping.

Typically, when we bootstrapped stock assessments across the estimated parameters, we got CVs of about 0.1 also, and so inverting the Hessian matrix is what we do now, and it also produces CVs of about 0.1.

Our current practice is to estimate the variance of the PDF as part of the stock assessment approach, and it results, as we've seen, in various small buffers.

Another approach, which we are proposing to follow, is that you estimate the variance external to the assessment process, and so you either borrow it from another stock assessment that has more fully characterized uncertainty, and call that kind of a sigma min value, minimum level of scientific uncertainty, or the approach that we're recommending, for now at least, is to compute sigma min from comparisons of estimates from many past assessments, and this is best shown by Ralston et al. in 2011 for a variety of Pacific species.

Here is an example, and it's a meta-analytical analysis of assessment uncertainty, and, on the left-hand side, you see an example from Pacific whiting, where they have looked at all of the previous stock assessments of Pacific whiting, over time, and he's looked at their spawning stock biomass trajectories.

Now, what he has chosen to do is to examine the uncertainty by

calculating the log-scale deviation from the mean biomass estimate from all historical assessments, and he actually did this for seventeen Pacific stocks, and, when he did this for the seventeen Pacific stocks, he created a distribution that looks like the plot on the right, and that's the aggregate distribution of all the log deviations pooled from seventeen different stocks, and he has fit their normal distribution, and the fit to that is a sigma value of 0.36, and that's where he is getting the sigma min of 0.36 from seventeen Pacific data-rich stock assessments.

What this results in is an actual relationship that is defined, where, if you know sigma, and you know P*, you can calculate the buffer between OFL and ABC, and so what's plotted here on the Y-axis is the fraction ABC over OFL, and so, if you look, for example, at a P* of 50 percent, you note that, at any sigma level, no matter what you specify as sigma -- If you set P* at 50 percent, OFL equals ABC, and there is essentially no significant uncertainty at a P* of 50, but, if you reduce P* down, then you do see that the buffers here get larger between ABC and OFL as you increase sigma.

On the top line are Tier 1 stock assessments, and those are thought to be data-rich stock assessments, and the sigma for those is 0.36, like I showed you on the previous slide.

What the Ralston paper proposes is that, as your data quality declines, you would impose larger buffers, and so Tier 2, in this case, are data-moderate stock assessments, and they produce larger buffers, and so that's middle line with the open squares, and then the bottom line, with the open circles, is for data-poor stock assessments, and they are Tier 3, essentially, of that control rule, and then you see the buffers are substantially larger, and, at 25 percent, for example, P*, or a probability of overfishing of 25 percent, ABC would be a little bit less than 40 percent of OFL for a data-poor stock.

Actually, the control rule, and I'm only showing you Tier 1 today, but we are -- Essentially, this is part of a tiered approach, where, as we move down into data-moderate and then data-limited stock assessments, we would propose to do very much this same thing, where we increase the width of the sigma min that would be applied to those stock assessments.

All right, and so I'm not going to spend a lot of time on this slide, but this is what our strawman proposal looks like in words, and, essentially, Tier 1 would have a condition for use, and it's based on a full stage structured, and so either length

or age-structured stock assessment, where we have reliable time series on catch, length or age composition data, and indices of abundance, and the assessment does provide estimates of MSST, MFMT, and a PDF on OFL.

This happens to be from the U.S. Caribbean, and so you will note here, for example, that the MFMT, or maximum fishing mortality threshold, in the Caribbean is also set for FMSY, or its proxy, just like it is in the Gulf, and the minimum stock size threshold in the Caribbean is set at 75 percent of BMSY, or its proxy, and so, in the Gulf of Mexico, this is actually 0.5, or 50 percent of BMSY, and that is fine, if the SSC and the council do prefer to retain that. We're not necessarily suggesting, in this particular presentation, that you must change that.

There is nothing much different here until you get down to the ABC, and now we're employing a ramp, and so, basically, we are -- I will walk you through the steps, but, in the first step, ABC is going to be equal now to some quantity, D, times X*, where this X* now is the yield that is produced at the percentile which is now defined by the PDF on OFL, which corresponds to the sigma min now from the assessment, and the P* as determined by the council, and so we're separating these two concepts, where now P* is the probability of overfishing, and it's a risk determination, and it's specified by the council, with some guidance from this SSC, and from the Science Center, that they should not choose values that are -- They certainly should not choose 0.5, because that would basically assume no scientific uncertainty.

The width of that PDF is now determined by sigma min, and so, for example, we could use 0.36, which is the data-rich sigma min determined from the Ralston approach, until such a time as we have a specific sigma min which is determined from Southeast stock assessments.

Now this D is the ramping feature, and so it's basically a piece-wise process, where, if you're above BMSY, then you're essentially -- You could, theoretically, apply a scalar. Now, this scalar was put in to protect us in the event that the council selected a P* of 0.5, because then the SSC could respond by setting that scalar less than one, to create a buffer, but it's not necessary if the council does not a select a P* of 0.5, and so let's assume, for the time being, that the scalar is set to one.

Now D is simply one, when B is above BMSY. When B is below BMSY, you apply this ramping feature, where the F would be

reduced by essentially a linear interpolation down to the origin, and so, as the biomass decreases towards the origin, the fishing mortality that you apply is also decreased, and so that's what creates the ramp.

This is a demonstration of what these two approaches look like, these two ramping features that we're going to discuss in more detail when I show the spreadsheets, and this one is created a with a P* of 0.4 and a sigma value of 0.36, which, again, corresponds to the data-rich stock assessments from the Pacific analysis from Ralston, and so, here, you will see now that there is a buffer applied, even when you are above BMSY, and you're essentially using a buffer of about 10 percent between ABC and OFL, and that is corresponding just to the sigma, and that's the Ralston approach, right, and that's applying P* and sigma alone.

Now, these two ramping features in blue is when you begin the ramp whenever a stock is less than BMSY, and so you're actually reducing fishing mortality as the stock size reduces, starting from BMSY, and then you're actually applying an F of zero when the stock is below a B critical value, and, in this case, the B critical is 10 percent of BMSY, is what I have applied here.

The orange line is actually more similar to your current control rule, which is where you don't actually start that ramp-down in F until a stock is below MSST, but you still, when you get to that B critical value, assume F equals zero.

As soon as Kai is ready to have this discussion, I will walk through some examples in a spreadsheet, which I have given to Ryan to post, and it's actually Version 3 of this spreadsheet now, and it contains a few new bells and whistles, and we'll also look at three different examples of how the ABC control rule functions for recently-assessed stocks, and so I've chosen three, and they are one stock that is currently considered above BMSY, and that's vermilion snapper, one which is above MSST, but below BMSY, king mackerel, and one that is current overfished, below MSST, and that is greater amberjack, and so that is what we will discuss as soon as Kai is ready to see these examples. That's it, and so are there any questions about this presentation?

CHAIRMAN LORENZEN: We'll wait for hands to come up, but, also, Shannon, it may be, since we're arrived at this point -- I think a lot of your examples are about the ramping feature, right, in a sense, or that's a central part of it, and maybe you should go through that, after the general questions about this presentation, and then I will do mine later, just because we

seem to be at the spot where this is a natural follow-on, but, yes, let's entertain general questions first, and so we have Will Patterson.

DR. PATTERSON: Thanks, Kai. I actually have three different question, or issues, to talk about, and so I don't know if I could be allowed to work through all of those, and the back-and-forth, or take one and then put me back at the end of the line, but I will just start, and you can cut me off whenever you feel like, Kai.

The first comment I have is that the ramping feature makes a lot of sense, to me, for MFMT and the issue of the stock being below BMSY, versus being below MSST. However, that really is an OFL issue and not an ABC issue, and so, if we would combine that into the ABC control rule, then it really becomes an OFL and an ABC control rule, and that doesn't adjust the ABC, and it simply sets the OFL on that ramp.

As far as the issue, and I'm on Slide 8 in Shannon's presentation, but the second thing that I just wanted to point out here is Shannon talked about this proposed Tier 1 control rule would be divorcing P* and sigma, but, really, what it would be doing is divorcing sigma from the assessment, and so it wouldn't be sigma derived from the assessment, and it would be sigma based on a meta-analysis of seventeen west coast stocks that Ralston et al. produced until such time as there was a similar analysis done, and there has been some analysis done on this, and we've seen it in recent years, for Gulf stocks.

Really, I think what it would end up being is Ralston would give us sort of the ballpark of estimates they derived from their stock assessments, through 2008 or 2009, whenever the time series was for the paper, and then we would say, okay, this is the range, and so, if we applied this approach that's being discussed here as a proposal, then we would -- It would simply be saying, okay, this is the range of potential sigma, and the council picks a fixed P*, which we tell them is the probability of overfishing, but it's not, and it's simply a multiplier to multiply by a sigma that we pulled out of this range that was produced elsewhere from other assessments, because we feel like the buffer between OFL and ABC is inadequate to fully capture scientific uncertainty.

I don't see how this new proposal is any less arbitrary than what we currently have, and it simply, again, puts this patina of science on setting a buffer between the OFL and ABC that perhaps we would feel more comfortable with, as the SSC.

I think, in the end, what it comes down to is we use this term "uncertainty" to apply to different things, and, generally, what we're applying it to is precision, or imprecision, in the assessment-derived OFL, but then we're also using it to talk about bias, and is this -- Is the OFL underestimated, or is it overestimated, and what are we missing, as far as stock dynamics, when, really, what we should be talking about is the process error, the natural variability in the population, so that the productivity estimates fluctuate over time.

Then the measurement error, and so things like the ageing error matrix, or did we actually estimate fecundity correctly, and then the modeling error, and, for modeling error, it takes so much time and effort to produce one of these really expansive, highly-parameterized, integrated assessment models that it's just not feasible, and it's not likely to be feasible, to produce several different iterations of stock assessment models, or use a different platform.

For example, with scamp, you have the South Atlantic and the Gulf doing assessments, and perhaps both assessments could be run in BAM, versus SS. You know, talking to Kyle Shertzer in Beaufort, he says they've actually done a little bit of that, and the results are quite similar, and it makes sense. The basic framework, or approach, is similar in the integrated assessment platforms, although, obviously, there are some different knobs and things in SS and different assumptions in BAM, but, anyway, you get the point that we're not really addressing modeling error effectively, and so we're kind of lumping back into this universal statement about uncertainty.

I think what this new approach is trying to do is maintain the P*, telling the council, okay, you just set one risk value, which isn't really a risk value, and it's simply the probability of overfishing, but it's the probability of overfishing conditioned on the assessment and the sigma, and we get to set the sigma, and so, instead of creating an arbitrary buffer when we depart from the current control rule, by saying, well, we don't really feel like this is enough, and so let's double it, or let's use F 75 percent of FMSY to set it, or whatever we do, in different circumstances, to increase that buffer, and this is trading one set of arbitrary decisions -- Not arbitrary decisions, but an arbitrary approach to try to satisfy our inclination about uncertainty with another.

I guarantee that we're going to spend -- If we went down this road, we would spend quite a bit of time developing a matrix of

what the sigma could be for a given assessment, whether we thought the data were great, whether we thought uncertainty was fully captured, et cetera, but then, the first time we put this in play, and we got a buffer that was narrower than we thought, we would say, okay, well, we're not going to use it, and we're going to go somewhere else.

I just think this is too close, too similar, to what we have now, and it's simply trading one set of decisions to scale this for another set of decisions to scale this, when, in the end, why -- I still haven't seen anything yet, as far as this idea about thresholds and targets, I have not seen anything yet produced that makes more sense to me than the Restrepo et al. 1998 simulation paper that shows how, in that case, what they called FOY, versus FMSY, are related.

Instead of calling it FOY, we could call it FABC, and the MSY -- Obviously, the FMSY produces OFL, and the beauty of that approach is that, as the stock is above, or approaches, BMSY, then the two -- The yield streams, the yield estimates, that come out of the FMSY versus the FOY, which is equal to 75 percent of F, the F rate, at MSY equals the F at OY, and the long-term yield streams are 98 percent.

The OY -- When the stock is at the OY, the OY is 98 percent of the MSY when the stock is at BMSY, and there's a dynamic, right? As the stock improves, those values get closer and closer together. As the stock gets above the BMSY value, those get closer and closer together, and it would eliminate one of the biggest issues that we have in fisheries, especially reef fish fisheries in the Gulf of Mexico, is that we put these buffers in, and then we get this ramping up of fishing and then having to fish the stock back down.

You know, we get these really weird projection yield streams that are reflective of the way we set buffers, and, anyway, I am kind of rambling on here, but I just think we're trading one set of -- It's really the same approach, in the end, in my view. It's simply -- We're just turning one knob differently than we did last time, and so we're basically trading the knobs here.

CHAIRMAN LORENZEN: Okay. Thanks, Will. That was a question that sounded more like a comment.

DR. PATTERSON: Yes. Sorry.

CHAIRMAN LORENZEN: But there are a lot of things that we should revisit in what you outlined, and I would like to do that after

the next bit of presentation, when we launch more into a general discussion, and so, if that's okay with the others who are on the list here, and mostly, at the moment, I think we're looking for questions on this presentation, and then we would turn to the bigger questions that Will raised, and I'm sure that others will raise as well. Thank you. Cam.

DR. AINSWORTH: Well, I mean, I have a question about this methodology, and I don't know if you want to wait until afterwards to discuss this, but let me say it, because I'll be quick.

First of all, I'm concerned that all of the studies in Ralston's meta-analysis would presumably suffer from a similar inability to accurately fit the OFL distribution, and so I'm not clear how this rectifies the problem of having too narrow distribution from the stock assessment models. That's my first question.

Secondly, the ramping threshold, I think, probably should account for stock biology, because highly-variable stocks -- I mean, is it really necessary to implement a reduced F on a highly-variable stock, regardless of its stock size, and so, anyway, that's all I wanted to say.

CHAIRMAN LORENZEN: Thank you. Shannon, do you want to respond to the question about the Ralston method?

DR. CALAY: Sure. Basically, what he's done is calculate the deviations in the mean -- So he's calculated the mean SSB, spawning stock biomass, trajectory across all historical assessments of seventeen stocks, by species, and he is calculating log-scale deviations from the spawning stock biomass mean, and so, in that sense, he's actually creating a PDF of your estimate of spawning stock biomass as a proxy for the OFL, and that is where he gets -- When you look across all seventeen of their frequently-assessed stocks which are considered to be data rich, he gets that sigma of that PDF of 0.36.

That's how he's doing it, and I believe that the paper is included in the SSC materials, and so that is the answer to the Ralston question, and I don't know if you wanted me to respond to anything else right now, and I'm trying to keep track of the questions as they arise.

CHAIRMAN LORENZEN: I thought the other thing was more of a comment, and I think the Ralston question was a direct question, and is that right, Cam?

DR. AINSWORTH: My other question was whether the ramping threshold needs to account for stock biology, but, if you want to move on, that's fine.

CHAIRMAN LORENZEN: Okay. Yes, I think that's more of a discussion point that we should come back to again, and thank you, Cam and Shannon. Sean.

DR. POWERS: Thanks, Shannon, for the presentation, and I appreciate the effort, because, obviously, what we want to try to do is remove some of the subjectivity that we had in setting ABC previously.

The issue that Will raised, I do want to turn one of those into a question. Can we estimate, or look at, sigma for the Gulf? Is there sufficient studies done, or would a new meta-analysis need to be done for the Gulf?

DR. CALAY: So we would need a new -- We would need a complete meta-analysis for the Gulf. We have looked at some key species, from time to time, and found similar sigma, but we haven't created any new analyses since the meeting several years ago, and not even the most recent one, and so it is our intention to do a Ralston-style approach that would inform sigma min for stocks that are frequently assessed in the Southeast region.

However, that is not done yet, and that would take some time, and so the Center's proposal was, until that time when we do have a Southeast-specific analysis, we would employ the Ralston sigma min as a proxy, or some value that the SSC considers more plausible. In the case of the Caribbean, they did not feel that their assessments were as high -- Well, they felt the data limitations were stronger in the Caribbean than they are in the Pacific, and so they chose, even in Tier 1, to use a sigma min of 0.5, which is larger than the Ralston guidance.

DR. POWERS: Okay, and so, until that meta-analysis is done for the Gulf, then we're still left with subjectivity for that value.

DR. CALAY: You are.

CHAIRMAN LORENZEN: Thank you. Doug.

MR. GREGORY: Thank you, and thanks, Shannon. This is a long time coming, and I had a couple of comments and a question, and I will only briefly go on a soapbox about we will never define uncertainty, or measure it, anywhere close to what it really is,

and I think the National Standard Guidelines have sent us on a wild goose-chase with that concept.

The other thing is the ramping of MFMT is totally different from the P* conundrum we've been dealing with, and the ramping was not necessary, as you said, when we were using one minus M for the MSST, but, at 50 percent of the biomass, we do need to be reducing the fishing mortality rate whenever the biomass gets below MSY.

I will just reiterate basic theory, and that is, at MSY, the virgin population has been reduced by half, the biomass. At 50 percent of BMSY, the virgin biomass has been reduced by 75 percent, and so, at 50 percent MSST, we're in trouble already, and the saving grace of this collection of concepts of overfishing and overfished is that the -- By being held to the overfishing standard, the fishery should never drive a fishery down to MSST, the way it is now, but some environmental catastrophe could, and so that's the projection.

I like the ramp from BMSY going down to some B critical, and you chose, as an example, 10 percent, and the North Pacific Council does something similar, and, to address something that Will said, the North Pacific Council ramps both OFL and ABC, and I don't quite -- They use a similar type of calculation that you do, and I'm sure you're familiar with it, but they apply that scalar to some average, and the OFL is the arithmetic average, and the ABC is a harmonic average, and so I thought that was kind of intriguing. I think we ought to look at that as we adopt this ramping thing. We're going in the right direction there, I'm sure.

Relative to uncertainty, another thing the North Pacific Council did, at one time, or does do, is they take the sigma from the stock assessment, and then they add more variance based on the index that's used for the stock assessment, I guess the primary index, or it could be a combination of indices, because the survey is an index of the population, historically and present, and so that might be a good indication of the uncertainty in the population, and so adding those kind of sigma might be a fruitful approach.

Then I've got a question, or two questions. On Slide 17, you mentioned -- You've got a scalar, and you've got D equals the scalar times the formula that is similar to what the North Pacific has, but what is that scalar? Is the scalar -- It's not D, and the scalar becomes D if you're at BMSY, which means the scalar is probably one, but I am confused by that, and I don't

know what the word "scalar" represents. Again, this example is scaling ABC and not OFL, or MFMT, as the graph suggests, and so there seems to be some confusion there.

Then it seemed like we need to define what is an acceptable buffer, because everybody is worried about the buffer, but the buffer is the end result of the process, and I think, if you look at some of the other councils, they have similar buffers that we do, and so do we start with that? Do we say we want a buffer that's at least 10 percent, or at least 15 percent, below OFL? If we do that, that's arbitrary, and it kind of defeats the whole complicated, formulaic process of P* and uncertainty, because, if we define an acceptable buffer, we can just apply that to everything and simplify it.

I bring this up because we've talked about the Ralston method for a decade now, and I keep pointing to Slide 16, and we've been using a P* of 0.35 or 0.4, or 0.3 to 0.4, and, at 0.35 to 0.4, the buffer is about 10 percent, or 12 percent. At 0.3, it's about probably 16 or 17 percent, and so, from the Center's preference for the Ralston approach, 20 to 10 percent seems to be an acceptable range, and I'm inferring that.

That's all my comments and suggestions. I'm glad we're doing this, and it is going to take some time. Thank you, Shannon. That was a good presentation.

CHAIRMAN LORENZEN: Thank you, Doug. Luiz.

DR. BARBIERI: Thank you, Kai, but I'm going to wait, because what I really want to do is have more discussion of some of these points, and so I think I'll wait until later, until we have the additional components here.

CHAIRMAN LORENZEN: Okay. Thank you. Lee.

DR. ANDERSON: I'm tempted to wait too, but I would just like to say that I agree wholeheartedly with Will. You're just changing one thing, and Doug's point was the same thing. You can select the 10 percent, and that's just doing it the other way. I guess, no matter what we do, we're going to have some arbitrariness, and I know there's a line in some law somewhere that says you can't be arbitrary or capricious. Well, I think we're going to end up being arbitrary no matter what we do, and we won't be capricious, because we're going to be spending a lot of time thinking about it and arguing about what the value of the fee should be. I might come back in later. Thank you.

CHAIRMAN LORENZEN: Thank you, Lee. I'm not seeing any other hands, and so I would actually suggest that I will go back and I might do my little presentation, because I think, based on the comments we had from Will and Doug and Lee, they were sort of quite fundamental questions about the approach to characterizing uncertainty, and so I think we should perhaps talk about that before we get into the more detailed look at different ramps and so on, and I think we should deal with the big-picture questions first. Paul, do you have a question on this presentation, before we move on?

DR. SAMMARCO: Thank you, Mr. Chair. Just a very brief comment and a note to Shannon. Shannon, thank you very much for this presentation. This is a very complex issue that you're talking about, and that everyone has been talking about, but it needs to be talked about.

Anything that will sharpen the edge of this knife, to make it a little better, and a little bit more effective, I think helps everyone, and so it may be perfect, and it may not be perfect, and it maybe needs to be looked at a little bit more deeply, but thank you very much for delving into it and presenting this to us and providing more food for thought and more hands-on work. Thank you.

CHAIRMAN LORENZEN: Dave, is that a question to Shannon's presentation?

DR. CHAGARIS: Yes, I do have a question for Shannon, and excuse me if it's maybe not the best place, but I don't see where it might come up later, and so my question is actually going back to the stock assessments, and I'm just curious what you guys have attempted there with the Gulf assessments.

You say you invert the Hessian, and that generates the PDF, but, if you look at what they're doing at the Beaufort Lab with the BAM model, they have some other approaches, the MCBE analysis, that seems to be able to reflect more of the uncertainty, at least in a few of the key parameters, and I am just -- It seems like we've kind of moved past that, and I'm just wondering if that's all been fully explored, and is there potential to resolve that issue at the assessment phase?

DR. CALAY: Dave, thanks. That's an excellent question, and that is something that we have a working group on right now, and Katie Siegfried can answer that question, since she is leading that effort.

DR. SIEGFRIED: Thanks, Dave, for that question. Since I've been on with the Gulf group, and I came from the Beaufort Lab, I do have that perspective, and I've been working with Nathan Vaughn and a whole working group, trying to develop some of those uncertainty analyses for the SS models.

One of the things -- The place we're starting is with forecasting, and what we're trying to do either develop the MCBE approach, like what Beaufort does, or a multivariate normal approach on the different parameters, which is what the ICCAT group does, and pull all of those uncertainties out and then use them as we project, and that sounds real simple, but I'm sure, as you all know, that's -- We have to go through it individually and determine how to do that for parameters and then work that into the assessments as we go.

We have gag going now, and we have scamp going now, and we're not sure that we're going to get these uncertainty analyses completed in their totality by the end of those assessments, but we do want to start reflecting more uncertainty through to the end for our projections.

I do think that Lissa might be reaching out to you, Dave, about some of the red tide stuff, and I know that Skyler and Francesca have been working together on the uncertainties in their models that are sort of proceeding in parallel, and so we are on it, and we would like to talk to the panels and ADTs about this as we continue to develop the uncertainty analysis.

DR. CHAGARIS: Thank you, Katie and Shannon.

CHAIRMAN LORENZEN: Thank you. Okay. Let me go ahead, and this is really about -- What I am looking at here is not the ramping, but it's the P* and uncertainty question.

Basically, the problem that we're looking at here is that the ABC Control Rule is used to set ABC at a defined level of risk of overfishing and based on scientific uncertainty, or the sigma, and the council's risk policy, which is really what is in the P*.

Most assessments underestimate scientific uncertainty, or the sigma, and, therefore, the true risk of overfishing at a given ABC is higher than implied by our application of the ABC Control Rule, quite generally, and the purpose of the revision, really, is to better characterize the true scientific uncertainty and the risk of overfishing.

For example, here is the overfishing limit and the PDF of the OFL, as it comes out of the assessment model, with a relatively sort of narrow sigma, and we know that the true uncertainty is typically a lot larger, and we usually don't know what the true uncertainty is, but what we do know is that it's a lot larger than what we're getting out of the assessment model, generally.

Then we have the Ralston method, which, basically, is a meta-analysis-based approximation of the true uncertainty in assessments, and, because, as was discussed, it was using Pacific coast assessments in that meta-analysis, we believe it reflects uncertainty in relatively data-rich assessments, and, typically, the uncertainty that we will see in Gulf assessments should be a little wider than that, but certainly the Ralston meta-analysis should give us a closer approximation to the true uncertainty than what we're getting out of our assessment models, in general.

I am converting all of those probability density functions into the cumulative probability of overfishing, and so that's what looks like, and, I will hone-in on the central part here, and so what I'm showing you in the next slide is just that central part here, and so we have the probability of overfishing, as it comes out of the assessment, the red dotted line, and what might be the true uncertainty, that generally we don't know, and the Ralston method, which is the black dashed line.

What we do is we go into our ABC control rule, the dimensions table, and so say, out of that table, based on the characteristics of the assessment, we derive a P* of 0.41, and, so basically, what we're looking at is a 41 percent probability of overfishing, nominally, and we apply that to the assessment-derived probability curve here, and so that's how we get the ABC. In this case, that's where our ABC would fall.

Now, because we're actually basing this ABC on an application of our risk policy to a sigma that underestimates the true uncertainty, it also means that the de facto uncertainty that we have at this level of ABC is a lot higher than our nominal level of uncertainty.

Basically, if we go up there, you can see the de facto risk would be what is implied by the actual uncertainty that we don't fully know at that level of catch, and so, in this case, for example, what we think of as a 41 percent level of risk of overfishing would turn out to be actually a 47 percent risk of overfishing.

What the new ABC Control Rule would do, as proposed, and this is not thinking about the ramping feature, but we're looking at a situation now where we have a stock that is not overfished, and so we're just applying the F at the maximum fishing mortality threshold to the population for the OFL and then applying a risk policy to set the ABC, and then you can see that, basically now, we have two things here.

We have the ABC that was set using our previous control rule, and the true probability of overfishing here would be equivalent to a P* of 0.47, whereas, if we applied the intended P* of 0.41 to the true uncertainty, or the uncertainty implied by the Ralston method, we end up with a substantially lower ABC, because we're switching from our underestimated uncertainty to a more realistic estimate of uncertainty.

There are several options here, and, obviously, this does not consider options that are not directly on the table at the moment, and, basically, what this is look at it is what does our current ABC control rule do, and so, if we keep it as it is, basically, the consequence of that is that, because the uncertainty estimate that we're using is unrealistically low, the risk level is actually greater than was formerly assumed.

We could transition to the proposed new ABC control rule with the Ralston sigma as the sigma min and keep the current formal risk policy in place, and so that would be what on the previous slide is the ABC you end up with to the left-most ABC, and so, basically, what that would mean is that the ABCs would be approximately correct, certainly more correct for the intended risk level, than our ABCs are at the moment, but it will also, almost inevitably, mean that we will get lower ABCs out of that control rule than we're getting out of our current control rule, and so we would have better science involved, and we would have a more realistic estimate of uncertainty, and a reduced risk, but the consequence is that the ABCs for a lot of stocks would end up being lower.

Also, one could transition to the new ABC control rule with that Ralston sigma as the minimum characterization of uncertainty, but use what is the current de facto risk policy and sort of basically make that formal, in which case what we would end up with is a better characterization of uncertainty, but, because we're accepting higher risk levels than we have before, formally, but no de facto, and sorry if this is confusing, we would not see a big change in management, and so we would end up with similar ABCs, but we would acknowledge that actually the risk level at which we are setting those ABCs is higher than we

thought.

Then Number 4 is that, of course, one can modify that risk policy, either during the transition or later, and so there are many sort of intermediate solutions, and, also, there are the features that I haven't discussed here to do with the ramping that also effectively applies modifications to the effective risk policy as the stock declines.

Also, of course, there are options that are not mentioned here, because I was looking specifically at our current control rule versus the new proposal that Shannon presented, but there are, obviously, options that are completely different, and I think Will, Lee, and Doug alluded to that.

One could set the buffer and sort of divorce that more from the direct use of the uncertainty, but it seems to me that, really, the first question we should tackle in our deliberations about this is that question of uncertainty, and do we feel that moving to the sigma min approach gives us a better characterization of uncertainty than we are getting directly out of the assessments, and do we want to build the revised ABC control rule on that basis, or do we feel that something more radically different is needed, and I think we'll pose that question, and, obviously, I would like to throw that back on the committee. Okay. That concludes my presentation. Thank you. Any questions or comments? Doug.

MR. GREGORY: I thought the analysis you did of the P* was pretty damn eloquent, but I think, in one of your slides, you had the lines mislabeled. You had the 0.41 and 0.47 backwards, and it was on Slide 12. Am I correct in that? I understood what you were talking about, and it lays out perfectly, and so thank you for that.

CHAIRMAN LORENZEN: Thank you. There is one line here that -- No, I don't think there's anything mislabeled on this one, although it's a little bit confusing, but let me take the other questions. Thanks, Doug. Luiz.

DR. BARBIERI: I agree with Doug there, Kai. This is a great way to discuss these issues and lay on the table some of the factors here that we need to consider, and I don't have really a specific question about your presentation, but, thinking about it, I'm wondering whether we have a way, looking through what we've done in the past, to assess the performance of the current control rule.

I'm thinking about your Option Number 3 there that was presented in your last slide, which basically says that we are probably underestimating uncertainty, as we are doing this right now, but what are the consequences of this underestimation of this imperfect knowledge of what the uncertainty is, and, to me, that would come from us looking at the performance of our ABC Control Rule, in terms of -- If we are underestimating the actual risk of overfishing, have we created problems there, in terms of stock sustainability?

I think we had a presentation, and it's been years and years ago, that I think Clay presented, and Shannon may remember this, because it goes way back, where an assessment of this was presented that was showing what the outcome of our ABC Control Rule application had been, in terms of the actual ABCs and a comparison in terms of the projections that come out of the assessment and how that performance turned out, but, anyway, I will stop there. Thank you, Kai.

CHAIRMAN LORENZEN: Thank you, Luiz, and I think that's a very good point, and I don't know, Shannon, if you had your hand up -- Is that a response to Luiz's recollection of that presentation?

DR. CALAY: I was actually just noting that I don't have a raise-hand feature on this webinar, and so I had typed it in the chat, and we could certainly look for that presentation and resurrect it. Certainly nothing has been done particularly recently to address that, but we do have a number of ideas for how that could be addressed, and it's really just a matter of prioritizing the research questions.

CHAIRMAN LORENZEN: Okay.

DR. CALAY: Just, in closing, I did kind of want to say that I'm going to present a variety of options that the Science Center has provided to you, but what we want most out of this meeting today is a conversation about what you are interested in seeing, so that, for the next webinar where we discuss ABC control rules, we can bring to you some of that supporting documentation.

CHAIRMAN LORENZEN: Right, and that's what I was thinking, and so this might be that past performance that might be a very useful piece to bring. Thanks, Shannon. Lee.

DR. ANDERSON: First, I would like to say that I thank all the presenters who went before, and especially Shannon. I may have

shone some bad light on her by saying it hasn't changed much, but I think that the new thoughts on this is nice, and you can separate those things out into two different things, but one thing I would like to bring up, and that is, as an economist, I've got to talk about opportunity costs.

We talk about -- In the back of my screen, I can see those slides that Kai put up, and those different angles mean that, as you change a little bit, we're changing how much fish we can put on the dock, and that is the opportunity cost of doing that. When we change this, we say that we reduce the risk of overfishing.

What is the penalty for overfishing? We haven't mentioned that at all. If we're going to pay a price to reduce the costs of overfishing, to reduce overfishing, we ought to know what we're gaining, and I have said this before, and sometimes we get a little into it, but I think we should be a little more explicit about what we're giving up when we're moving these things along, and that's a lot of food on the table. Thank you.

CHAIRMAN LORENZEN: Thank you, and that's right, and that's really where the risk policy aspect here comes into it, to decide what is an acceptable risk and what are the consequences. Thanks. Will.

DR. PATTERSON: In the first comments I had, I didn't thank Shannon for her presentation, and I should have. It was quite thorough, and so was Kai's here, and, obviously, the intention was not only to propose perhaps a modification, or change, in the control rule, but, as a thought exercise, to think about where we have been, and potentially where we could go, and so I think both presentations did a really nice job of doing that.

As far as Kai's presentation here, I think sigma -- It is a measure, or a proxy, for uncertainty, but the reason we say it doesn't fully capture uncertainty is because, really, it's a measure of the precision, or imprecision, in our estimate of OFL. In all of these assessments, when we accept them as the best scientific information available, we're basically saying that the OFL produced is accurate, but we know that it's not accurate and that there's bias in that estimate, and then the sigma -- We're basically, in this approach, in this P* approach, we're indicating that, okay, this is capturing the bias and the precision, imprecision, in that estimate, but it doesn't quite do that.

The P* itself really isn't a measure of risk, but it's just a

measure of the probability of overfishing, given -- Just predicated on the assessment results, either imposing a sigma or driving sigma from the assessment result, but it's just the probability of overfishing, and so the risk, as Lee points out, is much more complicated than just the probability of overfishing, because then you also have opportunity costs, and we haven't really looked at, as Luiz's question pointed out, how well the control rule has performed, and, really, there are two main objectives, to avoid overfishing and to produce OY.

Well, as we all know, OY is ill-defined in all of these examples, and there are some proxies for OY that have been used, such as in the Restrepo et al. approach, but Lee's comments about yield foregone are important, and they become more important the closer the biomass is to BMSY or being above BMSY.

We tend to think of things as around the MSST, because, for many of our stocks, they are there, or between there and BMSY, and we've done a good job, since 2011, of avoiding overfishing, in most cases, and so the stocks are trending upward. However, there will come a time when the stocks are recovering to such a high level that people really start to question what are these buffers doing, and so there's not only the opportunity costs, but then there's also the management buy-in costs.

That should be something the council, more so than us here at the SSC, is really focused on, is what are you getting for this reduction of two or three million pounds, or whatever it ends up being for a given assessment, and so, again, I will just reiterate my earlier comment about an approach that really scales this as a percentage reduction, and so, if you have an FABC that is a reduction as a percentage from FMSY, which is really the yield from that, and that's the OFL estimate, then that scales as the population recovers.

As the population approaches BMSY, or exceeds it, then that buffer shrinks, which makes sense, intuitively. It should, and you could put into place an ACL, perhaps, control rule, on the council side, that avoids any type of management measures that are required as penalties for exceeding the ACL on that end, once you're above BMSY, and you're in a much safer zone, and so the penalties should be much less severe, and so that issue of, well, we're too close to the OFL, and that causes issues downstream for the ACL, you can alleviate that by creating commonsense rules on that end of it.

Anyway, I really appreciate the thought exercise here, from Shannon's earlier presentation and then from Kai's approach

here, but I just don't think -- I don't think this is enough of a change from what we previously had that it's going to change the outcome of what we've previously done.

CHAIRMAN LORENZEN: Thank you, Will. Jim.

DR. NANCE: Thank you, Mr. Chairman. I really appreciate both Shannon's and Kai's presentations also, and I think, for me, the biggest impact is the concept of divorcing P* and sigma, and I really do think that's important, so that we're talking about -- In our discussions, if we're talking about sigma, we have that, and what's the range of that value, and then, once we determine that, through some scientific means, whether it's modeling or whatever, and we have a better estimate of that sigma, then we can use a P* type thing to then provide a buffer that's for ABC, and so I do think that it's important that we divorce those two concepts, and I appreciate that. Thank you.

CHAIRMAN LORENZEN: Thank you, Jim. Anyone else? I guess there are two ways we could go from here. We can continue to discuss -- I think the first big question is about the characterization of uncertainty here, and we can continue that, or we can look at the examples that Shannon has and then return to that question. Doug.

MR. GREGORY: Thank you. To what Jim said, we did divorce the two concepts. The council told us to use any risk level between 0.3 and 0.4, and we use the spreadsheet to determine that. I mean, they're not completely separate, but the problem was, when we went to the council and said, well, what risk level do you want, they turned around to us and said, well, what do you recommend, and we ended up with what we got. In a way, it is kind of separate. The council did set the risk level, but they gave us a range to work with. Thank you.

CHAIRMAN LORENZEN: Thanks, Doug. Luiz.

DR. BARBIERI: Thank you, Kai. Really quickly, I just want to bring up a point on something that Will said earlier that I think is important, and, Will, correct me if I'm wrong, but I think what he brought up is, right now, we are looking at this exercise here and focused on the within-assessment uncertainty characterization, and I think what he was bringing up is that there's another component between assessments that also needs to be taken into account, and, of course, the Ralston approach explicitly tries to account for this, but, still, we don't know how different assessments that are conducted, using either different models or different data streams, could actually come

up with different values of that MSY, and they're still estimates, right, and so, to some extent, this is something that we struggled with, to some extent, and I think it's an important point, and so I just wanted to bring this up.

CHAIRMAN LORENZEN: Thank you, Luiz. Will.

DR. PATTERSON: There was a meeting, about a year or so ago, where Clay actually presented sort of an alternative approach here that had percentage reductions from OFL as part of an alternative ABC control rule, and, as we move forward with this, I guess it will depend on the ideas of the SSC and what folks want to pursue here, but, as we move forward with this, it seems like there could be a parallel process, where that other type of approach was also included, if we wanted to look at performance.

I think it would be important to do that, not just at the types of stock levels that we see now relative to MSY estimates, but also as stock levels approach BMSY or above that, because we're heading in that direction, as the Act was intended to push things. If you're not overfishing, then you're building to biomasses that are above your current level.

I would like to see that, and the other thing I just need to say here is, unfortunately, I've got to jump off this for a little bit, starting at 11:00 Eastern time, and so I'm going to miss a bit of this discussion, but hopefully I can jump back in whenever I get back on the webinar.

CHAIRMAN LORENZEN: Thank you, Will. Shannon.

DR. CALAY: Thanks, Will. The Science Center will certainly pull up all of the candidate presentations we're given over the years, and we have been working together, in a cross-laboratory ABC control rule effort, and this Tier 1 proposal that I'm showing you is essentially the result of that to-date, although that is still certainly under consideration, and so I will be showing you, in the spreadsheets, a lot more about the Ralston approach and about how these control rules actually function and what bells and whistles there are that could be considered by this SSC, and so hopefully things will become a little bit more clear when we go through the examples, but, in any case, if there are alternative approaches the SSC would like to discuss, we would be more than willing to consider those as well.

CHAIRMAN LORENZEN: Thank you, Shannon. What I suggest is we do a short break, until 11:00 a.m. Eastern, and then we'll follow that up with your demonstration, Shannon, so that we have

everything on the table, and then we'll return to the bigger discussion, and so let's take a break for twelve minutes, until 11:00 a.m., and then we'll hear what you have to show us. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN LORENZEN: Okay. It's 11:00 a.m., and so let's get back into the swing of things, and so next up is Shannon with her demonstrations.

DR. CALAY: All right. I am ready when you are, Kai. Thank you. There are several tabs in this spreadsheet, and the one I'm looking at is called Pre-Decisional Gulf of Mexico Fishery Management Council ABC Rule Demo Version 3. A reminder that this is, so far, just Tier 1 of this control rule.

The very first thing that I just wanted to discuss again is the Ralston approach, just so that we're all clear on how this is working, and, essentially, the Ralston approach does create a direct mapping between sigma, P*, and the percent of OFL that will be produced, and that is what is shown in this Figure 7, which is from the Ralston document.

Just to assure myself that I have correctly coded the Ralston approach, I have gone ahead and calculated it here in this spreadsheet tab, which is called ABC OFL Buffers. Are you guys able -- Can you see my pointer?

CHAIRMAN LORENZEN: Yes.

DR. CALAY: Okay. Good. Thank you. Here in Column A, I have the P* from 0.5 to 0.25, and standard deviations of 0.36, 0.54, 0.72, and 1.44. I have this coded so that you could change the D multiplier that is actually specified in the ABC Control Rule, but let's not do that right now. Let's just leave that at one, so that we can see how -- That this maps to the Ralston paper, and I will tell you that it does, but what I am pointing out here is that, as you increase the sigma, the buffers that are produced become larger, and so, obviously, at a P* of 0.5, there is no buffer, in any case, between OFL and ABC, at any level of sigma, but let's look at 0.4.

At a P* of 0.4, and a sigma of 0.36, the ABC is 91 percent of OFL, and, by the time you get down to what Ralston called a data-limited sigma of 1.44, your ABC is 69 percent of OFL.

Then, if you were interested in looking at the value of various

Ds, while changing sigma, that's what is here on the right-hand side, and so you can change this sigma say to 1.44, and look at various Ds, and you will see that this Column F here, with a sigma of 1.44, and a D of one, corresponds to this sigma here, and so this is just a tool for you to explore how this functions in a demonstration that, in fact, I am able to return the same values that you see in the Ralston paper.

That's just this figure here, which shows you the buffer, the fraction of OFL that is ABC at the various sigma, and it does correspond exactly with what's in the Ralston diagram.

Remember that those Ds are actually a function of the stock size, and, as you would expect, as the stock size decreases, the D value also decreases, and the buffer between OFL and ABC increases, and so that's all I'm showing you here, and it is the behavior that one would expect to see.

Moving back to the ABC control rule that appears in that presentation, this is on the tab of the spreadsheet called Example of Control Rule, and what I've done here is just a little fake population that has a BMSY of 1,000 units, a B critical value of 10 percent of BMSY, and the MSST is 50 percent of BMSY, as it is for many of the Gulf stocks. The scalar, which we can just leave alone for now, and I will describe this again later, is set to one, which is what we would consider the default, and it would apply to anytime that the council employs a P* less than 0.5.

There's a place here that you can put an M value, if your MSST calculation actually does involve M, which it does still for some Gulf stocks, but it's not used in this particular spreadsheet, and here is a place that you can put in a new sigma min value, or a new P*, and it will recalculate the Ralston multiplier, which is that, essentially, just the buffer, and it is the fraction of OFL that corresponds with ABC, and so this 0.91283 just means that, at sigma 0.36 and P* of 0.4, ABC is 91.3 percent of OFL.

These first two columns just calculate the D value, and remember D is that ramping feature, and so, when you're above -- Let's use the BMSY one first, in Column O, and that corresponds the blue line here, and so, in this one, the ramp is calculated with the hinge at BMSY, and it's the blue ramp, and so, when you're at or above BMSY, which, again, is 1,000 in this case, then the ramp, the D value, is simply one, and so there is no deduction due to the biomass level, but, at values below BMSY, you start to see that ramping feature, where you apply a buffer just on

the basis of how far below BMSY you are, and it's a linear -- In this case, it's just a linear decrease between BMSY and B critical, which here remember is 10 percent of BMSY.

The Column P is that same ramp, but now applied to hinge at MSST instead of BMSY, and so this one is one above MSST, which is 500, and then it descends to zero, an ABC of zero, at B critical, just like the blue line did, and now Columns Q and R calculate the actual -- I am going to call it a buffer, even though that's a poor word, but the actual fraction of ABC, fraction of OFL that is ABC, when you apply both the ramp and the Ralston buffer, which is controlled, again, by the sigma min and P*.

You will see here now that, when you're above BMSY, or the application of the ramping feature at BMSY, the only deduction here for scientific uncertainty is due to the Ralston multipliers, and, likewise, with the MSST ramp, anything above MSST, the only deduction from OFL is due to the Ralston multiplier and not the ramping feature.

This is able to be adjusted, and so, for example, if you wanted to say sigma min was much smaller, and let's say it's more like 0.1, which is more akin to what we get out of our stock assessments, and that the P* is roughly 0.4, which is not too far off what we typically use in stock assessments, you will see that the buffers, when you're above the hinge point, are very small.

Even when you're looking at MSST, and so this column R with a hinge at MSST, it's very much like how our current rule functions, and it produces very small buffers when you're above MSST, because we're applying FSPR 30 directly, MFMT directly, and what's different is that these values below the hinge are now created by the ramping feature, when, under the current control rule, they're produced from a projection of F rebuild.

Then, if you wanted to say a sigma min of much larger, and say you're looking at a sigma min of 0.5, then all of these buffers are recalculated based on the new buffer that would apply from the Ralston approach, and so you can also, here, adjust the B critical value, if you wanted to look at something different. If you wanted to remove it entirely, you can, and now it's gone. If you wanted to look at a higher B critical value, say 20 percent of BMSY, you can do that, too. This is how the control rule functions for these two options. Are there any questions so far, before I move into the examples?

CHAIRMAN LORENZEN: Any questions for Shannon? I am not seeing any hands, and I guess we're good to go.

DR. CALAY: Okay. All right. First, I will look at a stock that is actually above BMSY, and so we're way out in this range here, where the only buffer you're going to get is due to the Ralston sigma and P* values.

This is from your SSC report, or, actually, this is from our executive summary, and it just shows you the actual values that come from the vermilion snapper base case, and this is from your SSC report, and so the OFL that was selected by the SSC is 8.6 million pounds from 2021 to 2025, and so that's what I have typed here in Column O, is 8.6 million pounds. The ABC selected by the SSC was --

MR. RINDONE: Shannon, can you zoom-in just a little bit? Some of these numbers might be a little hard for some to see. Thank you.

DR. CALAY: Thank you for bringing that to my attention. The ABC that was selected by the SSC, and I do so love the acronyms we use, was 7.27 million pounds for the same period of years, and it was actually computed from the FOY, and so it's the yield at 75 percent of F SPR 30, and that's what I have typed here in these cells, O-14 through 18, is the current ABC.

Again, in this case, we're above BMSY, well above, in fact, and we're at about 1.74 times BMSY, and I have just selected a B critical value, and it doesn't matter in this case, of 10 percent, and the MSST is set at 50 percent of BMSY, a scalar of one. Sigma min, from the data-rich Ralston species, is 0.36, and the theoretical P* I selected is 0.4, and, so, again, this returns a multiplier, so to speak, from the Ralston approach of about 91 percent, and that's exactly what you see here and here.

Remember that, in this case, whether you apply the ramp at BMSY or at MSST, you are above BMSY, and so the only deduction that would be taken between OFL and ABC is due to the Ralston sigma min and the Ralston P*, and so ABC is 91.3 percent of OFL for either approach, and that corresponds to 7.85 million pounds, because you're reducing this directly from OFL. You're applying that multiplier to reduce from OFL, and so this is not calculated now on the basis of FOY, and it's calculated as a reduction from OFL, which is computed using F SPR 30. Is everyone clear on this example?

CHAIRMAN LORENZEN: I can't see any hands, but I just wanted to

add here that I implied, in my presentation, that usually we'll see, by moving to the Ralston sigma and keeping the current risk policy, we will often see a reduction in ABCs, and that is not the case here, but the reason is that, in this case, we determined ABC based on OY, rather than using the P*.

DR. CALAY: That's exactly correct.

CHAIRMAN LORENZEN: Just to verify that. Okay. Thank you, but I don't see any other hands.

DR. CALAY: Just so -- You will see it in the subsequent tabs, but the current application of OFL and ABC produces an ABC that is 84.5 percent of OFL, whereas either of the two suggested approaches produces an ABC that is 91.3 percent of OFL, and so that's what these percentages mean.

I did want to point one thing out, which will apply to any of these examples, and that is that, in our proposed control rule, that D value, that scalar, actually depends on the biomass, the spawning stock biomass, level.

In this particular case, because you're above BMSY, nothing will change, but, if you are in a rebuilding condition, that BMSY level will increase each year as you rebuild, and so you'll see this when we get to amberjack. There is a nuance that we could put in where we actually recalculate D in each year, to give you the most fish you could possibly get in a rebuilding plan, but that has not been done yet for this spreadsheet.

King mackerel is actually between MSST and BMSY, and so it's very close, in fact, to BMSY, and it's at 92 percent of BMSY, and it's at 1.12 percent of MSST. For those of you who are like, oh my god, but it's MSST 50 percent of BMSY, yes, it almost always is, but, in this particular case, for king mackerel, MSST is still one minus M times SSB at MSY.

MR. RINDONE: Excuse me, Shannon. You mean 112 percent of MSST.

DR. CALAY: Thank you. Very correct, as usual, Ryan. Thank you very much. This is why a tag-team approach is always a good plan. Right. We're at 112 percent of MSST, 92 percent of BMSY, with king mackerel.

We're basically in this region where these two proposals differ somewhat, right, but we're very close to BMSY, and so the difference should be small, and, again, I have left the specifications the same, except for that MSST now is actually

one minus M times BMSY, as it is for the current management advice. Sigma min is still 0.36, and P* of 0.4.

Now you will see that, because you're above MSST, the only reduction here is because of the Ralston sigma and P*, but you're actually below BMSY, and so you're now invoking the ramp, to some extent, and so that's why this reduction is actually a little bit larger, because there is that ramping feature now being invoked, and so, in summary, these are your current OFLS, in Q-7 through 9, and, in Q-11 through 13, these are your current ABCs, which, in this case, is from a projection of actually another one that's an OY projection, and it's actually the projection of 85 percent of SPR 30.

It produces ABCs that are between 86 and 89 percent of OFL in the current situation. If you use the BMSY ramping feature, it produces ABCs that are 83 percent of OFL, and, if you invoke the MSST ramping feature, you're at 91.3 percent of the current OFL, but these are relatively similar, because you are in this area where the two control rules behave similarly. I am going to move on to amberjack, which is the stunning example, as long as the group is ready.

CHAIRMAN LORENZEN: Shannon, just to add again, and so this is interesting, and, again, the second example was one where we used FOY, and it -- It's a little more complicated, and they're closer together, as you said, and sometimes the application of the new control rule, depending on how you do the ramp, might be a little less conservative than what we get out of the FOY here, and so I think this is something interesting to note, that, compared to some of our FOY approaches to setting ABC, this new control rule may not always be more conservative, and it could be the opposite, compared to the P*, as we have used it in the past with the assessment-based PDF, and that should generally be -- The new approach should generally return more conservative ABCs, and so that's just something to note for our later discussion. Thanks.

DR. CALAY: Yes, thanks.

CHAIRMAN LORENZEN: Doug.

MR. GREGORY: Just a question, an observation. Using MSST, that S column, you get a buffer that's 9 percent from OFL, but, with the BMSY, it's 17 percent, sixteen-and-a-half percent, and I'm surprised at that large difference, given that the biomass is at 92 percent of MSY. Is it because the biomass is closer to the MSST than it is to the MSY? Does that difference make -- Does

the location of the current biomass between MSST and MSY make a difference?

DR. CALAY: Yes, it does make a difference.

MR. GREGORY: I'm surprised it was that large though, and that's all. I am not questioning the --

DR. CALAY: Right here, where you're about at -- Let's see, and I think you're at 0.92 percent of BMSY, correct? Yes, 0.92, and so this is the part of the rules that you're in, and so, if you apply the MSST rule, you're only looking at the buffer caused by the Ralston scalar, and there is no D, ramp, feature at all here, right, not at 0.92, because you're above MSST.

If you go down to the blue line, now you're invoking this ramping feature, because you're below BMSY, and the reason why this difference is so large is because this linear regression is quite aggressive, which is what I'm about to show you with the greater amberjack example. It's aggressive, and it's, frankly, a little bit more aggressive -- Well, maybe even significantly more aggressive than our typical rebuilding plans, and so the Science Center has some thoughts about that, too. This could still be something that we are able to further examine.

MR. GREGORY: Yes, and I know the North Pacific Council uses an alpha of 0.05 for their adjustment, for their D, I think, but, okay, let's go on. Thank you.

DR. CALAY: There are refinements that we are willing to make, and that's one reason to show you these examples, so that we can have that discussion, and we can bring them back and look at some options that might be of further interest to the SSC, and so here's where you're going to see how aggressive this ramping feature can be, and so here's greater amberjack, which is currently overfished and in a rebuilding plan, and here are the OFLs and ABCs that are on record from the SSC report, and, again, that's what I have typed in here to Column Q, and 8 through 10 are current OFLs, and, in Q-12 through 14, the current ABCs, and, in this case, derived from a rebuilding plan.

Now, if you invoke the ramping feature beginning -- Let's go down, and it doesn't really matter where we start, and so the MSST, again, is 50 percent of BMSY, in the case of greater amberjack, and I have just used the same default sigma min and P* that are in the other examples, and these can be adjusted, if you want to see the effect, but what you'll see here is you are now at 34 percent of BMSY in this example.

You are way down here, right, right about here, where the ramping feature is causing a very big buffer now between OFL and ABC, bigger than the Ralston buffer by a substantial margin, and the difference between the MSST inflection point and a BMSY inflection point is also pretty pronounced, and so here is what is actually produced now when you look at the combined effect of both Ralston and the ramp when you hinge at BMSY, is that the ABCs that are produced would be 25 percent of the current OFL.

You will see here that the current ABCs derived from the rebuilding plan are roughly 1.25 to 2.27 million pounds. If you do it just from the control rule, as described in the blue line, you get values of 0.4 to 0.68 million pounds, about 25 percent of the OFL, and that's what you would expect to see, given that you are on this blue line between 0.3 and 0.4, and so that's exactly what you would expect to see from this control rule.

If you use the MSST ramping feature, you're at-- Again, you're between 0.3 and 0.4, and you would expect to see about 55 percent, ABC about 55 percent of OFL, and that's exactly what you get, and those values are 0.9 to 1.5 million pounds, 55 percent of the current OFL, and so I think you'll see here that both of these approaches are substantially more conservative than the rebuilding plan, which is actually something that, frankly, surprised the Science Center a little bit, is how aggressive these linear connections between B critical and B hinge, so to speak, are.

We do have a few thoughts about that, but I can let that sink in for a moment, and, if you have any questions about this particular slide, we can address them.

CHAIRMAN LORENZEN: I can't see hands, because we're looking at your screen, and so, Jessica, if you see anything, let me know, and we'll let people ask.

MS. MATOS: I don't see any hands, as of now.

CHAIRMAN LORENZEN: Okay.

DR. CALAY: Well, one thing, before we continue, that I wanted to point out is that even this hinge, which begins at MSST, which is the less conservative of the two options, still is actually more conservative than the current rebuilding plan, and there are, obviously, some reasons for that, right? The current rebuilding plan is based on a projection of F rebuild that is limited in the amount of uncertainty it includes, and it only

includes the amount of uncertainty that is contained in the stock assessment itself, and so it still suffers from the same constraints as our determination of OFL itself.

It is based on an assessment with fixed parameters, many fixed parameters, including M and growth parameters, selectivity, retention, et cetera, and it's based on a presumption that we understand recruitment in the future, and it's an assumed recruitment, and it's assumed fishing allocations, assumed fleet dynamics, and so I think we can all agree that the rebuilding plan itself is -- The uncertainty of that rebuilding plan is underestimated, but, that being said, we were -- We had some thoughts about the shape of this linear feature, and, obviously, this can be handled a variety of ways.

One could, for example, create a curve that links these two segments between B critical and B hinge that would be less aggressive when you're at higher stock size, and then a more dramatic approach as you reduce the stock towards B critical, and so that's an approach that I am not going to show you.

What I will show you is essentially the application of a second hinge, and so now what you can do is control the slope of this decline between the hinge and the B critical value. This is meant to be knife-edge, and so let me make it knife-edged right here, and so that's the way it essentially functions, is that there would be -- At B critical, you would go to F equals zero, but you can control, essentially, the slope of this decrease between the hinge and B critical by essentially controlling this parameter that I have called buff inflection, because I couldn't think of anything better, and I'm sure that Clay would have a much better name for this, and so I have set it at 30 percent, and so it would be, at this inflection point here -- This new hinge would occur at about 30 percent, where ABC is 30 percent of OFL.

Then there is a Ralston deduction applied, and so it doesn't look like -- It's not exactly 30 by the time you do all the calculations, but, for example, you could set this hinge higher, so that the slope is less pronounced, or you could set it at zero, in which case there is no inflection at all, and it's the same rule that I showed you earlier.

The caveat to a proposal like this, or a curve linking these two parts of the series is that the Science Center has no information yet to tell you what would be an appropriate buff inflection, I'm going to call it for the time being, and we could set this at 0.3 and use a control rule like this, and what

we would need to do is look at our rebuilding plans and make sure that this is -- That this continues to allow the stock to rebuild within ten years, that it's at least as -- That it performs at least as well as our rebuilding plans, and that we have not done yet, and so I could not tell you what the exact value of this new hinge point should be, or, in the case -- If you wanted to use a curve instead of a straight line, I couldn't tell you the actual shape of that curve, and we would have to look at it against our rebuilding plans, to make sure that it functions properly, but these are all options that are on the table for further discussion.

CHAIRMAN LORENZEN: Thank you, Shannon. I guess you're asking for questions at this stage?

DR. CALAY: Yes, and, basically, the kinds of questions that the Science Center is really asking for is what are your questions about this particular approach, and what might you need from the Science Center to make you feel more informed about the selection of some of these decisions, or, alternatively, if there are additional approaches that you propose, we could examine how those function as well.

This is really an opportunity, now, for the SSC to weigh-in on what you've seen and what you would like to see for the next meeting of the ABC control rule discussion.

CHAIRMAN LORENZEN: Let's see if we can deal with any questions specifically about what Shannon just demonstrated first, and then I think maybe she can hand back control, and we can get back to our speaker list. If you have questions specifically that basically will require her to go back and show you other demonstrations, or play with these, then let's deal with those questions first. Doug.

MR. GREGORY: I think I follow you, but I don't know how this fits in. If you use a different scalar, you change the slope of the descending line, and I know, in the North Pacific, they use a scalar of 0.05, and I have played around with it, and changing that to 0.25, and I did a more steep line, and it's intriguing, how you came up with this idea of like a double hinge, and I never would have thought of that.

A basic question is, with an MSST of 0.5, we need to be aggressively reducing the fishing mortality rate. We're talking about a population that's at 25 percent of its virgin biomass, and I don't know if there's any empirical evidence or experiential knowledge within the Center, or within NMFS, that

was similar to the kind of studies that were done in the early 1990s about SPR, that basically said -- I think it was Gabriel who said, well, if you get below 20 percent SPR, you're at risk of recruitment collapse.

I think of 50 percent BMSY as that same level, and so I really question whether we should ever allow MFMT to stay high, between MSY and MSST, and now, with one minus M, that's a totally different story, and we can talk about this later. Thank you.

DR. CALAY: I would like to respond to the initial part, where you discussed the scalar. I don't think we're using the two terms in the same fashion, and I can show you most easily on the graph with the single hinge, but, really, this was a control rule that we developed initially for the Caribbean Council, and the concern was that they would set P* at 0.5, and so there would be no scientific uncertainty, basically when they were either above -- In their case, above BMSY, and so there would be no scientific uncertainty applied.

All that this scalar allows you to do is, if that happens, and the council sets P* at 0.5, you could use the scalar to create the buffer, and so then you're just using a scalar of 0.9, for example, which means that, rather than the P*, rather than the Ralston approach et al., you're just literally multiplying the ramp multiplier by 0.9.

Really, that was just an attempt by us to give the SSC another tool to create a buffer, in the event that the council wanted to choose a P* of 0.5, which, by law, I believe that they can.

MR. GREGORY: Well, maybe I'm talking about the D. I did note, in the earlier graph, between what was called scalar and D.

DR. CALAY: Right.

MR. GREGORY: Whatever the ramping mechanism is, you can change that slope, by changing B critical.

DR. CALAY: That's correct, and there are -- Basically, we can change B critical to zero, for example, and you could not use B critical at all, if you don't want, and then it just descends to the origin, but, in addition, we can create a different slope here, either by employing some kind of a curve or linear function, or by employing that second hinge, like we showed in this example.

It really depends -- What this value would be depends a little

bit on whether you choose to create that decline ramping feature at MSST or at BMSY. If you're going to do it at BMSY, then this slope could be less aggressive, right, because you're responding immediately.

As soon as the stock is below the level that produces MSY, you're already reducing the fishing mortality, whereas, with the current MSST definitions, you're not responding to that. The stock is below the level that produces BMSY, and you allow it to get lower and lower and lower and lower, until it reaches that MSST value, and then we create a rebuilding plan, but, by then, you're already in a place that, as we have shown through simulations, that you are unlikely to get to without overfishing, and this did not arise because of variability in recruitment or natural mortality. It arose because overfishing was occurring.

Furthermore, you're at a place where you have longer rebuilding plans, and potentially more aggressive rebuilding plans, than you would have been if you responded much earlier, and so I think the Science Center certainly supports the idea that I've heard from Doug, for example, where we would respond, in some way, beginning at BMSY.

How aggressive that is is really a matter of determining the SSC's comfort, as well as some simulation studies to make sure that the control rule performs well, and it is not any more -- Well, that it doesn't violate any of the tenets of NS 1, for example. If a stock is overfished, we do want to rebuild it as soon as possible, but, in many cases, no longer than ten years.

MR. GREGORY: Another reason for the blue line to start going down at MSY is you keep fishing at MFMT, but the biomass is between MSST and BMSY, and you will never get back to BMSY, because it will grow asymptotically, will it not, and so have to reduce fishing mortality below that to get back to BMSY, and, historically, in the scientific literature, fishing beyond BMSY is considered overfishing, but it would our dear Congress and guidelines that created MSST. I think that's just an artifact, and I don't think MSST has a basis in what is true overfishing or a threat to a population. Thank you.

CHAIRMAN LORENZEN: Harry.

MR. BLANCHET: This is kind of related to where Doug was going, I believe, and, for those who know me, you're not going to be surprised about this at all, but how about making this even more complex, and it seems that what we really are talking about is

the issue between BMSY and the hinge point and whether it stays flat or not, and it seems that we should have a reduction, potentially, and this is a council-type of a discussion, but a reduction in that F prior to getting all the way down to the MSST.

Then, when you get to the MSST, then the slope becomes more severe, so that there is a penalty for getting more of the MSST, but there is also a response to being below BMSY, and so, essentially, a lesser slope, and not zero, but a lesser slope, down to the MSST, and then continue at some -- I have no problem at all with that last -- At some point, dropping from, as you've got right here, going from point-four-something down to zero, when you get to 0.1.

The other point is that we're talking about all of these in terms of rates, and, when the council looks at it, they're going to be thinking in terms of millions of pounds landed, which is going to be a different picture, because, when you're at those lower biomass levels, your harvest is going to be reduced, just because you have less biomass to harvest, and so your pictures are going to look more like the amberjack or vermilion snapper, rather than what we've got here.

CHAIRMAN LORENZEN: Thanks, Harry. Shannon, is there anything that you want to respond to there?

DR. CALAY: Only that certainly we would be willing to entertain the notion of having the two-slope. I mean, basically, the shape of that decline is something that we're still considering the best approaches for.

CHAIRMAN LORENZEN: Okay. Thank you. Are there any other hands up at the moment, Jessica?

MS. MATOS: Leann Bosarge.

CHAIRMAN LORENZEN: Okay. Leann, please.

MS. BOSARGE: Thank you, Mr. Chairman. This is pretty technical, and so, at the risk of sounding unintelligent, I'm going to try and make a comment. I really like this idea that Shannon has with the hinge points and the ramping. When I look at it, and she has two examples right now of possible hinge points. She has that BMSY hinge point, and then she has a hinge point that essentially is way down there at the MSST, and so it's sort of two extremes, right, a super-healthy situation and a just about overfishing-type situation.

I wondered -- Shannon asked, and she wanted to know what you might want to see in the future for the data requests, and so I wondered what you all thought about some point in between there as a potential hinge point, to look at what the slope of that line would be, that ramping line, and, in my mind, one natural option for that was, instead of -- This kind of -- You're right that the council is going to think about this in foregone yield, right?

Now, I am usually pretty conservative, and I don't like anything getting down to that MSST level, but I also kind of have a little bit of hesitation about reducing harvest when you're up at BMSY, and so what about a hinge point that's one minus M times BMSY? In other words, you're not really starting to buffer anything down for scientific uncertainty until such point that you're at a level where natural mortality cannot explain the fluctuations anymore, right?

I just -- I may be way off, and maybe I'm thinking about this entirely wrong, and please correct me if I've said anything that's out of line, but I just wanted to throw that out there as an option, if you were looking for future data requests.

DR. CALAY: I just adjusted that for you, Leann, with an M of 0.2, and so now you see the lines are much more similar that you would get, and that's because, of course, MSST is much closer to BMSY, and this is for an M of 0.2. You can see that it was a big change when we switched to an MSST of 0.5.

MS. BOSARGE: Shannon, if I may, Mr. Chairman, I guess I wasn't -- So, in my mind, you would still have, I guess, that inflection point over at MSST, which, for a lot of our species, is that 50 percent of BMSY, and what we would be doing is adjusting the blue line slightly over to the left, and the hinge point for the blue line would move slightly over to the left, right, and so you would have three options there, which I guess you did the same thing by just moving the orange line, but you would have three different options.

DR. CALAY: Okay. I've got you. Thank you. I can't do that one on the fly. Sorry.

CHAIRMAN LORENZEN: Are there any more hands up at the moment?

MS. MATOS: David Chagaris.

CHAIRMAN LORENZEN: Dave.

DR. CHAGARIS: Thank you. I mean, I was going to make a similar suggestion to what Harry and Ms. Bosarge just suggested, that we have other reference points coming out of the stock assessment that could be used as the hinge points, and then I just wanted to add that, with the buff inference parameter breakpoint there, I'm concerned that that's adding just another subjective decision to the process, unless we can articulate what that means, that what inflection point that you have set up of 0.5 right now, what that would mean in contrast to the Ralston multiplier, which we know is P* and uncertainty on the OFL.

I would tend to want to avoid adding another subjective reference point, and try to utilize the reference points that we sort of already have on the books in creating these, and so I think that the two options that were suggested before are good options to explore further.

CHAIRMAN LORENZEN: Thanks, Dave, and, actually, if I can chime in on the same topic a little, because I was -- I was thinking sort of the same, in the sense that -- I was hoping that we would get a control rule that's a bit more straightforward than what we have at the moment, and that we'll have a better characterization of uncertainty and then a fairly straightforward way of arriving at the ABC, and now it seems that we may be doing that, but then we're adding a whole lot of complication by looking to create a control rule that works across all the full range of stock sizes here, including those where currently we are looking at rebuilding plans and so on.

Then it does add multiple new, somewhat ad hoc, ways of -- So it's really a question, I guess, generally, that we can come back to in the afternoon, but also to Shannon, I think, and what's the advantage of trying to kill all these birds with one stone, versus having say a rule that will apply for stocks that are certainly above the minimum threshold and keeping the stocks that need serious rebuilding in a separate category, and it's really just a question. Thanks.

DR. CALAY: I mean, to answer your question, I mean, we do recognize that this is a process and that there are several more meetings that will take place where further discussions can occur. The highest priority for us right now is to create a more realistic quantification of scientific uncertainty.

What's being used right now in the current control rule is very obviously an underestimate, and, although we are, as Katie said, making a number of efforts to improve our quantification of uncertainty, it will still be an underestimate, in the sense

that there are still model structures that we could have applied that we chose not to.

My feeling is that, to really get a handle on what the Southeast uncertainty would look like, we would need to correct our integration of uncertainty into our actual stock assessment models as well as look at historical past performance, like Ralston did, and, really, to do that is very, very time consuming, and unlikely to happen very quickly. So, our proposal, for the moment, is to use the Ralston approach as a proxy, until such a time as we better understand the sigma min that's produced by Southeastern stock assessments. That's the number-one priority.

Then how we would apply the control rule to stocks that require a rebuilding plan I think is something that we're still working on, and it may take a little longer to have a rational and scientifically-justifiable understanding of that.

CHAIRMAN LORENZEN: Okay. I think that's useful, Shannon, and that's sort of where I was trying to go, and I think maybe if we focus on the biggest priority, which is that better characterization of uncertainty and bringing that into a control rule, which will, I think, actually result in a simplification of the control rule that we're using at the moment, because we are doing this funny way of sort of increasing, or reducing, our P* when we think that the sigma isn't representing enough of the uncertainty, and so this will allow us to separate that more.

I'm thinking maybe, if we concentrate on that, and not have everything on the table, because, right now, we're talking about what do we do with very, very overfished stocks, and then maybe it makes it easier to come to a conclusion on the most important part.

MS. MATOS: Nobody else has their hand up.

CHAIRMAN LORENZEN: Okay. I think, actually, there is a natural break here for lunch, and we have three minutes left before our scheduled break, and so what I would suggest is we will reconvene at 1:00 p.m., and I think it would be great for everybody to think about, one, the sort of prioritization, and so what we've just talked about a little bit, and can we maybe decide to focus deliberations on what Shannon outlined as sort of the highest priority at the moment, which is getting a better handle on the uncertainty and revising the control rule as it applies to the stocks that are not currently technically overfished, i.e., below the MSST, and then think about what are

the things that we would like to see when this topic is brought back, and so what are the additional analyses that we would like to see.

Also, I think, if we can narrow down the range of options that we ask the Science Center to look at, in terms of performance, clearly that would help, I assume, Shannon, that we're not giving you a huge range of different things to keep looking at, and so I think those are the things that we need to discuss after lunch, and so I believe everyone can ponder these things, and then we'll take it from there at 1:00 p.m. Thank you. See you after lunch.

(Whereupon, the meeting recessed for lunch on May 4, 2021.)

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May 4, 2021

TUESDAY AFTERNOON SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Special Mackerel, Special Shrimp, Special Socioeconomic & Special Ecosystem Scientific and Statistical Committees reconvened via webinar on Tuesday afternoon, May 4, 2021, and was called to order by Acting Chairman Kai Lorenzen.

CHAIRMAN LORENZEN: Good afternoon. I was actually wondering, and you were copied in, but I put together a list of sort of questions and potential requests that I thought we could actually put up and work through and modify, as a way of focusing the discussion, but I haven't heard back from you or Ryan, or anyone else, whether that's a good idea, and I know we don't usually do it like that, and we only really put up the motions, but it seems to me that it would help us focus the discussion and make sure you get the information for the next steps that you need, and so I was wondering what the thoughts are.

DR. CALAY: That certainly seems helpful to me.

MR. RINDONE: Do you want me to edit that live?

CHAIRMAN LORENZEN: If that works for you, I think that would make sense, and I think it could really help us make sure we get

all the important things down, and so, if you're up for that, then I think that would be great.

MR. RINDONE: I reckon I'm up for it. Let me bring it up. All right. Toss it my way.

SSC DISCUSSION

CHAIRMAN LORENZEN: Okay, and so, basically, what this is, it's based on discussions we had this morning, and I just thought it would be useful, for our discussion this afternoon, to basically have this list, and so there are some questions to the committee and some things that would be potential requests for the Science Center, and all of those, of course, we can add to, and so we can add further questions, and modify this and so on, but I felt it would be useful for us to have that as something that, although it's not a motion, something that we can look at and modify as we go along, and it should address the main questions that I picked up from this morning's discussion, and we can add to that, obviously, if there are some that I didn't pick up on.

If that sounds reasonable, I would say let's say start with Number 1 here, and that's sort of the question, fundamentally, is should the new ABC control rule be based on P*, with a better characterization of uncertainty, which is the proposal we have from the Center, and other options have been mentioned, and so going towards rules that are less technically probability based, and I guess one example would be the FOY-based control rule, which basically uses a multiplier on the fishing mortality rate, the maximum fishing mortality rate, to arrive at an ABC, at that modified fishing mortality rate.

Basically, I would like to open that here, and so should we go with the rule based on P* with better uncertainty, and, if so, should that be based on the Ralston, as a default sigma min, or something else, and should we consider different approaches, and, if so, which alternative approaches should we consider? What I would like to do is open the discussion on that first item here first.

MR. RINDONE: Kai, I will be able to see the hands that pop up, and so I will call the hands.

CHAIRMAN LORENZEN: Okay. Great. Thank you.

MR. RINDONE: Harry.

CHAIRMAN LORENZEN: Harry, go ahead, please.

MR. BLANCHET: The only issue I have with FOY is that I'm not quite sure how we can really comfortably define FOY in a lot of these mixed-use fisheries, and, I mean, I'm thinking, even within a single fishery for a single stock, you might have a different FOY for Louisiana and Florida for recreational red snapper, for instance, because you have different dynamics, and those would be different than the FOY for the commercial harvest of the same species.

It seems like we are adding a level of complexity, by using an FOY, that might -- It might be worth approaching, just so that people understand what an FOY is, but it's -- It works beautifully if we're talking about a single industrial commercial fishery, but, when we start talking about the complex fisheries that we have in the Gulf of Mexico, I don't know that the concept works as well.

CHAIRMAN LORENZEN: Thank you, Harry, and I certainly agree. I mean, we are using the FOY, and, often, we're using that FOY proxy of like 0.75, or FMSY, or F 30 percent SPR or so, which, of course, is a very crude approximation, and the reason that it's in here, of course, is that there were contributions this morning of several members who wanted to also consider not probability-based approaches, and this is the obvious one that I could come up with, but, if there are -- We should decide, is this something we want to include, as we move forward in the considerations, or do we not want to do that, and, also, are there other approaches in this sort of ballpark that are not P* or sigma-based that we should look at.

MR. BLANCHET: I agree, and the conceptually different approaches is a good thing to have there. I just don't know that OY is -- Because you're adding a whole new level of complexity there, I'm not sure that that's maybe the best example, but some other benchmark of stock status, other than our current ones.

CHAIRMAN LORENZEN: Right. Do you have any ideas? That goes for others, too. I mean, are there are ideas of what we should consider as alternatives to the P* approach as better uncertainty characterization?

MR. RINDONE: Next up is Will, if you want to start ticking down the list and see if anyone in the queue has another idea.

CHAIRMAN LORENZEN: Okay. Will.

DR. PATTERSON: That's the language that Restrepo et al. used, using the 0.75 times FMSY as the proxy for FOY, but, really, what I -- I don't intend that we would -- If we used that approach, that we would have to estimate what FOY is for each stock, or for each sector, of a given fishery, prosecuted on a given stock, but, instead, that we would come up with an F multiplier, and, again, Clay presented some of this not too long ago, and I forget when, but, I mean the question here, under Number 1, is, fundamentally, should the new ABC control rule be based on P* with a better characterization of uncertainty?

I mean, I've already provided my perspective on this, and so I won't repeat it, and I think the question here maybe should be which of the various types of approaches should we consider as we develop more information to potentially change the ABC control rule, because I wasn't part of the last hour of the meeting, and so I don't really know -- I don't know at all what was discussed there, but, when I left, it didn't seem like we were quite at the place to make a decision whether we should go in one direction, versus multiple directions, as we try to gather more information about what's the best approach going forward.

CHAIRMAN LORENZEN: Right, and, if I can respond to that, Will, and so, no, we're not at that point, and I think this is looking to get us to that point of say, well, are we okay going with this one conceptual basis, or do we want to keep several in the mix, and, for your information, what we did before lunch is look at the different harvest control rules of the different ramps and hinges and so on in the spreadsheet that Shannon has prepared, but we have not fundamentally addressed this question.

Maybe I should broaden this, and so, when I say, fundamentally, should this be based on the P*, with better characterization of uncertainty, I guess the answer to that can be, yes, but we want to keep that, and we want to have other option on the table, or we could say we're good with that, or we could say, no, we don't want to go this way, although it seems, to me, that that will remain on the table, and so, really the question is do we want to keep something else on the table as well, and my understanding from you is yes.

DR. PATTERSON: Yes, and thanks for the background on the discussion before lunch.

CHAIRMAN LORENZEN: Thanks, Will. Who is next?

MR. RINDONE: Luiz.

DR. BARBIERI: Thank you. First of all, I mean, I think, for us keeping track of what's going on, and kind of taking notes on some of these important issues, because, eventually, as this discussion progresses, I think we're going to be asked to provide some sort of narrative justification for some of these decisions, and I think that this discussion will have to integrate the council input as well, and we're going to have to have those things lined up in a way that we have all the pieces ready for that.

I think, first of all, the issue of OY -- We don't need to repeat what was just discussed, and I think those are very valid points, both from Will's perspective, but I think that keeping in mind the factors that Harry brought that up there -- I think it's important, because, eventually, after we make a decision here, whatever that decision is on going forward, we're going to be asked why will we be using OY, and how can we characterize the OY, and how that applies to different fisheries in different areas, especially mixed-use fisheries, and so I just wanted to point this out first, that I think keeping track of this conversation here, as it is, will be important, going into the future.

Another point is I interpret this first question here as really kind of saying, asking, okay, are we okay with the status quo, what we have on the table right now, and, if not, what would be the next best alternative? I mean, we know that there will be tons of imperfections here, and we're not going to be fully satisfied with any of these approaches, and so I really liked Shannon's presentation this morning, because I think it provided some alternative to the status quo, and I think we are more unhappy with the status quo right now than we would be with application of the Ralston approach, as imperfect as that is, and that would be my input there.

Then something else is a lot of what was in, or is in, Shannon's presentation I think goes beyond just the plan vanilla application of the Ralston approach, and I think, at certain points there, it actually seemed to integrate a lot of policy-like factors, and so, for example, looking there at where the cursor is, and so the ramp, applying the ramp, and so the ramp from BMSY, versus the ramp from MSST, those are different approaches that, to some extent, involve policy issues, the way I see it, the way that I interpret it.

How much risk is involved and the size of the buffers is going to be different, depending on that choice there that's made,

and, yes, eventually, this is going to get to the council, and they're going to have an opportunity to weigh-in on this, but I think we need to be prepared to try and unpack some of these components of what was presented today.

I think some of it had to do with scientific uncertainty and trying to separate the issue of application of the P* to identifying the sigma that should be used, but then you went beyond that with some other concepts that, although I think that they are valid concepts, and I'm not in disagreement with any of them, as presented, I think that they put us in a situation where this discussion, I think, is going to have to be more iterative with the council, because this is going to involve their input on, for example, rebuilding, how fast or how slow or what's the risk, or the probabilities, of rebuilding within some defined schedule there.

I just wanted to bring this up, because I think it's something that we're eventually going to have to discuss as well, and I will pause there, Kai, and let others provide some input. Thanks.

CHAIRMAN LORENZEN: Thanks, Luiz, and, if I can just add to that, I think that's very true. I mean, we are looking, with that -- Sticking with basically a P* with better characterized uncertainty, that, in a sense, to my mind, is conceptually very clear, even though there is the issue of exactly how best to quantify that uncertainty, but it's conceptually very clear, and very straightforward, but we're adding a great deal of complication to the de facto risk policy, through those ramps and hinges and so on, and exactly how that plays out -- You pretty much have to simulation test to see what that really does, and, indeed, it does result in a fairly complex policy that we'll have to bring to the council and get meaningful input on, but yes. Thanks. Who is next?

MR. RINDONE: We're going to jump Doug and go to Shannon. Shannon has a response to Luiz.

CHAIRMAN LORENZEN: Okay. Shannon.

DR. CALAY: Thanks. In the future, you don't have to skip SSC members to get to me, and I'm happy to wait, but I will reply.

CHAIRMAN LORENZEN: But, if you have a response, please go ahead.

DR. CALAY: Okay. I did speak to Clay, and he is attempting to

find that document that he created with OY options. One thing we did want to clarify with the SSC is that we've moved away, a little bit, from FOY-based approaches for ABC, and the reason for that really is that we have seen certain circumstances, depending on the choice of your FMSY proxy, where, when you project at FOY, you can actually achieve a yield that is higher than the yield when you project at F SPR 30.

That has happened more than once, and it's an issue that arises based on the stock dynamics and the selection of the proxy, and so we were attempting to avoid those sorts of complications by creating a system that will routinely perform as expected, that species with higher uncertainty would receive higher buffers, and it's just unpredictable when we start attempting to use FOY-based proxies, but that doesn't mean that we wouldn't be willing to further evaluate that alternative.

CHAIRMAN LORENZEN: Thanks. I think that's a very, very important point, and it's also -- I guess, from my perspective about the FOY, is one thing is it's based on this idea that you would reduce fishing mortality to achieve certain objectives, but, of course we're not -- We're not managing effort, right, directly, and I have some -- It's a very simple rule, on the surface, but actually unpacking the conceptual basis of it is relatively complex, and so my concern about it is that we'll have difficulties explaining that simple rule more so than we have difficulties explaining sigma and P*-based rules.

Anyway, I think that was an important additional point, and we'll keep talking about the FOY-based approaches, but maybe we should get to a point where we decide whether this is something we want to carry forward or not. Who is next?

MR. RINDONE: We'll go back to Doug.

CHAIRMAN LORENZEN: Yes. Doug.

MR. GREGORY: Thank you. A couple of things here. One, going back to Harry's concern, we have adopted the FOY terminology, but we have never tried to estimate what FOY is, or what OY is, and people, every now and then, get twisted by the terminology of OY, and so why don't we just drop OY, and, in that third item you've got to consider conceptually different approaches, for example, 75, or 85, percent of F of MSY-based approaches, or, just generically, a percent of F of FMSY-based approaches, and get away from this OY.

I mean, we've used it a lot, and so we should all have a

generally unwritten understanding of it, but apparently not, and the other thing is I would ask the Center if they could provide some examples of when this percent F of MSY approach backfired, because, in the past two years, or three years, that I have been on the SSC, more than half of the assessments presented to us presented, or even recommended, this, quote, FOY ABC.

I am getting really confused here, and so I think we should, one, drop the terminology of OY, and, two, get some empirical evidence of the problem that it's brought, because, you know, this approach seems to have worked very well for us, and it provides a more conservative approach than our P* did, and so that's why we fell back to it as often as we did. Sometimes we go to P* because that's our mandate, and so those are my comments on that. Thank you.

CHAIRMAN LORENZEN: Thank you, Doug. Do we have others on the list?

MR. RINDONE: We do. We have Will.

CHAIRMAN LORENZEN: Okay. Will.

DR. PATTERSON: I agree with Doug, and that was the first comment that I wanted to make, is that I understand what Harry was talking about, and what Kai just mentioned again about complexity, and I think this becomes complex if you're trying to estimate OY and then setting a percentage of FMSY as the FOY proxy.

To me, it's a simpler approach, and that weakness, I think, gets bound up in OY, but I agree with Doug that we should call this an F-multiplier-based approach and discard the FOY, and I'm at fault here for introducing that, based on my talking about the Restrepo et al. analysis.

Back to what Luiz said, I think it is really important for us to identify what we perceive to be strengths and weaknesses of these different approaches, so the council can consider what we're talking about here, and I think a potential weakness of this F-multiplier-based approach -- I am hoping that, in the discussions we've had just now, we can perhaps sort of tone down the weakness part about its complexity, but maybe there's some ideas there that I'm missing.

As far as its strength, Doug just mentioned that we've used it because it's more conservative. We used it to create a larger buffer in the near term, based on the projections of OFL, but

it’s not really a more conservative approach, because it scales the percentage buffer between OFL and ABC using this approach with scale with the biomass. As the biomass approaches, or exceeds, BMSY, then the difference between the yield at FMSY and the yield at FABC, or the FMSY multiplier, whatever the percentage is, actually decreases.

Part of this discussion is about risk, and so I think that’s a more sincere reflection of risk, because, as you get closer to your target, and exceed it, or your threshold, in the case of BMSY -- Actually, no. It’s MSST is the threshold, but, as you get above that biological reference point, BMSY, then the risk of exceeding the OFL in a given year is much less than if you’re down at near the MSST, obviously, and so, by having less of a buffer, as far as an absolute value of the difference between the yield, OFL, versus ABC, that actually is more reflective of the risk.

It's less risky up there to have there be less of a buffer between the two values, and one thing that we rarely talk about, and Lee mentioned this earlier, is this idea of foregone yield, or opportunity costs, and there are costs associated with having a larger buffer, especially when the stock is in pretty good condition, estimated to be near BMSY, or even above it.

If we then have the same magnitude of buffer as we would at a lower value of BMSY, then, obviously, there are costs to the fishery, but there’s also costs to the management system and the buy-in of user groups and consternation that we seem to have quite a bit of in the Gulf of Mexico.

Those are management considerations, obviously, and so not so much science considerations, but I think, as we’re talking about this idea of risk and probability of overfishing, we’re kind of -- We’re kind of thinking about this both from the SSC perspective, but also from the council perspective.

CHAIRMAN LORENZEN: Thank you, Will. Do we have others on the list?

MR. RINDONE: Luiz.

CHAIRMAN LORENZEN: Luiz.

DR. BARBIERI: Thank you. I did not think that I was on the list, but I was thinking about it anyway, Ryan, and so you read my mind. Well, another thing that I wanted to bring up, I guess, in terms of sort of general discussion of this issue, is

also about us considering how much can we really quantitatively characterize uncertainty in these assessments and integrate this whole process of the ABC control rule that's based on that quantitative assessment.

I bring this up because, even within the Ralston approach, you can use different values of sigma there, depending on what tier you are, and then whether that specific 0.36 is what is most appropriate for us, and that is also a question, and then what would be our ability to come up with a similar meta-analysis for our assessments, and then, even if we do -- Now, think about this.

I mean, if we're actually looking at the sigma that were estimated by the assessments, and we already believe that they do not represent the true uncertainty, then using those values to do the meta-analysis is not going to give us, I think, something reasonable, and we wouldn't expect that to be representative of what we're trying to get, because they're already not being captured in the current assessments.

All of this, I'm thinking -- Eventually, I think this is discussion is going to have to converge towards us accepting that a lot of this process might have to be integrated with us exercising our professional judgment and assessing some of this in a more qualitative way, just acknowledging that, in some instances, we're going to have to be more qualitative in our assessment.

I don't believe that being more qualitative means being less scientific, and that's another distinction that I think we're going to have to make, but choices of an F multiplier, which we could have different values of that multiplier, for example, would be such a situation, and the values of sigma and how many sigma do we use, and then all the other judgements here that are embedded in this whole process that we went through with Shannon's presentation this morning.

I am not criticizing what she presented, or ruling out that this is not a good way to go, but I just think that we need to acknowledge some of these issues upfront, because, eventually, I think we're going to have to face that it's going to be impossible for us to be really just complete quantitative in a lot of what this entails, and we need to take that into account. Thanks.

CHAIRMAN LORENZEN: Thank you, Luiz. I think, if I can summarize where we are, the answer is all of the above, and so I

think we're not ready to go with just one option here, and it seems that we definitely want to consider options like the F multiplier, and I don't know if there are any other options that we should explicitly mention, other than the ones that we have here.

Obviously, I think it would be useful for the Science Center to, at the next round, provide sort of pros and cons, from their perspective, on those alternatives, but it seems that we're not ready to drop any, at the moment.

MR. RINDONE: Will.

DR. PATTERSON: Thanks. You know, whenever we have a reduction from OFL to ABC, no matter the method that we use, and no matter the method among these proposed that we use, there is a percentage of FMSY, or FMSY proxy, that yield corresponds to, given the makeup of the fisheries and the selectivities, et cetera, et cetera.

There is an F value that corresponds to what that buffer is, and, obviously, there are projections, but we're projecting the FMSY, or its proxy, forward, and we're doing the same thing with ABC, and so I'm curious if, in future materials, or information provided, if the Center could actually provide, as a percentage reduction from FMSY or proxy, whatever examples they use to demonstrate these various approaches and to have that included, just so we have a frame of reference of what that translates to.

It may appear more or less conservative than the F-multiplier-based approach, and it would be good to have that information to evaluate, as well as historical models, like stuff that we did in the past, where we used a percent reduction, and, typically, I think it's like 75 percent of OFL, or something like that, and not as an F value, but it would just be good to see, as far as evaluating performance, how those things stack up, in that respect.

CHAIRMAN LORENZEN: Thanks, Will, and that's good. Ryan, I see you are looking to add that there, and I think that's great. Should we -- Will, you made a particular point about how reductions in -- Basically how the buffer between OFL and ABC translates into the corresponding F multiplier, right?

DR. PATTERSON: Yes, and so, if we had a certain buffer, and we buffered the OFL to ABC for king mackerel in 2012 by 1.2 million pounds, and that translates to a percent reduction from FMSY of this percentage, that kind of thing, and so we can just kind of

put it in context.

CHAIRMAN LORENZEN: Yes. I was wondering, Ryan, if you can -- It's sort of implicit, I think, in what you have there, but I would like to make sure we capture that idea of looking at what the corresponding F multiplier is when we have a catch buffer.

MR. RINDONE: So, in examining the difference between F at MSY and the F multiplier in pounds? I'm just trying to figure out how you want to capture it.

DR. PATTERSON: The reduction from OFL to ABC from previous assessments, in terms of percent F reduction from FMSY, or the proxy. I think if you just add "in terms of a percentage reduction from", I think that captures it.

CHAIRMAN LORENZEN: Great. I think that's good to capture that in this way. As we're looking down here, I'm just pointing out that Number 4 on this list deals with how we bring things to the council, and, in particular, are there things that we can do to help and consider the risk policy when we do that, and so looking at risk of overfishing versus fishing opportunity foregone and so on, but we'll come back to that, and I didn't want to jump all the way down, but I did want to point out that that is a point on this list.

Are we done with Number 1 here? I think we're more or less done, and are there any other conceptually different approaches that should be included that we haven't included here? That was my only last question.

MR. RINDONE: I have a response from Shannon, and then you have Dave Chagaris and then Luiz again.

CHAIRMAN LORENZEN: Okay. Shannon.

DR. CALAY: I really appreciate this list, and I think it's going to be a very useful list for us to be able to understand the SSC's research questions, and I do want to caution the group that we won't be able to do all of these, but we will certainly look through this list and see what we can respond to quickly and what will take a little bit more effort and come back with some understanding of when these types of evaluations could be performed, but I do want to encourage you to include, in this list, anything that you are interested in exploring, but I just wanted to caution you that it's not possible for the Science Center to promise to address everyone.

CHAIRMAN LORENZEN: Thank you, Shannon, and I expected that. Of course, I was thinking, when I first put this together, that we would be able to eliminate some things, and it seems that so far we haven't eliminated anything, and, yes, you will have to triage that a bit.

Also, maybe we can, once we've gone through the list in the SSC, have another look and decide what are the most important things that we're looking for, and so thanks, Shannon, and I forgot who is next on the list, Ryan.

MR. RINDONE: Dave Chagaris.

CHAIRMAN LORENZEN: Dave.

DR. CHAGARIS: Just sort of a suggestion, and I think that -- Like, with Number 2, where you have like the B critical and the ramps, one thing to maybe think about, and it might be implicit there, with some of those reference points, but including things like natural mortality rate in defining the shape of that harvest control rule.

For example, a species that has a higher natural mortality rate might not need as steep of a slope, or as steep of a ramp, as something that is long lived and would take a long time to recover, and it might be somewhat baked in already, but I think maybe just being explicit about it, to -- So that we aren't entirely subjective when we set things like the B critical or the slope of the ramps, and so I just wanted to have that in there for the Center to consider when they're exploring these options.

CHAIRMAN LORENZEN: Thanks, Dave. Who was next?

MR. RINDONE: Luiz.

CHAIRMAN LORENZEN: Luiz.

DR. BARBIERI: Thank you, Kai. Just a couple of points. One, the first two bullets there under Number 3, where we're looking at that past performance of both the current ABC control rule and the deviations from it, which I think is a good idea, and I'm thinking, in my mind, this would include -- For example, when we had an assessment, and, based on that assessment, an application, or not, of our ABC control rule, and we set a catch level based on a probability of overfishing, but then, as that same stock is assessed next time, if it turns out that it was undergoing overfishing, because the catch level that we set,

based on the previous assessment, actually did not stick, and, I mean, that wasn't good enough to prevent overfishing, or to put the stock in an overfished condition, and so I think even something as simple as that would be interesting for us to see as we discuss the reasons why we do this.

Then, going back to Number 1, and, Shannon, I hope this doesn't sound weird, and it's not meant that way, but I think it would be good to understand why the Center is proposing this approach, and you talked a little bit about this, Shannon, during your presentation, and you gave that introduction that explained it, but why the Ralston method? Why do you think that this would be a good approach for the Gulf?

I'm thinking about this, because we know that there are other ABC control rules that are used by other councils in other areas, and so we haven't really been, here, considering a full suite of options. Right now, for that Number 1 there, we're basically just considering status quo or Ralston or, I guess now, the F multiplier, but I think it would be helpful for the SSC to have a better understanding of the reasoning behind the Center's choice of this particular Ralston approach, as presented, as we move along in this discussion. Thanks.

CHAIRMAN LORENZEN: Thank you, Luiz. Do we have anyone else on the list?

MR. RINDONE: Harry.

CHAIRMAN LORENZEN: Harry.

MR. BLANCHET: Under Number 2, under the second hinge, add another bullet for a third hinge, and this is where we were talking about -- So, right now, we've got hinges that begin, and then another one where we drop off to zero, but what I had been talking about was something that goes between the BMSY and the minimum stock size and having another F reduction in that range, rather than considering it either at one or the other. This may be just piling on, so that it gives the council something to knock off easily, but I'm just throwing it out there.

CHAIRMAN LORENZEN: Thanks, Harry. Do we have anyone else on the list?

MR. RINDONE: Doug.

CHAIRMAN LORENZEN: Doug.

MR. GREGORY: I will be brief. I believe the only thing the council has input on is P*. Everything else is in our bailiwick, and so we're not making recommendations to the council. We've got to make a decision and tell the council what we think the ABC thing is. We can give them a couple of options, and let them make that decision in that regard, and I may be wrong that it is their decision, but it's going to be based on our recommendations, and we just don't pass options to them.

CHAIRMAN LORENZEN: I think that's a good question, Doug. My understanding is, if you consider the P* the only sort of part of the risk policy, really, then I guess that is true, but I think it's the overall risk policy that is the prerogative of the council, and I think, if we have a complex harvest control rule, it does, in effect, change the risk policy from what's implied in just the P*, and so I think it's the wholeness of the ABC control rule, as far as it concerns what is considered the acceptable sort of risk policy that I think is at least partially a council prerogative, but maybe others can weigh-in on that.

MR. GREGORY: I understand that, and I don't fully disagree, but the concern is, if we were to present to the council options to do a ramp from BMSY or from MSST, they're going to choose the least conservative and the more risk-prone approach, and, if we don't start lowering, in my opinion, mortality, once we get below BMSY, we're putting the population at risk, and so it's a biological thing, but I understand what you're saying, and I don't disagree. It will clarify as we move on.

CHAIRMAN LORENZEN: Thanks, Doug. Who is next?

MR. RINDONE: Will.

CHAIRMAN LORENZEN: Will.

DR. PATTERSON: Thanks, Kai. I think I probably missed some of the multiple hinges discussion, but, in my view, rules should be simple, clear, and effective, and we can debate what we view as effective, or what the complete list of objectives of a harvest control rule might be, but this is already going to be a change, and I just wonder if we want to err on the side of simplicity, that may improve clarity, while still maintaining the effectiveness of whatever the change is that we're proposing here.

CHAIRMAN LORENZEN: Thanks, Will, and, actually, I made a

similar comment before lunch, and I think we should aim for something that is reasonably straightforward, and, also, I think we have to have that risk discussion with the council, and I remember there was one of the options that was in the document, which was some other factor that could be introduced if the council opts for a 50 percent risk, and I think we shouldn't have those things.

We just have to have a serious risk discussion, and we shouldn't have something that essentially pulls the risk down from 50 percent, if they insist that they want to go there, and so we are, obviously, not going to be able to simplify this here, but I think my suggestion, like Will's, would be for the Center to sort of see how we can come up with rules that are reasonably straightforward. To my mind, that would be a benefit. Thank you. Anyone else on the list right now?

MR. RINDONE: You have Doug and then Jim Nance.

CHAIRMAN LORENZEN: Okay. Doug.

MR. GREGORY: I just forgot to lower my hand. My apologies.

CHAIRMAN LORENZEN: Jim.

DR. NANCE: Thank you. You know, I like the idea of the ramp, and I kind of -- The more hinges we have in it, the more complex it gets, and so, while I like the idea of having the option to have hinges, I do like that straight ramp, because it provides a very simplistic view of our concept of what's going to happen, and that's my two-cents in it.

CHAIRMAN LORENZEN: Thank you, Jim. Do you have someone else on the list?

MR. RINDONE: Bob Gill and then Will Patterson.

CHAIRMAN LORENZEN: Bob.

MR. GILL: Thank you, Mr. Chairman. I'm in the camp that goes for simplicity, and, given that we're just starting out, and the tendency is just to make a huge list of all the possible options, I would like to suggest that, if simplicity is the will of the group, and I would argue that it ought to be, that we line through the second and third hinge, and not delete, but so that we concentrate on the more simple first. If we can't get there, then perhaps we can consider the more complex, but I would like to think that we could deal with the simplicity

options first, and focus on those, and we won't need to burden the Center with how many wings should be on a frog. Thank you.

CHAIRMAN LORENZEN: Thank you, Bob. Will.

DR. PATTERSON: Well, I thought I was confused before, but now -- Wings on a frog? So the only thing that confuses me about the ramp thing is that this is an ABC control rule, and, really, we're talking about the MFMT here, which would give us OFL and not ABC, and so I wonder if that should even be in an ABC control rule, or how do we work our way around that?

CHAIRMAN LORENZEN: I don't know what the answer is there, Will. To my mind, it's working a harvest control rule into the ABC control rule that we have, and I don't know where else we would put it. I don't know, and, Shannon, do you have a response to that question?

DR. CALAY: I think I'm just trying to understand exactly what Will is asking.

DR. PATTERSON: Sorry. I will try to be more clear.

DR. CALAY: Okay.

DR. PATTERSON: The ABC control rule is set up to provide an objective approach to reducing the ABC from the OFL, based on scientific information and an established approach, and so what we're talking about otherwise, besides the ramp, is how we might set up rules to guide us, when we have assessment output and projections, to set the ABC from the OFL projections, and that was what the original ABC control rule was.

Here, now, when we talk about this ramp for MFMT, that's not actually talking about ABC anymore, but now that's actually how we estimate the OFL, and do we decrease the F, whatever shape that looks like, as we approach B zero, and that really is setting up how OFL is estimated and not ABC.

DR. CALAY: Right, and it may be that some of this is a legacy of the way our current control rule functions, where, essentially, we are giving you -- We're creating most ABCs directly from the projection of FMSY, and then we're creating many ABCs from some reduction, which is P*, from that projection of FMSY, if the stock is not considered overfished, and then we're switching to F rebuild for ABC when the stock is overfished.

It may be that there are other approaches that don't have that discontinuity, but certainly, in order to get there, we would have to far more fully quantify the true scientific uncertainty, because the buffers would have to be large enough, between OFL and ABC, that the stock could rebuild successfully within the required time.

I think what I would have to see, and maybe I'm just a very visual thinker, but I think I just have to see kind of an example, Will, of the type of control rule you're looking for, to be able to give you a more specific response, but I know that Katie also has a point of view about your question, and certainly, if she would like to speak up, she is more than welcome to.

CHAIRMAN LORENZEN: Okay. Thanks, Shannon. Katie, if you want to respond --

DR. SIEGFRIED: Will, we might be able to discuss this more afterwards, and I would certainly like your input for the forecasting working group that we have going on at the Center, and I guess my question for you is, to clarify what you've been saying, is, if the Science Center was able to provide a true characterization of the uncertainty of OFL from the assessment, you're saying that these sorts of ramps, and these sorts of extra sigma, wouldn't be necessary, and is that correct, and so the ABC control rule is really a way to add that uncertainty, rather than having it come out from the assessment, in a more natural way?

DR. PATTERSON: No, and -- Well, some earlier statements that I made about the percent reduction multiplier on FMSY have a little bit to do with what you just said, but, as far as the ramp issue, and so changing the F value as the biomass declines from BMSY until it hits B zero, that would be a more precautious approach than the current F rebuild scenario.

My confusion here is whether that harvest control rule, that component, should be in an ABC control rule, because, really, we're talking about OFL, more so than ABC, in that context, and so it's not that I don't think that this is a good idea, or that it's reasonable, or actually a smart approach, but it's just that I don't know -- I am trying to, in my own mind, put this together, and like does this really need to be a separate topic that the council should consider, or should it be folded in here with an ABC control rule, and that's my specific question about this.

CHAIRMAN LORENZEN: Shannon.

DR. CALAY: One thing that I have heard a couple of times now is this idea that we could be using a reduced F, like an F rebuild, to estimate OFL, and that's actually apparently not consistent with the guidance that we've received from Headquarters and from SERO, where apparently, and we actually did that for a long time in the Gulf SSC, where, for overfished stocks, we actually created the OFL on the basis of the F rebuild trajectory, and what we were told, and we corrected the ABC control rule after that time, was that the OFL is essentially always meant to come as the 50th percentile of a projection of that MSY.

The F rebuild, that reduced F, whether it be implemented with a ramp or whether it be implemented with an F rebuild projection, is only applied to ABC, according to the guidance that we have received.

CHAIRMAN LORENZEN: If I can try and hopefully provide more clarity, and not less, but I will try, and that's, by the way, in my Number 2 here, I called this F limit, because it seems, to me, what we have, this harvest control rule, it describes a deterministic sort of limit of the fishing mortality rate that is neither OFL nor ABC, and so I gave it that new name.

At the moment, the way our harvest control rule functions is that, above, basically, BMSY, the F limit is always the same, which is basically our OFL, and then, below it, it turns into F rebuild, and so that is our current harvest control rule, so to speak, and the ABC control rule then only creates that buffer, as Will has pointed out, based on scientific uncertainty, whereas, indeed, the new control rule that we're looking at is more complex, in that it creates a change in the F limit as the stock size changes.

Then, on top of that, there is the accounting for scientific uncertainty, and so I could see where Will is coming from, that, basically, we are adding another component to this ABC control rule that is not simply accounting for scientific uncertainty.

I don't think -- Fundamentally, to me, that's not a problem, but I can see that it's a conceptual departure from the original idea of the ABC control rule, as simply adding that buffer for scientific uncertainty. I don't know if that has clarified anything, but do we have others on the list?

MR. RINDONE: We have Will and Doug.

CHAIRMAN LORENZEN: Okay. Will.

DR. PATTERSON: Yes, Kai, that does clarify it, but, back to what Shannon said, I think Shannon just said that the F rebuild - As that term is current utilized, it produces the estimate of ABC during the projected rebuilding period, and is that correct?

DR. CALAY: Well, what I said is that, for a stock that is overfished, OFL is always the yield at the 50th percentile of the projection of FMSY or its proxy. That is the definition of the overfishing limit, and that is, essentially, the guidance, the national guidance. Our current ABC control rule, for when a stock is overfished, below MSST, we use F rebuild, and we may or may not also apply a P*, depending on the stock.

Many, many years ago, we actually, for overfished stocks, used to use F rebuild to do OFL scenarios, and our thinking, at that time, was that, for overfished stocks, you were overfishing if you were delaying the rebuilding plan, but, in fact, that's not consistent with national guidance, and so that's what I was saying, but I'm not sure that I have addressed your question, Will.

DR. PATTERSON: You absolutely have. That was my understanding, and, also, my understanding about how F rebuild has kind of shifted, in our context, and so, if we're using -- The way this first bullet here, under Number 2 -- It says the status quo is that the MFMT, which is FMSY or the proxy, is the F limit when the biomass is above the MSST, and then, when it's below the MSST, it's F rebuild. It's the yield at F rebuild, but, really, the F rebuild is producing the ABC, and it's not producing OFL.

The way this is written is confusing me, but I understand what Shannon is saying, and I think, if we simply say that when -- This idea that sometimes we apply a buffer below F rebuild, and sometimes we haven't, in recent years, I think if we just -- Once the stock drops below BMSY, if we have a ramp, then on that ramp -- If we say we're going to set the yield at OFL and the ABC to be -- Excuse me. The OFL and the ABC to be equal, and that ramp scales down, in whatever function we have, to zero, then that makes this about ABC as much as it does about OFL, and that then easily fits within the context of an ABC control rule.

CHAIRMAN LORENZEN: Okay. Thank you. Who is next?

MR. RINDONE: Doug.

CHAIRMAN LORENZEN: Doug.

MR. GREGORY: Thank you. Currently, whether the stock is above BMSY or below BMSY, but above MSST, we apply the control rule consistently, and we don't change it, and so, with the ramp situation with MFMT, we just continue to apply the control rule, as we always did, because the ramp is simply a function of a constant scalar against MFMT or OFL.

We've got the same variability, and so we don't need to worry about it, but we have to address the ramp, because the council changed the default MSST for the Gulf of Mexico. At one minus M, it did not matter, because that bordered natural variability of the population, and so you didn't have to worry about a collapsing stock, or anything really draconian, if we exceeded MSST, until the council changed to 50 percent.

We cannot merrily go about our way until the stock falls below MSST anymore, if it's at 50 percent. We have to reduce the fishing mortality rate as soon as the biomass goes below BMSY, and we just use the same control rule approach we've been using, and I don't think we have to modify it because of the ramp. Thank you.

CHAIRMAN LORENZEN: Thank you, Doug. It seems, to me, if I can summarize where we are, that I think our Point 2 is sort of good to go, and it seems we are discussing more considerations, but it seems, to me, that, in terms of what we're requesting the Center to consider for the next iteration, I think this is fairly stable.

DR. BARBIERI: Kai, do you mind if I just -- Not to create more confusion, but I'm just trying to understand. Shannon, if you could look at Slide 17 in your presentation, and I think the use of the term MFMT for the F value here is what might be creating some of this confusion in that first bullet.

If you look at that Slide 17 in the presentation this morning, it says, right there, and we know, that OFL equals the yield at MFMT, and then, for the ABC down here, it says that it reduces MFMT as B declines. What I think you're trying to say is that F is reduced, because we're going to have a new FABC.

DR. CALAY: Correct.

DR. BARBIERI: So I think Will's confusion, and that was somewhat mine as well on the OFLs, because of that, is using the MFMT there, when, in reality, we want to say FABC, as determined by the ABC control rule.

DR. CALAY: Yes, that's exactly correct.

DR. BARBIERI: Okay. Thank you.

MR. RINDONE: Will.

DR. PATTERSON: I agree, Luiz, and I think Shannon kind of explained that a minute ago as well, but it's just not reflected yet in that first bullet, the nature of that distinction.

CHAIRMAN LORENZEN: Okay. Let's bring the list back, and, Will, if you want to modify that bullet, you are very welcome.

DR. PATTERSON: I wouldn't delete the text, and I think we can just modify it. The status quo is OFL is equal to MFMT when B is above MSST, and then ABC is set as a buffer from the OFL. Then, actually, I would just put a comma between "MSST" and "ABC", because those are related, or maybe you could put "and", so it's "and ABC is set below OFL". Then I would put a semicolon and say "F rebuild, OFL, and ABC are computed at F rebuild when biomass is below MSST".

Now, this doesn't reflect that statement that Shannon made that sometimes we've actually applied another buffer to the yield at F rebuild to get to the ABC, but I think this is, in spirit, what we've done most recently.

CHAIRMAN LORENZEN: Right. Just one minor amendment, and so OFL would be computed at MFMT, or equals MFMT times biomass, right, because one is a catch and --

DR. PATTERSON: Yes, and it's not equal. It's the yield at MFMT.

CHAIRMAN LORENZEN: Yes. You can just add that, so that we don't --

DR. PATTERSON: So just the yield at -- Thanks, Kai.

CHAIRMAN LORENZEN: Cool. Okay. Great. Thank you.

DR. BARBIERI: Just one more, and sorry, but I think what Shannon said, that clarification that they received, is that OFL is always equal to the yield at MFMT, right?

DR. CALAY: That's correct.

DR. BARBIERI: So the ABC is computed at F rebuild, but the OFL is always equal to the yield at MFMT.

CHAIRMAN LORENZEN: Correct. That's what she said.

DR. PATTERSON: So, to fix that, after the semicolon, we would need to move "when BMSY is less than MSST" first. Then put a comma, and then repeat "OFL equals yield at MFMT and ABC is computed as yield at F rebuild". It shouldn't be this hard, but I think we've got it.

CHAIRMAN LORENZEN: Okay. Thank you. I guess we -- That was just the status quo, and then we have those new elements, the ramps and the B critical, and we've decided to downgrade the hinges for now, but I think this sort of captures what we're asking the Science Center to look at for the next iteration, and so, unless there is anything more on this topic, I would suggest moving to Number 3, which is what information are we looking at, in terms of understanding the performance of the control rule alternatives that we're leaving on the table? Are there any additions or modifications to what we have on the list here?

MR. RINDONE: I don't see any hands up yet.

CHAIRMAN LORENZEN: So it seems, and we can come back to that if we --

MR. RINDONE: Dave Chagaris.

CHAIRMAN LORENZEN: Dave.

DR. CHAGARIS: Thank you, and so I think the simulation testing is going to be really important for this, and so I don't know if maybe, Shannon, if you want to share what you guys had in mind for those performance tests, but, in general, they should look at things like consecutive years of poor recruitment, or changes in natural mortality rate, or episodic events, things that we're confronted with in a lot of our Gulf species, but maybe you guys have thought through that a little bit.

DR. CALAY: I will be honest that we recognize the need for simulation testing, and we have not specified exactly the terms yet, and so we would be very interested in your feedback for what sorts of performance measures we would examine.

DR. CHAGARIS: I'm thinking about some of the work that was done by Doug Butterworth with Gulf menhaden, and I think he did a pretty thorough analysis of a harvest control rule for that

species, looking at various sources of uncertainty, and so that might be a place to start, as well as the performance metrics, as far as how many trials resulted in stock collapse or fishery closures and so forth, but it sounds like this might be down the road a little bit, and so I'm happy to provide more comments as the time gets closer.

CHAIRMAN LORENZEN: Thanks, Dave. Do we have anyone else on the list?

MR. RINDONE: Not at the moment.

CHAIRMAN LORENZEN: Okay. I guess then the question is are there any additions, and so there's the Point 4 here, which is about what can we do to help the council basically consider the risk policy when we bring this possible control rule revision to them, and so we did talk about the risk of overfishing versus lost fishing opportunities and so on, and I was wondering whether there are any particular suggestions here.

I mean, we often talk about this, but are there particular pieces of information that we should try to put together, and we can put together, and so this is a question also particularly to, I guess, the Socioeconomic SSC members, and, Lee, you have brought this up a lot, and so, anyway, are there any suggestions or additions to this point?

MR. RINDONE: Lee Anderson.

DR. ANDERSON: As far as fishing opportunity foregone, I would say give not only the tons not harvested, or the pounds, but the gross revenue, and that's just another way of looking at it, but sometimes the dollars makes a little more sense, and, obviously, if you could, you would like the net value, but I don't think we can get that, but both pounds and dollars.

CHAIRMAN LORENZEN: Okay. I say yes, but I don't know how we provide that, but it would be good to have that.

DR. ANDERSON: I would think it's a simple thing, because you've got the amount of pounds, and you just multiply by look at the most recent cost, and it changes, but you can see this was the price as of this date.

CHAIRMAN LORENZEN: Yes. Okay. Thanks, Lee. Any other additions to this point?

DR. CALAY: It will be important also to examine the opposite

side of that coin, which is, if you allow a stock to continue to be at levels that does not support MSY, that also has a risk, and so it's not as simple as, if we put a ramp in that starts at MSST, and pretend that the stock is not already well below BMSY, because it is, and so we have to look at the cost of overharvest to be exactly correct.

CHAIRMAN LORENZEN: Correct. Yes.

MR. RINDONE: Steven Scyphers.

CHAIRMAN LORENZEN: Steven.

DR. SCYPHERS: Thank you, Mr. Chair. Just a couple of quick things to consider adding, and one is response to what Shannon said, which I think is a really important point, and what I would add is the possibility of delayed ramping, and so, depending on when these decisions are made, having lead time has shown to be one of the things that minimizes social impacts, and so having a year of adaptation can be really beneficial, if it doesn't compound or add risk, and so thinking about how you would delay that ramping would be one consideration.

Then another one would just be, in general, and I know that the Center and the social science branch is putting a lot of thought and effort into performance indicators on the social side and the economic side, and just having some of those people chime in on where they see potential linkages between those indicators that are being developed and this type of decision system. Thank you.

CHAIRMAN LORENZEN: Thanks, Steven. Is there anyone else on the list?

MR. RINDONE: Not at the moment.

CHAIRMAN LORENZEN: Well, it seems we may be getting to the conclusion of this part. Are there any other questions or requests that we haven't mentioned yet that anyone feels are important, before we close this topic?

MR. RINDONE: We have John Mareska and then Leann Bosarge.

CHAIRMAN LORENZEN: John.

MR. MARESKA: I think this was already mentioned, but it's also the cost to management itself, and so, if the stock gets below MSST, then there's costs associated with rebuilding plans.

CHAIRMAN LORENZEN: Thank you, John. Leann.

MS. BOSARGE: Thank you, Mr. Chairman. I would just say, me as a council member listening to all the discussion, sometimes I do get a little fuzzy on what -- Because you talk about bringing this to the council and what the council actually has any decision-making authority over.

In other words, what is the scientific realm versus what is the management realm, and the delineation between the two, and so maybe just kind of brief us upfront on which portions of this are just for our information and then something that we may actually have some input or control over, and maybe make sure that we understand that part, going into it.

I did have one question, and, Mr. Chairman, at any point today, are we going to go into the actual spreadsheet, the beloved spreadsheet, for the current ABC control rule, with the tiers and color-coding, and it has weightings and all that?

CHAIRMAN LORENZEN: I wasn't intending to do that today, also because we really are looking at Tier 1 at the moment, and so we're not looking at the different tiers, but what would be the purpose of going there today, Leann?

MS. BOSARGE: Well, we don't need to, and I was just going to make one comment, as an outside observer listening to you all and listening to some of your other meetings, and I feel like sometimes, when you all get ready to take an ABC and -- I mean take an OFL and set an ABC, and you're trying to apply the -- Get the appropriate P*, and I feel like sometimes you all may feel like it's not actually capturing the uncertainty that you feel is really there.

I was looking at that spreadsheet, and, based on some of the comments that Shannon made earlier about the probability density function, and how it doesn't maybe sometimes capture the true uncertainty in that assessment, and possibly underestimates the true uncertainty, maybe that yellow section in that spreadsheet, which actually deals with the OFL PDF, and you're putting some Xs next to where you think that is and the uncertainty in the actual index, or the different indices that went into the assessment, and maybe you want to look at those weightings.

You know, you give a weight to that, and it really seems like that is kind of the crux of where some of this underestimation of uncertainty, scientific uncertainty, is coming from and

leading us to these discussions about all these alternative methods, and I just wondered, if you weighted that differently, would it maybe solve some of the issues, and give it a higher rating, because, when you go from the max rating down to the bottom rating, on that yellow section, it's only like -- Of course, I had it pulled up in my calculator, solar calculator, and it went off on me, but it was like 0.035 is the difference, when you go from the highest to the lowest scale right there.

Just maybe a higher weighting there might -- I was just trying to think of simple approaches to solve the problem, and so I thought I would throw it out.

MR. RINDONE: Lee, can I jump you and go to Shannon?

DR. ANDERSON: Yes.

MR. RINDONE: Shannon.

DR. CALAY: So, as one of the authors, and Joe Powers and I put this together years and years ago, when the whole concept of an ABC control rule was new, and there is two problems, really, with this spreadsheet, to be honest. One is that it's intended to use these characteristics to determine P*, which is the probability of overfishing, which is meant to be a risk determination and meant to be really the sphere of the council, rather than the SSC.

The second issue is that, even within the range of P* that were allowed, which is right at the very top of this spreadsheet, and it's 0.3 to 0.5, I believe, is what the council asked us to code into this spreadsheet, and, even at the very lowest P* of 0.3 that's allowed currently by the Gulf Council, most of our stock assessments will produce very small buffers, and the reason for that is because we're using the PDF of the stock assessment directly to adjust the application of P*.

Our PDFs are extremely narrow that come out of our stock assessments, and so this just has not worked, in practice. I mean, it could be that they choose to retain this as the determination of P*, or to modify it to continue to produce a P*, and the Science Center's advice would still be we must address the sigma, the scientific uncertainty, because the PDFs that are coming out of stock assessments are simply not appropriate to be used in this manner.

CHAIRMAN LORENZEN: If I can chime in there, Leann, I think, as Shannon pointed out, we're sort of using the -- We are modifying

the P* to take account of what we think is not captured in the scientific uncertainty, whereas we're trying to separate that and actually do a better job at characterizing the scientific uncertainties, so that then the P* would become strictly the risk tolerance that is the council prerogative, and so that's behind this idea of separating the characterization of the uncertainty from the setting of the risk tolerance, and so hopefully the spreadsheet will be retired when we switch to the new ABC control rule.

MS. BOSARGE: Got it. Thank you. I thought these two things were going to get blended together, but, if this is going to the wayside, there's no need to look at it. Thanks.

MR. RINDONE: Back to Lee.

DR. ANDERSON: Well, I guess I shouldn't say it, but I have been thinking about this for a while, and I've got another point to make, but I have to admit that, when I first saw this a long time ago, I used, as an example in my fisheries management course, some of the silly ways that you can use a computer to produce something which you think is really telling you something, and, Leann, you are exactly right.

If you change those numbers, you're going to change the probability, but just changing the numbers doesn't change reality, and so I will get off that hobbyhorse and just ask a question.

Ryan, the last paper that we've been typing on, I've been noticing that, and I would appreciate it, when we're through, if you could just send me a copy of that, and maybe to everybody, because I want to look at that while I go back and look at the spreadsheet that Shannon gave. I've been looking over that, and I find it very interesting.

MR. RINDONE: Will do, sir. Will.

DR. PATTERSON: While I think we've clarified the questions from Ms. Bosarge, I think the fact that she raised those questions is important to consider. Although we're only talking about Tier 1 here, I think one thing that we should at least keep in the back of our mind is how whatever change is going to be made will translate to other tiers. I mean, there has to be some continuity between the approach taken for Tier 1 and the other tiers, especially ones that are nearly as data rich and uncertainty captured nearly as well as a Tier 1 assessment. I think that is something that we need to consider, is what the

downstream effects of a change in Tier 1 will have.

CHAIRMAN LORENZEN: Thank you.

DR. CALAY: I can respond to I believe Will's comment.

CHAIRMAN LORENZEN: Please do.

DR. CALAY: Thank you. We do have a very similar tiered control rule in place right now in the Caribbean, and the top three tiers of that Caribbean control rule are for stock assessments, and they are for stock assessments that produce essentially an OFL.

The way we have created that tiered control rule is everything about it, in the top three tiers, is actually the same, except for the conditions of use, and so Tier 2 is for assessments where you don't know -- Either you don't have good length composition, or you don't have good age composition data, or maybe you don't have quality indices of abundance, so Tier 3 is for assessments with even -- That are even more data limited.

How we've handled that is by just increasing the sigma min that we apply, and so that sigma min from the Ralston paper actually included three different levels of stock assessment data quality, data-rich, data-moderate, data-limited, and, essentially, he's just applying a larger sigma min as the data quality degrades, and that's exactly what we have done in the Caribbean case, where, actually, the SSC chose a sigma min of 0.5 for Tier 1, and then they apply 1.5-times that sigma min for data-moderate stock assessments and two-times that sigma min for data-limited stock assessments.

You're just making the PDF wider and wider, but you keep the same P*, because that's the probability of overfishing that the council selected, and there is, of course, a fourth tier, which is for catch-only stocks, and, frankly, we don't have a particular proposal for that one yet that is very satisfactory.

CHAIRMAN LORENZEN: Thank you, Shannon. I don't know if we have anyone else on the list at the moment.

MR. RINDONE: Will.

CHAIRMAN LORENZEN: Will.

DR. PATTERSON: Just quickly, that seems like a reasonable approach. If the intent here would be, if we took a similar

approach to what they do on the west coast with using the Ralston meta-analysis generated estimate of sigma in that way, and the idea would be to go to the council and have the council set what the P* would be among all of the assessments, and then the SSC would simply scale the sigma estimate based on its perception of uncertainty, that really is giving a false sense to the council that the buffer, the willingness of them to accept the risk tolerance, is really being paid attention to, because we can just set the sigma multiplier at a scale where we think, okay, now this is a buffer that we're comfortable with.

Even though it's changing the dynamic from being driven by the PDF, versus being driven by the sigma, it really has the same effect, and we can still control what the buffer will be, irrespective of what the P* range in the previous case, or the set P* in the new example, would be.

CHAIRMAN LORENZEN: Okay. Thanks, Will. I think this is something that we will obviously have to bear in mind as we move forward, and, overall, it seems to me that we have had a pretty fruitful discussion about this, and there's plenty of feedback here for the Science Center, and I think, Shannon, as you pointed out -- I mean, you will have a look at this and decide what is realistic to look at in the short term and come back to us with an updated proposal and further information.

DR. CALAY: What specifically are you asking, Kai? I don't want to make a promise that I can't keep.

CHAIRMAN LORENZEN: I was saying that, as you said, there is plenty of feedback here on the initial proposal that you presented, and, as you pointed out, not everything we have on the list you can realistically, or the Science Center can realistically, address in the short term, but I think there is plenty of feedback here for you to consider as you basically update your proposal and bring it back to us with additional information

DR. CALAY: Yes, and I think this is very helpful, and I think the discussions have been quite comprehensive, and so, when next we have an SSC item relating to the ABC control rule, we can certainly pick off the low-hanging fruit here and have a response from the Science Center, and then we can identify which of these bullet points are more likely to be research questions that can't be addressed as quickly.

CHAIRMAN LORENZEN: Yes, that makes sense, and that's what I meant, and so, unless there are any last comments on this item,

I would like to close the ABC control rule discussion, and then I will give it a minute or so, to see if there are any more hands up, and then I would suggest that we have a fifteen-minute break and we move to the rest of the agenda, which is the gray triggerfish age validation challenges, public comment, and other business, and I believe that Ken Roberts has asked us to add a small item to Other Business about the Facebook, the council's Facebook page, and blog, which we should be able to deal with, and it looks like we may be able to wrap the meeting up this afternoon.

MR. RINDONE: Mr. Chair, we have Will.

CHAIRMAN LORENZEN: Okay. Will.

DR. PATTERSON: I just wanted to say thanks, Kai, for facilitating this discussion, and I thought that it went really well. We've batted around this idea of revisiting this for quite a while, and I agree that it seems like something that we can probably handle within the SSC, versus a special committee, and I was initially skeptical of that approach, and, obviously, this is just first step forward, but I think we did a good job kind of framing the realm of possibilities here, and things that we should be concerned about, and, obviously, new stuff will pop up, but, anyway, thanks for facilitating this and for you and Shannon for your presentations, and I think this is a really good first step.

CHAIRMAN LORENZEN: Thank you, Will. Okay. Let's take a break then until 3:00 p.m., and then we'll go into the gray triggerfish age validation. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN LORENZEN: Okay. Welcome back, everyone. We are moving to the gray triggerfish age validation. Maybe, Ryan, if you want to give us a quick reminder of the scope of work here, and then we'll go to Carrie's presentation.

GULF GRAY TRIGGERFISH AGE VALIDATION CHALLENGES AND RECOMMENDATIONS

MR. RINDONE: Can do. All right. Gulf fillet knife destroyer age validation challenges and recommendations. Due to the COVID-19 pandemic, there were lots of unspent travel funds for the council in 2020, which leaves some of these funds available for the council to try to address some outstanding needs and gaps in knowledge.

The last assessment for gray triggerfish was SEDAR 62, and this was terminated due to irreconcilable data issues, and the Science Center recommended a research track be completed for gray triggerfish, which the SEDAR Steering Committee is looking at how to map all of that out.

In the meantime, the council is considering funding an age validation study for gray triggerfish, and Dr. Simmons is going to give you guys an overview presentation and a draft request for proposals for you guys to consider to look at addressing this. It will outline some of the gaps in knowledge and uncertainties in ageing gray triggerfish and give an overview of the draft RFP and the proposed review process and timing, and there is some background literature in there for you to look at, too.

The council's intent for the study, if funded, would be to have it completed in time for the research track for gray triggerfish, which right now we have on the books starting in 2023, and you guys should comment on whether the approach is sound to inform these gaps in knowledge for the research track and if the draft RFP and the funding recommended would be enough to cover these data gaps, to better inform this upcoming assessment, and, also, consider any other relevant feedback that you guys think is appropriate for research and management consideration. Mr. Chair.

CHAIRMAN LORENZEN: Thank you, Ryan. Dr. Simmons.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. Good afternoon, everyone. I'm going to cover Agenda Items Number XIV(a) and (b), and so I have a brief presentation that goes through many of the items that Ryan just went over, and then I have a draft proposal, if the SSC wants to give me some comments on that that we'll take to the council in June and get their feedback on whether they want to move forward with funding.

Just a quick overview, to try to keep us on track, we'll talk a little bit about the assessment and the management status, what the council is requesting and where we're going with this, some of the issues that occurred during the last assessment, potential methodologies, some considerations for the next stock assessment, and then I have some specific questions for the SSC at the end of the presentation, and I must say that I appreciate the time of Will Patterson and Robert Allen before I put this together, and they helped me pull all the literature and spent some time speaking with me about this issue, and so I want to

thank them for helping me with this presentation.

I think most folks know this, but, just as a reminder, the last approved stock assessment for gray triggerfish had a terminal year of data of 2015, and SEDAR 62 was started in 2019, but it was terminated in early 2020, because of irreconcilable data issues, and a research track was recommended, moving forward, because of those issues, and one of the main concerns, or at least our understanding from this was one of the main concerns, was ageing of gray triggerfish during that SEDAR 62 -- I guess that was an operational assessment that we tried.

Gray triggerfish is not overfished or undergoing overfishing. However, we are in a rebuilding plan, and we did recently have an interim analysis that the SSC reviewed and recommended increasing the ABC, and I think was around 400,000 pounds, and the council took action on that, and that has been transmitted, and the Secretary is approving that right now.

As many of you know, this is an important socioeconomic species, particularly in the northern and eastern Gulf of Mexico, where most of the landings occur.

In 2021, we went through the budget, and, as most of you might imagine, we had quite a bit of unspent travel funds, primarily due to travel, because of the COVID-19 pandemic, and, at that time, the council -- We estimated that we had around $800,000, in total, and so the council asked us to look at evaluating research gaps, and one of those gaps was this ageing issue with triggerfish, and to determine if it's possible for us to fund a study that would be able to be completed and ready, with results that could be contributory to the SEDAR research track, which we currently have scheduled for gray triggerfish in 2023.

One of the other projects right now that the council is considering funding, and we are also putting together a draft proposal for them to review in June, is assisting with an expansion of the pilot project that looks at effort monitoring in the shrimp industry. A couple of you probably know that the current ELB program 3G network has expired, and that is no longer able to transmit data, and so we're looking at ways to improve that process, moving forward, and that's one of the other things that the council is considering funding.

Back to gray triggerfish, and so some of the issues about ageing triggerfish -- It's an interesting fish, and, of course, I think so, because I studied them, but they're unusual in many, many ways. One of the things that makes them unique for ageing is

the dorsal spines are typically used for ageing, and you count the translucent zones on those first dorsal spines, and so that's the slower-growing time, the translucent rings, and then the faster-growing is the opaque pink rings.

There is some evidence, and I think we've seen this in some of the stock assessments, that there may be a need for sex-specific age and growth curves. Right now, they're combined growth curves, but there's been several different publications that I have listed there that really point out that there is a significant difference in age and growth between the males and the females, and this has to do with their life history, and that's been documented there.

The otoliths, they're really difficult to extract, apparently. I actually didn't do it when I was in school, but you can see there is a very pretty interesting photo there of the otoliths, and that's from the Patterson et al. 2019 paper, and that was the SEDAR 62 Working Paper 17, and they are very fragile and unusual looking, compared to many other reef fish we manage.

Some of the things that came out during the SEDAR 62 research track assessment was a couple of different studies that pointed out this ageing bias, and one of them was using the bomb radiocarbon validation to compare the otoliths to the spines, and that estimated that the ageing bias may be an underestimate of the spines, by one to two years, compared to the otoliths, and that's documented in the Patterson et al. 2019 paper.

There was also a study that was recently published that compared otoliths and spines from gray triggerfish in Ghana compared to the U.S. South Atlantic, and they looked at spines and otoliths, and they also found an ageing bias, and that was, I guess, more dramatic for age-three and up, and the other thing the study did is they developed a methodology for more easily extracting the otoliths, which can be very cumbersome to remove.

That study also determined that the spines and the age range was from one to nine years, and then the otoliths were from three to thirteen years, and so, again, these studies didn't consider sex when estimating age differences, and I keep coming back to this, because this was one of the questions that I have for this body, between the dorsal spines and the otoliths, but there is really no evidence, right now, that that formation differs.

The potential methodologies, moving forward, are we could use bomb radiocarbon validation, and that seems to be more accurate for ageing these hard parts, but it is expensive, and so I think

there's an estimate of about $300 per fish, and I don't know if that fluctuates depending on samples, and also mark-recapture, and that's also potentially expensive, due to the cost of field work, and it may be difficult to tag the number of fish that are needed and then subsequently recapture them in time to validate this within this amount of time, which is about twenty-four months that we have, potentially, for this study.

Some considerations for the stock assessment, and so say the council goes forward with funding this study, and it comes out, and it's complete, and they validate ageing, whatever the results come out to be, and so the question is how will this be applied to SEDAR, and so, ideally, we would have some good sex-specific growth curves in addition to this age validation study, and then the next step would be, if the otoliths are necessary to age the fish, how would we do this, practically, for large numbers of fish that are in the sampling -- In the laboratories that we have at state and federal facilities, moving forward, and so would we have to change our process, our sampling protocols, for collecting these hard parts, potentially? Then, is it possible to determine a correction bias for these previously-collected hard parts from this type of study?

Some questions for the SSC, and is the timeline reasonable to produce the data by 2023? Are the expected products valuable to future gray triggerfish stock assessments and management, should the council choose to fund this, and are the proposed funds adequate to fund the intended research?

Right now, the council hasn't really put an upper bound on what they're thinking about funding, but, for a minimum, we've talked about $250,000, to date, and so I can stop there, or we can go through the draft proposal, Mr. Chair. Thank you.

CHAIRMAN LORENZEN: Okay. I think maybe why don't you go through the draft proposal, and then we'll have a discussion at the end.

EXECUTIVE DIRECTOR SIMMONS: Okay. Sounds good. That's going to be in Tab XIV(b). Again, this hasn't been approved by the council, and they are going to look at it in June. Since we haven't approved it yet, we don't have a submission deadline, and we're thinking the term of contract would be twenty-four months. Right now, the minimum amount of funding we've talked about is $250,000. Of course, they could have an upper bound to that, or decide to fund it for more than one year, potentially, or spread it over the twenty-four months, and those are all things that the council hasn't really deliberated yet on.

Then we have some information in here about what we would like to see in the draft proposal regarding like sample size and methodology and then some background. Then we would have to come up with, if the council moves forward with this, a review process, and should we get some experts involved, probably from the Science Center, and then decide, after a certain time period, that we would put this up to post, and we would have a competitive process, and we would have this review body, with the council leadership, and potentially outside experts, to make a decision, and then go forward from there. Mr. Chair.

CHAIRMAN LORENZEN: Thank you, Carrie. I think maybe do you want to bring up the questions from the end of your presentation again, and then we'll have discussion? Jim.

DR. NANCE: Thank you, Mr. Chairman. For the otolith stuff, I guess is there enough qualified individuals for otolith studies to be able to do this in a timely manner? I mean, does it need sectioning and things like that?

EXECUTIVE DIRECTOR SIMMONS: I think the intent would be that it would provide a proposal and tell us what their plan is. I mean, I think what we need right now is validation, and whether they use the spines or otoliths or vertebrae, however they go about the study, or whether they use the current samples, would be up to them.

I am going to try to outline that in the draft call for proposals, but what we're asking for is that the experts that are providing proposals lay that information out for us, but I think maybe Dr. Patterson is on, and I don't know if there's anybody from the life history group from the Science Center that could help me out here or not.

DR. CALAY: Carrie, I'm happy to help you out. What were you looking for, a commitment of a volunteer?

EXECUTIVE DIRECTOR SIMMONS: Well, we need that, but I think Dr. Nance's question was do we have enough expertise for ageing of the otoliths, and I guess that's why we're going about this process, to try to get validation under wraps, to make sure that there -- Is there this ageing bias, and can we figure out a calibration, or conversion, moving forward. I think Dr. Patterson has his hand up, and maybe he can help us out with that.

DR. CALAY: I mean, I can defer to Will, and then I will follow-

up, if needed.

CHAIRMAN LORENZEN: Will.

DR. PATTERSON: Sure. Jim's question was could this be done in the timeframe, and I think, yes, it could. One of the limitations will be collecting samples, and, going back to Carrie Fioramonti's master's thesis work that was in one of the Allman et al. gray triggerfish papers, in that work, there was a confounded issue of region and fisheries sector, as far as being able to estimate size-at-age.

There is a pretty strong selectivity component here to the estimates of size-at-age coming from the various fisheries, but some fisheries, like the longline fishery, where gray triggerfish are captured, only occurs in certain regions, and so that component would have to be addressed, I think, in this, to get -- If the RFP for the council is seeking fisheries-specific size-at-age information, which I think, based on previous data collected for this species, I think would be smart.

As far as the otoliths themselves, in Virginia Shervette's recent paper comparing size-at-age in Ghana versus the western Atlantic and southeast U.S., there are some images in there that show the opaque zones in gray triggerfish otoliths, and so folks could utilize that, I assume, as a guide to figuring out how to age these things, and there aren't a whole lot of people that have done it so far with otoliths, but, as far as the timeframe, I think it's reasonable for the scope of work that Carrie has outlined here.

CHAIRMAN LORENZEN: Thanks, Will. Julie.

DR. JULIE NEER: I just to chime in that the gray triggerfish research track is actually not set to start until 2024, and it was, unfortunately, one of the casualties when we had to push -- The SEDAR schedule got a bit of re-jarring last year, due to COVID, and gray snapper for the Gulf had to be slid back a year, and then gray triggerfish got slid back as well, and so you actually have a little bit more time, and so, for once, a postponement might actually help us, because it should ensure that this work can be done prior to that research track getting underway, which is always nice to know. I just wanted to clear that up. Thanks.

CHAIRMAN LORENZEN: Thanks, Julie. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I think one

question we did have, and I think Will kind of was bringing this out a little bit, is can this project utilize fish that have already been landed, from the state and federal, potentially, labs that we have already, or is there going to have to be additional field samples taken to get the hard parts that we need to validate, which is I think really what we're trying to do right now, is focus on the validation, and then how we could potentially apply that calibration to the fishery-dependent landings, I believe is what we're trying to focus on right now.

We do have, I believe, some limitations to our new award, which is part of this grant cycle, for field collections, and we would just need to think carefully about that and work with our Grant Program Officer on that.

CHAIRMAN LORENZEN: Thanks. Benny.

DR. GALLAWAY: Remind me of the amount of money that you had available for this effort.

EXECUTIVE DIRECTOR SIMMONS: It's a minimum that we've talked about, but, I mean, I think if you guys could provide some guidance on whether this is a reasonable amount of funds to complete this type of work, based on whether additional field collections would need to take place, and I know we have Dr. Barbieri is on there, and I think we've talked a little bit with his staff about what's available, and are the otoliths already collected, or is it just spines, and I know that some states have all the hard parts, and they have sexed the fish, whereas others haven't.

I guess I'm unsure, as far as cost. I mean, obviously, if you're doing field work, you're going to need quite a bit more funds, and so I'm looking for some feedback there, so we can take that back to the council, to see if perhaps they want to put an upper range on this. We have not talked about this explicitly with the council.

DR. GALLAWAY: What I find is that, even if a lot of these other costs have been covered and samples are available, that there tends to be undue optimism about the time and effort required to complete this, especially when the schedule is short, and so, whatever you have available, I would add some to it.

CHAIRMAN LORENZEN: Shannon. Thanks, Benny.

DR. CALAY: Thanks. I think that we can help, in terms of prioritizing what work is needed to improve the stock assessment

initially, with an eye on the next stock assessment of gray triggerfish. I mean, currently, that stock assessment is a Gulf-wide stock assessment, and it's not spatial in configuration, although we certainly do see some indications that it might be more appropriate to consider at least an east/west spatial structure, and, if we did that, it would be interesting to know if there is any difference in growth, east/west, say, of the Mississippi River.

We're most likely to use this information to actually as conditional age-at-length information, and so what we would really need is to understand -- Right now, what we've got is basically a lot of dorsal spine information, and there appears to be a well-known bias now between the dorsal spine age and the otolith age.

We basically need to better understand that, to either have a vector, for example, of the bias, or we need new age composition data created from otoliths. If we have new otolith data, it could be inserted in the model as age composition, which means then it really needs to be representative of the population. If there are now differences that arise, for example, with different gears or areas, it would be necessary to weight that, in some fashion, so that it would be reflective of the population, but if that is not possible, given the timeframe and the funding involved, it's also possible to use this data in the conditional sense, where we use length composition data as well as, essentially, fit to an age-length key.

The sex-specific growth that you discussed, at this time, is not really the highest priority, because we don't really have a convenient way to incorporate that in the stock assessment model, and so, essentially, what we have right now is a lot of length information, and the highest priority need right now is for us to have a way to also fit to conditional age-at-length or as a separate fishery-independent and representative source of age composition data, which is a better way to do it, but also more costly, in time and money.

CHAIRMAN LORENZEN: Thanks, Shannon. Will.

DR. PATTERSON: This last point that Shannon made is something that came up during the data workshop for the last triggerfish assessment that ultimately got put on the shelf. When we presented the early validation work for otolith-derived versus spine-and-vertebrate-derived estimates of age for triggerfish, one of the questions that came up was, well, what do we do with that now?

Basically, at the time, all the data were spine-derived age estimates, going back in time, and we didn't really have any fishery-specific information to try to estimate what the sex ratio is for a given fishery.

We do know, from a couple of different data sources, going all the way back to Walter Ingram's dissertation, that there are differences in the sex ratio with age, with the males disappearing quicker from the population than females, and so what we don't have is sex ratio information from the various fishing sectors, or even a Gulf-wide or regional estimates of the sex ratio.

If those data were available, then maybe -- We would have to make assumptions, going back in time, about what the ratios were historically, but it seems possible that, at least as a sensitivity, you could examine what the implications would be for sex-specific dynamics going back in time in the model, especially given that this will be a research track assessment, and it seems like there's some flexibility and latitude there.

CHAIRMAN LORENZEN: Thanks. Anyone else? Shannon.

DR. CALAY: This is more a question, and perhaps it's a question for Will, and it actually comes from Nancie Cummings. We are aware that there a couple of NOAA CRP-funded projects that are ongoing right now, and it's possible, Will, that you are in fact the PI. How do these projects that are currently underway differ? I think that -- I mean, basically, I think that they do, but maybe it would be helpful just to hear.

DR. PATTERSON: Sure. We have a funded project, CRP project, in the Gulf to examine age validation and ageing error in triggerfish, and so my student, Derek Chamberlain, is about to submit a manuscript for that work, which, basically, the report from 2019 and the SEDAR assessment -- Those were the preliminary data from that work, and so the CRP that Nancie is referring to is the project that funded that.

It was due to be completed last year. However, with COVID, we got an extension to complete the work, and Derek is about to submit the first manuscript from that. When I say about to, I have a draft that I'm about to return to him, and then the other co-authors would have to provide their comments, and then that would be submitted, and so I think it's reasonable to expect, in May, that would be submitted.

What that paper is, it's an age validation using the bomb radiocarbon to validate the age estimation, and the results -- I don't think I'm -- I don't think any of the co-authors would be displeased by revealing sort of the take-home, and pretty much what you see in that 2019 report, that the estimates are -- The spines underestimate age between about one to two years, and so that's consistent with the full dataset that is included in the report. Excuse me. That's included in the manuscript, which is one component of the CRP that Nancie is talking about.

There are some other components that have to do with stock assessment simulations with red snapper, based on otolith mass versus otolith-derived ages, and then, also, some work on vermilion snapper, but, for the gray triggerfish component, the results of that are basically what are included in that preliminary report to SEDAR back in 2019 that Carrie had cited in her presentation.

CHAIRMAN LORENZEN: Thank you, Will. Anyone else? Carrie.

EXECUTIVE DIRECTOR SIMMONS: Okay, and so I guess I have more questions now. If that is the case, and so you guys are publishing this draft bias that we now know is more prevalent for this other study, and I guess where does that leave us in what we need to do for the stock assessment, and so I'm going back to I believe something that Shannon said, and I think she said the priority was to fit conditional age and length.

I guess, in my mind, I still don't understand how we're going to get good fits of that without the sex-specific information, because we know there is this difference in size of the fish, and so I guess I'm not sure exactly what direction we should take this, and so it would be helpful to get some more guidance from the Science Center on this.

CHAIRMAN LORENZEN: Katie.

DR. SIEGFRIED: Thanks. I have a follow-up question for Will, or maybe questions for Will, and then maybe a comment for Carrie. If you've got that more complete age validation study than the smaller dataset that we tried to use for gray triggerfish, do you see, or is there something in the manuscript, that would allow us to calibrate, or convert -- If you say it's one to two years difference, will we be able to use that to convert the ages derived by spines from other data providers? Do you offer anything like that in the paper?

DR. PATTERSON: No. This is simply validating the age estimates

from spines versus vertebrae and otoliths for fish collected from the recreational fishery in the north central Gulf of Mexico. I talked, a little bit earlier, about the work that Carrie Fioramonti had done and the fact that we attempted -- She attempted, in her thesis, to examine differences in size-at-age by region in the Gulf, but it was confounded with gear effects, and so I think you would probably run into the same thing if you tried to apply a bias.

The Shervette et al. paper, as Carrie mentioned earlier, talks about the bias changing with age, and so, if you have differences in size-at-age coming from the various sectors, because of selectivity issues, then simply applying a one to two-year bias may not be suitable for all regions or all gears, but I don't know the answer to that until you actually looked and tried to figure out what those ratios look like and how that changed with age, and so we just don't have any data to give even a suggestion of an answer, at this stage, for that.

DR. SIEGFRIED: Okay. I guess just a follow-up to Carrie's question, although I may have forgotten the entire thing. Now, after listening to Will's answer, I think the thing that -- Or at least the point that I would like to make about the sex-specific growth curves, as far as their usefulness in the assessments, is just -- It's kind of like what Will mentioned, and we would have to assume some way to parse out the historical catch into sexes, and we would have to have some reason to think that we were getting at some life history component, besides just the growth that we weren't getting at in the model otherwise.

I suppose, after hearing Will's answer, it seems like that would be one of the best ways to improve the assessment, is to look at the interaction between selectivity, the age validation, and then potentially changing, by age, the relationship between those two, and that would help us use all of the data that we have available for gray triggerfish, instead of having to chuck out a whole bunch of lengths, because we don't have a good way to calibrate them. Again, it's something I'm not sure the Science Center has the person-power to do at this point, although we certainly could brainstorm on it.

CHAIRMAN LORENZEN: Shannon.

DR. CALAY: I think Katie touched on most of the things that I wanted to emphasize. I mean, the current stock assessment is not sex specific, and I believe that the next assessment is a research track assessment, and Julie can correct me if I'm

wrong, and, as such, we can create a statement of work and technical working groups to address how that sex-specific information could be used in the stock assessment framework.

There are a variety of approaches that would not necessarily require the landings data to all be broken out historically, but those are all decisions to be considered and made at the technical working group level within the research track stock assessment.

CHAIRMAN LORENZEN: Thank you. Anyone else? Carrie, is that --

EXECUTIVE DIRECTOR SIMMONS: I guess I need to work with the Science Center and Dr. Patterson on this some more, because, as far as the selectivity goes, I mean, I think you're going to have to take a lot of samples, with all the different gears, and it's going to be seasonally dependent and all that, and I just don't know if we have that amount of funding here for that, just because of the amount of field work I assume that's going to take, and so I don't know if we still need this type of validation, using fishery-independent samples, and that would be still a good approach with this funding, and so I'm a little stuck, I guess, right now.

CHAIRMAN LORENZEN: Ken.

DR. ROBERTS: Thank you, Mr. Chairman. Carrie, this is off the wall, but --

CHAIRMAN LORENZEN: We can't hear you.

MS. MATOS: It seems like his audio has disconnected, and he has to re-enter his audio pin.

CHAIRMAN LORENZEN: Will, why don't you go, and we'll get Ken when he is reconnected.

DR. PATTERSON: I will just say that I'm happy to go back over the work that we've done to-date, and apparently there's some misunderstanding about what's been completed and what hasn't been completed with gray triggerfish, and so that might help the council, or the council staff, fully understand where things are with estimating gray triggerfish size-at-age and growth rates.

I think the validation work is basically completed, and, as far as do otoliths provide more accurate estimates of size-at-age, I think the answer to that is yes, and there's not a peer-reviewed manuscript that I can say this is the citation, and not that

peer-reviewed manuscripts should be taken as the gospel truth, but there's not a peer-reviewed manuscript yet that we could point to and cite and say this has been completed, but there's another component here that I think is important.

That is how do our estimates of size-at-age change by gear, by region, and what are the implications, long term, for the stock assessments of the assessment of gray triggerfish, and I think there's probably several groups around who might want to take a crack at those types of questions, because a lot of the discussion here is based on historical data and how we could utilize new estimates, given the potential for council funding for gray triggerfish population dynamics research, and how can you best design studies, or design an RFP to solicit proposals, to utilize the historical data in the most meaningful way.

I think the council probably should also be thinking about, as well as the Center scientists, about, well, what about the future, and are we always going to be stuck in this loop of all the old data are spines, and why would we make a transition, if all the old data are spines, and there's going to have to be a transition.

I mean, the difference is pretty stark, and so, again, I would be happy to go over what's been done again, but I think everybody, based on this conversation, should be aware of where things stand, as far as the validation. In my view, it's complete, but it's got to go through peer review.

CHAIRMAN LORENZEN: Thanks, Will. Is Ken Roberts back?

MS. MATOS: No, not yet.

CHAIRMAN LORENZEN: Okay. Paul.

DR. SAMMARCO: I wanted to apologize, and the power went off in our neighborhood for about four hours, and so I missed a big block of the presentations, for which I apologize, but I'm back online now, and maybe even I'll have some air conditioning within a half-hour. Sorry about that.

CHAIRMAN LORENZEN: You don't want to weigh-in on gray triggerfish age validation?

DR. SAMMARCO: No, and I would feel that it would be inappropriate for me to do so, because I didn't hear most of the talk, but thank you for the invitation.

CHAIRMAN LORENZEN: Okay. Thanks, Paul. I don't know if Ken Roberts is back, but, Carrie, it seems you will have to make a decision where you want to go.

EXECUTIVE DIRECTOR SIMMONS: We can certainly go back through some of this with Dr. Patterson and the Science Center, but, I mean, I will say it again, and I just don't see how the council can fund a selectivity study, which I think the direction I was hearing folks say we should go, and, I mean, if we can have a little bit more discussion about that, that would certainly be helpful.

CHAIRMAN LORENZEN: Okay. Any feedback on that question?

MS. MATOS: Ken Roberts is connected again.

CHAIRMAN LORENZEN: Okay. Ken, if you're there and you can speak, the floor is yours.

DR. ROBERTS: Thank you so much. I apologize. By way of explanation, between 2:00 and 4:00 on Central time, it's a very busy trading time for me, and I have the burden of being a trustee of a generation-skipping trust, and a bunch of stuff came in at one time, and somebody didn't do what they were supposed to do.

Anyway, my question was does the council have any flexibility to do sole-source contracting, instead of waiting for an RFP to go out and be evaluated or whatnot? That's a way to save some time, and I just wonder if they can do that.

MR. RINDONE: Mr. Chair, Carrie wants to take this one.

EXECUTIVE DIRECTOR SIMMONS: Yes, we can sole-source, and it has to be a limited amount of funding, and it has to be justified, and it's $99,000, and it has to be passed by the council, but, right now, I guess I'm just not clear what we're taking to the council, as far as what the need is, or the call for the proposals now, and so we certainly need to refine that some more, but, if it's selectivity of the different fleets, I think that's a tall order for council funding.

DR. CALAY: Carrie, I can respond to that. I mean, we do have a lot of length composition data, and we typically do length-based selectivity and retention functions for fisheries, and we use the age information as what I called conditional age-length keys, and so we're fitting to that -- Basically, it's a predicted age-length key, and we're fitting to it, but we're not

directly converting ages, using an age-length key, for example.

I don't really think that we need -- We don't need to be estimating selectivity, based on the age composition data from this particular study, in order for it to be useful, but what we do probably need to do is look at some of the highest priority things that we could learn from this study that would potentially improve the stock assessment.

I think we could -- I mean, I'm a little bit uncomfortable trying to brainstorm right now, on the fly, but I am very happy to have a conversation with you and bring in the appropriate expertise.

EXECUTIVE DIRECTOR SIMMONS: I think, Shannon, you're suggesting an age validation study or a selectivity study? Sorry. I'm getting confused.

DR. CALAY: It sound like you are concerned that you would need to be able to estimate selectivity from this age composition data derived from this particular proposal.

EXECUTIVE DIRECTOR SIMMONS: I believe that's Dr. Patterson's concern and not mine.

DR. CALAY: Okay. Well, I didn't necessarily mean you, Carrie, and I just meant the SSC, I suppose, but that is one thing that could be done, but it's not the only thing that could be done with data that was collected from this RFP, and so I think we have to be really cautious, honestly, about using age composition data from a one-off study, in the stock assessment context, because one thing that becomes very important is, if you are going to use age composition data in a stock assessment, it needs to either be applied to a fleet or a fleet/area combination, if the model is spatial, and it needs to be representative of the population in that space.

The problem arises when you start to get samples that are not collected throughout time and over a large enough space that you get confounding, based on non-representative sampling, and so you can see, sometimes -- For example, it will look like fish grow differently in one place than another, and that can simply arise because you didn't collect the full spectrum of size of animals in the two locations, and so maybe, in the first location, you caught predominantly young fish, and so you have a good estimate, perhaps, of K, but a terrible estimate of L infinity, and then, in another location, you might collect predominantly older fish, and you have a better L infinity, but

a terrible K.

What I am really getting at is I just don't think you have the funds to try to collect representative age composition data through this sort of a funding mechanism, but I do think there are important research questions that can be addressed that would help us improve that stock assessment, and I welcome that conversation.

CHAIRMAN LORENZEN: Thanks, Shannon. Will.

DR. PATTERSON: Just back to Carrie's earlier comments about selectivity, my comments earlier weren't focused on an idea that anybody propose to do a selectivity study with these funds. What I was pointing out is that, because of gear selectivity, there are differences in size-at-age that appear to occur among the various fishing sectors, and so, within the commercial fishery, for example, handline versus bottom longline, but the differences that Carrie Fioramonti found were confounded by region.

I wasn't advocating to do a selectivity study, or to put into your call that there would be a selectivity investigation here, but just the fact that selectivity does affect estimates of size at age, and Shannon is right.

It's tough to compare growth rates, because you have this issue of sampling bias, and you also have uneven sampling among ages, but there are ways to test for differences in size-at-age that don't rely on comparing von Bertalanffy fits, and so that might be a way forward here.

In the end, I am happy to tell everybody what we've done, what our team of collaborators have done, as far as the age estimation in gray triggerfish, and talk about potential things that could be in the RFP. I am hesitant to lay out that, hey, I would -- I suggest you put in the RFP these six things, because I would -- I think, if you wrote a more general RFP, then you might get more proposals, which is always good for the science to have competing proposals.

To Ken's question earlier about sole source, I would stay away from that and write an RFP, and the council can decide, when the proposals come in, whether they think any of them are up to snuff, and they can consult with the Southeast Fisheries Science Center and say, okay, yes, I think this one or that one might push the science forward and be available for the next stock assessment. That way, the council gets the best return on their

investment, and the Southeast Fisheries Science Center gets more usable data for the long term.

CHAIRMAN LORENZEN: Carrie.

EXECUTIVE DIRECTOR SIMMONS: I mean, I don't know that we can do that, Dr. Patterson. I think we need to be very -- I don't want to say narrow, but fairly precise and specific in what our goal and objective would be for this call for proposals and how it meets our grant and program needs and how it would help us manage this stock and the fisheries in the Gulf of Mexico, and so I'm a little hesitant to make it too general, and maybe we could have some meetings with the Science Center, but I guess, if we don't need any more age validation studies, we just need to think about what else we could do, perhaps. Maybe look at recruitment or other things that the council may want to consider for triggerfish, moving forward.

CHAIRMAN LORENZEN: Thanks, Carrie. I mean, it seems to me that we can't take this very much further here. Katie.

DR. SIEGFRIED: I just have a quick question for Will. Your validation studies mentions that it's just recreational Florida data, and do you -- I was looking back at the documentation for the sample that you provided for 62 and then what was used for SEDAR 43 and the update.

If we convert all of the lengths we have into age comps, using an age-length key, but we would need to focus on the fleets, do you see any value in maybe the council asking for additional work in a different region from Florida, and is that what you were trying to get at earlier, or would we be able to use your work for an overall age-length key?

It would sort of eliminate the calibration issue, because we wouldn't be calibrating spine age to otolith age, and we would just be able to use the lengths and convert, using an age-length key, with otolith ages.

CHAIRMAN LORENZEN: Will.

DR. PATTERSON: Thanks, Kai. Katie, that's -- I guess there's really no way around it, but just for me to say that this is what I would do. If there was an RFP and I could respond to it, this is what I might propose, is actually to do that very thing, to go region-by-region and look at the predominant fisheries and the landings that contribute to the overall take of gray triggerfish and estimate size-at-age, estimate the sex comp, and

do some validating of those individual regions, because, although, overall, we have validated that otoliths are a better hard part ageing structure to estimate size-at-age growth in gray triggerfish, or to estimate age period in gray triggerfish, that -- You know, in different regions, you may encounter otoliths that look different.

We know that spines look different in different regions, and so it would be smart to do -- Not to the full extent that we've done with CRP funding, but to actually do some validation work, especially for the older individuals. If we get a lot of teenagers, potentially, from longline samples, for example, then it would be smart to actually do validation for those older ages, to make sure that you are accurately ageing them.

That could provide information not only for the regional age comp information, but also provide information on the sex ratio at-size or age, and that would be important, I think, just to examine differences in general, to inform the current assessment, but, also, moving forward, to kind of indicate where the uncertainties may be and where you would invest to examine that more closely in the future.

CHAIRMAN LORENZEN: Katie.

DR. SIEGFRIED: Okay. Great. Thanks, Will. That's kind of what I was thinking that you might say, and I just wanted to make sure that was right, and so that would actually help the assessment quite a bit, especially because we're looking at -- It's currently modeled in two regions, and we would want to look at those two regions, and we do have the other fleets, and so that information is really useful, Will.

I think that's what you probably should go on, Carrie, if you continue to go down this validation route, and there are potentials for recruitment too, but what Will just said would probably help the assessment quite a bit.

CHAIRMAN LORENZEN: John.

DR. JOHN FROESCHKE: A follow-up question for Katie, or perhaps Will, but a little bit more about the types of sampling, and it sounded like, from the discussion, you were focused on fishery-dependent sampling, but perhaps fishery-independent sampling would be necessary, either in addition to or in lieu of, and we're just trying to understand that process a little bit.

DR. SIEGFRIED: I can mention what I was thinking. I am looking

at all the data from the previous assessments and wondering, okay, well, if we wanted to get an age comp from all these lengths comps, we would need an age-length key that was representative.

In order to get that, we would have to know that there weren't regional differences, in order to use an age-length key across the Gulf, but Will has pointed out that there are potentially regional differences, and so those samples are already taken, and they continue to be taken.

It is always useful to get an independent stratified sample, and then the age comps from those we assume would then be created using the otoliths, rather than spines, because of this known now bias, and that would be helpful. However, just a short-term sample is not nearly as helpful as knowing that the otoliths are better to be used for ageing and then pulling those from a survey that lasts more than the time of the proposed work. I hope that makes sense, and I'm sure that Will can add to that.

CHAIRMAN LORENZEN: Will.

DR. PATTERSON: I think, from my perspective, that would be a step forward, and, again, I think you would want to balance new information that is going to be useful to recalibrate older information derived from spines moving forward, but, also, develop a new approach for how this is going to be done into the future.

This is an inflection point for gray triggerfish population dynamics and ageing. Virginia Shervette and John Dean started working on this five years ago in the Atlantic, or maybe longer, and then, through the validation work, we showed, in the Gulf, that, hey, actually the otoliths are a better approach.

Eventually, that's going to be the standard for ageing gray triggerfish, but it's just a matter of how do we get there, and I think -- I mean, I've already said kind of what I think would make for a useful study, and people can look at the minutes, and, if they can submit a proposal to do that, then it's probably pretty competitive.

CHAIRMAN LORENZEN: Carrie, do you sort of have what you need, or do you want to ask for more input?

EXECUTIVE DIRECTOR SIMMONS: No, and, I mean, I think I have an idea of what direction we should go now, and I will work on something for the council meeting. I will need some help from

the Science Center.

CHAIRMAN LORENZEN: Okay. Unless there is anything else, I think we will wrap up this topic, in which case the next part -- The next item on the agenda is Public Comment.

MR. RINDONE: Mr. Chair, I would help with this. I will wait for the instructions to be put up. Okay. If anyone out in webinar land would like to provide public comment, please use the raise-hand feature in Go to Webinar, and it's the little hand icon on the upper-right-hand part of your screen, in the control panel on the little sidebar there, and we will call your name and unmute your line, and you will have a few minutes to give public comment. First up, we have Michael Drexler.

PUBLIC COMMENT

MR. MICHAEL DREXLER: Hello. Thank you, Ryan, and thank you, Chair. I'm Michael Drexler with Ocean Conservancy. I just wanted to provide a few comments on the ABC control rule discussion, and it's a bit of a rant, and so I will try and make it quick, but this seems like the right stage to rant, or not rant, but ramble, I guess.

Just a few points on that. I wanted to comment that, last year, I provided a qualitative comparison of our OFLs to ABC, and just some points that are relevant here, mainly that the historical comparisons of our OFL show a discrepancy in the range of 30 to 50 percent of sort of what we intended and what was actually landed, and that incorporates both scientific and management uncertainty.

I would also note that our Tier 1 P* approach generally estimates buffer sizes of around 3 to 5 percent, and these are really rough ballparks, but that, to me, says that there's 30 to 50 percent discrepancy there, and I don't believe that the scientific uncertainty is only 3 to 5 percent of that, and so I think we're missing a piece of the pie there on the science end of that, and that's just speaking to the need to revise this.

I appreciate the work of the SSC to generate the list, and I'm really impressed that you were already able to generate a list, and I have some comments on some of the items on the list and two additional items that are for your thoughts.

The first is a historical approach, and I would just comment that this could be done using a meta-analytic approach like the Ralston method, qualitatively or quantitatively, but, also, it

could be applied on a species-by-species basis.

We're at the point where we have multiple assessments for most of our stocks, and a decent history of landings, and so you could think about that on a species-by-species basis, and it could account for those differing process errors that we're not capturing, like amberjack, where we're overestimating productivity, and, in red snapper, we're probably underestimating it, generally. That's one idea.

Second is the simpler fix idea, and Leann pointed to the ABC spreadsheet, and I was wondering that same thing. You know, the core issue is that we're underestimating this uncertainty, and so I wondered, if you removed the sigma from the stock assessment, and applied some sort of qualitative sigma, maybe that ABC spreadsheet becomes useful again. As you know, many of the concerns raised in your discussions are actually listed in that spreadsheet, and so that's one idea.

Two additional approaches, you can use multimodal inference to estimate -- To generate your estimates of uncertainty for multiple models, and the model BAM was mentioned, and JAVA has been discussed, and we have extended Stock Synthesis, the Data Limited Toolkit, which runs multiple models, and it could be an appropriate way to characterize model uncertainty and testing the structural assumptions and structural model uncertainty in that scientific component.

The second that I wanted to flag is a probabilistic-based framework, looking at multiple states of nature using a single model, and this method was just implemented by IATTC for tropical tunas. Basically, you run dozens of models, under different plausible states of nature, different productivity, fisheries assumptions, et cetera, and that captures the process of uncertainty in our models.

It's probabilistic-based, and the U.S. delegation is based on applying the outputs of that to our USA Magnuson-Stevens standards, and so there is a pathway there that you could consider.

I also wanted to comment on the ramps and related to opportunity costs, and I think these ramps are the most important concept to develop a resilient control rule, and it's basically a post-hoc acknowledgment of the unknown unknowns, right, where we can't capture everything, and we set up a safeguard to avoid failure.

The focus should be on designing control rules that work and not

emphasizing the changes in amberjack quotas if we implemented such a rule. I realize that it wasn't presented that way, but I would rather encourage you to think of the opportunity costs of a rebuilding shock, with the result in a really big drop of quotas, the way our control rules current work, rather than a gradual decline that would be associated with ramp rule.

MR. RINDONE: Michael, can you wind it down?

MR. DREXLER: I'm done. Last, on the process, I've spent a few years watching the most recent status determination document move through the council, and I would say the feedback from the council is partially ineffective, and so you guys did a great job, but I would encourage you to think about maybe creating a core team to co-develop these with the council moving forward, to get useful feedback. Thank you for the extended public comment.

MR. RINDONE: Thank you, Michael. Are there any questions from the SSC? Seeing no questions, Captain Zales. Captain Zales, you will need to unmute yourself. Are there any other individuals that would like to give public comment? Captain Zales, since it seems like you're having some audio issues there, if you would like to submit it in writing, we'll make sure it's put into the record. Mr. Chair.

CHAIRMAN LORENZEN: Thank you. Thanks, Ryan, and thanks, Mike, for the public comment. That gets us to Other Business, and so we have two items under Other Business, and one is we have to complete the SEDAR 68 chair recruitment, and so I'm hoping that one or two people have decided to step up. Then the second item is going to be a new item that was brought up by Ken Roberts, and we'll get to that in a moment, but, Ryan, if you want to go back to the SEDAR 68 review workshop and see if we can solicit a chair.

OTHER BUSINESS
SEDAR 68 PARTICIPANT SOLICITATION

MR. RINDONE: Sure. Again, this review workshop will be held via webinar, and thanks, Dr. Siegfried, for pointing that out. It will be August 31 to September 3, and the chair is responsible for making sure that the review workshop stays on track and follows the terms of reference and for helping the review panelists, which will include Gulf and South Atlantic SSC and others from the Center for Independent Experts to compile the review workshop report and get that submitted in a timely fashion to SEDAR. Dr. Neer has her hand up, and so we'll

recognize her.

DR. NEER: Just one quick change. After I sent the memo to the council, I met with the Science Center, and, since we switched from in-person to virtual, we decided let's add an extra day, just so we have a little extra time, and so the dates are actually August 30 through September 3, Monday through Friday. Thanks.

MR. RINDONE: All right. More webinar days. I know everyone is just brimming with excitement. It would be terrific if we could get another volunteer from the SSC to serve as the chair for this workshop. Dr. Neer's hand is back up, and I don't think she can be the chair, but, Julie.

DR. NEER: Just one other thing is that we actually don't anticipate that these are going to be eight-hour days all five days. Our goal would be to have a day or day-and-a-half initially, to get through the initial assessment presentations, and then we'll have breaks throughout the rest of those days, and we might meet for a half-day, or we might meet for four hours or whatever, as the panel works through stuff, but we don't think it's going to be forty hours' worth of sitting at the webinar all day long, just if that makes anybody feel a little bit more comfortable about serving as a reviewer or a chair. Thank you.

MR. RINDONE: Well, I heard that Mr. Gregory was interested.

CHAIRMAN LORENZEN: Mr. Gregory.

MR. GREGORY: Wait a minute. I was sleeping. I don't think so. I chaired a review workshop for spiny lobster in the Caribbean Council a couple of years ago, and I didn't really enjoy it, and it wasn't because it was difficult, and what I found, and I spoke with Julie a little bit, and I spoke with Luiz, because Luiz has chaired lots of committees in the past, and I found the CIE going to so many of our SEDAR meetings, that they came with a copy of SS, and they reran all the models themselves, and did all sorts of stuff, and they wrote the report, and I didn't do anything but sit there, and that's why I didn't like it. I mean, I was just sitting there for three or four days.

This past year, I've been involved in ten of the shrimp working group meetings, and they're about two or three hours each, and so they weren't time consuming, but they do add up, and I was on the scamp stock ID working group, and so I really am not interested in doing a review workshop, particularly a research

track review workshop, and I'm sorry.

CHAIRMAN LORENZEN: You had my hopes up when you started to speak.

DR. PATTERSON: All I heard was Doug say, yes, I'll do it.

MR. RINDONE: Dr. Neer.

DR. NEER: I just want to say the council is not required to send SSC reps to serve on a review panel, but it makes it much more difficult to report back to the SSC, when you have to review it, if no one is part of that process, and so I'm just putting it out there. We do have two South Atlantic participants identified, because it is a joint assessment, and so you will be reviewing both the South Atlantic scamp assessment and the Gulf scamp assessment.

MR. RINDONE: Julie, I have a question. Since it seems as if the SSC's excitement for this responsibility is tempered, is there a process, or procedural issue, with me serving as the chair, to facilitate that role for the review workshop?

DR. NEER: We would have to find out. Really, I don't think so. Honestly, we always had it be an SSC or someone appointed by the council to serve that role, and so I will run it by and see if that's okay with everyone, and I personally would have no problem, and I know you could serve as an impartial chair, and would probably do an excellent job, and so I don't think that's a problem, but we'll have to double-check, because I think the SOPPs do say it's supposed to be an SSC member, but, if you have no one who is willing to do it, then we would need to find someone else, and I know, for HMS, they don't have SSCs, and so we make alternative arrangements for the HMS assessments, as is already, and so I will be happy to look into that and report back.

CHAIRMAN LORENZEN: Julie, I mean, I would support that, and I will say that it's -- I would normally consider it, but I know that, more or less taking a week out at the height of the fall term that is just not a realistic proposition, and I do think that Ryan would do a great job, and so, if that's possible, then I think that will solve our problem.

MR. RINDONE: All right. Well, in the meantime, Julie, let's just scribble my name in pencil on a post-it note there, and then, if we can find an alternative between now and then, then we'll do that, but, in the meantime, put me as a placeholder.

DR. NEER: Sure, and, if anyone wants to serve as just a reviewer and not a chair, let Ryan know as well.

CHAIRMAN LORENZEN: Good. Thank you. We can make that a condition of applicants for the next SSC. Of course, this is the last meeting of the current SSC. Okay. Ken Roberts, you had an additional item for Other Business, it's not mistaken.

DISCUSSION OF COUNCIL FACEBOOK PAGE AND BLOG

DR. ROBERTS: Thank you, Mr. Chairman. Let's focus on the webpage for the council, under the news icon on the bar. If you scroll through that, there is a thing called Gulf Currents, which is a blog for the council.

I originally came to thinking about this when I saw that, on Agenda Item XIII, there was going to be a discussion of best scientific information available from the National Marine Fisheries Service, and I know it's been scratched, but my interest is this.

The Gulf Currents -- Because I do follow it, and there's a good mixture of what is about to happen, like pre-council meetings, and it's educational, too. I went back to 2018 and found an educational thing called *Moving the Bar on What it Means to be Overfished*. Then, in 2019, *Recreational Data Collection.* In 2021, *Regulation Rationale and Minimum Size Limits.* Then, also in 2021, *Clarifying Common Misunderstandings: Aggregate Bag Limits.*

I characterize those as educational for the people who are following what the council is doing, and a real good means, it appears, to communicate with an audience that they don't see face-to-face, and I got to linking that to the best scientific information available issue, and, if anybody read the Facebook page on the council after the last council meeting, and SSC meeting, there was a great deal of negative feelings about ignoring, as it was said by many people, the Great Red Snapper Count, because it was best scientific information available.

I am getting to the point, and the point is I think some attention, if it hasn't been prior to 2018, and that's as far back as I went, it would be nice to have a concise discussion about what best scientific information available is, in the same vein that these other four things I mentioned are educational on some really kind of sticky points, and so I guess what I'm doing is recommending to council staff to consider this as something

that ought to be done pretty quickly, given all of the issues that were raised during the post-council meeting in mid-April about best scientific information available. All I'm asking is for somebody to consider writing something to put in the Gulf Currents that's educational like the other four that I cited. Thank you, Mr. Chairman.

CHAIRMAN LORENZEN: Thank you, Dr. Roberts. I see Emily's hand up.

MS. MUEHLSTEIN: Thank you, and thank you, Ken, for that suggestion. I do handle that blog, and we have a list of a bunch of articles that we would like to write in the future, and that exact topic is somewhere buried in that list, and what I will promise is that I will bring it to the top, and one of the next couple of posts that we put up will certainly address the best scientific information available and how that's defined and embedded, and so thank you for that suggestion, and I think it's a great idea.

DR. ROBERTS: Very good, Emily, and I will say it in front of the group, but, in relationship to what was going on after the council meeting on the Facebook page of the council, I certainly appreciate the fine job you did in responding not only to things you thought essential that some of the people were writing in that were critical, but, when I spoke to you about one I thought was in need of a response, within about six hours you responded, and I'm going to tell you that people have to go back and read the Facebook comments after the council meeting and see what Emily wrote. In relationship to one that she and I were discussing in particular, she did a fabulous job, and I compliment you. Thanks so much.

MS. MUEHLSTEIN: Thank you in return.

CHAIRMAN LORENZEN: Thanks, Emily. Okay. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I just wanted to say that I thought that was a great idea too, and thank you, Dr. Roberts. We'll work on that, and I appreciate the kind words. Thank you very much for your feedback.

CHAIRMAN LORENZEN: Thank you. Unless there are more hands up, I think we are done with the other business component as well, which leaves me to thank everyone, the presenters, our SSC colleagues, and council staff for the very productive meeting. As I said, this is the last meeting of the current SSC, and so I hope that many of us will see each other again in the next SSC.

Thank you very much, everyone, and I guess I'm looking for a motion to adjourn.

MR. GILL: So moved, Mr. Chairman.

DR. PATTERSON: Second.

CHAIRMAN LORENZEN: Any objections? Hearing none, the meeting is adjourned.

(Whereupon, the meeting adjourned on May 4, 2021.)

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