SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SCIENTIFIC AND STATISTICAL COMMITTEE

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Transcript

Scientific and Statistical Committee

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Dr. Frederick Scharf, Vice Chair
Dustin Addis
Dr. Walter Bubley
Dr. Jie Cao
Dr. Chris Dumas
Dr. Jared Flowers
Dr. Kai Lorenzen
Anne Markwith
Dr. Genny Nesslage
Christina Package-Ward
Dr. Marcel Reichert
Dr. Amy Schueller
Dr. Fred Serchuk
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Attendees and Invited Participants

James Gartland
Shep Grimes
Dr. Erik Willimas
Bev Sauls
Tracy Smart

Observers and Participants

Other observers and participants attached.

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at The Crowne Plaza in North Charleston, South Carolina on April 16, 2024, and was called to order by Dr. Jeff Buckel.

INTRODUCTIONS

DR. BUCKEL: Good afternoon, and welcome to the April 2024 South Atlantic Fishery Management Council's Scientific and Statistical Committee meeting. My name is Jeff Buckel, and I'll be chairing the meeting this week. Along with Vice Chair, Fred Scharf, we thank you all for attending, and we're looking forward to a productive week working with you all.

Before we do voice recognitions, if you remember from the February webinar, we have a new SSC member, and we introduced him virtually, but today we can introduce him in-person, and that's Jim Gartland. Jim, if you could just let us know a little bit about yourself, we would appreciate that.

MR. GARTLAND: Sure, and so I'm Jim Gartland. I just learned how to use this. I'm an Associate Research Scientist up at the Virginia Institute of Marine Science. I've been there since the late 1990s, and I started my career building fishery-independent surveys for, you know, the Virginia waters and the Atlantic coast, and, about maybe seven or eight years ago now, I transferred kind of out of that and more into an analytical role at VIMS. I'm currently working on my PhD, and I defend two weeks from today, and so hopefully I will be done with that soon, and get a little bit of my life back, and, again, I want to thank you all for having me.

DR. BUCKEL: Thank you, Jim. We look forward to working with you, and good luck on the defense. All right. Next up is voice recognitions, and then we'll get to some meeting items, and so we'll start down there with Jason, if you could just say your name and affiliation.

MR. WALSH: I'm Jason Walsh, and I'm with the North Carolina Division of Marine Fisheries. I'm an economist over there.

DR. CAO: Jie Cao, N.C. State University.

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

DR. SERCHUK: Fred Serchuk, SSC.

DR. LORENZEN: Kai Lorenzen, University of Florida.

DR. SCHUELLER: Amy Schueller, NOAA Fisheries.

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

DR. NESSLAGE: Genny Nesslage, Chesapeake Biological Lab.

DR. SCHARF: Fred Scharf, University of North Carolina Wilmington, and Vice Chair of the SSC.

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

MR. GARTLAND: Jim Gartland, VIMS.

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

DR. REICHERT: Marcel Reichert, SSC.

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

DR. TURNER: Steve Turner, SSC.

MR. ADDIS: Dustin Addis, Florida FWC, stock assessment.

DR. PACKAGE-WARD: Christina Package-Ward, NOAA Fisheries, Southeast Regional Office.

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

DR. BUCKEL: All right. Thanks, everyone, and I also want to recognize the council members that are here. Amy Dukes, if you could raise your hand, and she's a relatively new member, and then we have Trish Murphey online, and I think our liaison, Carolyn, will be joining us shortly. We also have Southeast Fisheries Science Center reps here, Scott Crosson, and Kyle Shertzer is online, and he'll be giving some presentations, and Erik Williams is here. Thanks for attending, and then NOAA Counsel, Shep Grimes.

All right, and so let's move on to our agenda items, which is Attachment 1a. There was an overview on the website, and now there's a revised overview. When you download that PDF, it starts with a "10", and so, just if you're looking for that in your list, there's a revised overview document. Are there any changes to the agenda, or questions about the agenda? Marcel.

DR. REICHERT: Thanks, Jeff, and just a question. I may have missed it, but is Attachment 11 available yet? That's the red snapper.

DR. CURTIS: Thank you. The South Atlantic Research Program presentation is now available, and I just got it this morning, and so it should be posted to the website this afternoon.

DR. BUCKEL: Thanks for checking on that, Marcel, and so that's a presentation that we'll receive on Thursday, and it should be up there by this evening. Any other questions about the agenda, or issues with the agenda? All right. I don't see any hands, and so the agenda is approved, as it stands, and the next item is Attachment 1b, and that is the meeting transcript from our February 2024 webinar. Does anyone have any edits to the minutes from our last webinar meeting? All right. I see no hands raised, and we will consider the February 2024 meeting transcript notes approved.

Moving on to Action Item Number 2, it's Public Comment, and I just checked, before we started, and I didn't see anything online, and so is there any public that's joining via webinar, or here in-person? If you have comments on anything, now is the time, and then we'll have time after each

specific agenda item, if you've joined in, and we'll make sure we -- I will try to remember, and I usually try, or Judd or Fred will remind me, but, if we forget, just send a -- Raise your hand, and we'll make sure that we get the public comment for each of our agenda items.

Okay, and I sent an email out to everyone, and a lot of the agenda items this week are informational only, and we don't have a lot of action items after those, and so I didn't assign topics to groups, and so we're all on the hook for taking notes on the items that we do have action items for, and so please look at the overview, look at those action items, and, as we're having discussion, please take notes. Judd provides some notes for us, but he's multitasking up here, and so, if you take notes, that will help in fleshing-out the final report from the meeting. All right. Anything else, Judd?

DR. CURTIS: No.

DR. BUCKEL: All right. Then we will move on to our next agenda item, which is the red snapper discard presentation, and there's an Attachment 3a, which is the published paper, and Attachment 3b is the PowerPoint presentation, and Scott is going to be -- Scott Crosson is going to be giving the presentation. Welcome, Scott.

SEFSC MINIMIZING RED SNAPPER DISCARDS PUBLICATION

DR. CROSSON: Good afternoon. My name is Scott Crosson, and I am an economist at NOAA's Southeast Fisheries Science Center, and I know most of you, if not all of you, and Kyle Shertzer is also online, and I think he'll be able to help answer questions, and Kyle is a stock assessment scientist, but this is an interdisciplinary project, and so we've been very proud of this one, and so I'm really excited to have a chance today to present it to you.

One of the things, after many years of watching the South Atlantic Council discussions, and public comments, and comments from different council members, and just everybody else, is that there are a lot of complaints about the snapper grouper fishery. A lot of species are currently overfished, or undergoing overfishing, and, the last time I looked, at least six of the top ten targeted species in the complex, like gag and red snapper and black sea bass, were overfished, or undergoing overfishing.

There's a lot of discarding going on, and, consequently, and you hear this comment from council members and the public again, is why can't we just keep these fish? Why do we keep discarding these fish? I'm getting sick of dropping fish back overboard, and it seems counterintuitive to be discarding fish that people would like to consume and catch, and we've also got very short seasons for some species, especially red snapper, which is generally down to just a few days, even just one or two days, and we have small bag limits for a lot of the different species, and, of course, all of these species are caught together, and so people pull up one species, and they're discarding other ones, and this is causing this sort of situation where -- I mean, I call it -- You know, it's a spiral.

It's a downward spiral, where you find out that something is overfished, or undergoing overfishing, and so you lower the ACL, but, because the fishery is multispecies, you get more discards, and, because the discards go up, you have more overfishing, and you have to lower the ACL again, and you just can't seem to get out of that trap, and so I found this to be a distressing thing.

This is actually -- I went looking, to try and put pictures into the slideshow, and I typed "South Atlantic red snapper" into Google Images, and this was the second image that popped up, all right, from a recreational fishing website, and it's not a happy story, and I didn't, obviously, paste the whole thing in there, but there's a lot of complaints about this, and you just -- Again, you hear it at every council meeting repeatedly, and so how can we get out of this situation?

I am the PI on a project that was started a couple of years ago, where I wanted to explore policy space, and model things out, and I wanted to look at how we could model all of the different economic and biological effects of different regulatory regimes, right, that would minimize all this discarding, but increase catch, right, and I didn't want -- It shouldn't just be a stick, and I wanted carrots. I wanted to see where we could increase the policy options and make people happier, and it needed to be a model that was sufficiently realistic, and so it had to have a lot of fishery dynamics, and so I, obviously, had to work with stock assessment scientists, and it had to be flexible enough to model the multispecies fishery.

Now, we didn't start with the whole fishery, because there's, whatever, fifty-some species in the snapper grouper complex, and I didn't intend to start with red snapper. The red snapper seems to be the hottest species going right now, and so we started with red snapper, and so these are the results for red snapper, but we're going to be going into more species as the next step for our project.

This is internally funded by NOAA, and I, again, thank the agency for kind of backing me on this. The history of this is we started out with an ideas workshop that was just looking at different ways to, you know, diagnose the problem and then look at what we could do to model the problem, and so several of us met up in Beaufort, in the spring of 2022, and you can see some of the members of the SSC were there, and I was there, and I don't have them all listed, but most of the members of the Beaufort assessment team showed up, and kind of drifted in and out of the meeting. Jie, I don't think was at the meeting, but we quickly realized that we needed his expertise, and so we dragged him into this as well, after the meeting.

We spent the day, or a day-and-a-half, looking at different -- Every conceivable policy option, after we diagnosed the problem, and so we diagnosed the problem, as best we could, and we started thinking about every potential solution to it, and we tried to narrow that down, and then we tried to think about how we were going to model all of this.

That model was reviewed by the SSC, in October of 2022, and so you all saw that before it went to *North American Journal of Fisheries Management*, and it's been published now, and that's, obviously, in your briefing book. It went through a couple of rounds of review, and, you know, this is the initial results from this, but we'll talk more about where we're going to go in the future, but the model is very similar to what you all saw back in October of 2022, and so this is not going to be as heavy on the stock assessment science, because, obviously, that's not my expertise, and this is going to be about the policy options and some of the initial findings that we found out about this.

So, you know, we noticed that there is certain management tools that the South Atlantic Council seems to prefer, and these are the ones that -- You know, it's bag limits, and trip limits, are just very, very common for managing these different species, and area closures, and, when I say area closures, they're very small area closures, and not large ones, and time closures, but they're time

closures for particular species, and not for the complex as a whole, right, and so this is what is resulting in the discarding. Then gear requirements, like circle hooks and descender devices, are some of the things that have been added in recent years, but there's a lot of management tools that are not used, or used very infrequently, by the South Atlantic Council for snappers and groupers.

For the commercial fishery, and this is mostly a presentation about the rec fishery, but we'll talk about the commercial fishery a little bit, catch shares are not used in the South Atlantic snapper grouper complex, except for wreckfish, which is sort of its own unique species, and they're not usually caught with all the other ones, and they don't talk about doing big area closures, and that's certainly a radioactive topic, every time that I've seen that brought up, and it usually brings out a lot of public comments against it.

Having a big aggregate bag limit for the major species is not something that's utilized, and there is certainly no kind of lottery for access, or slots are not used, and there is no tag program, and not tagging the fish the way a biologist does, but like tags in the sense that like you get game tags that restrict what you can go out and hunt, and there is nothing like that that's been utilized in the South Atlantic, and then there's certainly not mandatory retention, because that's what is causing all the discards.

So we decided that we would develop -- We would start to develop the snapper grouper spatial model, and eventually we started including all the other species in the snapper grouper complex, or at least the big ones, like gag and black sea bass and stuff like that, and this paper that you see in front of you -- We simulated, and compared, twenty-five different management measures, or sort of tweaks to the model, and we looked at those, and they kind of fall into four big categories.

One is gear modification, including you know, descender devices, but not only descender devices, but that's one of them, certainly, that is utilized right now. We tried a size limit out, and we tried spatial approaches, like closing different areas, and, again, these are just things that we were using to explore the policy space, and this is not any particular proposal that's before the council right now, but this is just we look at what we could break down, based off the fisheries-dependent and fisheries-independent data, and we tried to see what would happen if you fiddled around with those different areas and the landings.

Then general effort reduction, all right, and we did not test tags, or seasons, per se, but we looked at what would happen if you reduced the effort by a certain amount, and that means like, again, you can't go fishing, right, and so, if you reduce the effort, by closing it for part of the year, and you're not allowed to go out there and fish on the reef, or you can do it by distributing -- The way that economists like to do it is you just sort of distribute some sort of unit, that people can then use, and harvest, whenever they want to, but they have a limited number of those, and they're not allowed to bottom fish when they're not utilizing them. Either way, we're looking at, initially, at this point, what would be the effects of that on the population.

This is not an MSE, all right, and we did not consult with stakeholders, and this is just sort of an idea that we wanted to explore all the different policy options out there and see how the stock would respond, and so, for modeling, we took the current scenario from -- I mean, it's a modified version of what's in SEDAR 73, because SEDAR 73 doesn't use spatial aspects for the stock, but we looked at what happens if you set this initial scenario, like we have right now, and you run it

out a hundred years, and so all of them would run out starting the same hundred years, and then you tweak the model, and you see how all of these different variables respond.

There's a lot of variables, and there's a huge -- Table 3, I think, is in the document, and it is massive, and so a lot of the little graphs that I'm putting into this thing were me trying to put that into something that's more visually appealing than looking at a giant table that's twenty-five-by-twenty or whatever.

Our criteria for what we were trying to test for is we wanted to decrease the dead discards, and, obviously, that's the major focus of this, and rebuild the age structure, but we also wanted to increase landings, right, because, again, I was trying to get to this idea where you could find what are the things that would increase people's welfare out of this fishery, right, and increasing landings -- Trading discards for landings, and how do you trade discards for landings? That's what we wanted to find out, and we want to increase the spawning biomass and make the fishing that happens more enjoyable.

To my mind, if we ran a policy option, and some of those things are going to be positive, and some of them are going to be negative, but, if it decreases landings, I would mark that as a negative, okay, because I don't think you're trying to decrease landings, and you're trying to convert discards to landings, and so the different things that we tested.

Gear modification, and this one is really hard to explain, because there's no such technology that exists right now, but, if there were -- I have heard different ideas that, you know, in the future, there might be some sort of devices that could more selectively target fish, and, if that existed, how would that -- You know, you would reduce some of the efficiency of catching red snapper, or snapper grouper species overall, and then how would that affect the fishery, and the thing about this is --

Again, I want to take this very skeptically, because the technology doesn't exist, and, as an economist, I know that, every time you try to decrease the efficiency of one thing, people respond by trying to increase the efficiency of another, and there's been a massive increase in fishing efficiency by recreational anglers over the past two decades, with the advent of GPS, with the advent of the sonars, and radars, that you can use under your boat, and with now the point -- What is it, Spot-Lock or whatever, where you can have the electronics of the boat hooked into your motor, and it can just keep you on without having to, you know, physically throw an anchor down on the bottom, and so all of those things have made the fleet much more efficient, but, if you could decrease the efficiency, how would that affect the stocks?

Then descender devices, and we tried to different things that were in the literature, the Vecchio, and these are estimates of discard mortality after you use barotrauma-mitigation device, and so the Vecchio one had different numbers, and so it's like 21 or 22 percent estimates of discard mortality, and then Brendan Runde had an estimate that the bycatch -- That they were more efficient than that, or more effective than that, and so that it was 12 percent, from what he came up with.

Size limits, we tried increasing -- Putting a minimum size limit in there of twenty-four inches, and then we had the effort reduction, like I was talking about, which you can do in different ways, but we tried 25 percent, and we tried 75 percent, effort reductions, and we tried it both with -- You know, with regulations that would allow discarding, and then we tried also -- We flipped it around,

so you would have to have full retention, to see how that would -- Basically, if you have full retention, you're not discarding anything, right, and so how would that affect the stocks?

These area experiments, again, these are our maps, and these are not particular proposals that are before the council, but these are some of the major areas for fishing, and we broke it down by depth and region, you know, and latitude, and so we had six different regions. Obviously, Areas 2 and 5 are where you tend to find a lot of the red snapper fishing, and so we tried different scenarios where we would prohibit red snapper retention, which is kind of what we have right now for a large portion of the year, and we also tried what would happen if you closed all bottom fishing in that area, or just tried closing recreational effort in an area.

The performance metrics that I'm looking at, you know, we have estimates of the value of abundance, and we have estimates of biomass, and we have the average age of the population, which is also going to be related to the average weight of each fish, which I think was also variable in there, and the landings for each fleet, both commercial and recreational, and then the dead discards for those fleets, and then also we have estimates of what the catch rates would be, and so sort of a CPUE-type proxy that's in there.

To cut to the chase, out of the twenty-five different scenarios, all but two of them increased stock abundance, all right, and spawning biomass and the average age of the fish, but some of them were more efficient than others, right, and so gear modifications -- Generally, that first one that I talked about, like I said, doesn't work particularly well, and it's not -- Again, it's not technology that currently exists that we can think about, but descender devices do have some modest effects, and it depends on the assumptions that you bring into it, and size limits we did not find to be a very promising management tool.

We did find that reductions in effort, general reductions in effort, were the most promising scenario, and spatial measures, that allow effort, don't do very much, which is something that the council already knows, because that's what we're seeing in reality right now.

In the following slides, I put -- I tried to -- Again, all that data that's in Table 3, I tried to put it into formats that's more visually appealing, and the scenario -- Next to each graph, I put the number for the scenario in Table 3 in purple, so that you can kind of flip back to the table if you need to, and I made something blue if it was good, or a desirable change, and red if it's an undesirable change, and so things like increase in landings are blue, and things like increasing discard are red.

Gear modifications, we don't know what they are, and they're also very inefficient. They take -- It takes a lot of reductions in catchability to reduce discards, and reduce landings, and so even a 10 percent in reduction only produces a drop of about 5 percent, and a 30 percent reduction only drops it about 15 percent, and so you really would have to find some sort of massive way of decreasing the efficiency of the recreational fleet, you know, and, again, I don't know how you would do that. I don't see how you're going to be able to pull all the GPS and everything off the boats, but if there was some way to do that, and, again, it wouldn't be the best option, necessarily.

Descender devices, and, again, these are assuming compliance, that everybody is actually utilizing but the Vecchio estimates would produce a decrease in discard mortality rates of around -- Dead discards would go down about 6 percent, and there would be a 3 percent increase in landings and catch rates. The ones from Brendan would result in a bigger decrease, because he assumed that

the mortality of the species was lower after the descender device use, and he basically showed that they were more effective than the Vecchio thing, but these are the two results that you can see for that. On the left is the Vecchio, and the right is the Runde, and you can see the increase, and most of these are pretty good results.

They're small stuff, but they're helping a bit, and there's not too many red markers. The commercial discards get larger, because the stock is responding to it, right, and so you're going to end up -- The commercial fleet is going to end up having to get rid of more of those species, but certainly there's some potential for changing the management structure to get into ways that you could deal with that.

Size limits, this is not a promising graph, all right, to say the least. Most of the markers are in red, and discards are going up, and landings are going down, and it's the recreational -- Also, the recreational catch rates are going down, and so, you know, you get some small increases in abundance, and a tiny increase in age, but it's not something that I think is going to get to the area that we're trying to get to, where we can try and increase the catches overall, and so we didn't find size limits to be that promising.

A red snapper season, okay, which means, again, this is just -- I've heard this brought up before at council meetings, people saying, you know, we are currently keeping red snapper closed for most of the year, and so we're throwing them back, and then they die, and so why don't we just increase the season, so we can keep these fish instead, and, well, a short red snapper season is sort of what we have right now in real life, and it's not producing very positive gains, and it's producing a lot of different discards.

A longer red snapper season will increase the landings a bit, but everything else flips to the red, and you can see there's massive increases in the commercial discards, and the recreational discards go up substantially, and the spawning biomass goes down, and so, again, this is probably not the best option for solving this issue.

The general effort reduction, and this is, again, this is -- There's lot of different directions that you can go with effort reduction, but, if you're able to reduce the fishing effort on the complex overall, that seems to generally produce the most effective strategies for rebuilding red snapper. The average weight of landings goes up, and recreational catch rates go up, which there's also a graph in this presentation that you will see that is comparing some of these, but the fishing increases, and the value, or the quality, of the fishing increases, and it's even easier to catch some of these species.

Again, we don't differentiate between using a seasonal closure and something like tags, or a set number of trips, and that was another thing that came up, and I think Chris Dumas had the idea that people would have a certain number of trips that they were allowed to use, sort of a days-at-sea kind of process, and so these things -- We didn't break them out in this model, and that's something that probably we're going to look at in the future, is trying to think about some of these policy options, and, as an economist, I definitely want to see them explored from that perspective, but, if you were able to theoretically reduce the recreational effort overall, in the snapper grouper complex, by a quarter, you can see that you will get some increases in most of the good things.

The rec landings are not going to increase. They're going to go down, because you've reduced the effort on it, but the recreational discards will go down, and the commercial landings will go

up, because the stock is rebounding a little bit, and so the commercial fleet is able to take advantage of that. The spawning biomass increases, and the average age of the fish increases somewhat. If you were able to reduce it by 75 percent, which that's quite a bit, but, I mean, you can see how high some of these numbers are.

I mean, the biomass goes very high, and the average age of the fish increases quite a bit. The commercial fleet is able to utilize this, and take advantage of this, and so they're able to increase their landings, and then the recreational landings -- Again, because you reduced effort, people are less able to go out there and catch the fish, and so those landings do go down, but, if you combine it will full retention, and that's what that bar stands for, is full retention, and you will get quite a big bump in recreational landings. It's 200 percent for reducing it by 25 percent. If you were able to -- But you're still going to get a drop in the biomass size, and the average age and abundance, and so that's not necessarily a great option.

75 percent, which is sort of -- I mean, this is a spectrum, right, and there's a whole number of different options you could pick, but 25 percent is a smaller amount, and 75 percent is a huge amount. At 75 percent, almost everything gets much better. You know, almost everything is blue, by a substantial amount, and so somewhere in that policy space, between 25 and 75 percent, you probably could find something that people would find more tolerable, maybe.

The area closures is always a hot topic during discussions. They generally did reduce the red snapper catch, and they did result in the stock size increasing overall, okay, and almost all those benefits are coming from the closure to the recreational sector, but, if you close the areas just to red snapper landings, then -- Which is, again, not so dissimilar from some of the reality that we have right now, for most of the year, then you do get increased dead discards. Again, just closing it for one particular species in the complex does not address the issue.

If you close it to all effort, that increases the biomass for the species, but it decreases the landings, again because you've shut down large areas of the coast, okay, and so some of these -- Again, the map, and you could look back earlier in the slides, and I wasn't going to try and push more things into the slide show, but closing the entire middle region, just to red snapper retention, is not a positive thing. Closing it to effort, obviously, the stock responds quite well, and that's Scenario 20, but the rec landings, and the commercial landings, are going to go down, and, of course, this is a multispecies fishery, and so I'm not getting into any of the impacts that you're going to have on gag, black sea bass, or any of the other species that people like to go out and fish for.

This is a model showing some of the different CPUE, the recreational CPUE, estimates. These are all the ones where CPUE increased by more than 50 percent, and so you can see the numbers, and you can, again, look those up on the -- This is in the paper as well, and you can see some of the goals that people might have on this.

Then, you know, our general conclusion from this is that the measures that we found that are most effective at rebuilding the stock are those that limit fishing effort, either throughout the year or in areas where red snapper are abundant, and, if you put full retention into there, and you want to replace discarding, that's fine, and it's possible, and, you know, area closures have the problem, again though, that they're going to decrease the amount of catch, and so it's probably, you know, to at least the standards that we were putting in this paper, not our best option.

Input controls, you know, which are regulations on effort, reduce the discards, and output controls, like regulations on the catch, like, you know, using different things like size limits and stuff like that, generally don't help address the discard issue, with the exception of descender devices, which did seem to show a fair amount of promise, depending on the assumption, and, again, also depending on the assumptions about their proper use by the recreational fleet, which is a huge caveat that we need to put in there.

The next step for our model is that we're going to start throwing other species into this, and see how it responds, because, again, I know that I wanted to show as many positive results as possible, and I'm sure that, if you were to do some of these scenarios, you're going to get a positive response from gag and black sea bass, and all these other species that we're looking at, and so those are the next species I think that we have on our list, and not all of those are overfished, but they're definitely different types of things that people are concerned about.

Judd, I saw that you added -- I just copied this discussion question from the briefing book, but then you changed it a little bit, and so I think it's a little bit longer in there, but, you know, my -- I will get to it in a sec, but the goal, I guess, for the SSC today, is to discuss which strategies would best meet the goals of rebuilding the stock, and reducing the discards, and I would encourage you also to consider about increasing catch, because I think that's something that people value, and we're communicating, you know, with the MSE group, and so I guess this is something that the council wants the MSE group to look at, or some of the recommendations that come out of this committee, about the best different options.

I put these on here just -- It's up to the committee how you guys want to go and approach this problem, but, just to remind you, you know, we had four major strategies that we looked at of gear modifications, size limits, spatial closures, and then effort reduction, and we mentioned four different goals, right, which was decrease the discards, rebuild the age structure, increase the landings, and increase the spawning biomass, and so, for our purposes, and I would assume for the council's, you probably want to think about which council --

What those council goals are, and what are probably the most viable short and long-term options, and I would encourage you, again, to also consider what would be a greater scenario than the current one to four-day red snapper season, or which strategies also would be less likely to meet those goals, and so, you know, talk with us, and talk amongst yourselves today, and figure out -- You know, prioritize this list, and tell us also which ones we probably should ditch, because we don't want to model twenty-five scenarios again in the next round, and so I will let Judd pull up whatever you want.

I don't know if you want to try and keep the slide show open, because this is -- People may want to flip back and forth between different slides, but if you guys -- First of all, are there questions, technical questions, for Kyle and I, before you get to that point, and I don't have the ability to call on people, because I'm not the chair.

DR. BUCKEL: Questions for Scott? Kai. Thanks, Scott.

DR. LORENZEN: This was a very, very interesting presentation. Thank you. I have some questions about the descender assumptions, and so are you assuming that your sort of starting point is no descender use, and, you know, fish suffering barotrauma, and then the alternative is all the

fish get descender use, and the mortality decreases by the amounts that you have from those studies, and is that the basic assumption?

DR. CROSSON: Kyle, are you able to answer that for Kai?

DR. SHERTZER: Yes, and not exactly. The baseline assumption was from the assessment, which used the Vecchio et al. estimates that assumed a 75 percent usage, and so the decrease, in this paper, was taking the 75 percent to 100 percent.

DR. LORENZEN: Okay, because I was going to say -- I mean, the -- Only maybe a quarter or so of the fish would suffer from barotrauma to start with, and then, of course, people also vent, and certainly in Florida it's a common thing.

MS. SAULS: (Ms. Sauls' comment is not audible on the recording.)

DR. LORENZEN: This only applies to fish that --

MS. SAULS: That paper incorporates what fishermen actually do, which is release fish without venting or descending, if they don't need it, and then the 75 percent descending rate was applied to those fish that theoretically needed it.

DR. LORENZEN: Okay, but that's -- So my point was about the model assumptions, and that I think, if you're assuming that most of the fish need mitigation, and many don't get it, that's probably not realistic, because only maybe 25 percent or so of the fish would suffer from barotrauma, and maybe half of those are already getting, you know, either vented or descended, and so what I'm saying is I think the effect of the descenders is an overestimate, and even the small effect is probably an overestimate. Thanks.

DR. BUCKEL: Marcel.

DR. REICHERT: Just a couple of clarifying questions, and I know it's somewhere in the paper, but the results, positive and negative, and that was after how many years?

DR. CROSSON: It was after a hundred years.

DR. REICHERT: Okay. Thanks.

DR. CROSSON: I mean, basically, the model -- The model, you ran it -- It was, you know, run for a hundred years so you get some stability, right, in your outputs, and then you change it, and then you run it for another hundred years, until you get some stability.

DR. REICHERT: That's for the slides you showed?

DR. CROSSON: Yes.

DR. REICHERT: Okay, because I was trying to wrap my head around in terms of, you know, a hundred years, and we can talk a little bit more about it, but, if you want to start making recommendations for a hundred years, none of us is interested in what management is going to be

in a hundred years, but we may be able to talk a little bit more about that later. There is a, and I think you showed it too, but the areas, the depth, and how were they chosen, because it looks like the deeper areas -- I don't have red snapper distribution off the top of my head, but it seems like the deeper areas -- That there may not be a lot of red snapper there to be caught, or how were they chosen? Do you remember how they were chosen?

DR. CROSSON: Yes, and we chose them based off of the -- I think we talked to Jeff, because you were around. There we go, and look at this. Spread the blame among as many committee members as possible, and so we spoke to Jeff about the depth at which barotrauma started to become a significant issue, and do you remember that, and I think that's -- So expert judgment is where we came up with that number from, but you are right, and a lot of the -- One of the things that -- Again, if Kyle wants to correct me on this, he can, but one of the things that we noticed was that the barotrauma -- Like you said, a lot of the red snapper are caught at a lower level, or, I'm sorry, a lower depth, but barotrauma is also not the only thing that's causing mortality of red snapper, okay, and there's other things that are causing it, and it's not just a barotrauma issue.

DR. REICHERT: Okay, and so, on kind of a related point, on page 13, it says closure of offshore areas reduced the rates inshore, and I had a hard time wrapping my head around that, and maybe that's --

DR. CROSSON: Kyle, do you -- I don't have the paper in front of me.

DR. REICHERT: It was like the second column, and it's on the top, and closing offshore areas, Scenarios 18 and 22, reduce recreational catch rates in inshore areas.

DR. BUCKEL: Kyle, go ahead.

DR. SHERTZER: I was going to respond to some of the other comments first, and I would have to go back to the paper and find that wording, to try to tease that apart. Do you want me to respond to the other comments now or wait?

DR. BUCKEL: Please go ahead and respond to the other comments, and then we'll come back to Marcel. Thanks, Kyle.

DR. SHERTZER: Regarding the duration of the simulations, don't get hung up on the time. That was a brute force way to compute equilibrium values, and so the hundred years was just overkill on getting the model to an equilibrium, but there's not really any temporal implications here, and it's a deterministic model, and we probably could compute equilibria analytically, if we were a lot smarter, but this was a brute force way to do it.

Regarding the thirty-five-meter break for distinguishing shallow from deep, I think that was based on where we might see differences in discard mortality from barotrauma, and you're absolutely right that the bulk of the red snapper are in the shallower regions, and I think we computed close to 90 percent would be within thirty-five meters.

DR. REICHERT: Thanks, Kyle. Scott, you and I talked a little bit about it, but adding species means you're running the same model, but then for other species also, and so there may be -- But

the species interactions are not likely part of that effort, correct? Okay. I had a couple more, but I will check back later.

DR. BUCKEL: I had Fred and then Jim.

DR. SERCHUK: It's a little bit unclear to me whether you looked at what the times to rebuilding of the stock are, relative to any one of these scenarios, and, first of all, did you look at that?

DR. CROSSON: I will let Kyle tackle that one.

DR. SHERTZER: No, and, again, we were looking at equilibria here, and so there really isn't a time component to the dynamics.

DR. SERCHUK: Okay. I mean, I understand that, but, you know, the council is judged by the target of rebuilding stocks, and the stocks are either classified as overfished, or overfishing is going on, and so I think the -- It would be helpful to look at whether the stock ever gets rebuilt, and when it does get rebuilt under any of these scenarios, and which one is most efficacious, in terms of the time spectrum. I know that wasn't exactly what you were looking at, but that's an issue that the council has to deal with.

DR. CROSSON: I agree, and it's a valid point, and, I mean, it's been pointed out -- I remember John Carmichael gave a presentation to the council, a year or two ago, about what's going to happen when red snapper is rebuilt, and the expectation was that you're going to go back to the 1980s, or 1990s, type of fishing behavior, and it's not going to happen under the current system, right, with the current efficiency of the recreational fleet, and the size of the fleet, and so we were also -- We weren't just trying to -- I mean, we agree that you're trying to rebuild the stock, but you're also trying to, to my mind, increase some of the value of the fishing, and so you're right that our project has a slightly different focus than just trying to meet a rebuilding plan.

DR. BUCKEL: Jim.

MR. GARTLAND: Thanks, and so, first, I think this is a really cool paper, and I think the results are really interesting. The question I had is the performance metrics associated with the full retention looked pretty promising, but is there any indication of what noncompliance might do to those results, and what I mean by that is, I think, in a recreational fishery, you're -- If you're required to retain everything, that's great, but, if there's no other boats around, then maybe you highgrade, and so, if you were to -- Would it be linear? For example, if you have 50 percent compliance with the full retention, would those performance metrics change by 50 percent accordingly, or would it be nonlinear, and, if you haven't looked at it, or if you're not quite sure, that's cool too, and I was just curious.

DR. CROSSON: Kyle -- I mean, well, first of all, I agree with you. We did not get into the details about -- You know, even really well-managed fisheries still have a lot of discarding that is not reported, and so, Kyle, do you want to chip-in anything on this?

DR. SHERTZER: We didn't look at that specifically, and I don't have a strong intuition whether it would be linear or nonlinear, but I suspect it would be a nonlinear relationship, but that's just -- Again, we didn't look at that specifically.

DR. CROSSON: I mean, I would think that some of these policy options are also easier to manage, right, and, I mean, I always find it interesting to listen to like the Coast Guard chip-in, during a council discussion, about how they're actually going to enforce any of this stuff, and so, if you do area closures, or time closures, for effort, that is -- You know, if people are not allowed to be fishing, and you find them on a reef, then they're probably not doing what they're supposed to be doing, and they're probably, you know, going to be more easy to detect, assuming that there's sufficient manpower out there for them to do that, but I think that's probably also something that you guys probably should discuss, when you're looking at this, because I -- We have an interest at looking at this from a modeling perspective, and I think it's very valuable for looking at the council's situation, and, again, that downward spiral that I mentioned in one of the early slides, but not all of these things are as realistic to implement as others.

DR. SHERTZER: It may not have to be a mandatory you must keep everything, and it could just be it's open, and you may keep everything that you catch, and so, under that scenario, certainly for recreational anglers, there would be some discarding, and some landings, that were lost due to that, but just, in the scenarios that we ran, that would just -- It would decrease the landings, and increase the dead discards, and probably the rebuilding would actually occur a little bit faster.

DR. BUCKEL: Other questions? I have just a follow-up on that one from me, and so that full retention -- There's the issues with the -- Or maybe it's a non-issue, as Kyle just mentioned, that there could be some still retention, but the bigger -- The one that worked in the full retention was a 75 percent reduction in effort, and so did you guys discuss what -- How you would bring that about? I guess you mentioned before that you had the list of items, and you said, well, any of these could reduce effort, and did you have any -- It's not in the paper, but did you have any internal discussions on what you think might work, like the tagging or others, because it's a big -- A 75 percent reduction is --

DR. CROSSON: Right. It is a huge thing, and there are -- You know, like every good economist, I can think of lots of great scenarios that work out mentally, if you assume lots of things, but, when it comes to reality, it's different. I mean, some things -- Obviously, if you could do a big seasonal closure to effort, then you could probably -- I mean, there's still going to be some effort shifting, and we always know that, but, depending on the -- I mean, if you just have a short season, a seasonal closure, you're probably going to get a larger percentage of the effort, and there's only so much time that people can make up, and so somewhere in that slide. Again, I mean, we have 25 percent, and we have 75 percent, but there's lots of different things that are going to be in there, and so it's just trying to find out, if you did a smaller amount, versus a larger amount, where would you go.

DR. BUCKEL: Thanks. Chris.

DR. DUMAS: Right, and, if we're talking about effort reduction, we're talking about, you know, reducing the number of trips, and you could reduce the number of trips in different ways, but, from a recreational angler's point of view, you would be taking fewer trips, but potentially you would have an increased probability of encountering a red snapper, or some other type of fish, on the trips that you did take, and you could keep more fish that you do catch, and those fish would likely be of a larger size.

You would be trading off fewer trips, perhaps, but an increased encounter rate, and an increase in your landings per trip, and an increase in the size of the fish that you did land, and so, you know, that might -- There are some attractive features for anglers too, and there is different ways that we could -- That the reduction in trips could be implemented. One way would be to have a season where trips are allowed, and another season perhaps where trips are not allowed, but then you might get some shifting of trips across, and there is other ways that we could implement a limit on the number of trips.

DR. BUCKEL: Thanks, Chris. Go ahead, Scott.

DR. CROSSON: I mean, one of the things about this project to keep in mind, right, is anglers -- There is a lot of different angler preferences out there, right, and there is no one angler preference, but it's intuitively obvious, at least, that what people are looking for, for like fishing for tuna, or for mahi, or for king, is different from what they're looking for when they fish on a reef, and I think a lot of the things, the complaints, that we keeping, through the process, has been that people are looking for table fare off of a reef.

They want to pull a fish in, and pulling a fish off the bottom is fun, but it's not fun in the same way that, you know, a pelagic racing around the boat is, and so I think that people tend to be looking for fish that they can keep, when they're going fishing on a reef, and so that was one of our big factors was trying, again, to find that -- To find this -- You know, you manage this fishery that people want table fare, but you're managing it for more of a sportfishing aspect, and there might be kind of a misalignment of desires there.

DR. BUCKEL: Did we have Alexei?

DR. CURTIS: We have Kyle, to that point, I think.

DR. BUCKEL: All right. Kyle, to that point, and then Alexei was next online, and then Amy and Steve.

DR. SHERTZER: It wasn't to that point, and it was to Marcel's previous question, but I can wait.

DR. BUCKEL: No, go ahead, Kyle.

DR. SHERTZER: Okay. I think, Marcel, you were asking about the comment that says closing offshore areas reduced recreational catch rates of inshore areas by about 15 percent, as a result of effort shifting, and is that the comment you were --

DR. REICHERT: Yes, and I had a hard time wrapping my head around that.

DR. SHERTZER: So one of the assumptions that we made, for when offshore areas were closed, was that there wouldn't be an overall reduction in effort, and it's that people who were going to fish offshore would instead fish closer to shore, and so that's the effort shifting part, and, because of effort shifting from offshore areas, where there are fewer red snapper, to nearshore areas, where there are a lot more red snapper, there would be a reduction in the overall abundance, and, because of that reduction in abundance, that's the reason that the catch rates were reduced.

DR. REICHERT: All right. Thank you for that clarification. That makes sense.

DR. BUCKEL: Thanks, Kyle. Alexei.

DR. SHAROV: Thank you. I think -- Well, first of all, thank you, and it's always interesting to learn about studies like this one, because they're really hands-on and important, but I think, at the moment, it appears more like an abstract sort of theoretical analysis, and not like to -- For example, I understand the importance of, as a first stage, we need to explore, for example, the -- Assuming there is some reduction in fishing effort for the different parameters, and, yes, a 75 percent reduction in effort is impressive, but I think it's important for the study to actually have more realistic mechanisms that would suggest how, in practice, this effort reduction could be achieved, because, I mean, this has been billed, or developed, as a support for a strategy, and I don't see a strategy here, because a strategy would have an implementation mechanism, and, of course, I have to admit that I didn't read the paper, and I only read the presentation, but having those elements of the practical -- For example, a reduction, and a possible range of reductions, and that would be useful.

The same in terms of the timing, and I understand that, you know, you ran through a hundred years, or a thousand years, to get you estimates, and so sort of to evaluate the maximum effect of the measure, but, in order for these strategies to be followed by the public, or the stakeholders, I think the actual dynamics, within the reasonable timeframe that each of us can expect to observe, probably would much more important, and that is, if you set a certain strategy for an option, the dynamics, or the changes in SSB, and the catch and discards, say within ten years, is much more important, because that's how the public will be, or we will be, judging whether the strategies work or not, and that's not possibility really for a hundred years, and so I think that the short-term directions in trends probably would be more important, or quite important. Thank you.

DR. BUCKEL: Thanks, Alexei. Next up, I have Amy.

DR. SCHUELLER: In slide 20, it says a qualitatively short red snapper season, and a longer red snapper season, and I'm just trying to wrap my head around what that means exactly, and so it says, in the paper, I think, that the season length was dealt with through a retention function, which was then halved and doubled, and is that correct, and then are those retention functions the ones in Figure 2, and does that equate to -- I guess I don't think there's anywhere where we say like how long that really is, and it's like qualitative statement, I think, with respect to what we currently have now, and is that true? Am I interpreting that correctly?

DR. CROSSON: You're asking an economist a stock assessment question, and so I'm going to certainly defer to Kyle.

DR. SHERTZER: Yes, you're interpreting it correctly. The halving, or the doubling, of the retention was how that was handled. I mean, I guess, the halving would make a short season even shorter, and I'm not sure how long the doubling would make the season, but, yes, these are qualitative statements.

DR. BUCKEL: Thanks, Kyle. Did you have something else, Amy?

DR. SCHUELLER: No, and I'm just -- We already have an extremely short season, and so I'm trying to imagine what a shorter season actually looks like, or how you would get to that sort of halving of a retention function is something that I don't quite have squared away in my brain, nor do -- I mean, I don't think you guys -- I think you purposefully didn't equate this to a number of days that the season is open, which I would not have done either, but that's where my head goes.

DR. BUCKEL: Okay. Steve is going to pass, and so we've got Adrian online. Please go ahead, Adrian.

DR. HORDYK: Thanks, Chair. Just so everyone knows, I'm working with Blue Matter Science, and we're working on the management strategy evaluation project for this snapper grouper fishery. The presentation was really interesting, and really useful, and I've got two comments. One is just on the effort reduction slide, and I believe it's before the one I'm seeing now, and there was a sort of -- This one.

Scott made the point that it has a decrease, and like the red, the 25 percent, is a decrease from landings, and I just thought it was worth pointing out that -- Like Chris said, there is potentially increased catch rates, and so like the landings, the recreational landings, will decline, because the effort is decreasing, and so the actual landings will decrease, but, for people that are still fishing, potentially they're going to get higher catch rates, at least once the stock is rebuilt, and potentially larger fish, and so it might seem a misleading, seeing the landings decline in this red, because, as effort increases -- You might see more positives, in terms of catch rates.

The other point, just to what Alexei said earlier about some of the limitations of this approach, is it's a deterministic model, and so it's not really intended to capture those temporal changes, but it's also really useful, because it gives a sort of snapshot of the potential effectiveness of those different approaches, which, for our MSE, from the perspective of the MSE, it would be really useful. This result is really useful for the council perhaps to identify classes of management measures, ranges of measures, and like, for example, this effort reduction. You know, is 75 percent feasible, and maybe it's not, but like a range of values that we could explore in more detail in the MSE.

In the MSE, it's a dynamic model, and so we can talk about this at another time, but it can reveal things like the probability of rebuilding in a certain timeframe, or how long it takes to see the positive impacts, for example, of reducing effort and so on, and so it's quite complementary to the work that we're doing here, and I think a lot of those questions that you were having about the temporal changes, and doing that, could be addressed in the MSE, once there's a set of management methods that we want to be explored in detail.

DR. BUCKEL: Thanks, Adrian. Kyle.

DR. SHERTZER: Just to respond to both of those points quickly, yes, you're exactly right that this Scenario 9 was one where there wasn't an increase in the catch rates, and, if Scott could show that slide, that he had later in the presentation, I think that was one of the five scenarios where the catch rates did increase quite a bit. Scott, are you able to go forward to that slide? That was Scenario 9 that we were just looking at. The Scenario 13, in this slide, was the one with the larger reduction in effort, plus the full retention, and, to the other point, I completely agree, and this project, from the start, was intended to provide strategic management advice, and a lot of the

questions that have come up have been more about technical management advice, which I think the MSE will be really well-positioned to try to address, in terms of how do these translate into actual policies, and what is the timescale that you would expect to see responses on, and so, yes, we see this work as being very complementary with the MSE work that Blue Matter is doing.

DR. BUCKEL: Agreed. Other questions for Scott and Kyle? Go ahead, Marcel.

DR. REICHERT: I found my notes. I have two questions, and one was about steepness. In the table, there is a -- It says, in italics, where a lower steepness -- Was that the same lower steepness, or what was the steepness that was part of the lower steepness run?

DR. SHERTZER: It was about 0.75, and we used a Beverton-Holt spawner-recruit function there. The base scenario used the mean recruitment model that was used in the assessment.

DR. REICHERT: Okay. Thank you, and this is something that we, as an SSC, talked about in the past, and one of the criteria was rebuilding the age structure, and I assume that was kind of, you know, the traditional age structure for a long-lived fish, and I think, as an SSC, in the past, we talked about perhaps red snapper is an unusual beast, and maybe that age structure may not be reached, and it's just a different age structure, and so have you guys talked at all about, you know, in terms of the criteria, or success criteria, and looking at like a different like final age structure?

I know the complication is there, and, in a lot of species, you see changes in life history parameters, and so that, you know, may bounce back, and I think later we'll talk about the terms of reference for red snapper, and I think that's a new one in there, to look at that potentially, but have you guys discussed something like that at all, in terms of whether that will make a difference? Does that make sense?

DR. SHERTZER: Not specific to this project, and it's a topic that we have talked about though for the assessment in general. In this project, we were mostly focused on whether mean age was increasing or decreasing, as a proxy for rebuilding the age structure.

DR. REICHERT: Okay, and so you -- Okay. Thank you. That clarifies a lot, and so you guys did not look at the age structure itself, and you just looked at whether average age increased. Okay. Thanks. That makes sense, and, again, I didn't mention it earlier, but I thought it was a really cool paper, and so thank you for that.

DR. BUCKEL: Others have questions for Scott and Kyle, or comments? Steve.

DR. TURNER: I haven't been able to find the paper on the website, and so it would be good to put it back up, if it's not there.

DR. BUCKEL: Thanks for letting us know, Steve. It was there as Attachment 3a, but it may not be there anymore, and the recent documents are in the top-right. If you look at each agenda item, there is attachments next to those, and it might be there, since it was on there fairly early, and not as a recent. Right there. Yes. We'll check that out for you, and make sure it's there. Are there other questions, or comments, for Scott and Kyle? Yes, Fred.

DR. SERCHUK: I am trying to look at the graphs, and it seems, to me, and correct me if I'm wrong, that, apart from the most drastic changes, the 75 percent scenarios that you point out here, there is very little increase in abundance of spawning biomass, okay, in the stock, and one would expect -- In some cases with reductions, the spawning biomass becomes negative, and it only becomes positive in very high scenarios, the 75 percent reduction in effort, and I'm just thinking that that is not a very comfort thought, that you have to go that high to get really any meaningful increase in spawning stock biomass. Would that be a fair -- Did I interpret it correctly, first of all?

DR. BUCKEL: Kyle, do you want to address Fred's question there for us?

DR. SHERTZER: Sure. I mean, we only looked at those two values, the 25 percent and 75 percent, and, as Scott suggested, somewhere in between might be a more reasonable value, where you get the management responses that you're looking for.

DR. BUCKEL: Steve.

DR. TURNER: Fred, I was concerned about that as well, but I noticed that under the full retention model, but not under the model that includes discards, and that seems odd to me, but, still, reduced effort of 25 percent does increase spawning biomass, by about 25 percent, but, when you add full retention, it really changes the effect, which is odd.

DR. BUCKEL: Other questions or comments? Again, not just Kyle and Scott, but if you had suggestions for Adrian, with the MSE. I think we've finished the question part of this, and so we're going to go on to discussion. Go ahead, Steve.

DR. TURNER: A question for Kyle, and why the difference between Scenario 8 and Scenario 12, effort reduction of 25 percent, one with full retention and one without, and, you know, there are very different effects on the spawning stock.

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

DR. SHERTZER: Sure. It would help if Scott pulled the plots back up, but maybe it's too late for that.

DR. BUCKEL: I think Judd is working on that right now.

DR. SHERTZER: The case with effort reductions, just in the recreational fleet versus the full retention, and I think that one, versus the next slide, is what you're asking about?

DR. TURNER: Yes.

DR. SHERTZER: The question was why are they different?

DR. TURNER: Yes, and why -- What is the difference in say the effect of a 25 percent reduction on spawning biomass, when you have discarding, versus when you have full retention?

DR. SHERTZER: Well, they're keeping more fish, in this case, and so it's full retention, and the 25 percent -- The rec landings is a lot higher, and so that's driving down the spawning biomass more.

DR. TURNER: Okay, and I guess what you're saying is the discard mortality is low enough that the discards -- When you don't have full retention, the discards are contributing to the spawning stock in the future. Okay. Thank you.

DR. SHERTZER: Yes, and, again, discards, or dead discards, are eliminated entirely with full retention, but, if you go back to the last plot, the rec landings decreases, and the rec discards decrease, because effort has gone down, but it's not enough to make a big difference, as big of a difference, in the spawning biomass.

DR. BUCKEL: Thanks, Kyle. Good questions, everyone, and so I think, if there are no hands raised here, or online, we'll move into the discussion, and our action items, for Agenda Item Number 3.

DR. CURTIS: If you look at the revised overview, we had one additional bullet that came out of some staff discussions last week, and that's that third bullet, and so just some background, and the council is very interested in having the SSC discuss these strategies, and then also come up with a prioritization of, you know, not all of them, but which ones would be most effective in reducing those discards and rebuilding that snapper stock.

As you've seen, from that past paper, and you heard from Adrian, and we got a great presentation from him in February on the snapper grouper management strategy evaluation that is underway, and, as Kyle had mentioned too, there is a lot of communication between these two groups, to try to build that into something, a more holistic kind of approach, for the entire snapper grouper fishery, and so, taking some of these strategies that the SSC deems to be most effective, which ones should be prioritized in that snapper grouper MSE as well, or further explored, if they aren't already?

Adrian has done a great job getting information not only from the SSC, but from the advisory panels, from council members, and the technical workgroup on what strategies should be looked at, and then, because we're looking at a multispecies fishery, right, are some of these strategies that we saw in this paper, and what's being considered from the MSE, are those going to be applicable, and what are some of the hurdles, as we look at this multispecies fishery?

As a reminder, the MSE is going to be looking at not only red snapper, but gag, and then they're going to include black sea bass into it as well, and Kyle mentioned that they used red snapper just in that paper there, but they're going to look at other species, and incorporate those other species too, and so these are some of the action items that the council wants you to discuss, and, again, if we could come up with a semi-prioritized list of a number of those strategies, that would be useful. Thanks.

DR. BUCKEL: Thanks, Judd, for that summary. The action items are up, and our first one is discuss what strategies could meet goals for reducing discards and rebuilding the red snapper stock. Genny.

DR. NESSLAGE: Before we get too far into this discussion, I think it might be helpful, given the concerns that people have raised about this equilibrium approach that we took, which is pretty standard for any kind of simulation study like this, but the goal of this was not, as Scott said, to do an MSE.

An MSE is going to be done, and I'm looking at the presentation that we were given back in February, and slide 45 ends -- Basically, the end of the presentation says there's a whole bucket list of management measures that can be evaluated, including effort control, spatial closures, size limits, catch limits, gear selectivity, bag limits, release gear, and combinations thereof, and it was left at that, and I'm not sure how much progress has been made in narrowing-down that list, but I think that what the council is looking for is helping us to narrow down that list, and the purpose of this study was to help narrow-down this list, so that we're not chasing and spend a whole lot of time -- Or not we, but the folks doing the MSE, kindly, are focusing their effort on management measures that potentially could be most useful.

I don't think we're being asked, at this point, to say what will the most effective approaches be, and we're being asked what might be the best style of management that we should be exploring in more depth, and with a lot more detail, so we can get those short-term management projections that would give the council the information that they need, and so I hope that -- If I'm wrong, stop me there, but, if I'm right, I just want to help frame this discussion, before we get too into the details of how far we're supposed to take these recommendations. These are recommendations essentially aimed at helping the council, and the MSE, go to the next stage.

DR. BUCKEL: Thanks, Genny, and I think that's a -- I see a lot of nodding heads, and I think we all agree with that. I do, and so I appreciate you setting the stage for this discussion. We could turn this around and list some strategies that we don't think are worthwhile pursuing anymore, after seeing Kyle's presentation, or Scott's presentation with Kyle's input. Marcel.

DR. REICHERT: Well, just -- Genny, I'm pulling up that February presentation, and what was the slide number?

DR. NESSLAGE: 45, is what I had in my PDF.

DR. BUCKEL: Go ahead, Marcel.

DR. REICHERT: Well, to start off the conversation, you know, one of the things this modeling effort showed is that size limits are really not helping much, and that is -- That's why I pulled up that list, and that is on the list, and so one potential recommendation, that I would throw out to the group, is perhaps size limits may not be something we should spend our time on, or the people who are doing the MSE should not spend a lot of time on, and that doesn't mean eliminating, but, as I said, just to start the conversation.

DR. BUCKEL: Thanks, Marcel, and that's exactly what we want to do here, and maybe we can have it as a priority list, and so, if the MSE folks are able to address all that are on the slide 45, they can, but, if they run out of time, the ones that are at the bottom of the list would not be done, based on our input, and so are we agreed on the size limits? Go ahead, Jim.

MR. GARTLAND: In terms of the positives, and so what to look at, I mean, it would seem like the first bullet there, effort control, would be a useful one to look at, but maybe with a broader range of percentage reductions, right, and so there was 25 and 75, as kind of bookends, which are awesome, and maybe we can look at a few in between, to see, you know, what the relationships are between changing the percent reduction and what the outcome would be, and, not to make it too complicated, but, if time permits, also maybe building compliance.

DR. BUCKEL: All right. Thanks, Jim. Fred Serchuk.

DR. SERCHUK: It also seems, to me, looking at maybe red snapper seasons, and seasons really don't have much impact, whether it's a short one or a long one, and you only get a minimum of about -- A short one only gives a minimum amount of increase in spawning biomass and abundance, and the long one doesn't help at all, and so, if I read those two graphs correctly, the effects on the management goals of increasing abundance, and increasing the stock, are minor under any of those, short or long, seasons, and that's 6 and 7, and I think that's important.

DR. BUCKEL: I agree, Fred. I think that can be listed underneath size limits. How do others feel? Raise your hands if you have concerns with adding size limits and seasons -- For those to be a lower priority for the MSE and the council to consider. Genny.

DR. NESSLAGE: This is -- I can hear Scott whispering, and this is the red-snapper-specific season and not the snapper grouper complex season, which will be a totally different thing, right? Thank you.

DR. BUCKEL: Thank you. Others? Kai.

DR. LORENZEN: So, I mean, it seems, to me, even though the -- Maybe the prospects are not that brilliant, but, obviously, we need to keep the descenders sort of in there, because it's one of the things that, you know, people spend a lot of effort on promoting and so on, and I would like to, maybe as part of the MSE, to revisit a little bit of exactly how that effect is calculated, and I'm still a little confused about exactly how that is done here, because it depends on how many fish need mitigation, and then how many get it, and so on, and I'm not sure that is, you know, fully captured, but clearly we need to keep that, because it's one of the most -- You know, it's one of the areas where there is a lot of effort being made.

DR. BUCKEL: Thanks, Kai.

DR. LORENZEN: Also, more generally, I think, if we do not look at some of the things that don't seem very promising, then, of course, those sort of disappear from view, and then people might come back and say, oh, we should try this, and we should try that, whereas we should maybe keep them in there, just to show that they're not making much of a difference.

DR. BUCKEL: I think a priority list from us, and so we're not removing things from the list for the MSE, but just having a priority, if folks agree with that. I'm seeing nodding heads, and so thanks, Kai. Good point. You know, in the paper, as I recall, there is a statement about the -- Just following your point about the descender devices, that there was not as dramatic of a decrease in the dead discards, but that, in combination with some of these, the effort reduction, and not just using one single, but that in combination with the effort reduction, and that was something that, as

I recall, the authors recommended as a consideration for like a combined strategy, and so maybe that's something to recommend for the MSE, is not just breaking these out individually, but effort seems to be rising to the top, some kind of effort control, and then descender, or venting, some kind of barotrauma mitigation, but those two in combination. Thanks, Judd. Others? Chris.

DR. DUMAS: The area closure scenarios also did not seem to meet all the objectives, and so that might be something we could put in the column of less effective strategies.

DR. BUCKEL: Genny.

DR. NESSLAGE: I think I agree completely, but I think we need to be careful about how we -- What we mean by effective, and so that is one that would be very effective at ending overfishing and overfished conditions, but it may not be good at hitting all the objectives, and so we might want to have maybe two sets of recommendations, one for if you have to do something dramatic, and the best option would be let's try to find a win-win, but, if that doesn't work, for some reason, this would be the next-best effective, and, even though it would be actually more effective for the population, but not as palatable, and ideal, for all the stakeholders involved, but I think it needs to be said that this one would actually work really well for the snapper grouper complex, but maybe not the people involved.

DR. BUCKEL: Thanks, Genny, and so maybe the area closures up there, Judd, and, you know, they came close to 100 percent reduction in reducing the dead discards, the rec dead discards, but there was a negative on the rec landings, and so it could be in both places, I think, where we just have the caveat, a parenthetic statement, and so it's a negative for the area closures, the reduction in rec landings, but it did give the benefit of a near 100 percent reduction in the dead discards, that closing the middle region, which, by the way, two years ago, this body recommended as an approach, for the council to consider area closures off of northeast Florida, to bring about reductions in dead discards, and so that recommendation, that came out of this body, was one that was found to reduce dead discards, from the Shertzer et al. paper. Marcel.

DR. REICHERT: A clarification, and so, here, we recommend not further investigating, and is that what we mean to say, because I think -- Okay. Thanks.

DR. BUCKEL: So, Judd, on that first -- The SSC recommends not further investigating, or the SSC recommends --

DR. REICHERT: No, and Judd moved it. Thanks.

DR. BUCKEL: I think recommends making those a lower priority, but I didn't think that we wanted to remove anything from the table, and so not further investigating was -- We'll let Judd catch up here, and we'll give him a minute.

DR. CURTIS: All right. Do you want, for that first bullet then, to suggest, or recommend, what is not -- Should not be further investigated, or are we making this lower priorities, or both?

DR. BUCKEL: Lower priority, I think was what folks agreed on, to keep those options on the table for the MSE, and, if they're able to do it, then that will be good to come out of the MSE, to show that they were also -- Not only the Shertzer et al. paper showed that they were not effective,

but then the MSE also would show them, but, if the MSE folks run out of time, and can't get to it, and if they have to prioritize management strategies, then these would be a lower priority.

DR. BUBLEY: I was just going to jump in, and, based on what we were -- The conversation we were having, and Genny was talking about, and then to your question, Marcel, and I think it's just what the priorities are here, because, as Genny had mentioned, the area closures, if it's for all species, work really, really well, in terms of limiting discards and increasing biomass, but it also, obviously, has the complete opposite effect with landings, and so I think that's where it was getting confusing, switching back and forth, because it depends on what priority we're looking at, as to where it would go.

DR. REICHERT: To that point, I completely agree, and I think it's important for us to say that here.

DR. BUCKEL: Yes, and that's why I was asking for the parenthetic statements.

DR. REICHERT: Because then the other aspect of area closures also, and that is in terms of feasibility, as we've seen in the past, but that may be a different issue.

DR. BUCKEL: After "area closure", Judd, at the top, the first "area closure", you could say something about listed here because of declines in rec landings, and then you could have it down below, and it's listed here because of the large impact on reducing dead discards. Fred.

DR. SERCHUK: I mean, we're presented with the area closures experiment, and, one, you close it in the middle region to retention, and another one says close the middle region to effort, but could you basically -- That assumes a complete closure of the middle region, for the entire year, I guess, or for the entire season, and I'm not really quite sure, but there is a -- It seems, to me, that the gains for closing the middle region to effort, in terms of the stock abundance and the spawning biomass and the mean age, are very pronounced, and I'm just wondering whether you could not close it completely for the entire year, but close it for part of the year, and you could still get the benefits, and still have that as a management option, and, in other words, you might be able to run a scenario where it's not close the middle region to effort for the entire year, but close it for a certain amount of time. The benefits would be a little bit lower, but you wouldn't have some of the negative effects that are quite as large, and I'm just wondering whether that's an approach. Thank you.

DR. BUCKEL: Thanks, Fred. Judd, did you -- A sub-bullet was spatial and temporal. Go ahead, Kai.

DR. LORENZEN: Just sort of reemphasizing, because we talked about how the things that are likely effective are also quite difficult to do, politically, and I think it's very important that we show the things that probably don't work, even though they're easier to achieve, because there is always a tendency to try and go for the things that are not so difficult to go for, and, if we can show that that really is unlikely to help, I think that's really important, and it's important to keep those things on the books.

DR. BUCKEL: Good point, Kai. Others? Go ahead, Fred Scharf.

DR. SCHARF: So I was thinking -- I was looking at the first point that Jim made under effort control, like a broader range of percentage reduction in effort, and I was just thinking that, you know, when you look at the table, the only scenarios that allow for an increase in landings, right, which is one of the metrics, and are these ones that allow full retention, but, if you incorporate full retention, the only way to achieve any of the stock improvement metrics of abundance, biomass, or increasing in age, is to go really high, with the effort reductions of 75 percent, and so I just -- I think, maybe as a sub-bullet under there, just to recognize the challenges in achieving those two contrasting objectives require significant effort reduction, and so, even though we might explore a range of effort reductions --

DR. BUCKEL: Go ahead, Scott, and then Wally.

DR. CROSSON: To that point, I just want to reiterate I think a point that Kyle made earlier, which is that, when you say full retention, it's allowing for retention, and it's not requiring full retention. I mean, if people discard some of the fish, some of them are presumably going to survive, and so it's sort of like just contributing more to the stock biomass, and to the spawning biomass, but it's just allowing it, and it's not forbidding it, I guess, and so, if some people choose to discard fish anyway, then that's actually going to be a benefit.

DR. BUCKEL: Thanks, Scott. Wally.

DR. BUBLEY: I've thought about this a few times, and we keep talking about this large effort reduction, but we also have to remember that there's that larger-term study, based on the pilot study, that they're looking at recreational effort, and so, if they're actually not calculating that recreational effort at the correct level, and it's actually lower than what they were thinking, we're going to have some of this -- If those findings are like, we're going to have an effort reduction by just, I mean, snapping your fingers, at that point, because it's not -- You're not taking people off the water, but it's just the way that they're calculating effort, and so I'm not sure how that would play into any of this, in terms of the MSE or anything looking forward, but that effort reduction could be built in, at some point in the next couple years, if we find out what the findings of those studies are.

DR. BUCKEL: Thanks, Wally. Whatever effort that is out there is not allowing our age structure to rebuild, right, and we've had these good recruitment events fifteen years ago, but we don't have any fifteen-year-old red snapper, right, and something is -- So we've got some -- The effort may not be correct, but we are in a situation where we're not able to build out age structure.

DR. BUBLEY: But, I mean, isn't that based off the model where the assumption is that effort is happening, because, I mean, that age structure is starting to rebound, but I think the model itself is basing it on that amount of recreational effort that might not actually be to that level, correct?

DR. BUCKEL: Go ahead, Kai.

DR. LORENZEN: When you correct that, you have to re-estimate the model, and it just rescales the model, and it's not going to get us off the hook, unfortunately.

DR. BUCKEL: Thanks, Wally and Kai. Marcel.

DR. REICHERT: This is a detail, and we all know what we're talking about, but area closures, and this is specifically for bottom fishing, and I just want to make sure that people know, and, for the report's sake, let's make sure that we say what we mean.

DR. BUCKEL: Good point, Marcel. Others? Dustin and then Jie.

MR. ADDIS: The study included gear modifications, and they're unspecified, and so I'm just guessing like hook size, or something to increase or decrease catchability, but that could be a low priority, like gear modifications, gear selectivity.

DR. BUCKEL: Agreed, Dustin. Thank you. Jie.

DR. CAO: I am looking at the bullet point of area closure, and I think -- The second one, because I get the impression, from the start, that area closures, instead of reducing the dead discards, it actually increases dead discards, depending on if you close the area to only red snapper or to all the -- You know, to all fish, and so I think we should be specific there.

DR. BUCKEL: Yes, and it's the scenario -- It's the area closure with -- I can't remember the wording, and I'm scrolling to it now. The closing the -- The area closure with no effort, Number 20, Scenario 20, and not Scenario 16, which was closing it to red snapper retention. Thanks, Jie. Others? Christina.

DR. PACKAGE-WARD: I'm just wondering if we should note, somewhere about area closures, that it's problematic in terms of equity concerns, and I don't know.

DR. BUCKEL: So we're talking about that one up at the top, where we -- The ones having a lower priority, and area closure was a lower priority because of the declines in rec landings. Does that capture it, Christina? All right. Thanks. If we look at the list on the right-hand screen, we had effort control, and we discussed that, and spatial closures, size limits, catch limits. Have we talked about catch limits? We have not. Was that a scenario, of the twenty-five, or thirty-five, scenarios, and was catch limit -- I don't remember.

DR. CROSSON: Yes, and I'm not -- Is this from my slide show?

DR. BUCKEL: No, and this is the MSE.

DR. CROSSON: Oh. From the MSE? I can't speak to the MSE.

DR. BUCKEL: We're asking if, in the Shertzer et al. paper, if there was a scenario that looked at a --

DR. CROSSON: What is a catch limit? Is it a bag limit? Catch limit doesn't have a definition, to me, and so I don't know what it means. Lots of these things are catch limits.

DR. BUCKEL: I thought it was referring to a bag, but now I see two bullets down is a bag, and so this would be like, I guess, the ABC. All right. Fred.

DR. SERCHUK: A comment, Chair, on this last thing about the area closures reducing dead discards, and that is true, but what I have seen that is funny is there are significant increases to stock abundance and spawning biomass and the age, and so it's just not one item, and that one actually has some really significant impacts on stock rebuilding, and I think we shouldn't underestimate that.

DR. BUCKEL: Good point, Fred, and Genny had mentioned that before too, that we should capture the positives of the area closure. In addition to the large percentage reduction in dead discards, there is also the very large impact to the spawning biomass, as well as abundance in mean age. Genny.

DR. NESSLAGE: Did you get an answer to your catch limits question, because I think, if catch limits is like ABC, total landings, total discard levels, that doesn't seem to be working right now, and so maybe just -- I will just go out on a limb there and say put that in the low-priority list.

DR. BUCKEL: Thanks, Genny, and so, on the lower priority management strategy, catch limits, annual catch limits.

DR. DUMAS: And also bag limits, because it doesn't help with discards.

DR. BUCKEL: Then we have release gear, and I think we've captured that with gear modifications and selectivity. Release gear is like the venting or descending, which we've covered, and I like the combinations thereof, and we've hit on that. Genny, or Chris and then Genny. Sorry.

DR. DUMAS: Back to the area closures, and we might not get some of the benefits if the effort shifts to other areas that are not closed, or to other -- If it's a temporal closure, to other times of the year that are not closed, and so, to the extent that the shifting effort could reduce the benefits of the area closures, that should be considered, and, if it's a closure where effort can't be shifted, then is that the same as a just total closure, a season closure, if the whole area is closed? My point would be that those spatial and temporal area closures may not have the full benefits if the effort shifts to other areas, or times, that reduces the benefit of the closure.

DR. BUCKEL: Thanks, Chris. I think that may be -- The spatial shifting may be more of an issue when we get into other species, but there's such a -- You know, when you look at the distribution of red snapper, the bulk of them are in that middle region, in the Shertzer et al. paper, and so effort shifting to another area won't be the numbers of red snapper, but temporal -- Within that region, I think the temporal shifting is a bigger concern here.

DR. DUMAS: Right, but, if you do an area closure on the whole area where the red snapper actually are, then that's the same as just like closing the whole fishery, right? If they can't shift anywhere else, then you're closing the whole area, and you're not closing a -- If they have nowhere else to shift to, if you're closing off all the areas where the red snapper exist, then that's just like shutting down the whole red snapper fishery. It's the same as just shutting down the season, right, because they have nowhere else to catch them.

DR. BUCKEL: Yes.

DR. DUMAS: So the only area closure that's different from a whole-season-shutdown is when the area closure only closes some of the areas that contain red snapper, and, if you only shut down some of the areas, then there are other areas where they could shift to, or the effort could shift.

DR. BUCKEL: Understood. Thanks, Chris. Others? Genny, you were next. Genny is still working on her question, or comment, and we're going to go to Chris again, and then Genny.

DR. DUMAS: Under the effort control bullet, it would be interesting to look at sort of the different ways in which effort control could be implemented, to look at that in more detail, and so is effort control capping the number of vessel trips, like recreational vessel trips, or is it capping angler trips, and, if it caps angler trips, is it capping the number of trips per angler, and so can an individual angler only take a limited number of trips, or can that individual angler take a --

For example, one way to get the same amount of effort is you could let one angler take a thousand trips, or you could let a thousand anglers each take one trip, right, and each of those would be sort of the same cap on effort, and so looking at different ways in which effort could be controlled, and what I just said assumes that the relationships between caps on trips per angler, and number of anglers, that those relationships are linear, but, if there were nonlinearities in there, that would be interesting, and I'm not sure if there are any nonlinearities, in terms of capping number of anglers versus number of trips per angler, and looking at the different ways to define effort, and are there any nonlinearities among the different ways to control effort, and that would be interesting to investigate.

DR. BUCKEL: I think that's a good point, Chris, and I've been thinking about what other data need to be brought to the MSE table that can help. If there's just a reduction in effort, but if it's a -- To help the council, some exploration of, all right, here's the current situation, and this is the distribution of, if you look at vessels, how many vessel trips, per individual vessel, and how many trips are made per year, right, and is it centered on -- If that median is one or two, there's not a lot of room to reduce, right, and you've got -- You're not getting what you were talking about, where everybody is still playing, and they're going to get this better catch per unit effort, and you're saying, at that point, you've got to drop.

Say it's one, and then 75 percent of those folks can't fish in a year, and so knowing what that distribution looks like, both for vessel -- The number of vessel trips per year, or, at the individual angler, the number of individual angler snapper grouper fishing per year, and, here, we're talking about red snapper.

DR. DUMAS: And number of anglers per vessel per trip.

DR. BUCKEL: Yes, and so those data, to me, need to come to the table for that, to develop those strategies, and to help the council with --

DR. DUMAS: If you limit effort by limiting vessel trips, then they just put thirty anglers per vessel, and you've got anglers hanging off the sides of the vessel as it goes out kind of thing, and so, you know, how to -- What are the different ways that effort could be controlled, and looking at the pros and cons of those different ways.

DR. BUCKEL: Yes. All right. Thanks, Chris. Judd, did you -- I wasn't watching. I was looking at Chris, and not watching your -- Do you have notes on that?

DR. CURTIS: Yes, I got that.

DR. BUCKEL: Okay. Marcel, go ahead. All right. Genny is ready, and then we're going to go to Marcel.

DR. NESSLAGE: Can you smell the burning in my brain? Okay, and so this is probably a question for Adrian, and maybe it's a stupid one, and I apologize if it is, but I'm looking at the list there on your slide, and we talk about all these different options, but then there's the parenthetical statement, at the bottom, of "and combinations thereof", and I guess I'm wondering, based on something that someone said earlier about, well, once we're rebuilt, it won't look like the fishery was in the 1980s.

Will these projections include only out -- Management measures that won't change once they're rebuilt, and will they just continue past the rebuilt stage, or, once they hit the rebuilt stage, will then an alternative management option -- Could that be put into place? In other words, can we get more bang from our buck out of this MSE by saying, okay, if we do something that might be kind of painful, but maybe a win-win situation that's moderately palatable to everybody, and get us through, and get us rebuilt, but then what? I don't want to have to wait another five years, for another MSE to be done, if we can do something now to say, for some of these more successful options, once they're rebuilt, what should we do next, and is that something that's within the scope of work, or you're thinking of, and maybe you've already presented on this, and I don't know.

DR. HORDYK: I can speak to that, and that's a great question, because that's one that we've been sort of discussing about what our approach is at this point. There's kind of two ways to do it. One is what we're looking at here is essentially static management measures, and, by looking at this paper, we're seeing -- Similar to the MSE, it's a way to be able to scope out which, at least in theory, which approaches are likely to be most effective at getting these to the most important management goals.

The question that you raise is about dynamic management measures, and so being able to change the management in the future, once the stock has rebuilt to a certain level or so on, and that's actually an MSE, at least the MSE work that I've done in the past, and a lot of the focus is on that path, in trying to develop dynamic harvest control rules that adjust the management based on the stock status.

The part that you need for that is the estimation model. You need some model of what we're doing now, and what we're doing now is the static control, and then we're reporting directly from the operating model what the model says is how the stock recovers, but, to do what you're suggesting, a dynamic management control, you implement some rule, and then you need to have, internally, some estimation model, essentially a stock assessment model of some type, that gets the data and tries to estimate what the stock status is, if it's rebuilt or not.

We can see, you know, from the MSE, we can see the stock, within the model, that it actually rebuilds, but, of course, if we're trying to implement this in reality, we've got to try and estimate that somehow, and so you need an estimation model, which can, obviously, have varying degrees

of success, but you can develop a sort of estimation model, and that will adjust, for example, the amount of the fishery, based on -- So there's two ways, two sort of steps in it, and, right now, we've just been focusing on the static controls, to try to narrow the methods that would work most successfully, but then the next piece is exactly what you're talking about, trying to develop dynamic methods.

I'm not sure whether -- It's certainly something that we can do, but I'm not sure if it's something that we'll be able to do in the scope of this kind of project, because we're sort of focusing right now on this part.

DR. BUCKEL: Thanks, Adrian. Genny, a follow-up?

DR. NESSLAGE: Yes. Thank you very much, and that all makes sense. I guess I'm wondering if we should include something in our response, so that the council understands, if they don't already, that this is -- That this would just be the management measures that would get us to rebuild, but we might want to start thinking farther ahead, sooner than later.

DR. BUCKEL: Thanks, Genny and Adrian. Judd is typing that up, Genny, and so make sure it captures what you -- While Judd is typing, others? Marcel.

DR. REICHERT: In terms of the things that Chris said earlier, I kind of lost where that is on the report, but I will wait until Judd finishes his --

DR. BUCKEL: Marcel, what was the --

DR. REICHERT: Can you scroll by the trips? The capping vessel trips, and angler trips, and I was trying to think -- You know, in the commercial, I can see that, because you've got your sea days, and you've got the records, and I'm trying to think -- Do you have any ideas how that would work in the recreational fishery? What's a recommendation, in terms of capping vessel trips, or angler trips, and how would we implement that? When I was thinking about it, I kept coming back to, well, you know, effort reduction is -- In terms of the recreational fishery, it's how you translate that to.

DR. DUMAS: Right, and that was my question, is how would we -- What are the different ways that you could define effort reduction? You know, it could be a cap on the number of vessel trips, or it could be a cap on the number of trips per angler, and suppose you said, okay, sort of the optimal amount of effort is this number of angler trips per year, and suppose you could calculate that. Then how should that effort be allocated? Should it be allocated to a number of vessel trips, or to a number of angler trips? Should it be a for-for-all when the season opens?

Like, for example, suppose the optimal number of effort was, you know, X number of vessel trips, and suppose you could count vessel trips perfectly with satellites or something, let's just say, and so then the season opens, and there is a race for the fish, right, because there's a certain number of vessel trips, and you can -- You know, one guy could take a vessel trip every day, and some other guy only has to work five days a week, and he can only take a vessel trip on a weekend, but, when you hit the cap number of vessel trips, then, boom, you know, the season is over, or you could take that same number of vessel trips and distribute it out across the whole year and say there's a daily cap of vessel trips, and, when you add up across all those daily caps, it adds up to the annual cap

on vessel trips, and so there's different ways that effort could be allocated. There's different ways that a cap on effort could be allocated across the year.

Also, you could -- You know, you could also allocate that effort cap. You know, anglers could just go for it, and then some anglers might get a lot of trips in that year, and other anglers might now, or you could say, no, we're going to limit each angler to only, you know, two vessel trips per year, and sort of allocate that effort cap across anglers in that way, and so there's lots of different ways that a given cap on effort could be allocated across time, and also across anglers, and so that was part of what I was trying to get at here, is to investigate those different ways that a given effort cap could be allocated, and look at the different pros and cons of allocating that effort cap in different ways, and, also, different ways in which -- Allocating that effort cap in different ways could also have different biological effects, effects on the fish population, and I'm not sure, but there could be. Thanks.

DR. BUCKEL: Thanks, Marcel, and thanks, Chris. Others? Jim.

MR. GARTLAND: Do the economics of the enforcement come into this at all, in the MSE or any consideration? The reason I ask is, I mean, if you wanted to have let's say every boat gets two trips, you can do that with a call-in-call-out system, but the cost of that is going to probably be pretty darned high, right, if you have -- I don't know how many boats are in this fishery, but I suppose it's, what, a few hundred?

Sure, and on the phone, but, like I said, still, you have to have somebody on the backside monitoring that, right, and so, again, are there any kind of cost tradeoffs considered with -- We said earlier there are easier ones, and I'm assuming they're the cheaper ones, and so is there any kind of -- Is that tradeoff considered in the MSE at all, or can that be something that you consider on the backside as a tack-on, and like here are the ones that work the best, but this is the price tag on it, and that price tag might take some of those out of consideration.

DR. BUCKEL: Jim, good point, and we're getting into some council realm, right, coming up with different management -- Or discussing management measures, and they do have enforcement that helps in that process, and they can say this is not -- That something that you're talking about is not going to be -- It's going to be too difficult for us to enforce, and so that does come into play at the council level. Other comments or questions?

I guess, Adrian, since you're on the call, these things about effort have come up, and I guess a question, from me to you, is, when you're looking at the management strategy, is it going to be -- Say recreational effort, right, and we've seen that, by reducing recreational effort, you can get a reduction in dead discards, and depending on how -- There is, you know, the retention, and there could be this increase in rec landings, and is there going to be this deeper dive, besides a reduction in effort, or will it be specifics on that, to help the council with like getting into the details on looking at what is currently -- How many vessels are involved in the fishery, or how many individual trips there are per angler, and are you going to get into that level of detail, or is that --

The council is going to need that information, and is that something that a different group will have to pursue? I guess that's my concern, is we get to the point where, all right, the MSE shows that this is the best strategy, is effort reduction, but we still don't know how to bring that about, and so I will let Adrian go first, and then others, if others have comments on that.

DR. HORDYK: Thanks, Chair. What we've been focusing on right now, or up to now, is really the sort of causal level, like effort control, and so not so much how it's going to be implemented in practice, like you're talking about, but what reduction in effort, or what change in effort, would be required to get to a certain -- Or what would you get if you changed effort, and you could say -- You could answer those questions with some confidence in the model.

It gets much more tricky when you start looking at the actual specifics of that, where you cap vessel trips or angler trips, and so, essentially, you need to have a sub-part inside of that, to actually determine what some levels, some catch, what impact that will have on the fisheries throughout the year. It might be more reasonable to explore for the commercial fishery, where we have actual logbook data. I haven't had a chance to really explore the records in detail, but I know it's quite difficult to get at, from what I've seen, finer-scale information.

Then I think the point I will sort of make is that we've got sort of the coarse thing, and we can say with some confidence, but, as soon as you start getting down into the weeds, it's more difficult to make a confident statement about reducing angler trips by this amount will equal, you know, this reduction in total effort, and so there's going to be much more uncertainty in that answer.

I think what we can focus on right now is the former, and doing that second part is certainly possible, but I think it's going to be if the council decides to continue with this effort management in some way, but I think it's beyond the scope of what we're currently working on, and it will require -- For example, it will require a group to try to focus on, you know, answering that question of how are the number of angler trips, for example, related to total effort, and what's the dynamics there, and that's quite a specific question that needs to be answered, and maybe it can be answered with existing data, or maybe not, and I'm not sure.

DR. BUCKEL: Thanks, Adrian. I thought it was at that coarser level, but I just wanted to double-check, and so do others have, I guess, discussion, and I would like to hear some feedback on if we want to provide any input to the council, or direction to the council, on what other information they might need to help make that decision on how to bring about -- How to reduce effort, or do we wait and see what comes out of the MSE, and then cross that bridge when we come to it, and I'm just throwing that out, if we want to have discussion on that. We're at the 3:30 mark, and so we're halfway, and so Judd just mentioned taking a break, which might be good. We can get a little caffeine and sugar, and discussion off the mic, and then -- Go ahead, Judd.

DR. CURTIS: Just before we break, we've got Dewey with a public comment, and so go ahead, Dewey.

MR. HEMILRIGHT: Thank you. I take great interest, and thank you all for allowing me to comment here, and you all mentioned, numerous times, the council, and some of the things -- This recording is really good, because you mentioned the council numerous times, and the reason why we're at this level is because of failure of the council. You know, why can't you all just say that the current effort, whatever it really is, is too high, and it has to be reduced for any other management measures to have a chance to achieve the desired goals?

This stuff of talking about how to figure out effort from the recreational industry is impossible, and it's years down the road, if you even had a partner at the council that wanted to achieve that,

and so many of you all here need to really look at the reality in some of these discussions, because it's past -- It's two or three years that the council has failed to do anything to end overfishing, and this failure has caused great economic effect to the commercial industry that gets 28 percent of the catch, and that's harvested catch.

I think that some of you all, with some of these different controls you're looking at, or responses, and you need to realize that this is almost like a smoke in the air, to actually before it's going to achieve anything, which could be three or four years down the road, and one following thing that I've got to ask, and what is the definition of "catch"? Genny made mention of that, and I was just curious what the definition of catch is, as the SSC sees it, if it is harvest and discards, and I thank you all for allowing me to speak, and I apologize if I'm too harsh, but listening to this conversation -- Some reality has got to get back in it, because the only way you're going to reduce and end the overfishing of red snapper is to reduce hooks in the water, and that is to have some type of small type of area closure to protect the red snapper, very similar to what the council did in 17B.

The effect of the closure of 17B, and it was to protect speckled hind and warsaw, but it actually reduced the catch of blueline tilefish, and that was known and shown that, and so these different things that you all are putting forward here -- Some need to really realize that there is limitations, and the council doesn't want to do anything, and that's why we're in the predicament that we are here today, and thank you, and I look forward to continuing to listen to your conversation.

DR. BUCKEL: Thank you, Dewey.

MR. HEMILRIGHT: How about the definition part, the definition of "catch", based on the SSC, if you all could tell me that. Thank you.

DR. BUCKEL: Dewey, in the past, ABC has been the harvest, right, and so that's -- Then, recently, we just did black sea bass, and that was where the ABC was harvest and dead discards, and is that -- I'm seeing nodding heads, and so it is in flux right now, and it's species-dependent at this point.

MR. HEMILRIGHT: Is the choice of species-dependent -- Does that -- Who decides on that definition of species-dependent?

DR. BUCKEL: Well, the plan, I think, is to move forward -- In the future, these ABCs will have both landed fish and the dead discards, will be in the projections moving forward, and so it's just species-dependent now because, in the past, that was not done, and folks correct me if I'm wrong, because I'm not the stock assessment scientist, but that's -- That is the plan for moving forward, I think, when we have an issue where there is -- Dewey, when the dead discards are substantial, right, and so there may be a situation where it's not in the future, because it's just the dead discards for a particular species may not be that large.

MR. HEMILRIGHT: All right. Well, thank you. You all have your work cut out for you, because you don't have a good partner so far in what the council has chosen not to do. Thank you.

DR. BUCKEL: Thank you, Dewey. Okay. Now we'll move on to a break. It's 3:40, and do you want to do ten minutes, Judd? All right. We'll do ten minutes, and be back at 3:50, please.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. If folks could start moving back to your chairs, please. Thank you. All right, and so great questions for Scott and Kyle, and a good discussion. I think we've got good responses to the action items. I will let Judd get those back up on the screen, just to make sure that we hit on all that we were asked to do, and so we had discuss the strategies that can meet the goals for reducing discards and rebuilding red snapper, what potential strategies should explored in the snapper grouper MSE, and then the last one would these strategies be applicable in a multispecies fishery, and what are some of the hurdles? Marcel.

DR. REICHERT: Well, we talked about, you know, the area closures, and I think that would affect the multispecies fishery, because those are only effective if they're closed for all bottom fishing, because, otherwise, you continue to have the bycatch problem that we currently have, and so I think they are applicable, and I'm really looking forward to what the authors said they were going to in looking at other species, including other species, but, you know, other recommendations may be more red-snapper specific, and I would argue that some of the hurdles are that it affects the other snapper grouper fisheries, even species that may not -- That may not undergo overfishing or are overfished.

DR. BUCKEL: Marcel, good point. This area closure that's specific to a region where there is high red snapper abundance, where the largest proportion of red snapper in our stock occur, that -- If you close that area, then you're impacting the other snapper grouper fisheries in that area, but then there's also the shifting that Chris talked about, and that could shift to outside of that, to impact snapper grouper fisheries in other regions. That would be a hurdle. Go ahead, Marcel.

DR. REICHERT: Yes, and this is just a question, but, when it says area closures, I'm thinking -- Would effort reduction basically have the same effects, because, again, that only works if it works for the bottom fishery. Otherwise, you will continue to have the bycatch problem, correct? So, in other words -- Because we've said that, based on the paper, the best bang for the buck is effort reduction, and part of the effort reduction is area closures, or maybe we say area closures and/or effort reduction, or something like that.

DR. BUCKEL: Do others have comments on what Judd just typed in, or other points, other strategies, that -- Obviously, this is a mixed -- It's a multispecies fishery, right, and so that's what has gotten us into this trouble, where we try to -- You know, we have the very short season for the harvest of red snapper, but then there's hooks in the water for the other species, that are leading to the high discards of red snapper, and it works the other way. If you put in these regs for effort reduction, and we're trying to reduce dead discards on red snapper, and that's going to reduce opportunities for catch as well as reduce the discards for those other species. Genny.

DR. NESSLAGE: I wonder, and are we -- Is it correct then to maybe add a little detail to say that area closures and effort reductions would need to be for the entire fishery, to ensure efficacy and -- What was Jim basically saying, for what's logistically possible, and so between the economics and the enforcement issues, and to do it species-by-species would not -- That would reduce -- That would make those options ineffective in a multispecies fishery, and so there's multiple reasons, and not just the simulations that showed the biology of it, but also the practical considerations that I think the council would be interested in, both economic and logistics.

DR. BUCKEL: Thanks, Genny. Jim.

MR. GARTLAND: Just because I'm still wrapping my head around it, and so the MSE itself is for more than red snapper, correct?

DR. BUCKEL: Yes, and so it's red snapper, gag, and black sea bass.

MR. GARTLAND: So I'm wondering -- Like these options -- If we do these things for red snapper, and I don't know a ton about the distributions of these species, but I'm assuming that they don't perfectly overlap, and so would it be worth looking into -- If a given regulation can do this for red snapper, what would be the impacts on the other two, and like suppose you were to close let's say an area that really protects the red snapper, but the other two kind of overlap it, but kind of don't, and could you use that to inform the magnitude of the impact on the other two, the spatial distributions of these things, or habitat ranges? If that's totally off-the-wall, you can delete that sentence.

DR. BUCKEL: It's a good point, Jim, and I think that's why, two years ago, when we were talking about using area closures to reduce effort and dead discards for red snapper, the initial discussion was the South Atlantic, right, and, all right, well, how are we going to reduce effort, and, well, we'll close it, you know, for a section of time, but then, when we looked at the data, we saw that a lot of the live releases of red snapper -- It was like 95 percent, or more, were off of a small section of the South Atlantic coast, and then it was like, all right, if we don't have to penalize folks that are fishing in other areas, in areas that there's less red snapper, but more gag, or black sea bass, and so those fisheries could remain open when there's this closure for red snapper, and so I think that's the point you're making.

DR. CURTIS: The MSE explores some of those tradeoffs as well, where, you know, if you're looking at implementing a minimum size limit across-the-board on both species, or, if they're different size limits across the two different species, what are the impacts for both the different species and the entire fishery, and so that's one of the ongoing goals for the snapper grouper MSE.

DR. BUCKEL: Others? All right. It's a little after 4:00, and we can -- Go ahead, Marcel.

DR. REICHERT: Sorry, and I quickly want to go back to the timeframe and the equilibrium, the time it takes, and would it be feasible, and I'm looking at that Figure 3 that was in Scott's presentation also, but to look at the trajectory, because, at the equilibrium, you know, you may get a really positive result, but other scenarios may show results, and maybe not as positive, but earlier, and so, if you look at the slope of that change, or, you know, I think Chris mentioned maybe take a couple of timeframes and see where the trajectory is, and I think that could -- If that's feasible, and easy to do, I think that would be very helpful, ultimately, for management, because you -- Again, in a hundred years, I think none of us are too interested in what's happening with the fishery anymore, but it would be very helpful for the council to see what scenarios may get us to certain levels in a shorter period of time, and does that make sense, what I'm proposing? Anyway, and so the --

DR. BUCKEL: To that point?

DR. TURNER: Does it make sense, because, basically, it's assuming equilibrium, and so, if you have equilibrium, and you apply something, then immediately have your second effect. Now, they've done it over a hundred years, but it's not the hundred years, and it's the equilibrium that counts.

DR. BUCKEL: I think that's the point that Kyle was making there, and someone I think mentioned the MSE, that that would be -- Looking at the timing of the impacts, that would be a place to look.

DR. TURNER: But his point may be good, and some effects may be more rapid than others, but this isn't the tool to look at it.

DR. BUCKEL: Thanks, Steve, and maybe the MSE is? Okay. I'm seeing some nodding heads, and so maybe Judd can make Marcel's point about looking at the -- How rapidly you get an impact on a reduction in dead discards, or an increase in SSB, or abundance, related to the different management strategies.

DR. REICHERT: Maybe you can address that, in terms of the tool, and what I'm looking at is, for instance, if these were examples of different scenarios, and you can see, in that modeling, what scenarios may have a trajectory that shows some earlier results than other trajectories, and I realize that, you know, ultimately, you're looking at what's happening with the equilibrium, but I still think it would perhaps be useful, in that modeling effort, to look at that, but, anyway, that's --

DR. BUCKEL: Thanks, Marcel. We'll let folks think about these different action items over the next couple of days, and we can circle back and add to these, or in the report writing, but, for now, for the sake of time, and it's a little after 4:00, and we're going to move on to our Agenda Item Number 4, which is the Low Recruitment Workgroup Update, and Kyle Shertzer is online, and he's going to give this presentation. Are you ready, Kyle?

DR. SHERTZER: I am. Is it okay if I present my own screen here? The presentation has just a few minor updates since the one that I sent to council staff.

DR. BUCKEL: I'm okay with that if Judd can pull it off.

DR. CURTIS: Kyle, let me make you a presenter. Just a second.

DR. BUCKEL: I will just point out, to the committee, that there are no action items, and this is for informational, and, you know, it's an update on what's happening with this -- We've had a presentation before on the low recruitment that we're seeing in multiple species, and so this is an update from Kyle, and his team, on what other objectives they have addressed, and so I'm looking forward to it, Kyle, and so start whenever you're ready.

SEFSC LOW RECRUITMENT WORKGROUP UPDATE

DR. SHERTZER: Thanks for the opportunity to talk about yet another pressing issue in the South Atlantic. I'll be giving an update on what we've been investigating with this workgroup, along with Kevin Craig, who will tag-team the presentation with me, and Ana is also online, and she's done a lot of the analyses. Also, Brendan Runde was a post-doc on this project for a while, and

I'll try to highlight some of his contributions, as well as those by Kaitlynn Wade, who was a graduate intern with us for a summer.

The bottom line of what I'm about to tell you is that we don't yet know why we're seeing low recruitment for a lot of these stocks. We have a better handle, I think, on why we're not seeing it, and, in other words, some hypotheses that maybe we can discard, and we have some, I think, intriguing leads on perhaps why we are, but we really don't have a smoking gun yet.

The evidence that we've seen of poor recruitment has come largely from stock assessments for several species, but also from some of the SERFS trends reports, and we see the signature of poor recruitment in some species that are not maybe targeted by the fisheries, and there's also several peer-reviewed publications that have documented this, one on scamp and one on red porgy, and then also a multispecies paper that Kaitlynn Wade was the lead author on.

Typically, when we come to the SSC to present stock assessments, we look at the poor recruitment, one stock at a time, and we wonder what's happening, but I think it's really striking when we look at these all together and see that this poor recruitment signal is happening across these species, and at roughly a similar time, although it's not identical across all species, but it's happening over the last ten to fifteen years or so.

This is work that Kaitlynn did with principal components analysis, looking at recruitment deviations, grouped by species, and also by years, and we can see that there are these commonalities across species, showing low recruitment, this box in red, and that we are seeing these trends in the recent years, this blue box on the right, and, in this analysis, 2014 was the terminal year that was used, because that was the latest year of one of the assessments that was used in the analysis, but the bottom line, from this slide, is that this really is a multispecies issue, and it appears to have started around 2010, though with some variability by species.

The rest of this talk is broken up by various hypotheses that we've considered about what might be driving these results, and we would certainly love to get feedback from the SSC on the analyses that we've done, whether positive or negative, or additional ideas about things that perhaps we haven't thought of, but the first one that I will look at is the sampling artifact.

The idea here is that, whether from the assessment or from the SERFS trends reports, or even the publications, a lot of what's driving these results are coming from the SERFS sampling, and so there is some question about whether we're getting a false signal of decline in the index, and so the way that this was addressed was by comparing indices of -- Well, let me back up a second.

The reason for this is because of this expansion of the SERFS sampling, and so there was this core region, through much of the sampling, and it was off of South Carolina, and maybe Georgia, and then, around 2010, or 2011, when SEFIS came onboard, there was expanded sampling toward the south, and then, a few years later, there was some more expanded sampling toward the north, and so that's the question, is whether the sampling artifact is being caused by this geographic expansion in the sampling.

The way this was tackled was by comparing indices, and also length comps, that used all the SERFS areas to those that used the core areas, or the restricted areas, before the geographic sampling, and, in this case, we didn't really find any evidence that the core areas had different

trends than what was happening for the full areas, and the indices really appeared similar, and I will show a couple of examples on the next slide.

In addition, patterns in the composition data were generally consistent with fishery-dependent sources, and so those haven't really undergone the geographic changes in sampling, and I guess I will also just mention that, anecdotally, we've heard reports from fishermen that some of these stocks are indeed declining, and they've been observing that on the water, and that's documented in some of the AP reports that are on the SEDAR website for the assessments.

Here's an example of -- This is red porgy, looking at -- This is work that Brendan did looking at the indices that were developed, standardized indices, for the full area, and that's the black, in this top panel, versus the standardized index for the core areas off of Georgia and South Carolina, and you can see that the trends here are really similar.

There is some differences in some of the years, but we don't see -- You know, if there were an area expansion effect, we might see a divergence in these indices, starting when the expansion in the areas started, and, looking at the length comps on the bottom, and on the left side is the full area for each of these, and that's the maroon, and on the right side of each of these violin plots is the blue, the blue truncated areas, and we don't see -- I mean, there are some differences, but there is not a large different that would be driving this result of finding low recruitment because of geographic expansion.

This is a similar slide, and this is for black sea bass, but, again, the core areas versus the full areas, and there are some differences in year-to-year, but the trend is very similar in that top panel, and then the bottom panel is, again, the length compositions are fairly similar for the full area versus the core area, and so that's what we did for the sampling artifact. I think there's maybe more that we could do there to investigate that, but, as far as where we've looked, we have not found evidence yet that there is a sampling artifact from SERFS that is driving these estimates of low recruitment.

The next hypothesis that we investigated is recruitment overfishing, and the idea here is that fishing goes up, and that drives the spawners down, and, because of reduced spawners, there is reduced recruitment, and this implies an order of events, that something goes up and something goes down and then something else goes down, and so we can ask if we see that order of events in the assessment output, and we investigated this idea in a few ways.

The first was just visual inspection of the time series, the output from the stock assessment, but also a change point analysis, a derivative analysis, recruits per spawning analysis, and looking more closely at some of the SERFS data, and so, in the next part of this presentation, I will go into each of these five modes of investigation into the recruitment overfishing hypothesis.

This is just a visual inspection, looking for that order of events, and the top-left panel is scamp, and what we're looking at is, over time, the yellow line is the recruitment time series, and these are all scaled, and the purple line is the spawning biomass, and then the blue is the fishing rate, and so what we would expect to see, if recruitment overfishing were driving these results, is that F would go up, and SSB would go down, and recruitment would go down, but what we see, with scamp, is that there is a drop in recruitment, and then SSB kind of follows that, and then F increases after that, and so that's not really the order of events that we would expect.

Gag is on the right, and this one is a little more ambiguous. It's really showing a concomitant decrease in spawning biomass and recreational -- Or recruitment, along with an increase in F, and so this is potentially -- This potentially could be recruitment overfishing, just based on these visual patterns.

The bottom-left is black sea bass, and so, again, here we see recruitment decreasing, and then spawning biomass decreasing, and, meanwhile, F is sort of gradually increasing, or somewhat stable, and so it's not the order of events where we see an increase in F that's driving SSB, and then recruitment, down, and then red grouper, on the bottom-right, and it shows something similar, a decrease in recruitment, and we actually have an increase in spawning biomass, but then a decrease, and then F increases, or is stable, and so we don't really see that order of events here either, but that is, you know, just visually looking at it.

What Kaitlynn Wade did was analyzed these data using change point analysis, and she first explored the methods themselves, using simulation analyses, and, from the simulation analyses, she found that tree classification and linear regression change point analysis were effective for identifying recruitment overfishing, and she also investigated Bayesian change point analysis, and that one was not effective, and so, for these analyses, we're just applying tree classification and the strucchange approach to the South Atlantic stocks.

Here's what she found, and so, again, with the change point analysis, what we're expecting to see, if recruitment overfishing is occurring, is that we would see a change point in fishing, the increase in fishing, and then a decrease in recruitment after that, and so these are the results for the low-recruitment species, and these were the same results for tree classification and for strucchange, and so the same sets of years were identified, and so in none of these cases do we see that expectation of a change point in F occurring prior to the change point in recruitment, with the exception of snowy grouper, but then, when we look more closely at snowy grouper, it's really actually not recruitment overfishing, because, in this case, the fishing rate is going down, and SSB is going up, and so that's not what we would see with recruitment overfishing, and so, in this case, it's just finding changes in fishing, where there's a change, where it's actually decreasing, and then a change in recruitment where it was decreasing as well, but sort of unrelated, I think, to the fishing rate.

The next approach we looked at for recruitment overfishing is a derivative analysis, and the idea here is to fit smoothers to spawning biomass, to F, and to recruitment time series, and then to evaluate the locations of the maximum gradient, for the case of F, and so where it's increasing the fastest, and also the minimum gradients, and, in this case, they're negative, and that's why minimums were minima, where SSB and recruitment are decreasing, and so, again, we can look for that order of events, and, in this case, it's the order in the derivatives.

To show -- What we would expect to see is this left-hand panel, the top-left panel, are time series generated -- They're simulated time series, where we forced recruitment overfishing, and then, if you look at the panel just below it, that's showing the derivatives, and, with recruitment overfishing, we see the peak in the F derivative occurs prior to the decrease, or the peak negative derivative, in spawning biomass, and then recruitment negative derivative follows that, and so that's the pattern that we would expect to see if recruitment overfishing is happening.

On the right-hand side, we simulated recruitment failure, and so, there, you see, on the bottom-right, that you do not see that pattern, and so, in this case, recruitment fails first, and so the negative derivative, in this yellow curve -- It peaks at its negative value, and then spawning biomass follows that, and then F increases, because of the decreases in the biomass, and so that's what we would expect to see from recruitment failure, and then here's what we see in a couple of examples from the actual stock assessments.

This is black sea bass on the left, and it's showing the time series, on the top-left, and then the derivatives, on the bottom-left, show that we see the peak decline, the fastest decline, in recruitment first, and then we see actually the F sort of occurs next, and then we see the decline in spawning biomass, but what we're not seeing is the peak in F occurring prior to spawning biomass, and then following that would be the recruitment.

This is scamp, on the right, and, again, the bottom-right panel, we don't see the -- We see that recruitment has its biggest decline early on, and then spawning biomass follows that, and then the fishing rate follows that, and so, again, we don't see that signature of recruitment overfishing here, and I will mention that these are some of the cleaner examples from the derivative analysis. A lot of the other cases were somewhat messy.

Then this is a different analysis, looking at recruits per spawner, and so, again, we simulated some data to show what we would expect to see if recruitment overfishing were occurring, and so this top-left panel -- This is a simulation with a low variation in recruitment, a low SigmaR, and it's showing a time series of spawning biomass, which, in this simulation, decreases, and then it increases, and I have color-coded the curves, so that you could get a sense for time in the next panel, and so the panel to the right shows what we would see for the recruits per spawner as a function of spawning biomass.

Now, the dashed line is just the expectation, and so that's -- If you're following the spawner-recruit curve exactly, that is what would happen. If this were a deterministic simulation, the population would just slide up and down this curve. As fishing decreased the spawning biomass, the recruits-per-spawner would sort of slide up this curve to the left, and, if spawning biomass were increasing, it would slide back down, and so you kind of see that pattern here, the color-coded pattern, where the recruits per spawner is bouncing around that curve, and so, here, there's not any trends at all, and it's random variability, and so there's really no pattern, and I'm not showing residual analysis here, but, if I were, you wouldn't see any pattern in the residuals, and it's just bouncing around the curve.

Then the bottom-left is a similar simulation, and it's just higher noise, and then, in the bottom-right, you can see, when there's higher noise -- It's the same idea, but there's just more noise around the curve, and so there's no trends in the residuals, and they're just bouncing -- The recruits-per-spawner is bouncing around the expectation, and so that's what you would expect to see if there is recruitment overfishing occurring.

Here's what we actually see from the assessments, and I'm not going to go through all of the species, but I will highlight some of the low-recruitment ones, and so this is red porgy, or this first arrow is, which, over time, has decreased, and then we see this big decrease towards the end of the time series, and, if we look at the expectation of recruits-per-spawner, it has some curvature to it, and there is some bouncing around that, but, in these terminal years, it's much lower, recruits-per-

spawner, than the expectation, and so this is an indication that something else is driving recruitment here, other than spawners, at least in these last several years.

Similarly, for black sea bass, this next curve, we see this big decrease in the end of the time series, in the spawning biomass, and, again, with the expected recruits-per-spawner, as a function of spawners, there is some bouncing around that curve, but, in these terminal years, it is much lower recruits per spawner than expectation from the spawner-recruit relationship.

I have to mention red snapper, and that's this top panel, and it's sort of the opposite, because we're seeing this big increase in spawners over the recent years, and the recruits-per-spawner is far exceeding the expectation, and so that could be driven by an environmental effect, or maybe input from the Gulf of Mexico, but something other than spawning biomass is driving these higher recruitment events.

The next one is red grouper, and it shows a similar pattern, with the low-recruit species bouncing around the expectation, but, during this time period of decline, the recruits-per-spawner is much lower than the expectation, and the bottom panel is gag, and, again, during this period of decline, we're seeing much lower recruits-per-spawner than the expectation.

Snowy grouper, this one is interesting, because the spawning biomass was actually increasing at the end of the time series, but, again, the recruits-per-spawner is lower than we would expect to see, and it's another one that has had low recruitment, even though the spawning biomass has been increasing, and then scamp, in the bottom set of panels, shows that same pattern of, as the spawning biomass is decreasing, the recruits per spawner is far below the expectation, and so these are not the patterns that we would expect to see from recruitment overfishing.

Moving on to the last investigation of recruitment overfishing, and it's evidence that we see from SERFS, and so, for declining stocks, recruitment overfishing, we would expect that to coincide with decreases in mean size, or age, as age structure gets truncated. If it's recruitment failure, we might expect to see the opposite, where there is more larger fish, fewer of the smaller fish coming in to take their place, and so, in this case, we examined the information from the trends report, the Bubley et al. trends report, of the SERFS trap data.

Here are just a couple of examples, and the black sea bass, on the left-hand side, is showing this decline, and then, when we look at the bottom panel, showing the total length, the mean length, we're just -- We're not really seeing that decrease in mean length that we might expect to see from recruitment overfishing when there's a decrease in the biomass, or the abundance, and then, on the right-hand side, it's similar. We're seeing the decrease in relative abundance, but we're not really seeing that decrease in average length that we would expect for recruitment overfishing.

Scamp is on the left-hand side, and it's the same thing. Decreases in relative abundance do not coincide with decreases in average size, and then red porgy, on the right, the decreases in relative abundance do not coincide with decreases in average length, and so we're not seeing here -- There may be other explanations for these patterns, but we're not seeing that signature of recruitment overfishing, and, when I mentioned, early on, that SERFS data showed, SERFS reports showed, this signature of recruitment failure in some of the non-targeted stocks, this is what I was referring to, is these declines in relative abundance, but, more than that, that we did not see the decline, the coinciding decline, in the average total length.

This is a little bit more about this idea from SERFS data, and this is a paper by Bacheler and Smart in 2016, where they investigated relative abundance of species that were targeted by the fisheries, and also species that were not targeted by the fishery, and what I wanted to point out, from here, is that we see these declines in abundance from non-targeted species, and so it's not -- In those cases, it's not likely to be fishing that's driving that result. I mean, I guess there could be bycatch that's occurring, and contributing, but this result is perhaps driven by something other than fishing.

The next hypothesis that we considered was sperm limitation, and we haven't done a lot on this one, but we do note that most of the species that were showing low recruitment are protogynous, and the usual mechanism that we think of, that might be the issue, is that, as fishing goes up, the males go down, and the ratio of males-to-females decreases, and this affects fertilization of eggs, and there is fewer fertilized eggs, and then recruitment would decline, but we note that this is really just a special case of recruitment overfishing, and we don't really see that signature, when we looked at recruitment overfishing, and so we don't think that this is the issue, although there's certainly more that we could investigate on this topic, and it would be interesting, if we have the data, to look at whether the ratios of males-to-females have been declining over time, particularly when we see these decreases is the recruitment.

There may be other mechanisms related to protogyny that we're not really considering here, outside of fishing, a fishing effect, for example effects of population or microplastics or something like that, that could affect sex transition rates.

Another hypothesis that has been discussed, in a number of meetings, and it comes up quite often, is depredation, and so sharks and red snapper and lionfish have all been mentioned as being culprits for devouring black sea bass and scamp and gag, and so one thing that we note is that we don't really -- That may be happening, but we don't really have a good explanation for why these generalist predators would preferentially eat the suite of species that are showing low recruitment and why they would avoid other species, such as snappers, tomtate, and grunts, which have generally been increasing in abundance over the recent time period.

Also, looking more specifically at red snapper, and this is, again, from the Bubley et al. trends report, if we look at the distribution of red snapper, where they're being caught in the traps, and this top-left panel -- As we know, we find red snapper off of north Florida, and off of Georgia, but, if we look at the other species for spatial overlap, red porgy, the top-right panel, the bulk of their distribution is off of the Carolinas, and there are some off of Florida and Georgia, but the bulk of their population is north of that.

If we look at scamp, the bottom-left panel, again, they're mostly north, but there are some that are south. If we look at red grouper, there is a pocket of red grouper that are north, but then there's another pocket that are south of red snapper abundance, and then there is stenotomus species that are generally farther north than red snapper, and so, for a lot of these species, there is some overlap with red snapper, but the bulk of their distribution is outside of where we see most of the red snapper.

There is also some modeling done with Ecopath with Ecosim that Lauren Gentry presented to the council in December of 2021, and, in that model, they found that red snapper is not likely to cause more than a 5 percent decline in other species of groupers, and they also pointed out that red

snapper is a generalist predator, and they switch prey according to whatever is available, and they have a diverse diet, and they really like invertebrates.

Lionfish, this is from a recent Finch et al. paper, where we can look at, through time, and this top panel is through time, relative abundance over space, and I'm just going to point out that the bulk of their abundance seems to be about where the red snapper was, or is, and so we have this spatial overlap issue with the other species, that is similar to red snapper, and then, also, the bottom-right panel shows their relative abundance, and they have peaked in 2015, or 2017, and it has since declined some, and so that trend continues, and, if lionfish is having an effect on recruitment, then we should see some rebounding of recruitment as those lionfish either decline or stabilize at this lower abundance.

That is -- Those are the first four hypotheses, and the next bit is about an environmental effect, and Kevin is going to present this part of the talk, and I will keep control of the slides, but I will just cycle through as Kevin asks me to, and so, Judd, if you could unmute Kevin.

DR. CURTIS: Kevin, you're unmuted now. Go ahead.

DR. CRAIG: Thanks, Judd. I'm going to summarize the environmental effect hypothesis, and I've got about eight or nine slides here, and, you know, more specifically, have there been any changes in oceanographic conditions in the South Atlantic that, either through effects on adult spawning dynamics, or sort of larval fish growth and survival, could be causing, or contributing to, these declines in recruitment that are occurring across multiple species.

I wanted to start off with this paper, and this is a recent paper that came out in fisheries research earlier this year, and it's a meta-analysis of the RAM Myers legacy database, and so a worldwide database of stock and recruitment time series, and they applied various correlative approaches to time series of SSB and recruitment, to try to categorize stocks as to whether recruitment is driven by spawning stock biomass, driven by the environment, or driven by both spawning stock biomass and low recruitment, which we kind of characterize as edge stocks, where both of those factors are contributing.

In the original paper, Sellinger looked at 432 stocks, I believe, and their general conclusion was that environmental conditions played a larger role in recruitment variation than in spawning biomass, at least over the period of observed spawning biomasses that were covered by the stock assessments that contributed to that database, and so we took the same methods that were used in that paper and applied them to the stocks where we have assessments in the South Atlantic, and so there's a lot of detail in this paper, and a lot of alternative methodologies that were tried, but I'm just going to summarize the main result.

The premise of this approach is it's based on a similar idea to what Kyle articulated earlier, that, if spawning biomass is driving recruitment, then we expect a particular ordering to be evident in those time series that would be different than if recruitment is driven by environmental factors, and, so, on the right here, you see the different categories, and lag to the year of fertilization, or zero lag, and, if variation in SSB is the primary driver, then we would expect a positive correlation between spawning biomass and recruitment, at zero lag, and we would expect that, at negative lag, a correlation between SSB and recruitment would be non-significant, or at least weaker, compared to the correlation at zero lag.

If there is no correlation at zero lag, then the inference is that the environment is driving patterns in recruitment, and so that's -- You know, that's kind of arguing for an effect from a negative result, which we should probably interpret cautiously, but that's how they categorized it. If there's no relationship between spawning biomass and recruitment at zero lag, then the inference was the environment was driving things, or you could have a significant correlation of zero lag and a correlation at negative lag, in which case the inference was that both the environment and spawning biomass were contributing to patterns in recruitment.

This is the result for the twelve stocks in the South Atlantic, and the main thing to note is that, based on this particular classification approach, there is no stock where spawning stock biomass was determined to be the sole driver of patterns in recruitment variability. Seven of the twelve stocks suggested that the environment was the main driver, and then, for five of the stocks, the suggestion was that both spawning stock biomass and the environment were contributing factors.

I wouldn't consider this diagnostic for what's driving recruitment variability, but it's certainly consistent with the results that Kyle showed earlier regarding recruitment overfishing, or the lack of a clear and consistent effect across species that recruitment overfishing was the primary driver, and it's consistent with what I will show in a few minutes, that, you know, we think there might be an environmental factor that is driving, or at least contributing, to some of the recruitment declines that have been observed, particularly in the most recent years, the last, you know, say five to ten years.

One clue is the patterns in spawning, temporal patterns in spawning, and so I think you may have seen this graph before, and this is a summary graph that Brendan Runde contributed to, and it's actually based on some work that George Sedberry and Dave Lansky, at SC DNR, did, and it has been updated since then, but, if you look at the species that show evidence of the recruitment declines, they're all winter spawners, with most of that spawning occurring primarily from roughly February to April, you know, and sometimes into May.

As Kyle pointed out earlier, and I will point out here, there's at least two species in this list, and we have some others, that aren't heavily targeted by fisheries, and so the stenotomus species, which is the porgy complex and sandperch, and they're also showing these declines in recruitment, even though they're not heavily exploited, or presumably less heavily exploited, than some of the other species.

In contrast, you know, the species that haven't really shown indications of low recruitment, or declining recruitment, have all been summer spawners, with spawning mostly occurring between June and August, or September, including red snapper, and so this suggests that there is something happening with the winter spawners, and what we're trying to evaluate here is whether that effect is related to changes in the environment.

Looking at these environmental effects really started within the context of the South Atlantic Ecosystem Status Report, which we completed a couple of years ago, but, in that report, we have sections that are looking at various oceanographic indicators and how they varied over time, and so these three panels on the left show changes in mean monthly sea surface temperature, in the top panel, upwelling intensity, in the middle panel, and then the position of the Gulf Stream, in the bottom panel, and what you can see pretty clearly is there has been an increase in sea surface

temperature, beginning around 2013 or 2014, and that increase in sea surface temperature is mirrored by a decrease in upwelling intensity over about the same time period.

If you look at the position of the Gulf Stream, you know, the Gulf Stream has been in a more onshore position in more recent years, and maybe a little bit later in time than the changes in upwelling and SST, but, when the Gulf Stream is in an onshore position, that is downwelling favorable, and so it's not favorable to upwelling, and so it's likely that these two indicators are related, and it's also possible that they're related to changes in SST, because, when sea surface temperature increases, it increases the strength of thermal stratification, which can actually inhibit the upwelling of nutrients from the bottom waters up into the photic zone, where they contribute to primary productivity.

That's a nice hypothesis, but the disconnect -- There's a disconnect with the chlorophyll data, and so this is showing a chlorophyll time series on the right, since about 2003, and so we actually don't see decreases in surface chlorophyll-A, which we're considering an indicator of primary productivity, that corresponds with these declines in upwelling and onshore position of the Gulf Stream, and, in fact, we see some indications of the opposite, that, you know, maybe surface chlorophyll-A, at least on average across the whole South Atlantic Bight, has been higher in that more recent time period, at least compared to this earlier 2010 to 2015 time period. We have been doing some work to try to understand these relationships, both amongst these oceanographic indicators and also how they relate to the recruitment time series.

This is largely where Ana's work comes in, and so Ana has been looking at this from a couple of different perspectives, and one is trying to better understand these mechanistic relationships, how the changes in sea surface temperature relate to upwelling, and how is that potentially mediated by changes in Gulf Stream dynamics, and is it reflected or not in productivity in the surface waters, and so trying to get at kind of a match-mismatch hypothesis, how some of these oceanographic changes resulted in disconnects between where and when the primary productivity occurs and where and when the spawning might be occurring, and she's also taken a second approach, looking more at spatial and temporal scales of variability in the environmental drivers, from sort of sub-seasonal to seasonal scales up to annual time scales, and trying to kind of dissect how those might be related to the annual recruitments.

One of the -- On the recruitment side of that equation, we're limited, and we only have a single observation per year of recruitment, in most cases, but, on the environmental side, it's unlikely that mean conditions over the entire South Atlantic region, at an annual time scale, are the driving factor, and so we can kind of parse those, and look at different scales of variability, to see if we can identify potential relationships with the recruitment time series.

One of the fundamental limitations we have, in the South Atlantic, is that there is relatively low coverage, at least in terms of sampling observations, and we don't have a lot of cruise data, or mooring data, in the region, and you can see some of what we have from SERFS, and some of the information available in the World Ocean Database, and there's a few other sources, but, overall, we don't have a lot of observations, and so that's where outputs of oceanographic models can help, in terms of overcoming these limitations.

We've been working with Ruoying He, and also Taylor Shropshire, at NC State, and it was a fortuitous collaboration, in a lot of ways, and they have an oceanographic model, and it's called

CNAPS, and I don't remember the acronym, and it's the Coastal Something Atmospheric Prediction System, but the spatial domain of the model encompasses the South Atlantic Bight. It's a 3D atmospheric ocean model, and it's at a very high spatial and temporal resolution, and it's a four-kilometer horizontal resolution, daily estimates, and it gives us an ability to look at an increased number of potential oceanographic factors, and you see some of those listed here.

What Ana has been doing is looking at how these spatial and temporal patterns in model output are related to the recruitment time series, and we've also been trying to make progress on this primary productivity issue, and there are multiple sort of satellite products available, and some of them differ, in terms of the time series of chlorophyll-A, that they provide, and so we're trying to look at those further, as a way to make this jump between the physical oceanographic conditions, which are encapsulated in the CNAPS model output and primary productivity, which we basically have observations of from satellite imagery.

I'm going to show two data slides of work that Ana has been doing, and so this top graph shows -- This is all model output, and so this is winter sea surface height over time, from 1993 to roughly -- I think it was 2021, or 2022, and winter bottom temperature is in the middle, and winter SST along the bottom, and one thing you notice is you see that same pattern that I showed earlier, and based on the indicators in the ecosystem status report, that there's been this change where we're getting warmer sea surface temperatures, particularly in the winter, and that's also reflected as warmer bottom temperatures, and then we're also seeing this change in sea surface height.

You know, sea surface height is basically a measure of the height of the water at any given time and location relative to some average height under sort of resting baseline conditions, and so it's really driven by hydrodynamics, things like changes in current, changes in stratification, potentially changes in upwelling and Gulf Stream dynamics. I should say that we don't know all of the mechanisms driving these changes, nor how they're related to the patterns in recruitment, but it is suggestive that there is something that has happened in the South Atlantic, since about 2013 or 2014, and it's reflected not only in the empirical observations that I showed earlier, but also in the output from this oceanographic model.

On the right are correlations between a number of these predictors for different seasons and the recruitment time series, and so, if you can read the X-axis, this is bottom temperature, during fall, spring, summer, and winter, mixed layer depth in fall, spring, summer, and winter, et cetera, and these are correlation coefficients with the recruitment time series that Kyle showed earlier, and so red are positive correlations, and blue are negative correlations.

A couple of things to notice here is that, you know, at least -- Almost all of these factors listed along the X-axis are correlated, positively or negatively, with the recruitment time series, for at least one, or sometimes more, species. There is a couple of exceptions, and that's important, because we recognize that, you know, this is a preliminary analysis, and it's likely that some of these correlations are spurious, and we're not making any sort of adjustments for doing multiple correlations across the set of factors, but what does kind of stick out is, if you look at sea surface height in winter, you see a lot of blue, and so there's a negative correlation between sea surface height during the wintertime and the recruitment time series for almost all -- Well, all of the species that have shown strong declines in recruitment, the snowy, scamp, black sea bass, red grouper, red porgy, and gag grouper.

You don't see any correlation with species like gray triggerfish and greater amberjack or vermilion, which have shown more sort of stable recruitment patterns over time, and then you see the positive correlation with red snapper, which, you know, as Kyle alluded to earlier, is the anomaly in most of these analyses, as it's shown pretty strong recent increases in recruitment, and so sea surface height in winter, and you see the same thing in the spring, though it's not quite as strong, and there are a lot of positive correlations for the species that have shown the recruitment declines, and, you know, some negative correlations for the other species.

Then, also, bottom temperatures, and so not quite as strong across all of these species with bottom temperature, but at least snowy, scamp, and black sea bass are showing negative relationships with bottom temperature. It's notable, also, that like sea surface temperature in winter isn't particularly remarkable, in terms of its correlations with these other species, and so it suggests that this isn't just strictly a temperature increase, and that there is something maybe associated, or driven, by temperature increases that is affecting other aspects of the oceanographic environment that are resulting in these correlations, and so this is something that we're interested in pursuing further.

That was just highlighting those particular factors that I've mentioned, and so this is also output from the CNAPS model, and this is looking at Gulf Stream position, and so the position of the Gulf Stream drives a lot of the current patterns and upwelling dynamics in the South Atlantic Bight. If you look at that just at the surface, and so what you're looking at here is distance of the surface Gulf Stream waters from the shelf-slope break, and so it's just a distance of -- It's a measure of position of where is the Gulf Stream located on the shelf, and there's really not any pattern over time.

You know, there is deviations, and variability, around the mean position, but no strong temporal trend, but, if you look at the subsurface Gulf Stream waters, and so this is waters down to 200 meters depth, we see this pattern that mimics what we were seeing in sea surface height and bottom temperature and sea surface temperature, that there has been this shift in the location of those subsurface waters, and they're more onshore, since about 2013, or 2014, then they have been historically, and that is a pattern that is, you know, really evident over these recent years. Otherwise, the pattern looks pretty -- There may be some cycling here, or certainly, you know, shorter-term variability, but a very noticeable decline, or shift, to the onshore in the location of the Gulf Stream.

This just breaks that pattern in the left two panels down into fall, spring, summer, and winter, and then it computes the correlation coefficient with the suite of species that we have time series of recruitment deviations for, and so the takeaway here is that, again, you know, winter conditions seem to be positively correlated with the recruitment time series for the species that have shown the declines, snowy grouper, scamp, black sea bass, red grouper, and red porgy, and then they're negatively correlated for red snapper, and a weaker negative correlation for vermilion snapper.

You know, we don't fully understand the mechanisms, and we can't really get at the mechanisms fully from this analysis, and, you know, there are certainly limits to what we can infer, based on correlations, but it looks like there has been some change in ocean conditions, and it's manifest in various properties, and they do seem to be correlated with the recruitment time series for those species that have shown the recent declines in recruitment.

I will just try to summarize, and these results are still preliminary, and they're largely exploratory, I would say, and so, as Kyle mentioned at the outset, there's no sort of smoking gun yet, and, overall, what we've done so far suggests that sampling artifacts aren't the primary driver of the patterns in recruitment. We've done less on protogyny, and sort of predation effects, but what we have done suggests those are not likely to be, you know, the primary drivers of the recruitment declines.

Recruitment overfishing, I mean, I think it still could be playing a role, but it doesn't look like it's the main driver in isolation. It could certainly be suppressing recruitment, if stocks are experiencing high exploitation, and there's low-abundance conditions, and it may have been an important driver earlier for some species, particularly species like red porgy, and they have shown evidence of recruitment declines that date back much prior to when these oceanographic changes have been occurring, and so there could be a temporal component to whether recruitment, or environmental effects, are affecting recruitment dynamics, but it doesn't look like, based on what we've done so far, the recruitment overfishing is a sole cause.

Some of the takeaways, based on this correlation analysis, is we are seeing correlations between multiple oceanographic variables during the wintertime and the recruitment deviations of several species that have shown these declines in recruitment, and it does seem like some of these are related to Gulf Stream dynamics, and not just surface conditions, but also depth, and so those anomalies, and the location of the Gulf Stream, does seem to be another factor that is strongly correlated with a number of species that have shown declines in recruitment.

Some of the next steps, I think, you know, Ana is still working on looking at relationships among these various factors, and so sort of Gulf Stream position, and there's a lot of factors that can influence primary productivity, particularly location of the Gulf Stream and upwelling dynamics and so forth, and so she's continuing to investigate those, and I think another factor is we've also look at this mostly -- We've looked at these correlations kind of factor-by-factor, in isolation, and I think, you know, we have a sense that we need to start to integrate some of these, in some way, so we can get a better picture of what the actual combined effects of these changes might be, instead of looking at just the individual variables.

I know that was a lot for this project, and I think that's all I have, and the next slide I think is just the question slide, and so, if there's any questions for me, or Kyle, or Ana is on the phone as well, we would entertain them. Thanks.

DR. BUCKEL: Thanks very much, Kevin and Kyle, for the excellent presentation. I will open the floor to questions for Kevin, Kyle, and Ana. Chris.

DR. DUMAS: Hi, folks. Thanks for the great presentations. I learned a lot. I have a question now from the perspective of a baby fish, and so, if I'm a little larval fish, that was just born, and I'm a winter spawner, or I was born from a winter spawner, and I'm a little baby larval fish, swimming around, and the ocean temperatures warm up, and there's an increase in chlorophyll, and so there's more food, maybe, for me, but, also, my metabolic requirements go up, due to the warmer ocean, and do we have some idea that, as water temperatures increase, how much do the metabolic requirements of larval fish increase, and do those increase proportionally more than the increase, any increase, in food, like chlorophyll as an index, but, you know, the increase in food for those fish, and so could they be -- Could the larval fish be starving to death because the waters

are warming, and they're requiring more food, and the food isn't there, and so they're basically starving to death, and is that a possibility? Do we have any larval fish experts? We've got to have those somewhere around here. Thanks.

DR. CRAIG: I don't think I have an answer for that, and I can certainly speculate, and I don't know if, Ana, you want to say something about that. I guess my sense is that, yes, it's a possibility. We don't have information, or we haven't actually tried to compute, what the metabolic requirements of a larval fish would be, and that's certainly within the realm of possibility, looking at what those -- How those requirements may have increased, given the increases in temperature that we've seen, which has been on the order of about a two-degree increase in the wintertime.

I would also note that, you know, increases in temperature would potentially increase grazing rates of predators as well, and so the metabolic demands of predators on larval fish would increase, and presumably, you know, higher temperatures would result in faster growth rates of larval fish, and so I think it would be really difficult to fully kind of disentangle sort of starvation, growth, predation interaction, and certainly not with the type of data that we're working with.

I will note that, you know, Taylor Shropshire, who is in Ruoying's lab, and is helping on this project, has done a similar thing, where he has coupled an oceanographic model, similar to what I showed with the CNAPS model, to a biogenic model, and, in this case, it was for larval tuna in the Gulf of Mexico, to look at those sorts of issues, and, in that case, if I recall correctly, there was some possibility of some related stress, or potentially, you know, a starvation effect, but whether that's occurring in the South Atlantic --

DR. BUCKEL: Jim.

DR. VAZ: Can I jump in on the answer?

DR. BUCKEL: Go ahead, Ana.

DR. VAZ: Thank you. I agree with Kevin that we speculate at this point, but there is an increase in metabolic needs, and so, while you can have an increase in growth rates, you're also going to have an increase in mortality rates, and for predation, and even predation, in your cohort, and, for lack of food, and so one thing is we are showing these results for the entire region, and what can happen is a disconnect where the larvae is to where the food is, and those are very patchy processes in the environment, especially for some of these species that might have spawning aggregations.

What we would do, following our next step, our next project, is looking at this larval dispersal and see if maybe the physical mechanisms are actually changing the probability of the larvae getting close to the coast, or if they are being transported to areas that are not favorable for their survival, and so we're going to investigate that with this post-larval dispersal model in our region, to complement this work. Thank you.

DR. BUCKEL: Go ahead, Jim.

MR. GARTLAND: That was a really good answer, because it was kind of getting at the question that I think that I was going to ask. In terms of the Gulf Stream being more inshore, is that year-round, or is that just for the winter months? I wasn't entirely clear on that. The reason I was

asking is, is it possible that just more are getting kind of swept out of the system? The reason I ask that is we had a presentation, last week, on the ECOMON survey up in the Northeast, and one of the comments that was made is that, a lot of times, larval fishes from the South Atlantic are seen in that survey, and so it might be worth just looking at that dataset, or maybe reaching out to those folks, to see if they're seeing any increases in the larvae, in their survey, of the ones that you're seeing reductions in recruitment on, and it could be just as simple as maybe more are being swept away, and, if it's even a small change in the proportion, it could have a big change, or a big impact, on the recruitment, and so that was my thought.

DR. VAZ: I can answer, and so what we see, if we look at the Gulf Stream position over the entire region, those results we had, is there is a tendency of the surface is still behaving as before, but what is interesting is that bottom intrusion is historically common during the summer months, and not the winter months, and what we saw, when we separated the winter versus summer, is that now it's happening more often during winter than during summer, when it is expected to happen, and so there is a little shift there in that pattern, which can influence both the local circulation and can influence the productivity.

One big factor, in the region, to retention of larvae in the nearshore regions -- That is a lot dependent on the Gulf Stream position, to allow the propagation of the areas, and how long they're going to stay in the nearshore region, and so that is something that, once we have a larval dispersal model, we're going to be able to look better at these patterns over time, and see if there are any retention times associated with any of these structures, because, yes, it could be possible that just patterns are changing how larvae are able to stay in the coastal environment.

MR. GARTLAND: Thank you.

DR. BUCKEL: Thanks, Ana. Genny.

DR. NESSLAGE: To follow-up on that, I have actually two questions. One is are you just looking at Gulf Stream position, but are you also looking at transport measurements, because that might get at speed at which some of the -- But I don't know if that's available at the subsurface level, and if that matters, and then my second question is are you looking at the Florida Current, and how that might be changing, relative to the major part of the Gulf Stream? If there's something weird going on there, where they're interacting differently now than in the past, that could be impacting our recruits as well, and I don't know enough oceanography to even begin to know the answer to that question.

DR. VAZ: That is a really complex question, and there is a lot of thought being put into this, especially for predictive models, and it's very important to get correct both the flows from the Strait of Yucatan and the Strait of Florida and capture currents well. At the moment, it's unknown, and we know that there was a reduction of --

There was a tendency of slowing down, but we really don't know how that plays into our region, with change especially on the biogeochemistry in the region, and that's why we're exploring this role of the Gulf Stream, because that is what drives the large upwelling of the shelf break, and the pattern really seems to match, as far as species patterns, the years that you have a decline and how things are happening. We tried to explore, a little bit, the mechanism with temperature increasing, and changes in -- But there was not as strong of a correlation that we could find there.

In relation to the transport, so, yes, it could change, but I don't think we're going to see a direct relationship, and it's going to be indirect, and that, if you have a low transport, maybe they can push out of the Gulf Stream at the surface, and then the bottom can intrude more, and so those are things that we're trying to collaborate with other researchers that are working in these topics to try to understand, in our region, how they interplay, but it's not like directly that we can put just the transport, and I don't think it would answer much more than we already have with these dynamics at this point. Thank you.

DR. BUCKEL: Thank you, Ana. Amy.

DR. SCHUELLER: So, as I was looking at the environmental factors that were looked at for this, what I noticed is that, in my mind, the timeframe didn't really match, meaning the observed changes in recruitment were starting to occur before the observed changes in the environmental anomalies, and I think that there's no doubt that there are environmental changes that are occurring, and they're likely exacerbating whatever is occurring, and so I just wondered if you had thoughts about that, because the timing doesn't seem like it lines up, at least with the suite that you presented here.

DR. CRAIG: I can say something, Amy, and I think that's a good point, and I think it relates back to, you know, I think what Kyle suggested, and what I was trying to suggest, is there's not a simple sort of linear effect here, where, you know, whether it's looking at recruitment overfishing or the environmental drivers, and it's not simply the increasing STT results in decreases in upwelling and decreases in primary productivity and those line up with the recruitment deviations.

I think it points to some sort of potentially an interactive effect. I mean, one think I've thought about is maybe the initial recruitment declines were caused by something else, and then recruitment overfishing would be one potential explanation, but now there's been changes in environmental conditions that are inhibiting, in some way, recruitment, which is suggestive of some sort of interactive effect that might vary in time, which is pretty difficult to tease apart, but, yes, I think you're right that, if you look at it at least based on the change point analysis, and I have to go back and look at it, but sometimes the change point analysis is picking a particular year, and that's based, often, on some measure of variability before and after a given threshold, and those did suggest that somewhere around 2010 to 2012 was where those changes were occurring, whereas the environmental factors seem to be changing a little bit later than that, more like 2013 to 2015, and so it's a good point, and I don't know that we have a good answer for it.

DR. BUCKEL: Thanks, Kevin. Fred Scharf.

DR. SCHARF: So, Kevin, have you guys looked at all at the recruitment patterns of some of these same species, or other winter spawners, in the Gulf of Mexico, to see if they have been experiencing similar declines in the last ten or fifteen years?

DR. CRAIG: That's a great question, Fred. You know, we have thought about that, and I think we've gone to the -- We have got the recruitment, at least the recruitment data, and I believe the SSB data, from the Gulf assessments, but we haven't looked at that in any detail, and, I mean, it would be a great comparison, as sort of an out -- I don't know if, Kyle, if you have any sense, from the Gulf assessments, whether there's been similar declines, and my sense is not, but I'm not sure.

DR. SCHARF: I just asked because, you know, we just did a big sort of multi-basin review for southern flounder, and, you know, we had a lot of data from the Gulf of Mexico and the South Atlantic, and so the fishery-independent indices, in those different regions, were all showing the same kinds of recruitment declines, and they're a winter spawner, and so I just wonder, for some of these other species, if they were also showing evidence of poor recruitment in recent years.

DR. CRAIG: I think that would definitely be worth looking at. Kyle, did you want to say something about that?

DR. VAZ: No, but one other thing is that we should really look into that, and we have the other project of going and looking into the connections between the Gulf and the Atlantic, and we'll start to also look into some changes, especially like red grouper, and there is a correlation between the two populations, and so that's definitely worth to take a look into with more detail.

DR. BUCKEL: Thanks, Kevin and Ana. Kai, did you --

DR. LORENZEN: I was trying to go by my recollections on the Gulf, and I don't think there's anything quite as consistent going on as here, but, just generally, I wanted to commend the working group for this work, because I think it's very interesting, and it's very thorough, and very timely, and I think we don't do this kind of thing enough, and so we often have a situation where we see something is changing, is different, and we just say, okay, let's wait for the next assessment, and see what it looks like then, and we don't often sort of go back and then really try to look at these patterns that might arise, and so I thought it was very useful. Thank you.

DR. BUCKEL: Agreed, Kai, and thanks. Steve Turner.

DR. TURNER: I was wondering -- This may have been addressed, but I was wondering about some of the analyses of recruitment declines prior to the impact of this interaction, the environmental effects, and I wonder if we would come to a different conclusion about recruitment declines if we weren't looking at the last five years, when these environmental effects may be having -- They may be influencing what we're seeing.

DR. BUCKEL: Thanks, Steve. Others? Kevin and Ana, I don't know if you want to respond to Steve's comment there. Go ahead, if so. If not, I will continue looking around the room here. Amy.

DR. CRAIG: I mean, I can just say a quick word, Jeff, and I think that's a good point. I think we've tried, to some degree, to parse the time series and look at sort of early recruitment dynamics, like the 1980s and 1990s, versus this more recent time period, and we can do some more with that, but we end up losing a lot of power, you know, and it gets really difficult, particularly if we're looking at some sort of correlative approach, you know, when we start to parse the time series.

I do think that Kyle's component on the recruitment overfishing was generally looking at the whole time series. It was looking at the recruitment deviations from, you know, when they were first estimated in the assessments, which is often in the 1990s and ending in 2014, and, you know, one of the limitations of that is that, you know, we didn't really get into, you know, what the early versus late dynamics were, or, actually, what the functional relationship might look like, and a lot

of these were kind of Pearson correlations, or Spearman correlations, based on rank, and so I think there's more that we could do, in that respect, to see to what extent some of the patterns we're seeing are driven by sort of the early part of the time series, versus the latter part of the time series.

DR. BUCKEL: Thanks, Kevin. Others? Amy.

DR. SCHUELLER: I was hoping to ask some clarification questions related to the SERFS survey expansion comparison. When you're saying SERFS, do you mean the trap-only data, and so no video data?

DR. SHERTZER: Yes, and those were the data that we --

DR. SCHUELLER: So only trap data, and then I guess my understanding is that the one index prior to the expansion that you're showing is an index based on Georgia and South Carolina data, and not necessarily the sampling frame which was used by MARMAP during the duration of their sampling, prior to the addition of sites after 2010, and I guess I wondered if anyone would want to comment on like -- It seems like it's not comparing apples-to-apples, to me.

If I was going to do that, I would take the sampling frame directly from what had been used in the past, and only use those sites to put together an index with what had been sampled past 2010, rather than just limiting the scope, and I say that because I'm just concerned there might be some like fundamental difference in those North Carolina and Florida data between historically and now, with respect to how the sort of sampling frame was selected, if that makes sense, and I wondered if you guys could speak to that.

DR. SHERTZER: I will try, and maybe Wally can -- Maybe he has better information, but I think that, if you were to restrict to just the sampling sites -- I mean, I think they're chosen from a universe of sites, and each year they're chosen at random, and so, if there's -- I think the assumption is that any variability across sites doesn't have any trends, or patterns, and so, as different sites were used from year to year, we should just see noise, and not necessarily any trend, and so I think that would be my response to that first part about using just the few, or the select, sites that existed.

Then, as far as the expansion goes, I think there's still more that can be done to investigate this hypothesis, but we would have to explain what it is about these particular species that the expansion is affecting our perception in this way, and why it's not affecting all these other species that are sampled by SERFS, and also why the analyses that were done by Brendan didn't show any of those -- Any patterns that might be reflective of some concerning issue.

DR. SCHUELLER: Can I just ask for clarification, Kyle, and did Brendan use the sample sites from North Carolina in the old sampling frame for the creation of those historical indices? Do you understand what I'm asking?

DR. SHERTZER: He created -- Well, he just created two indices, and one was with all of the areas available, and the other was just looking at the South Carolina and Georgia areas.

DR. SCHUELLER: Yes, and so that's my concern, right, is that Florida and North Carolina are edges, potentially, and that there is something fundamentally different about them, that, if you only

look at the center there, you might be missing something, and some of those species -- I mean, some of these species, they're throughout the range, but, in some of them, they're only in certain locations, where I would expect to see some differences if you did that, and, if you're not, that's a bit concerning.

DR. SHERTZER: Yes, and so, going back in time -- If you used all of the areas, going back in time, of course, the sampling sites would have been similar to just using the core areas, and so, if there were an artifact of adding areas, we would expect to see that starting in 2011 or so, when the expansion, or 2010, when the southern expansion started, I think. I mean, there may be some explanations for why we're not seeing any patterns, if there is one, but I'm not sure what that explanation would be.

DR. BUCKEL: Go ahead, Wally.

DR. BUBLEY: We just had a paper published recently doing this similar kind of stuff that Brendan was doing, but we did do what you were talking about, Amy, is we looked at the historic frame of our universe, pulled from those, and we utilized those going forward, and so we just used those sites that were there, and the findings, and I was talking with Tracey as we were going through this, is we didn't actually -- The species that we selected -- Unfortunately, we didn't use any of the ones that were having these potential recruitment failures, and we used gray triggerfish, red snapper, and white grunt, and we chose those ones because they did have different distribution patterns.

The red snapper are predominantly in the south, and the white grunt, as least where they're showing up in our survey, are in the north, and then gray triggerfish are found throughout, and so what we found were gray triggerfish and white grunt were not -- Those indices didn't seem to be affected by the change in SERFS, with the addition of the sampling, and so apparently the northern portion, the North Carolina area, was sampled a little better than the Florida portion, because the red snapper were showing a lag, and so, eventually, the surveys would pick it up, but it was a four or five-year lag.

That would be really interesting, to look at some of those species, to see if the same thing applied, but, based on what I saw with those species, it seems to be just the ones that the center of distribution is in the south, or, at least, of those three that we looked at, that was the only one that was affected, and the other ones weren't, and so I would be interested to see if that held true, but, as of right now, I think red snapper is one of the only ones that we have where the center of distribution really is the southern portion, and we have some that are further north, but there's not a lot of them that we're encountering in the traps that are further south that's in North Carolina, too.

DR. BUCKEL: All right. It's almost 5:40, and we're forty minutes past time, and I appreciate everyone's patience in sticking around for the good discussion, and so we do not have any action items to flesh out, which is good, because we're over time today, but I'm going to just -- One last change, while we have Kevin, Kyle, and Ana on the call, and any other burning questions? I think the triggerfish had suggestions, which there's been some suggestions provided to them, which is great. Fred Scharf.

DR. SCHARF: I just want to echo what Kai said before, and thank everyone here for this work and presentation, and I agree that it's really nice to see this kind of work, and so continue the great work, folks.

DR. BUCKEL: Kevin and Kyle, there's going to be a presentation from Wally, or Tracey, and, just taking a peek at the update, it looks like there is some recruitment signals for scamp and gag, and maybe some --

DR. BUBLEY: Red grouper as well.

DR. BUCKEL: And red grouper, and so, if you didn't know, it looks like there's some good recruitment recently for those species, and so, if you didn't know about that, that might be something to include here and look at your environmental data in relation to those years. All right, and so one last item that we have to do is Kim Iverson would like a photo. Our SSC member photo is outdated, and Kim was waiting for us to come back here, so we can take the picture in the exact same spot, right? So we're going to go to the lobby, underneath the round wooden wall decoration, and so please follow Kim. We'll meet back up here tomorrow at 8:30. Thanks, everyone. Great discussion today.

(Whereupon, the meeting recessed on April 16, 2024.)

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APRIL 17, 2024

WEDNESDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at The Crowne Plaza in North Charleston, South Carolina on April 17, 2024, and was called to order by Dr. Jeff Buckel.

DR. BUCKEL: Good morning, everyone. Welcome back to the April 2024 South Atlantic Fishery Management Council's Scientific and Statistical Committee meeting. Happy Wednesday morning, everybody.

This morning, we're going to receive presentations on the Florida State Reef Fish Survey. If you recall from our previous meetings, we've started to see TORs for Florida-centric species, like yellowtail snapper for example, where the Florida State Reef Fish Survey is being used, and we've been asked to comment on the appropriateness of that survey, and the SSC asked for a presentation on the survey, so we can better review the TORs, and review the assessments, that are using the Florida State Reef Fish Survey.

First up is Dr. Luiz Barbieri, who is going to give a presentation, and, for those of you that don't know, Luiz used to be a member of the SSC, for many years, and served as our vice chair and chair, and so welcome back, Luiz, and you can proceed whenever you're ready.

FLORIDA STATE REEF FISH SURVEY

DR. BARBIERI: Sounds good, Jeff. Good morning. Thank you for that introduction, and good morning, everyone. It's good to be back here in front of this committee. Sorry that I could not be there in-person. I wanted to be, but it didn't work in my schedule, and so I'm going with this webinar version.

Jeff already provided some context, right, for this presentation this morning, but, just to explain a little further, you know, we thought that, before Bev goes into her more detailed presentation, that is highly technical, on Florida's State Reef Fish Survey, and I'm going to be referring to it as SRFS, right, the State Reef Fish Survey, throughout the presentation, but we thought that we would provide this general introduction, right, that discusses some of the challenges we face with recreational fisheries data collection for council-managed species. The idea here is to try and provide additional context, so you understand how these specialized surveys, like SRFS, can be used to supplement MRIP and, in this way, address some of the council needs.

Then, in case you are interested in doing a deeper dive into this issue, I thought I would make you aware of this 2021 National Academies of Science study report on how well MRIP meets the management needs of fisheries with ACLs, and I know that -- I guess most of you probably have heard about this report, and you have even received a presentation on this study, but, in case there are new committee members, I thought that this would be useful, because this report goes into a lot more detail and looks at this issue at really the national level.

Also, I wanted to thank two South Atlantic committee members, SSC members, Chris Dumas and Kai Lorenzen, for their participation in this study, and their input was very valuable, their contribution to the report, and so, as the discussion gets started, a little later this morning, I'm hoping that Chris and Kai can help us articulate some of the broader issues associated with this topic.

When you look at the main framework that we have in place for recreational fisheries surveys, which is the MRIP program, you see that it's really a general survey program that's structured to monitor recreational landings for different fishing modes, different fleets and fisheries, and it's designed to provide recreational catch estimates at the annual and regional scale, and so it's not really a high-resolution survey that samples a whole variety of species, and has different sampling domains, and so it's not very high-resolution, and, because of that, in its current format, the study that we talked about before, the NAS study, basically concluded that MRIP is not really suitable for in-season management, and so a generalized survey that's valuable, but perhaps not sufficient.

As you know, the council needs are more complex than what can be achieved through a generalized survey, right, and so council-specific management needs have really stretched MRIP's capabilities to provide accurate and precise data in a timely manner, and I know I'm preaching to the choir here, because you know how short recreational seasons, like we have for South Atlantic red snapper and low-catch-rate species, like we have with tilefish and deepwater groupers, really complicates the sampling of those stocks, and then it provides data that is highly imprecise, and sometimes jumping all over the place, and it's difficult to integrate into assessments and then follow-up for catch monitoring for management.

When we look at the national picture, right, the map there on the right, and the symbols for the councils underneath, you know that the Magnuson-Stevens Act established this regional fisheries management process, right, and so this was done deliberately, on purpose, recognizing that there are regional differences in the composition of fish stocks in different areas of the country, and different fisheries as well, and so those have to be explicitly accounted for, and this is why we have eight regional management councils distributed throughout the nation, and the NMFS Regional Science Centers, and Regional Offices, were really set up to fit into this framework.

Although the science, and the management structures, that we have in place, that the agency has put in place to deal with these regional differences and support of the regional fisheries management councils, the national level recreational fisheries data collection enterprise is a bit behind in that effort, the regionalizing, right, and so it's now realizing that it needs to evolve as well.

When we think about the evolution, right, what are we talking about? There are some major considerations for the recreational data programs if we want them to be designed, and implemented, in a way that they inform assessment and council management needs, and, of course, at the core of what we do is accuracy, right, and accurate data is critical, and then at the apex of the triangle is precision, because, of course, if the data is highly imprecise, it's not really very useful, right, for assessment and management, but then, when you look at timeliness, and adaptability, these criteria is also very important, because they fit into our assessment and management framework that has to follow specific timelines.

Because of the complexity, and the specificity, of the council management needs, it has become really difficult for the MRIP program, by itself, to check all these boxes, right, because the survey, as it stands right now, the whole MRIP program, is set up in a more general survey type of setting.

While they recognize the value of MRIP, NOAA Fisheries itself has acknowledged the need to expand and improve the program, and so this slide here is just a screen capture that I got from an MRIP, OST MRIP, newsletter that was issued earlier this year, where they talk about this process that they're starting now for visioning, nationwide, and how they're going to be readapting MRIP to be more regionally focused, and I highlighted there, in yellow, that this plan includes regional data collection priorities developed by teams composed of regional fisheries information networks, regional fishery management councils, interstate marine fisheries commissions, state partners, and NOAA Fisheries. This is a more integrated approach that's focused on this regional specificity.

Although this visioning is a recent development, right, that has just started, we have to recognize that NOAA Fisheries has started, for about a decade now, this process of evolving the MRIP program into what could be called a national network of integrated fisheries surveys. I know that the writing here is really small, and that this is really all over the place, but, if you were to count all the different surveys there, you would see that, currently, there are twenty-eight data collection programs within this MRIP national partnership, right, and ten of these programs are administered by NOAA Fisheries, and that means either they are administered by the MRIP program, out of Silver Spring, or one of the science centers or one of the regional offices, and so twenty-eight of those, and ten are administered by MRIP, or NOAA Fisheries, and eighteen programs are administered by states or territories. Several of those surveys are specialized programs that are designed to collect data for a particular component of the fishery that is not really considered to be properly covered by the general MRIP survey.

The South Atlantic Council has been attentive to this effort, right, and is also interested in pursuing a way to establish a framework that can support development of specialized surveys that can be more effective in collecting data for the snapper grouper fishery, and this process that the council is following is going through Snapper Grouper Amendment 46, and this amendment considers establishing a private recreational permit and educational requirement for the South Atlantic snapper grouper fishery.

The goal here is to generate a more specific, a more specialized, sampling frame, a universe of anglers, and using this to improve estimates of catch and effort for the private recreational sector for those snapper grouper fisheries, but, in doing this, in evaluating this whole process, the council actually has decided to follow that more integrated regional type of process, and so it established the Snapper Grouper Recreational Permitting and Reporting Technical Advisory Panel, right, and, instead of being composed by just one group or another, it's really integrated.

We have John Foster, from the MRIP program, as part of this technical advisory panel, and we have Geoff White, from the ACCSP, and we have Kai Lorenzen, from your SSC, and we have state reps from all four states, and so the idea then is to use our regional framework that we have in place of the regional collection of state and federal partnerships to establish this process, and there is a link there on the right, if you're curious about this process, and you can find out more about this snapper grouper technical advisory panel.

If the idea there, for Amendment 46, is to generate something that's more specific to the snapper grouper process, the need for this becomes really apparent when you look at the distribution of saltwater recreational fishing trips in the South Atlantic region, right, and I stole this graph here from John Carmichael's presentation on black sea bass at the last council meeting, and I thought that this really captures what we've been thinking about, and the fact is that only about -- When you look at the total number of saltwater fishing trips in the South Atlantic region, only about 5 percent of those trips occur in the EEZ, and so this is the sector, the slice of the recreational fishing trips, that the council is most interested in, and they represent only 5 percent of that majority of trips that you see that go into bays, estuaries, and sounds in state oceanic waters.

Because of this, when you look at that table on the right, and you try to rank the top MRIP species in the South Atlantic region, you see that most of the -- I mean, not even the top-ten species include any council-managed stocks, right, and we have to go down to number twelve just to get to black sea bass, and most of the top-eleven species are actually state-managed species, because they dominate the number of trips, and the survey is struggling to actually find that slice of EEZ trips that can address council-managed species.

The development of a specialized survey that's focused on these council-managed species in federal waters can provide more accurate, precise, and timely recreational fisheries data that can be better integrated into assessment and management.

Are these specialized supplemental surveys the only way to address council needs? Well, no. There are several approaches that can be used, and this slide is from a presentation that John Foster, from the MRIP program, gave to the South Atlantic SSC back in 2015, when we were discussing ways for improving precision of catch statistics for deepwater species, and so you can see there, in the column on the left, there's a number of different approaches that can be used to address

precision gains, in the second column, and then you look at other criteria there of cost, time to implement, species specificity, and then the limitations of each one of those approaches.

A bit later today, you will be receiving an update, right, from the Precision Threshold Workgroup that's going to be discussing some of the analytical approaches that they are exploring. This working group actually integrates Southeast Fisheries Science Center scientists with the Office of Science and Technology, and they are trying to discuss analytical approaches that can improve estimates for these highly-imprecise species, you know, estimates that are coming into our assessments and impacting the assessments, the uncertainty of those assessments.

What I highlighted here, in the red square, is the box there with the approach behind what we are doing with the State Reef Fish Survey, is to design and implement a specialized program, right, that's focused on that slice of the fishery, and you can see there that, compared to some of the other approaches, the precise gain is really high. Of course, the downside is that the cost can be pretty high itself, but, if you can find the funding to implement this, the gains can be really, really significant, and so that's the approach that we are adopting, is the State Reef Fish Survey.

Bev is going to give you a really deep dive into SRFS, right, but, before she goes there, I thought it would be important for me here to give you a general overview of some of the criteria, some of the parameters associated with the survey, so we understand how this ties into the context that I just discussed, and so SRFS is a specialized survey developed in cooperation with NOAA Fisheries to supplement MRIP, and so this is not a substitute survey, and it's really designed and integrated with MRIP to supplement it for those species that need a more specialized survey, in this case the reef fish, or the snapper grouper fisheries.

The survey was certified in 2018 by the MRIP program, after peer review by a panel of the NMFS statistical consultants, and, of course, you know those are some of the best survey statisticians that you have in the country, in the nation, and so we received that certification, and so, scientifically, it's credible. It conforms to MRIP data standards, and so there is no problem there, and then another issue to discuss is, if we're going to use this for assessments, we're going to have to have a calibration between SRFS and MRIP, so that we can generate a retrospective time series of landings, right, that can be integrated as an input into the assessment.

In the Gulf, where we have already been able to do this, and integrate SRFS landings for length and discards for Gulf gag, in SEDAR 72, and now we're in the process of doing the same for red grouper, through SEDAR 88, the calibration procedures that we're developing, the methodologies, were peer reviewed and approved for use in assessments, and so, when this comes before the SSC, we can see that all of this has been peer reviewed, and it's scientifically credible.

For the two bottom species there, the southeastern U.S. mutton snapper, SEDAR 79, and the yellowtail snapper, SEDAR 96, and I put those in italics because we are now in the process of developing the actual calibration methodology for those, and I already am in discussion with Katherine Papacostas at the MRIP program, and she has agreed to -- Not just agreed, but she is really supportive of these efforts, and she has arranged for us to have his calibration included, and even approved, for use in the assessment, and so, by the time that you see this assessment put in front of you, it has gone already through the SEDAR process, and there will be a working paper there that outlines what the calibration procedures were and contains some of the terms of reference that are used for that, and then the peer review designation there for the survey.

Jeff, this concludes this part of the presentation, or my introduction, and I can pause here and address any questions, if you feel that that would be appropriate, or we can just move straight into Bev's presentation.

DR. BUCKEL: Thanks very much for the presentation, Luiz. That was very informative. We definitely can take questions at this point, if folks have them, and so please raise your hand, and I will call on you. Jason.

MR. WALSH: Thank you. That was a great presentation. Can you remind us how long it took for the SRFS to be -- To go through the approval process?

DR. BARBIERI: You mean just the MRIP certification process?

MR. WALSH: Yes.

DR. BARBIERI: Well, I think Bev's presentation has a bit more detail on that, but it took probably I would say a year, in terms of the actual review process itself, right, and so there was a panel of statisticians, and they received all the documentation for the survey, and they developed the review report, the terms of reference that were established by the MRIP program, and then they eventually had a workshop, you know, kind of like a SEDAR assessment review type of process, but they came in and -- The MRIP program came in, and our staff, Bev and her staff, gave the presentation, and we received the comments from the review panel, and so, throughout this whole process, from submission of the survey documentation all the way to completion, I would estimate that it took about a year.

The reason for that is complicated, right, and you would have to talk to the MRIP program about this, but they had a real hard time getting bandwidth for their statistical consultants, because, even though they have a lot, if you saw that map, with all the different surveys, that are in different processes of certification and review, right, and there's a lot for them to do, and so it takes a while for them to be able to step away from their day jobs, and most of them are academics, right, professors of statistics, but to step away from their day jobs and complete this, but I would estimate that it was about a year, Jason.

DR. BUCKEL: Thanks, Luiz. Next up is Alexei.

DR. SHAROV: Good morning. Good morning, Luiz. It's very good to hear you. I wish we could see you more often at the SSC meetings. We miss you. On the presentation, and you possibly will have the answers to my question further down, and then just say so, but, just in case, and so you were saying that this -- That your State Reef Fish Survey is essentially designed as an extension of MRIP, if I understood correctly, and so could you say a few words in terms of its design in the way that it operates, and that is you're focusing on reef fishes, but is data collected for them sort of within the same structure of the MRIP, and that is you treat it just as an additional stratum, or strata, that you utilize the same, you know, like allocation of sampling sites, looking at the probabilities of interception, and you just simply have an additional number of samplers at the intercept areas, and they just simply inspect only the catches that have one of the species that are on the list of your interest, and do you understand where I'm going? If it's all further down in the presentation, I will patiently wait. Thanks a lot.

DR. BARBIERI: Right, and it's good to hear your voice as well, Alexei, and I also miss the South Atlantic SSC, and all the colleagues there, and so thank you for the question. Bev's presentation is going to go into a lot more detail on this, and so she's going to give you a detailed perspective there on those issues, but, in general, I can tell you that, yes, the APAIS part of the survey is conducted in complete integration with the APAIS from the MRIP program.

Actually, the assignments for the SRFS survey are done in Silver Spring, by the MRIP program, so they can actually fit perfectly into the probability sampling framework that MRIP uses for their estimation process, right, and we conduct a dedicated effort survey that Bev will explain more in detail, but all of this is set up to be really sort of like a modular, I would say, is the term that I use to think about this, and it's like when you buy a car, right, and you can say, okay, I would like to buy it, and here is the basic car, and what additions, what other things, do you want to have on it that fit there for specific purposes, like four-wheel drive or whatever.

The idea is that this is a supplemental survey that is specialized for that stratum, right, but it's done completely in coordination with the MRIP program, and one of the things that Bev might get into, but, if she doesn't, I just want to mention that there is another survey, and I don't know if my presentation is still up, Judd, or can you pull it up, real quickly, and go to that map that has the distribution of surveys, and so there is a specialized -- The only really specialized survey conducted under the MRIP family of surveys, is what they call it, is this LPS, the Large Pelagic Survey.

When all these conversations about designing specialized surveys came up, we worked with the MRIP program through that effort, right, and we modeled this specialized survey to be working like of like the Large Pelagic Survey. If you Google "Large Pelagic Survey", and you go to that webpage, then you're going to read there that it's exactly what they're trying to do, you know, and it's just thinking that a lot of the HMS species, like tunas, sharks, billfishes, and they are not really properly sampled within the general MRIP framework, and so they require a separate survey that's dedicated to just that stratum, because of that. I hope that addresses your questions, Alexei.

DR. BUCKEL: Thanks, Luiz. Other questions for Luiz? Go ahead, Steve.

DR. TURNER: Luiz, hello. It's nice to talk to you again. I'm concerned, or I'm interested, in basically the availability of consultants to help with your calibration, as well as future survey designs, and so, for the immediate question that we're going to be looking at today, which is use in upcoming stock assessments, I'm interested in the calibration process and the statisticians you've had available to help you with that process.

If I recall, and I may not recall properly, the calibration process that was used in -- That was needed in the 2010s, that required extensive work by the MRIP staff, and I'm wondering about what processes you have been using here for the recent stock assessments that this data has been used for, as well as the upcoming assessments, and really the statistical basis and advice you're getting on these approaches. Thank you.

DR. BARBIERI: Right. Good question, Steve, because this is critical, right, if these are going to be credible for assessment and management, and so, for starters, there's a big difference between the calibration that was done for the MRIP survey and the calibration that you're going to be seeing for these species, right, and, for this, we are basically just using a ratio estimator, like a scalar,

that's being used to calibrate between the surveys, and you're going to understand this more after you hear Bev's talk, and, eventually, you know, as you review the documentation for the actual calibration development in the review process.

The development of the calibration is done by our team, you know, led by Bev and some of her statistical staff, but we also have a PhD-level statistician on staff that works with her team to develop this calibration, but, truth be told, Steve, and I've had this conversation multiple times already with them, with Richard Cody, John Cody, and Katherine Papacostas, but, in reality, right, all of this complex statistical review, for something that's just a ratio calibration, is a little bit of an overkill, right, because this is a real simple process.

The difference between the two, you know, calibrations, the fact that MRIP had to use a model-based calibration, you know, reflects some changes to that process, right, and so the survey was adapting over time, and then the response to the phone calls, for the Coastal Household Telephone Survey, also changed over time, and so it was impossible for them to have, you know, a stable scalar between the new FES and the old CHTS. It's a real complex problem that their statisticians, during that whole review process of the calibration, they discussed extensively.

You know, I can think of some specific documentation on that, and so, in this case, we are working with the MRIP program, and it's important to conduct all of this not as a rogue sort of effort to the side, right, and so this is why this is being done not just with the MRIP program, but we're trying to be integrated into our regional MRIP implementation process, right, and so, as you know, the MRIP program has these regional implementation teams, but there is a plan in place for development, and it's on the screen there. The MRIP program itself works with different regions in addressing their needs.

Like, as you know, there in the Pacific states, you cannot use MRIP for salmon or halibut, and it's just not appropriate, right, and it doesn't have the weekly specificity. Hawaii and Alaska use their own separate things, because, of course, they have their own specific needs, and so the MRIP program provides statisticians to the regional implementation process, and, as part of that, we have access to their consultants. In terms of calibration, and Bev may go into more detail on this in her presentation, but the terms of reference are developed by the MRIP program, and so it's almost like when they establish their MRIP data standards. If you don't meet, and if you don't check those boxes, you don't get approval, right, and so those are developed by statisticians, working with our staff, and then reviewed by professional statisticians. Is that sufficient, Steve?

DR. TURNER: Thank you, Luiz.

DR. BUCKEL: Thanks, Steve and Luiz. Other questions for Luiz? All right. No more hands here, Luiz, and no hands online, and so we will move on to the next presentation, and that is Attachment 5b, and Bev Sauls is here in-person to give that presentation. Bev, the floor is yours.

MS. SAULS: Thank you, and thanks, Luiz, for that good setup. My name is Beverly Sauls, and I work with Luiz at the Florida Fish and Wildlife Conservation Commission, at our Fish and Wildlife Research Institute, based out of St. Petersburg, Florida, and I'm actually the science program lead for all of our fisheries-dependent monitoring programs in the state of Florida.

I'm going to talk to you today about all of our efforts in Florida to improve recreational fisheries data, specifically for reef fishes, and so recreational fisheries are extremely important to the state of Florida, and we have a very high vested interest in collecting good quality data for use in stock assessments and for sustainable management.

It's economically important to us, and we care about our resources, and we really want to be involved in working towards collecting better data to help with this. We've made some big investments in our fisheries-dependent monitoring programs, specifically for those reef fish fisheries that Luiz had mentioned are sort of rare within the realm of all of the saltwater fishing that occurs within the state of Florida. One of those -- I will also mention that all three of these surveys are largely conducted with state funds that are long-term and recurring, and so these are stable, long-term monitoring programs.

The for-hire at-sea observer program is a cooperative research project with our for-hire industry. Vessel operators voluntarily allow our biologists to board and ride along with their customers, and we collect very high-quality data on recreational discards, as they're being caught and released at-sea, and these are data are used in many SEDARs now, and we're actually working with other states to try and expand this work throughout the regions, in both the Gulf and the South Atlantic.

For the South Atlantic red snapper mini-season, we do a very intense in-season survey that allows us to provide very precise landings estimates from the private boat and charter boat segments of the fishery, which really is a big help with managing the small ACL for that species, especially since Florida is the majority of the recreational catch for that season, and then the State Reef Fish Survey, which is what I'm going to focus on today, is a supplemental survey to MRIP, as Luiz explained, and its purpose was to provide more precise year-round estimates of effort and catch, specifically from the private boat segment of the fishery.

I'm going to hit on each of these bullet points throughout this talk, and this is going to be a long talk, and so I've kind of organized it into sections, and I will be glad to pause, through each of these sections, if there's questions, before I move on to the next section.

I'm going to start by talking about the survey background and design methods, and then I'm going to move into our ongoing and continued efforts to improve the survey and groundtruth the accuracy of the estimates that are coming out of the survey, and then I'm going to talk about some of the results that we are seeing since the State Reef Fish Survey was expanded statewide to include the Atlantic coast of Florida, and then I'm going to touch on some of the ways that the data being used now.

As I mentioned before, the State Reef Fish Survey is focused on improving data specifically for that private boat segment of the recreational fishery, and this fishery, this segment of the recreational fishery, accounts for a very large portion of the total recreational catch for reef fishes in Florida, and, obviously, shore fishing is not a large component for reef fishing, and so we focused on the private boat segment, and the charter fleet is covered through the MRIP for-hire survey, which we feel is doing a good job monitoring that segment of the fishery, and so we really wanted to focus on this larger-participant fishery that is more difficult to kind of get our arms around.

There is a large number of participants, and I'll talk more about that as we go into this talk, that are dispersed across large geographic areas, at many different sites, and it's an open-access fishery, and so, in Florida, anyone who purchases a saltwater fishing license is able to participate in this fishery. We've put some more specific license requirements in place on that, and I'll talk about that in a minute, but, in the past, all you needed was a saltwater recreational fishing license, and we sell about 1.4 million of those each year in Florida, and so that gives you kind of a glimpse into how big our recreational fishery is.

Reef trips, as Luiz mentioned, are a small portion of the overall recreational effort, and we feel like that's been very difficult to monitor and get very precise estimates with a general survey, and so our intent here was to develop a specialized survey that could run complementary to the MRIP survey in our state, and I should mention that the MRIP survey is a very important survey for the state of Florida, and we use it to monitor, and assess, all of our state-managed stocks that are not managed with ACLs, and we feel that that survey does a fairly good job for us to manage those fisheries.

There's also a number of federally-managed species that are not covered by the State Reef Fish Survey, and so, obviously, the survey is still important to those species as well, and so our intention has always been not to replace MRIP in Florida, but to complement it, and supplement it, in our state, to provide more specialized data for this fishery that is so, sometimes, controversial for us.

To answer Alexei's question, Luiz said that it took about a year for the certification, but the process has been a decade in the making, and so the survey was designed over a series of workshops in the Gulf region, during 2013 and 2014. All five Gulf states participated in these workshops, along with NOAA Fisheries and their statistical consultants, and we worked very closely with NOAA Fisheries, and the statistical consultants, on designing a supplemental specialized survey for reef fishes in Florida over that two-year period.

We implemented the survey, and we started testing it, in May of 2015, just on the Gulf coast of Florida, and, after we had collected over three years of data, we went through a peer review and certification procedure, reviewing all of the results from the years of pilot testing in the Gulf, and then, after we were certified, we received long-term state funding to continue the program in Florida, and that's when we expanded the survey statewide, during July of 2020, and renamed it the State Reef Fish Survey. I will emphasize, again, that this survey has run concurrent with the MRIP survey in our state throughout this whole time period, which is beneficial, because it allows -- It has facilitated the use of these data in stock assessments, because we have had a long benchmark period now.

The general design of the survey is very similar to the MRIP survey. It uses two complementary survey methods. We have a mail survey of fishing effort, and, now, I will mention that this gets confusing sometimes, because we talk about how we do use some MRIP data in the survey, but the mail survey, for the State Reef Fish Survey, is completely separate and independent, and it is not a part of the MRIP-FES survey. It is a different questionnaire, and it's a different sample universe that we draw from, and nothing about our mail survey and effort estimates are dependent on MRIP.

The second component of the survey is an angler intercept survey, which is used to measure catch per unit effort, and this information does include MRIP Access Point Angler Intercept data, the

APAIS survey, as well as data that we collect specifically for reef fish -- From reef fish fishing parties in our supplemental intercept survey, and so the survey is integrated with MRIP, in that respect, and these data, the catch per unit effort and the effort estimate from the mail survey, are used together to produce year-round monthly estimates of fishing effort, total fishing effort, total landings, and total discards.

When this methodology was reviewed by the peer reviewers, they noted that this is a very common approach that is used to monitor recreational fisheries in many parts of the country, and the world, and it's been studied extensively by two National Academy panels, and they concluded that the approach was sound, and they didn't see any issues with the survey design.

A key component of the State Reef Fish Survey, which differs from the MRIP survey, is our sample universe comes from people who have a saltwater fishing license, a saltwater recreational fishing license, in Florida, who also choose to participate in the reef fish fishery, and so, when you buy your saltwater fishing license in Florida, you can select from a variety of special endorsements. For example, there's a spiny lobster endorsement, a snook endorsement, and now there is a state reef fish angler designation that you may choose when you purchase your saltwater fishing license.

This is a free designation, and so there's no -- There's a little bit less of a disincentive to purchase it, because it's free, but, basically, what this does is it allows us to have a directory of participants, and so people that we know are likely to be participating in the reef fish fishery, and so, out of those 1.4 million people who are purchasing a saltwater fishing license each year, it allows us to kind of subset out those who are likely to be participating in reef fish fishing. This designation is required when you are fishing from a private boat and are targeting, and catching and keeping, a suite of reef fish species, and so it allows us to define that universe of offshore anglers.

These are the suite of species that are included in that requirement. The original suite of species were selected for the Gulf coast survey, and these are the main, the most popular, species that are targeted by private recreational boat anglers, on both the Gulf and Atlantic coasts, but, when we expanded the survey statewide, in 2020, we included three new species that are important to the Atlantic and south Florida, and that includes yellowtail snapper, mutton, and hogfish, and so we now have a three-year time series for that special group of species.

NOAA Fisheries, as I mentioned before, certified the survey in 2018, and what does that mean? When they certify a design, it means that they have reviewed the design of the survey and the estimation methods, and it's been peer reviewed by statistical statisticians, and they have deemed that the survey methodologies are scientifically valid, and, once you are certified, that means that, if a state wanted to apply for financial support to continue the survey, they could.

Fortunately, Florida is supporting this survey on its own, and we're very thankful for that support, but it also means that the methodology -- It's the methodology itself that is certified, and so it's not tied to just the state of Florida, or a geographic region where it was tested and implemented in Florida, but it means that it's a tool that is approved for use in other parts of Florida, or even in other states, if another state wanted to adopt this methodology.

The only real contingency that was placed on our certification, and I shouldn't say -- This is nothing negative, but it's that the survey is only certified as long as the design remains consistent over time, and so, if we were to make any major changes to how we collect the data, and estimate

the landings and catch, that would then trigger, you know, the need to maybe get another peer review, and have that new methodology certified, but, of course, in any long-term monitoring program, you don't want to do that too frequently, and break your time series, and so we were certainly agreeable to that one limitation on the certification, and we would actually, you know, welcome peer review, if we were to make any major changes again.

During the peer review, while they didn't find any major concerns that would preclude certification, the reviewers were very helpful in recommending some minor improvements that we have taken to heart and have -- I will talk, throughout this talk, about how we've responded to some of those recommendations, how we've looked into some of the particular concerns they pointed out, and have continued to make improvements to address those things, and so some of the things that they pointed out were increasing response rate in the mail survey, which is something that every mail survey -- That every survey of that type struggles with, is achieving and maintaining high response rates.

They recommended that the questionnaire maybe could be more simplified, to try and help increase those response rates, and they suggested that we look at ways to reduce oversubscription in the mail survey, and I'll talk more about this too, but I mentioned before that the state reef fish angler designation on that saltwater fishing license is a free checkbox.

We do see a lot of -- We do hear from a lot of people, who have purchased a fishing license at a third-party vendor, where that box was checked for them, without necessarily asking them whether they wanted that on their license or not, and so there are some people who are included in our sample frame who don't necessarily participate in the reef fish fisheries. That's not a statistical concern, if you can account for it and address it in your sample weights, and I'll talk more about that soon, but, you know, it does affect the efficiency of our survey, and so we do have to have larger sample sizes, higher stratification, to try and measure, and address and account, for all of that.

Then, lastly, they recommended exploring the possibility of any potential biases in the intercept data, the data that are collected at the dock, that could be introducing error and bias into our effort estimates, because those data are only collected at public access sites, and so I'll talk about all of those, as we go through this talk, and I will try to hit on all of these points.

I also want to emphasize the collaborative nature of the design and development of the survey, and so we worked very closely with the Office of Science and Technology, from NOAA Fisheries, on integrating our design and making sure we were -- While we were overlapping with the MRIP survey, we weren't interfering with that survey in our state, because we do feel that's an important survey as well, and we also wanted to work with them on ways to potentially improve both surveys. Since we do use APAIS data for the State Reef Fish Survey, that was in our interest, for both surveys to be improved.

One of the things that we wanted to work with them, or we did work with them on, very closely, was to how to increase the number of reef fish intercepts in the Access Point Angler Intercept Survey, and, prior to the State Reef Fish Survey design and implementation, the APAIS survey, in Florida, was only stratified by two major regions. The entire Gulf coast of Florida through the Florida Keys was one strata, and the entire Atlantic coast of Florida,, through Miami-Dade, was another strata, but we all know that there's large -- That's a large latitudinal gradient, from north

to south in Florida, and so the species are not evenly distributed throughout those regions. We have different population centers, and we have seasonal differences, and we have fishing regulation differences, throughout both of those large geographic areas.

To randomly select sites, proportional to fishing pressure, was really causing a lot of our sample to be drawn to one or the other part of a state during different times of the year, and so we were seeing a lot of our sample taken away from areas where fishing was still an important activity going on, but it was just being not sampled as well, because of -- You know, like, if red snapper opened in the Panhandle, in the summertime, we would see a lot of -- Our APAIS sample would be drawn up there, and taken away from southern parts of the state, and so we worked closely with NOAA Fisheries on creating more strata, regional strata, for the APAIS survey, and these are the eight regions that we agreed upon, and they now allocate all of their APAIS sample across these eight regions for us, and I think they will agree with me, with us, that that has been an improvement in Florida.

The other thing that we worked with them on is identifying sites within the MRIP site registry that are considered offshore accessible sites, and so sites that are close to an ocean inlet, or a Gulf of Mexico inlet, or sites that are larger and can accommodate boats with larger motors, and, obviously, you're not going to put in at a canoe launch site if you're going on an offshore fishing trip, and so we identified a subset of sites where boats that are more likely to fish offshore are launching from, and we created a separate site group just for those sites, and so a portion of our private recreational boat assignments for the APAIS survey now are allocated specifically to that offshore site group, which helps APAIS get a better hit rate for some of those rarer trips for offshore species, and so that's been a good improvement, too.

Then that offshore site group is also used by the State Reef Fish Survey, and so that's where we conduct our more specialized reef fish intercept survey, to really try to increase the number of intercepts we're getting for those trips, and we work very closely with NOAA Fisheries on drawing those assignments together, so that we're not bumping into ourselves in the field by doing two surveys at the same site at the same time, and it also has been a big benefit, because NOAA Fisheries will provide us those sample draws each month.

They select our SRFS sample for us, along with the APAIS sample, and then we get compatible sample weights that go with each of those assignments that we can use to combine APAIS data and SRFS intercept data together and produce appropriate statistical sample weights for all of those assignments, and so it really has been a very good working collaborative effort between the two agencies to kind of integrate the survey into the state of Florida.

I mentioned before that MRIP APAIS data and the supplemental assignments for SRFS are used together to calculate our CPUE estimates for the State Reef Fish Survey, and the supplemental assignments that we conduct at that offshore site group are able to increase intercepts particularly for reef fishes, because we do a screener question for each vessel party that we approach, to determine whether they were fishing for reef fish species or on some other type of fishing trip, and, if they were fishing for, you know, inshore species, we can screen through them quickly, and move to the next boat, to conduct an interview with that next boat.

With the MRIP survey, a lot of times, we'll have to do just vessel counts, because some of these sites are just so busy that you just can't conduct a full interview with every boat that comes in, and

so you have to just count them, and they get accounted for in the sample weights, and so we can miss a lot of these rare trips, just by the nature of the fact that we can't talk to every boat, and so the supplement assignments really allow us to kind of zoom-in on those offshore trips as they're coming in, and so, by using these two surveys together, we're really improving the number of intercepts that we're getting from reef fish trips.

Lastly on this slide, I wanted to mention that the intercept data are also being used in the State Reef Fish Survey to measure under-coverage in our mail survey of fishing effort, and so, as we approach -- In both the MRIP survey and the SRFS survey now, as we approach those angler groups, and we determine that they were on a reef fish trip, then we are able to ask them to take their license out and verify that they have that State Reef Fish angler designation on the license, and, if they don't, and there's a variety of reasons that people may not have it. Some people might be fishing without a license, or have an expired license, or they weren't aware of the reef fish designation requirement.

Anglers under sixteen are not required to have a license or the State Reef Fish Survey designation, and some people just aren't necessarily targeting reef fish, but they may have happened to release some, and so all of those are reasons that people might be included in our under-coverage adjustment. As we use -- We use all of those intercept data to calculate an under-coverage adjustment factor that gets applied to our mail survey fishing effort estimate.

I talked, earlier, about some of the minor recommendations we got from the peer review, and one of those was to evaluate potential sources of bias in our effort estimates that are coming from the reliance upon intercept data for adjusting effort, and so we've really thought about this a lot in our design of the State Reef Fish Survey. There's a number of things that are collected in the intercept survey for MRIP that are used to adjust their effort, or allocate their fishing effort, across different areas of the state.

For example, they use intercept data to allocate how much of that total fishing effort gets allocated to the Atlantic coast of Florida, versus the Gulf coast of Florida, and so we've tried to -- We identified all those different ways that intercept data were currently being used to adjust effort estimates, and we tried to really eliminate, or minimize, the amount of reliance that the specialized survey had on intercept data for some of those effort adjustments.

We also include, I will mention, out-of-state anglers in our effort survey, and so we don't have to do any kind of adjustment for non-resident anglers, because people who buy an out-of-state license, and have that State Reef Fish angler designation, are included in our mail survey, and so there's only thing that we rely on the intercept survey for, for the State Reef Fish Survey, and that is the under-coverage adjustment that I just talked about, those people participating in a reef fish trip who don't have the state reef fish angler designation on a fishing license.

We thought about that, whether that could be a potential source of bias, and we think that compliance with that requirement is very unlikely to differ between private and public access sites where the -- Where all of the intercept surveys are conducted at public access sites, because people on a boat are subject to law enforcement checks on the water, as well as at the dock, and so there really is equal deterrence for people who leave, even from private access sites, for, you know, complying with -- For not complying with that requirement, and so that's really the only potential

source of bias coming from the APAIS survey, and the SRFS intercept survey, that could be injected in our effort estimates, and we don't feel like it's very likely to be a large source of bias.

I will talk now about how we collect all of these things directly, and so the region fished, the Gulf versus Atlantic, the area fished, and that's trips in state waters versus EEZ, and both of those things are being estimated directly from our effort survey for SRFS, and even the directed trips for reef fish -- We get that directly from the effort survey, and so I'll talk more about that next, soon, but, first, I was going to cover kind of who is participating in the State Reef Fish Survey in Florida.

On average, and these are current numbers, and, on average, we have about -- For each month that we draw a survey for the effort, the mail survey of fishing effort, there is about 630,000 eligible state reef fish angler designations that we draw from for that month. About 36 percent of those 630,000 are out-of-state residents. A good portion of those live in nearby states of Alabama and Georgia, but the majority of them are coming from other states all over the country, and so Florida is a very big tourist state, and, when people come to Florida, a lot of them like to fish, and so that's a big chunk of who signed up for the State Reef Fish Survey.

64 percent of those are Florida residents, and we actually -- For the Florida residents, we obtain recreational vessel registration data from our department of motor vehicles, and we're able to match that up with our license holders, by address, and I think we get driver's license number that we're able to match upon, and so we know, of the people in Florida, who live in Florida, who have signed up for the State Reef Fish Survey, who lives in a household with a registered recreational boat and who lives in a household that is not matched to a state-registered boat.

You can see that's a fairly small proportion, and so 18 percent of the state residents live in a household with a registered boat, and so, again, that just gives you a sense of how unique, and rare, it is for somebody to have a boat and be able to fish offshore, and then, just among those Florida residents -- You can see they're about equally distributed across the Atlantic and Gulf coasts of Florida, and so 23 percent live in counties that are directly adjacent to the Atlantic coast, and 28 percent live in counties on the Gulf coast, and only 1 percent live in the Keys, which, of course, straddles both coasts, and then about 12 percent live in land-locked counties inside the interior of the state, which means they would have to travel to one or the other coast in order to fish.

We actually use that information, in the design of the mail survey, to stratify our sample, to try and capture all of that, all of the potential variability in who is participating in the fishery, how avid they are, how likely they are to fish on the Gulf versus the Atlantic coast, and so some of the things that we stratified by are those non-residents who have to travel to Florida in order to participate in the fishery, and so we figured that they would probably have different avidities, and activity levels, compared to somebody who lives in the state of Florida, on the coast, in a household with a private boat.

We actually stratify the mail survey by all of those factors, and so, for those state residents, we split the state into the northwestern Panhandle region, and then we took the peninsula and split it up into thirds, with the northern, central, and southern thirds each considered different regions, and then, within each of those regions, we sub-stratify by those counties on the Gulf coast, versus counties on the Atlantic coast, and then the landlocked counties in the interior of the state, and then, within each of those subregions, we sub-stratify again by those households with a registered boat and those without a registered boat, and all of this stratification has allowed us to account for

the just variability in fishing effort across the state, but also any potential varied response rates and avidities among those different types of anglers.

If somebody who is very avid is more or less likely to respond to the survey, we want to account for that, and if someone who lives say in the interior of the state, who participates less frequently in a trip, or lives in an household that doesn't have access, direct access, to a private boat, if they're less likely to participate, and also less likely to respond to the survey, we want to account for that, and so all of that was kind of baked into the design of this survey, and I mentioned earlier about the oversubscription, that that is only a concern if you can't account for it in your sample, and your sample weights.

This was very intentional here too, and we were concerned, from the offset, about people getting signed-up, and subscribed to the survey, and not actually being -- Or participating in the reef fish fishery, and whether they would have different response rates, and so this is how we addressed that, was we just stratified, based on all of these factors. We've tried to put people into groups of anglers that we thought would be more or less avid, and potentially more or less likely to respond to the survey, so we could account for all of that.

When we pilot-tested this in the Gulf, that did -- We were confirmed in the fact that that stratification does help account for potential nonresponse bias in our effort estimates, and so, in this figure, the yellow bars are the percent of people who were selected for the survey, when we were pilot testing in the Gulf, that responded to that survey, and then the blue bars is, of those people who responded, the percent of them that reported taking at least one or more trips for reef fish species, and so you can see that, on the bottom, those out-of-state anglers, they are very likely to respond to the survey, but those in Alabama and Georgia are much more likely to have taken a trip for reef fish in Florida, compared to those who live in other states.

You can see that people who live in all other states take fewer trips, and their highest response rate comes from this group, but they are less likely than other groups to have taken a trip, and so that's an important way that we are accounting for different response rates there.

You can also see that people who live on the coast, and so this is the central part of the state, and people who live on the coast are more likely to have taken a trip, especially if they live in a household with a boat, but they may be somewhat less likely than other groups to have responded to the survey, or more likely, I should say, and so, anyone, long story short there is that, yes, the stratification is successfully helping us account for and create sample weights and account for potential nonresponse bias.

Some of the things that we are also learning, since we have expanded the survey statewide, is where people are more or less likely to fish, and so these orange bars are the trips per response for people who said they fished in the Gulf, and the blue bars are trips per response for people who took trips, one or more trips, in the Atlantic, and, unsurprisingly, if you live on the Gulf coast, you're highly to take a trip in the Gulf, and, if you live on the Atlantic coast, you're very likely to take a trip in the Atlantic, and less likely to travel to the Gulf coast, although we do see some of that.

If you live in the Keys, you're also more likely to fish for reef fish on the Atlantic side of the Keys than the Gulf side, and so that was an interesting finding, and what was really interesting to learn

is that people who live in inland counties are much more likely to fish in the Gulf. They're much more likely to travel to the Gulf coast to go fishing, and people who travel from other states are also more likely to travel to the Gulf coast to fish, and so we are learning a lot about the dynamics of this fishery through this survey, and that's helping us better understand trends and differences in this survey with the MRIP survey, and we're really learning a lot, just through collecting these data.

I mentioned, before, that that state reef fish angler designation gave us that directory of people that we can specifically target for a specialized survey, and, just to show you how that's helping us better hone-in on reef fish participants, I mentioned that we have about 630,000 people each month who are eligible for the State Reef Fish Survey, to receive the State Reef Fish Survey in the mail, and so that's less than one-million individual registered anglers.

The MRIP survey is drawing from all residential households in Florida, because they're trying to account for all of the unlicensed fishing from shore, all of the out-of-state licenses, and their sample universe is -- They are sampling a completely different sample universe than we are, and it's a general survey, of course, of all saltwater fishing, anywhere in Florida, for any species, and so they have to be a lot more inclusive in who they're including in their survey, and so they're sampling from a universe of more than eight-million residential households in Florida. Having this sort of registry, for us, has really allowed us to kind of zoom-in on who we need to be surveying for reef fishes.

Our sample sizes, each month, we select 7,000 individuals each month to receive the survey in the mail, and our response rate, from that sample, is about 20 percent. This is one of the things that the peer reviewers suggested, and recommended, that we work on. 20 percent is not an unacceptable response rate, but a higher response rate, obviously, is preferred, if you want to reduce, and minimize, nonresponse bias, but, however, since our sample size is so big, we get about 1,400 responses each month, and having that very large sample size, and the stratification that we have built into the survey, has really allowed us, in this specialized survey, to provide much more granular effort estimates for the state of Florida, and so this is not a general survey. This is a very targeted, directed, specialized survey methodology.

If you compare that to MRIP, their survey is -- Because it's so general, they have much lower sample sizes, and they only select between 900 and 1,200 total households in Florida each wave, and they do get a higher response rate, about 30 percent, which is considered more favorable, but, because of their lower sample sizes, they're only getting less than 400 responses each wave, and so you're not going to be able to get the detailed level of effort estimate, from a sample size like that, that we are with the State Reef Fish Survey.

Now I'm going to walk you through the effort questionnaire and talk about how we are collecting all that data. One of the things we thought was important is, because we are asking for so much detail in this survey, was the reduced recall period, and so we are only asking people to recall trips for the past month. We didn't want to go with the two-month wave, like MRIP, just because we felt like it would be harder for people to recall of the details we're trying to ask them to remember.

The very first question that they answer is they're asked to recall whether, yes or no whether, they fished from a private boat in Florida over the past month, and, if the answer is yes, then they

proceed on to the rest of the survey. If the answer is no, we ask them to then return the survey, and they don't have to respond to any of the questions after that.

When they move on, if they answer yes, then we move them into a calendar for that month, and they are asked to mark, or to think about, which days they fished during that month and mark that on the calendar, and so the purpose of the calendar really was to help prompt the respondent to think intentionally about when they took those trips and whether it was in the month that we're asking them to report for, and so it's a good -- It's a good kind of recall reminder, to help them think, and hopefully avoid telescoping trips from prior months into their reporting for this survey.

This is the fishing area map that we include with the questionnaire, and they use this as a resource, as a guide, as they're reporting for each of those trips, and this is what the trip-level reporting looks like, and so, for each of those dates that they marked on the calendar, we then move them into this trip-level reporting question, and so, for each trip, we ask them which region of the state they departed from for that trip, using that map that I showed you in the previous slide, and, depending on whether they fished from the Gulf or the Atlantic coast of Florida, we ask them what percent of their time was spent fishing more than ten miles from shore in the Gulf, or more than three miles from shore in the Atlantic, and so we are directly getting an estimate of whether they were fishing in the EEZ or state waters or both.

Then, lastly, we ask them what types of species were they targeting, or trying to catch, and I'm sorry. Catching, or trying to catch, on that trip, and that includes, of course, all of the reef fish species what we're interested in for this survey, but, to make sure that the survey is salient to everyone, we also include these inshore species, and so, if they took an inshore trip, they can report to us what they were targeting for those, and then we even include this kind of catch-all for any other species.

What this allows is to do is then determine, for each trip that they report to us, whether it should be classified as a reef fish trip or some other type of fishing trip, and so all of this allows us to directly estimate reef fish effort by region and area fished, and that's why we don't rely on APAIS data, or dockside intercept data, for this information, and this is the reef fish identification guide that is also included with the questionnaire, to kind of help them with some of the species ID issues and make sure they're accurately reporting what types of species they targeted on those trips.

Just to quickly summarize, our CPUE comes from MRIP APAIS data and supplemental reef fish intercept data and those joint sample weights that we receive from NOAA Fisheries when they draw the sample for each of those assignments. Our effort estimate is coming from mail survey responses from the State Reef Fish Survey, stratified sample weights, and nonresponse rates, which I will talk about in a bit, and our under-coverage adjustment, which is just accounting for those people who are fishing without the reef fish angler designation.

Then total catch is simply CPUE multiplied times effort to get total catch, and so that's actually a good time to kind of pause and see if you guys have any questions before I move on to the next part of the talk.

DR. BUCKEL: Thank you, Bev. Questions for Bev? Marcel.

DR. REICHERT: Thanks, Bev. A couple of practical questions, and so you mentioned that they sign-up for the survey, but does that mean that they make the designation for reef fish -- The fisher makes a designation for reef fish, and that's what you mean by that, or are they actively signing-up to participate in the reef fish survey?

MS. SAULS: When you buy a saltwater fishing license, and there's two ways to do it. You can go online, and do it yourself, you know, put everything in the cart that you want on that license yourself, or you can go to a vendor, such as a bait-and-tackle store, and purchase your license there, and so, at that time, when you're buying that license, is when you would either check or not select that box, and there is no additional charge, when you're buying that license. I didn't mention this before, but I should too, but senior citizens, in Florida, are not required to have a saltwater fishing license, but they are still required to go into our license database and sign-up for a free State Reef Fish Survey angler designation.

DR. REICHERT: But what I meant to ask is you mentioned they sign-up for the survey, but they don't actually sign-up for the survey, and the sign-up for the survey is because they have designated -- In addition to that, there's not a --

MS. SAULS: By checking that box, they become eligible to receive the survey in the mail.

DR. REICHERT: Okay, and just why were bay scallops on the mail survey?

MS. SAULS: So that is, obviously, a species of high interest in Florida, and it's not covered in any recreational fishing survey right now. We added it, a few years ago, because we were doing a special pilot study to try and do a -- Trying to get a good estimate of scallops, and we've kept it on there, and I will talk more about the testing we've done for shellfish further in this talk, but one of the things we're concerned about is that people are including shellfish trips in their recreational fishing trips, and that's another potential source of, you know, overestimates, if people aren't discerning between a finfish trip and a shellfish trip.

DR. REICHERT: Are they required to participate, when your people go to the docks, or is it entirely voluntary?

MS. SAULS: When we go to the docks, the intercept survey is voluntary. We don't see a very high -- What is it? We don't see a lot of refusals of that survey.

DR. REICHERT: Okay. Thank you. I appreciate that. Thanks, and just a couple of practical questions.

DR. BUCKEL: Thanks, Marcel and Bev. Others? Genny.

DR. NESSLAGE: Thanks. This is great, and I'm excited to see this work coming to fruition. I just had a question about your estimate of 18 percent of state residents have a registered recreational boat, and I thought that was interesting, the work that you guys did to cross-reference that, but you said that you thought that was a small amount, and I'm guessing -- Like the east coast of Florida has, what, nine to ten-million people, and, if 18 percent of them have a private boat, and they're much more likely to go offshore and do reef fishing trips, that's essentially where our

effort, a large amount of effort, for reef fishing is coming from, right, and so I'm just trying to put that into perspective.

MS. SAULS: Yes, and so the rest of the people, who don't live in a household with a boat, obviously, have to know somebody with a boat, in order to get out offshore to go reef fishing. I don't have a boat, but I like to have friends with boats.

DR. BUCKEL: Thanks, Genny. Fred Scharf.

DR. SCHARF: Bev, you said, in the peer review, they mentioned a couple of things about maybe -- One is simplifying the mail survey questionnaire, and then two was reducing oversubscription in that mail survey, and could you maybe talk about those a little bit, and like what did they -- That survey questionnaire that you just showed us seemed pretty simple, and so did they have any specific recommendations to make it simpler?

MS. SAULS: Not necessarily. They pointed us to the FES survey as an example for how -- You know, an example of a very simplified questionnaire, and I will actually, in the next part of the talk, go over a side-by-side test we did of a more FES-type questionnaire, and what the results of that looked like, but, for the oversubscription, a couple of things that have helped with that, I think, have been mainly that we expanded the survey statewide, and so now people who are signed up on the Atlantic coast are more likely to actually be participating in a reef fish trip on the Atlantic coast, and so they're not oversubscribing anymore.

DR. BUCKEL: Thanks, Fred. Genny and then Kai.

DR. NESSLAGE: On slide 18, this is the -- Is this what it looks like, this first page of the survey, if I were to get this in the mail?

MS. SAULS: Yes, that is the first page of the survey.

DR. NESSLAGE: Okay. I just wanted to refresh my memory. When you get an MRIP survey, doesn't the first page ask you about the weather?

MS. SAULS: Yes.

DR. NESSLAGE: Yes, and so I just want to complement you all on being direct, and honest, with the people you're surveying, because I think that's a huge improvement. Thank you.

MS. SAULS: Thanks, and the FES was -- They have different issues that they're trying to overcome with their survey design, because they're sampling all households in Florida, some who have fishermen in them and some who have never fished, and so they're trying to make that survey interesting, and salient, to somebody who maybe doesn't fish, so that they get those responses back as well. The fact that we know everyone that we're targeting in this survey already has a saltwater fishing license, and so we know they must have some interest in fishing, and we don't have to worry about that, which is what allows us to better focus in on the fishing questions.

DR. BUCKEL: Thanks, Genny. Kai and then Chris.

DR. LORENZEN: This is actually maybe related, and I was wondering about the difference in response rate between the MRIP 30 percent and your 20, and, okay, that may be something to do with the fact that it's -- That you get more people responding who don't actually fish, and they're just doing the weather part.

MS. SAULS: Possibly, yes. That's possible.

DR. LORENZEN: I mean, both are, I think, good response rates, but I was just wondering why the MRIP was getting so much more.

MS. SAULS: Yes, and, in this next section, I'm going to talk about some of the things we've been throwing at that response rate, to try to get it up. It's not an easy task.

DR. LORENZEN: Okay, and I actually have one question about your under-coverage estimate, because I used to be worried about the over sixty-five, who were, I think, quite a bit part of the reef fish community, fishing community, and how many of those don't go out and get that free endorsement, because they don't need the license, and you probably have the answer to that, from your under-coverage estimate.

MS. SAULS: I don't know if we record why they don't have that, and, when we are asking them to pull up their license, and confirm whether they have it or not, and I'm not sure whether -- We might be collecting that.

DR. LORENZEN: I mean, so, if you asked them, and they say, well, I don't have anything, and, I mean, do you register whether they're over sixty-five?

MS. SAULS: That's what I'm trying to remember, is how our question is structured, and I'm not sure if we discern between those who don't have it and are over sixty-five. I think we do, because the -- We collect age, or date of birth, now in the APAIS survey, and so there would be a way to look at that.

DR. LORENZEN: Okay, because that seemed, to me, the biggest sort of potential under-coverage, you know, if people just don't get that endorsement because they don't have to get a license.

MS. SAULS: Yes, and it takes more outreach to that group specifically, because they're not being asked to go buy a license, and so they have to be aware that they're supposed to have that free license, yes.

DR. LORENZEN: Okay. Thanks.

DR. BUCKEL: Thanks, Kai. Chris.

DR. DUMAS: Thanks for your presentation, and this is a fantastic program, and this is great additional data. My first question was going to be Kai's question about age, and about, you know, the possibility for stratifying for age, just in general, and not just the particular issue that Kai mentioned, but --

MS. SAULS: I will cover that in the next section.

DR. DUMAS: Fantastic, and is it possible to do that, and are you guys doing that, stratifying for age, and also stratifying for gender, if you have that information, and I don't know if you have that information.

MS. SAULS: Yes, and I will get into that.

DR. DUMAS: And by vessel length, if you have vessel length on the boat registration data, and sometimes fees, boat fees, are by vessel length, sometimes, and so they are in North Carolina, I think, at least commercial, but, if you had vessel length, that might be something else that could be helpful.

MS. SAULS: We do know that, and we do use vessel length to kind of weed-out the small like, you know, john-boat-type vessels, and stuff like that, and so we don't include those in our household with a boat strata.

DR. DUMAS: Right, but there might be big differences between the boats a little bit larger than a john boat and then boats that are private, but as large as a charter boat, you know, that kind of thing, and there might be some differences.

MS. SAULS: That's a good idea. I like that.

DR. DUMAS: Just as a possibility, and the second question was about -- You were talking about potential differences between vessels that launch from a public access site versus vessels that launch from maybe a private dock, and potential differences between those, and you said, well, they're similar, in that they're both subject to the same enforcement out at-sea, and I totally agree with that, but there might be a difference between them, in that the ones that launch from a public access site have the possibility of being intercepted by a surveyor, and their license is checked then, right, whereas, the ones that launch from a private dock, no one is checking them when they launch from their own private dock.

MS. SAULS: That's correct.

DR. DUMAS: So there is that difference, and I don't know if it's a significant difference.

MS. SAULS: Yes, and so the assumption is that the disincentive to be fishing without that state reef fish angler designation is equal.

DR. DUMAS: Right, but I'm saying it might not be, because -- Out at-sea it's equal, I agree, but, at the launch site, it's different, because, at the public access site, they have -- I don't know what their probability is of being intercepted, and their license checked, when they're intercepted for the survey, either the APAIS survey or your survey, whereas, if they're launched from their own private site, they're not risking being intercepted by the surveyor at the launch site, and so there could be a difference.

MS. SAULS: But they're still equally as likely to either have it or not have it.

DR. DUMAS: But they're reduced risk of not having it if I'm not being checked at the launch site, and that's all.

MS. SAULS: Somewhat, yes, and I would agree with that.

DR. DUMAS: It may not be significant, but I just wanted to make sure, and that's all.

MS. SAULS: We do a lot of on-the-water checks in Florida.

DR. LORENZEN: And the surveyors don't -- They're not law enforcement people, right, and, I mean, if you don't have a license, the surveyors may note that, but they don't write you a ticket.

MS. SAULS: Correct. We don't carry guns.

DR. DUMAS: Thanks.

DR. BUCKEL: Thank you, Chris.

DR. SWEENEY-TOOKES: I just wanted to tag onto Chris's comments, and I flipped through and didn't see it, but, thinking about equity, and are you gathering any data on race or ethnicity or income level, and is that something that we could get in there, if we're trying to move towards more equity in management? I know we're making your survey fifty pages long, but --

MS. SAULS: You're asking if we can -- No, we don't ask it, but I believe that's in our license database, because it's driver's-license-based, and it's linked to the state driver's license, and so I believe that information is there. We link all the -- So, when you buy a state saltwater fishing license, you have to prove proof of residency, because we have different fees, depending on whether you're an in-state or out-of-state resident, and so they -- All of our license data are linked up to all of the data, and it's highly-confidential data that we work with, but we can see age and ethnicity and gender and all of that stuff, yes.

DR. BUCKEL: Thanks, Jennifer. Steve.

DR. TURNER: Dockside sampling, and what's the latest time -- Are there trips returning after your sampling window, and do you have any information on that?

MS. SAULS: Our sample window is the same as the APAIS survey.

DR. TURNER: Right, and so what's the end time?

MS. SAULS: 8:00 p.m.

DR. TURNER: 8:00 p.m.? Okay.

MS. SAULS: There are -- We've tried nighttime assignments, and APAIS issued a certain number of nighttime assignments. One, they were very unproductive, and we just didn't get a lot of intercepts, and, two, they were very unsafe.

DR. TURNER: Yes. Okay. So you do a match between the vessel database and your license database, and how good is that match? You're trying to figure out who has a boat, and so there's a match between those two, and how good is that match?

MS. SAULS: It's based on the residential address.

DR. TURNER: Right. I understand, but how good is that? Are the --

MS. SAULS: It's the same database, and it's driver's-license-based data, and so it should be a good match.

DR. TURNER: How many people update their driver's license when they move?

MS. SAULS: I don't think there's any statistical concern about that. That just means that some people who aren't matched are included in the unmatched sample.

DR. TURNER: Okay, and so, on your form, on the effort form, you have basically catch you're targeting, and let's say somebody doesn't catch anything, and are they just checking the boxes off, and so maybe it's not actually a reef fish trip, and they're just checking something off, or do you have any information on that?

MS. SAULS: So the question is did anyone on the boat keep, release, or try to catch any of the following species.

DR. TURNER: Right.

MS. SAULS: It's so what were you trying to catch.

DR. TURNER: Okay. I think a lot of people say they're trying to catch something, and maybe they're going for reef fish, but they really don't know what they're doing, or something like that.

MS. SAULS: Which is fine, and we capture them, in the intercept survey, as zero CPUE, because we ask the same question in the intercept survey of what were you trying to catch.

DR. TURNER: Okay. The last question is you don't have very many questions in your effort survey. Obviously, MRIP seems to have had some problems with the order of their questions, and are you going to be talking about that later?

MS. SAULS: Yes, a little bit, yes.

DR. TURNER: All right. Thank you.

DR. BUCKEL: Thanks, Steve. Fred Scharf.

DR. SCHARF: Bev, just a quick clarifying question, and so the out-of-state anglers are captured in the effort survey because they have to buy a nonresident license and then check the box for --

MS. SAULS: Yes.

DR. BUCKEL: Thanks, Fred. Jason.

MR. WALSH: I had a question on the effort survey, and so, for each trip, you're asked this line, and so, if you go, whatever, twenty days throughout the month, you're filling out twenty separate trips, and do you see any pattern of like more responses at the beginning of the month, or maybe the end of the month?

MS. SAULS: That's a good question, and so they report up to nine trips, and then we have to do an imputation for any remaining trips after nine. That was -- We did take the peer reviewers' recommendations to heart on that, and I think, initially, we were asking up to twelve trips, and they highly suggested that we limit it, to you, just the first nine trips, to make the questionnaire less burdensome, and shorter, for them to complete.

DR. BUCKEL: Jason.

MR. WALSH: I had another clarifying question, following-up on what Genny was asking, and so I misinterpreted that that 18 percent of the Florida participants had a boat was of the folks that checked that they had -- Or, you know, checked their reef designation, and is that accurate, or is it of all of Florida, because I thought Genny was saying that it was --

MS. SAULS: Of the -- 65 percent of the registrants are Florida residents, and, of those, 18 percent live in a house with a registered boat.

MR. WALSH: Okay. That's what I thought. Sorry, and I was confusing myself. Thank you.

DR. BUCKEL: Thanks, Jason. I wasn't sure which one that was either, because what Genny said was a different animal than what was just described.

MS. SAULS: Okay. Maybe I didn't understand the question.

DR. BUCKEL: It was 18 percent of state residents, but it's of that 64 percent. Thanks for the clarification. Jim.

MR. GARTLAND: So far, this presentation is excellent, I think, and I imagine that the dataset is really impressive, and my question is real simple. Have any other states inquired, with you, about setting one of these up for them, like Georgia, or I'm thinking Virginia. It's not my call, but I just think it would be really cool to have something like this up our way.

MS. SAULS: I'm from Virginia, and I would be glad to work with them, but, no, I am participating on the AP that Luiz talked about earlier for the considering of a federal-type reef fish permit, and I have presented a lot of this information to that technical group, and so they are familiar with the survey design. However, depending on what type of license structure gets selected, it will depend on what type of survey design will be used, I guess, for that, but, yes, I think everybody is interested in this, but do the states have the resources to do a survey like this, and, you know, that's a question for them, and the other thing too, I think, is that sometimes there is legislative, and political, barriers to requiring an additional permit in different states.

DR. BUCKEL: Jason.

MR. WALSH: To that point, do you know about the budget of this program?

MS. SAULS: Yes, and so the recurring funds that pay for this are -- This is for the Gulf and the Atlantic coast, and it includes our at-sea observer program on the for-hire vessels, is $3 million recurring, right now, and I think about two-thirds probably of that are dedicated to this survey.

DR. BUCKEL: Yes, Christina.

DR. PACKAGE-WARD: I just wondered, and, with the requirement to have a driver's license to get a state license, what happens to people who don't have a driver's license?

MS. SAULS: They're required to provide some other form of identification.

DR. PACKAGE-WARD: Okay. Just some folks don't have any ID, and so --

MS. SAULS: They probably also don't own a boat and go offshore fishing, and you kind of need a driver's license to tow your boat to the boat ramp, and I don't know, and, yes, I don't know exactly what mechanism is used to do that, and I think there's a free state-issued non-driver's license, probably, available for someone who doesn't drive.

DR. BUCKEL: Kai and then Genny.

DR. LORENZEN: I think this also gets to, you know, if you wanted to roll out this survey, or something very similar, to other states, I'm wondering -- I mean, it relies on certain things, like, you know, your ability to use the driver's license database, and so on, and I work in several states, and some are super restrictive about information. In Florida, most everything is public record, and, in some states, it may be very difficult, even for one state agency, to get access to personal information from another, and so there may be constraints to emulating the same thing, and I don't know the states well enough to --

MS. SAULS: We worked very hard on an MOU with our department of transportation, to gain access to that confidential information, and we can't share it, obviously, with anyone.

DR. LORENZEN: But then the opportunity to do that even may be different in different states.

MS. SAULS: Yes.

DR. BUCKEL: Thanks, Kai. Genny.

DR. NESSLAGE: I get my license when I go down to visit the in-laws, and go fishing, and I don't go reef fishing, but I do remember, when I get my license online -- Do I remember, I guess is the question, and it seems like was a popup, and so I clicked "saltwater angler license", and I go to put it in my cart, and then, before I go to pay, it says are you going to -- I remember a box popping up, or am I making that up in my head, that it says, are you going to go reef fish fishing, but what I don't recall is that it says it's free. Like I'm wondering if advertising more on that thing, when

you click on it, that says it's free, and don't worry, and just click on it, and would that help at all, or do you think that you're not getting the full group? Do you think you are getting everybody?

MS. SAULS: I honestly have not looked at the license -- How that works in the license website in a while, but I'm actually glad to hear that you got a pop-up like that.

DR. NESSLAGE: I might actually go through and try and -- Not actually buy it quite yet, but do it again, because I thought that happened.

MS. SAULS: The thing is, if people are signing-up for it, and it's free, but then it's asking are you sure you need this, and I think that's the better prompt than telling someone to go ahead and do this, because it's free.

DR. NESSLAGE: Because then they might just say, oh, I might go sometime this year, and oversubscribe.

MS. SAULS: Which is fine. You know, if you think you might go, you should get it.

DR. NESSLAGE: Right. Okay. That's fair. Thanks.

DR. BUCKEL: All right. Kai.

DR. LORENZEN: This is to the same thing, and I have a reef fish permit, and I haven't been reef fishing in years, and so I think there's oversubscription on that side, but you described that, but we may have undersubscription, because of the people who don't have to get a license, but they should be going online just to get the reef fish permit, and whether those people do it -- It's free, but, you know, if you need a license, and you go to renew, then it gives you the option of the reef fish permit, and, yes, I think a lot of people would click on everything that's free, just because it's free, but then, you know, you don't have to go there at all, except to get the reef fish permit, which is free, and I think a lot of people might think, you know, that I'm not going to get into trouble for not doing that, and --

DR. BUCKEL: All right. Great questions on this first part of the talk. We're halfway through our morning session, and so we're going to take a ten-minute break. Be back here at 10:35, and we'll get the second-half of Bev's presentation. Thanks, Bev.

(Whereupon, a recess was taken.)

DR. CURTIS: We had a couple of questions from the public, and we will hold a public comment period following the presentation and discussion by the SSC, before we break for lunch. Thanks.

DR. BUCKEL: Thanks, Judd. All right. Welcome back. We're in the middle of a presentation from Bev Sauls on the Florida State Reef Fish Survey. Take it away, Bev.

MS. SAULS: All right, and so the next part of this talk is I'm going to talk about some of our ongoing efforts to make improvements to the survey, address some of those initial concerns during the peer review, and do some groundtruthing to verify the accuracy of the estimates coming out of our survey, which we think is a very important thing for any survey to do.

One of the first things we explored was whether there was some potential nonresponse bias that we weren't capturing already in that stratification design that I talked about in the first part of my talk, and I cannot remember all of the things that were looked at, and a couple of them came up in the question-and-answer session just now, and we looked at differences in response rates and avidity rates between genders, and I know we looked at that one, and I don't remember if we looked at it by ethnicity, and I could find out.

There were several things that we looked at, but the one that stood out as a potential source of nonresponse bias, when we looked into this, was age. This figure is age groups, and the blue bars are the percent of people with SFRS angler designation that are in the population, the percentage of people in each group that are in that population, and then the gray bars are when those people are selected for the survey, the percent of them that are responding to the survey, and so what you can see -- Keep in mind this is a mail survey, which is kind of an old-fashioned way of contacting people now, compared to other methods of contact, and what we found is that older people are much more likely to respond to the mail survey than younger groups, and so that was a potential concern if we had different avidities, or fishing activity levels, among those different age groups, and so that's something that we explored.

It also was interesting to find out, because it helps us better focus our efforts on improving overall response rates, and so, when we looked at that, we did a post-stratification procedure on the responses that we were receiving from people in those different age groups to account for any potential differences in their avidities, and what we found is the gray bars in this figure are no post-stratification at all, and the blue bars are post-stratified on age, and you can see that those estimates, across all the months, are pretty similar, and so that was good news, but it was still very interesting to find out that, you know, if we want to improve response rates, we need to focus on those younger age classes.

Now, the orange bars, in this figure, is a post-stratification method that we have actually implemented, and so it's in our survey estimation design now, and that is people who register for their -- Or people who purchase their saltwater fishing license online versus those who are purchasing their license through a third-party vendor, such as a bait-and-tackle store, and so what we found is that people who are signing-up online, or buying their license online, they self-select whether they want the State Reef Fish angler designation on their license or not, and, actually, Genny was just showing me the pop-up window that she was talking about earlier, and it's really nice, and it actually asks you, yes or no, do you fish for any of these species, and so it's kind of prompting people to know whether they need that permit or not, and I wasn't aware of that improvement, and so that was really nice to see.

But, when you go to a bait-and-tackle store, and I was talking to John Carmichael last night, and he said this actually happened to him, where he went and bought a saltwater fishing license in Florida, recently, and the clerk did not ask him at all whether he wanted the State Reef Fish Survey designation on there or not, and then, when he went home and looked at his license, there it was, and so we know that happens. He's not the first person to tell me that.

So this post-stratification on the method, or mode, that was used to purchase your license actually has shown that there is a little bit of nonresponse bias that we were not accounting for, and so we're doing that now with this post-stratification method, and it's not a huge difference. You can

see, in some of those high-effort months, it makes a difference. In other months, it doesn't make much of a difference, but we are accounting for that.

Now, moving on to improving response rates, and I talked earlier, just now, about those younger groups that we're more concerned about, and response rates is one of the -- There's a whole science about surveys, and how to get your response rates up, and how to maintain them, and it's one of those things that every survey administrator really needs to just always be working to not only improve, but maintain, because, as technologies change, and the way people receive information and respond to surveys changes, you're always having to adapt your survey to meet those needs, and so it really is just one of the biggest challenges for any survey.

Thinking about those younger groups, we wanted to test out some electronic methods for contacting people who are selected for the survey, and/or for receiving their responses back, and so we tried -- We've tried a series of side-by-side tests with our original survey, and so the original survey, which we're calling the "OG" in the figures that I'm going to show you next, we just send a packet in the mail, that includes a cover letter, the questionnaire, all of the survey materials, including the map and the species ID guide, and so they get that whole packet in the mail, right off the bat.

Then they get a postcard reminding them of, hey, we sent you this pack, and please return the survey for us, and then, if we don't hear from them again, we mail them a second packet, in case they've lost it, or forgotten about it, to try and encourage those non-responders to -- You know, to return the survey to us, and this is a pretty standard methodology for mail surveys, is the two-packet survey, with a reminder in the middle.

Some of the alternative methods we've tested side-by-side with that, and we've included what we're calling a mixed-mode approach, where they get an invitation in the mail, and it's just a letter, and it includes a QR code, that you can scan with your phone, and it takes you to an electronic reporting option, and then you get a reminder in the mail, and then, if we still don't hear from you, we send them a mail packet, in the mail, to get them to respond that way.

Then we tried out something called the two-packet, where you got the mail packet first, but it also included a QR code, so that, if you preferred to respond that way, you could. Then you get a reminder, and then you get a second pack, and, lastly, we tried a text message, and so a lot of people, when they sign-up for a fishing license, they can provide a cellphone number, and/or an email address, and so we've tested out -- For those people who provide a cellphone, they receive a text message, and then they receive a reminder, and then another reminder, and the text message had a link to electronically report that way.

This is what the electronic reporting option looks like. You can do it on a mobile phone or on a computer, and you have to have a unique passcode that's provided in the invitation, so that we know you're the actual person doing the survey, and somebody didn't share the link, and somebody else is doing the survey, who wasn't selected for it, and the survey questionnaire is set up exactly the way the paper survey is. It asks all the same questions, in the same order.

Unfortunately, the results were disappointing, and so the gray bar is the original survey that we're currently doing, and the colors are the different -- Those three different tests that I described, and the response rates that we got back there, and so what next?

The silver lining was, for that text message group, the purple bars in this figure, you can see that the younger people were more responsive to that methodology, and they weren't so much responsive to the other methods, because they're still getting a piece of paper in the mail, and probably not even opening the letter, but, if they get a text message, they do seem to be responsive to that type of survey contact approach, and so that led to our next test, which we're calling the pre-contact, or PRE, and it's a combination of all of those methods together.

First, for those who provide a cellphone and an email address, and/or an email address, they get a text and/or an email invitation to participate in the survey first, and then they get a text and email reminder, and another reminder, and then, for everyone who didn't respond that way, or who we didn't have a text and email address for, then we send out the mail packet, with the QR code, and we send the reminder with the QR code, and then we send a second mail packet with a QR code, and so throwing everything in there.

The results are really promising. We've only done this for two months. The January 2024 results are still preliminary, and so we're still getting some of those paper survey packets back in the mail from that month, but, the December 2023 test, we got over a 30 percent response rate, which we are ecstatic about, and so this is just -- This really just shows you the importance of just, you know, constantly working to improve response rates and be adaptive to changes in technology and how people are responding.

The next thing, one of the next things, we've looked at is that question about questionnaire length. The peer review recommended testing a shorter questionnaire, to improve response rates, and they kind of pointed us to the FES survey as an example of a very simplified approach for the fishing effort questions, and they do get about a 30 percent response rate, and so we thought it was worth looking into.

If we were to modify our survey, could we improve response rates if we were asking fewer questions, and what would be sacrificing, if we eliminated some of those questions, and so are the calendar, and the trip-level reporting, really helping better recall trips, and serving as memory cues, and do we really want to sacrifice some of those things in this survey, at the cost of, you know, potential bias in the responses? How important is the one-month recall period? Could we maybe get away with a two-month recall period, and another question that we had, a lingering question that we had in our minds, was, you know, how frequently are people including shellfish trips in their recreational trip reports, and is that something that maybe should be discerned in any fishing effort survey in Florida, to make sure that we fully understand what type of a fishing trip they're reporting to us?

This is the shortened SRFS-style questionnaire that we tested, side-by-side with the original survey, and you can see this is the whole survey right here, and it only asks four questions. The first one asks people to report the total number of trips they took from a private boat, over either a one or two-month period, depending on which sample they were selected for, and we felt it was still important to at least collect information on whether they fished on the Gulf or the Atlantic coast of Florida, and so we included a map, and it was a simplified map, and it really was just Gulf and Atlantic coasts, and we asked them, of those trips that they remember taking over the past one or two months, how many were from each coast of the state, and then we asked them what types of things they were targeting on those trips, and were they only targeting shellfish.

How many of those trips were they only targeting shellfish species, and how many were only targeting finfish, and how many were targeting both of those types of things. Then, lastly, how many of those trips were specifically targeting reef fish, and we included that species ID guide, that I showed you before, to help them understand what we meant by reef fish.

There were no calendar, no trip-level reporting, fewer questions, and we only did this in the northern region of the state, during Waves 4 and 5 in 2021, and so it's not -- This wasn't a statewide test, but it was conducted in an area of the state where recreational scallop fishing is important, and so that will play into some of our results here, as I go through things.

The first question is did the length of the questionnaire impact response rates, and the answer was no. The first blue bar, the one-month recall SRFS questionnaire, that is the response rates in that area during those two waves for the original SRFS survey, and the shortened questionnaire -- There was no difference in the one or two-month recall in the response rates, and the response rates were very similar to our current questionnaire, and so that answered that question for us.

The next question is does asking for less information influence what people are reporting and recall on when they're responding to the survey, and so, in this left-hand figure, that is the number of reef fish trips per response for the SRFS questionnaire, which includes the calendar and the trip-level detail and the shortened questionnaire for the one-month and the two-month wave recall periods.

We didn't see a difference in the one or two-month periods, but we did see a big difference in the number of trips per response for that short questionnaire, versus the longer-style questionnaire, and the figure on the right-hand side is just showing that that is largely due to the fact that people responding to the SRFS survey are more likely to report to us that they didn't take any fishing trips during that month, versus the shortened questionnaire, and they were more likely to recall taking at least one trip during the period that we were asking them to report for. These, we think, are very interesting results that are kind of telling about the importance of memory cues in responding to surveys like this.

I think this committee is aware that MRIP has also been doing some kind of parallel research into this subject, and this is the questions, the two fishing questions, that are on the FES survey questionnaire, and they've been testing switching up the two questions that ask people to remember what they did over the past one or two months, versus over the past year, and they've found some big differences there. Similarly, they did not -- Some of their early tests did not see differences in the one or two-month recall, the same as what we found, but they have found that they believe people are remembering trips from prior months, and including them in their reports in the FES survey, and so it's interesting that we're seeing similar results there.

Then, looking at that question about shellfish, and I mentioned that this was conducted in a part of the state where scalloping is a very popular recreational fishing activity in the summer months, and we did see up to 15 percent of the trips that were reported in the shortened questionnaire were only targeting shellfish during their recreational fishing, and so I would like to do some more testing of this throughout the state, because we have important fisheries for spiny lobster in Florida, in the southern part of the state, as well as shrimp and stone crabs, and I think this is an important question to maybe do some further investigation on.

Another thing we looked at was our sample size and stratification, and, to do this, we actually constructed a fictitious Florida population, using data from the American Community Survey on households throughout the state. We have our saltwater fishing license database, and so we know who and where people live that have saltwater fishing licenses, and so we assigned to that population whether they live in a household with a license or not.

Then we had MRFSS coastal household telephone data that was historically collected in Florida, before MRIP switched to the FES, and that was county-level data, because that survey was stratified by county in Florida, and so, when we combined all those years, it gave us a good idea of what the prevalence of fishing is in each county, and so we used that to inform our kind of fictious population, and then we -- So then we -- By doing this, we had a kind of known population, with a known fishing effort, that we could resample and use to produce effort estimates, and, at this time, we were only interested in the Gulf coast of Florida, but we still have this dataset that we could use to resample any way we want to.

We looked at some different stratification designs, and one of them was no stratification, and so just sampling randomly all households in Florida. We looked at four different strata for Gulf, Atlantic, and Keys, and inland counties. The SRFS regions -- At the time, we had nine strata in that survey, for the Gulf reef fish survey, and so we tested that, and we looked at just a simple coastal versus inland, a north versus south, and so we looked at a variety of kind of stratification schemes, and different sample sizes, ranging from a thousand to 14,000 households per wave, and that would be a really expensive survey, to do 14,000.

We didn't see any bias in any of the stratification designs, which is good, and all of those random sample designs are unbiased, and so this figure shows that zero is no bias, a negative number is a relative bias, by a percentage point, and you can see that most of the stratification schemes were less than 2 percent negative bias, underestimating effort by 2 percent, and so nothing really concerning there.

However, we did find that the higher stratification does give more precise effort estimates, especially at lower sample sizes, and so the dark-blue dots on this figure are kind of mimicking the State Reef Fish Survey stratification design, and the gray dots, on the top, are just sampling the whole state of Florida randomly, without any stratification, and so more stratification is good, not just for precision, but also even lowering the sample size required to get that precision.

Another thing that we wanted to look into is there were -- Some of the peer review concerns were, you know, is that under-coverage adjustment factor really accounting for what you're missing in your mail survey, and so we did a little groundtruth study in the Panhandle of Florida, where we have these four distinct passes that boats have to pass through in order to take a fishing trip into the Gulf of Mexico.

We put human observers out at the point of each of these passes, on randomly-sampled days and time periods, and then used that to come up with an estimate of total boat trips going out those inlets, and then, through our dockside interviews, we were able to discern what percentage of those boats going out the passes were taking a trip specifically to go reef fishing, and so that gave us a separate independent estimate of fishing effort for that specific region of Florida, based on actual

observational data, versus self-reported through the mail survey, and you can see that -- We did it during the two busy summer months, June and July, of 2019.

The blue bars are the effort, the total estimated angler trips from that inlet count survey, and the orange is the Gulf Reef Fish Survey estimate, at the time, specifically for the Panhandle region, and you can see that, in the first month, the inlet count estimate was slightly higher than the GRFS estimate. In the second month, the GRFS estimate was slightly higher than the observational estimate, and so we don't see any directional bias there, and the confidence intervals overlap, and so we feel pretty good that we're getting a reasonably accurate estimate through our Gulf Reef Fish Survey.

On a larger scale, we're attempting to do this on the Atlantic coast of Florida, where we have these very distinct coastal inlets that boats have to pass through to fish in the Atlantic Ocean, and this is a screenshot of a video camera that we had trained on Ponce Inlet, which is near Daytona, and you can see how easy it is to visibly count boats going through this inlet, and so we stationed a video camera on a lifeguard tower there on the beach, that trained it on this inlet, and we've been working with a company called Sea Vision to develop an artificial intelligence algorithm that will help us automatically count these boats for us, so that we don't have to have humans actually reading all of this video, and counting all these boats, and so this has been something that we've been working on since 2022.

There has been a lot of, as you can imagine, logistical challenges with placing video cameras out at these ocean inlets, and the video camera that I told you about on the lifeguard station at Ponce Inlet actually was taken out by a hurricane, not long after that still shot was taken, and we are working, right now, finally to get that camera back up and running, because the lifeguard station -- The stairway got wiped away, and they just rebuilt the stairs, so that we could go up and get the camera, and now we're trying to fix it, and so lots of logistical issues, as you can imagine, with doing this, but it's something that we feel is important, and we're going to give it a good shot again this year, and we're putting the camera back up at Ponce, and we currently have another camera system set up at Mayport, which is the entrance of the St. Johns River.

That's a much larger inlet, and we've had -- That's been an interesting one to work with too, because it's a farther distance and so we've had to experiment with some different cameras, that have different zoom levels, and work with the AI company to train the AI, on that inlet specifically and so we're learning a lot through this, and we're hoping to maybe expand this in the future, but, in order to get some results sooner, rather than trying to expand this to all those inlets on the Atlantic coast, given all the logistical issues we've already run into, we're actually going to hire some additional field staff this year, and put human observers out, to validate effort on those inlets where we don't have cameras trained, and see if we can do a similar estimate like we did in the Panhandle during 2019, and so hopefully we'll have some results to share about that soon. I could pause here, if you want to take any questions before I move on.

DR. BUCKEL: Questions for Bev? Jason.

MR. WALSH: I noticed you were talking about the -- When you were talking about the electronic option, using a QR code, and is there also a link, or is it just a QR code?

MS. SAULS: I believe there was a link, yes, because we had a computer version and a mobile version, and so yes.

MR. WALSH: I just ask because, when I've done surveys like this, in my experience, the link was far more used than the QR code.

MS. SAULS: Really? Okay. I'm 99 percent sure that was the case, yes.

DR. BUCKEL: Jennifer.

DR. SWEENEY-TOOKES: I have a similar question. Somewhere back around slide 28, you had a summary of what you found really worked, and I was so excited, but I was busy listening to you, and not looking at the screen, and I don't see it in our slide deck. Can we see that one again?

MS. SAULS: Really? Oh no. That one?

DR. SWEENEY-TOOKES: That one. Thank you. Ours looks different, and it has improving response rates.

MS. SAULS: I hope that I gave you the right file.

DR. SWEENEY-TOOKES: If it works, I don't want to reinvent this wheel, and I've been playing with this very topic this year, and so thank you.

MS. SAULS: I did modify this slide a bit, after I talked to the folks who ran this test, and so, yes, I think the original presentation that I sent out had a less-clear slide, but the one that's online right now, and I provided this updated slide this morning, and so it's out there.

DR. SWEENEY-TOOKES: Thank you.

DR. BUCKEL: So look in the recent documents for the updated 5b, and is that what it's labeled as, Judd? I'm using the old one too, and I didn't realize.

DR. CURTIS: I will double-check, at lunch, and make sure that this presentation gets copied over as a PDF and that material is up on the website after lunch.

DR. BUCKEL: Thanks, Judd. Thanks for pointing that out, Jennifer. Chris Dumas.

DR. DUMAS: I would just like to commend Beverly, and the program, and all this work to test and validate the survey methodology. I think this is fantastic, and very informative for the committee, and, also, I think this work will be of use to other programs, to try to design surveys in the future, and so this is fantastic. Thank you so much.

MS. SAULS: Thank you. We actually did some research, and a lot of this type of work has been done in other countries, in Australia and New Zealand, and we were like we should be doing this, and so that was kind of where we got our inspiration to do some of this groundtruthing.

DR. DUMAS: As we all know, Florida anglers are special, and so this is great, to have work done here in the U.S., and in that state in particular. Thank you so much.

MS. SAULS: Sure.

DR. BUCKEL: Jason.

MR. WALSH: I had a clarifying question, I think, about the shortened questionnaire having more reef trips, and I think you said that the -- Whether they ask for one month or two months, there was no difference, but there was more reef trips in the shortened questionnaire than the SRFS, and you were thinking that is because there's more zero trips in the SRFS, but there's no real reason why that should be the case, right? I don't understand why that means that there --

MS. SAULS: If you look into what MRIP-FES has been looking into, one of their main conclusions is that, if you don't have good enough bounding, or prompts in there, to really think about when you took those trips, you're very likely to be thinking about a trip outside the period of time that the survey is covering, and so maybe the trip you took was actually three months ago, and not two months ago, and you're going to report that in that number of trips that you took.

DR. BUCKEL: I had a question on this one, too. With the MRIP, it was an ordering, but, here, it's a shortened questionnaire, and I'm just wondering if another possibility is, when they see the SRFS questionnaire, and they see how much -- If they say they took a trip, then they've got to fill out this longer form, and they're like, all right, and so it's a laziness factor, right, and it's like, oh, it's a short form, and I took the trip, and I'm going to say I took it, because I only have to answer three more questions, but, if I say I took a trip on the SRFS questionnaire, that's got the whole calendar, and then it's going to take you longer.

MS. SAULS: I have no idea how to test that, but I can't imagine, if you're that inclined to not report, why would you even fill out the survey? I mean, that takes some effort, to think about, well, how can I lie on this survey, so that I don't have to do as much work.

DR. BUCKEL: Other questions for Bev? Fred Scharf.

DR. SCHARF: Just related to this, so it seems like a second bar plot there, that, if you don't include the calendar, right, you get a better response rate, or at least they're reporting that they took trips, and so what does the -- What's the big advantage of having the calendar, in terms of the information that you get, relative to then just clicking on that just saying they took a trip that month, like the daily -- Was it put in to help them with recall, or is it actually data that you guys used?

MS. SAULS: It was to help them clearly -- It was intended to help them clearly think about the number of trips and when those trips occurred.

DR. BUCKEL: Steve.

DR. TURNER: So you basically have a doubling in the number of trips if you use a simpler form, and what happens if they don't remember what day they took a trip?

MS. SAULS: Our main concern is that they're remembering that it was definitely that month. The specific day of the month doesn't really affect our survey.

DR. TURNER: That calendar-based -- It's not coming off the calendar?

MS. SAULS: I'm sorry?

DR. TURNER: Do they report the total number of trips and then they go to the calendar and --

MS. SAULS: No, and they just report that yes or no I took a trip first. The first question is did you take a trip?

DR. TURNER: So they just say, okay, I took a trip, and that was on the seven trips, but, on the calendar, they can only remember when three of those trips were?

MS. SAULS: No, and the first question is, yes, I did -- No, I did not fish, or, yes, I fished, and we're not asking them, at that point, to think about how many times they fished, but just did you fish.

DR. TURNER: Okay, and so -- All right.

MS. SAULS: Then the calendar is to prompt them to think about how many times did we fish this month, and was it actually the month that we're remembering that we took the --

DR. TURNER: But the axis, on my slide number 37, the one with the bars and probably the previous -- The axis is trips per response, okay?

MS. SAULS: Yes.

DR. TURNER: So you have a doubling in the number of trips between the calendar form and the other forms.

MS. SAULS: For those waves -- During that time of year that we did that survey, and the area that we chose, the --

DR. TURNER: Right, and so you're doubling the number of trips.

MS. SAULS: Yes, and I don't know if I would expand that out to the whole statewide survey.

DR. TURNER: No, and I'm not trying to, but there is a big difference between these two.

MS. SAULS: Yes.

DR. TURNER: You're selecting the calendar-based estimate, and you're saying that's the best estimate, and so my question is why do you think that's the best estimate, other than, well, they filled out a form, and so they started filling out the form, and so they've got to be more accurate, and is there some way to figure out which of those two is more accurate?

MS. SAULS: I think this corroborates what MRIP is finding with their FES survey, that people telescope trips from prior months, unless you prompt them to think about it.

DR. TURNER: Okay.

MS. SAULS: That's my personal conclusion on that.

DR. BUCKEL: Chris.

DR. DUMAS: I have one more comment that I guess is a commendation, and that is the work that you've done to increase your, potentially increase your, response rate from 20 to 30 percent, I mean, that's fantastic, and people might think, oh, you know, 20 to 30 percent, and so what, but that's, you know, increasing your sample size by 50 percent, the number of received responses, and that's fantastic, in terms of the amount of additional information that you're going to get, and so that's great.

DR. BUCKEL: Marcel.

DR. REICHERT: I can't see making this -- Why that would happen, but is there a way for you guys to test whether or not a response from a mail-in survey would be different than when someone does it online?

MS. SAULS: You mean does the way they respond affect their response?

DR. REICHERT: Yes.

MS. SAULS: I don't know how to do that.

DR. REICHERT: Okay, and I --

MS. SAULS: We've tried to keep the questions similar, and like we didn't do a lot of skipped patterns, or simplifications, and the questions are very similar, in the electronic reporting option, to the paper questionnaire.

DR. REICHERT: The only thing I could think of is, if you do it electronically, people may be inclined to answer questions quicker than when you maybe do the mail survey, but, anyway, I was just wondering about that. Thanks.

MS. SAULS: I mean, we could look at the responses that we get from the two different modes, and see if they're reporting the same trips per response, but we only have preliminary data right now, and so we're not there yet, but, yes, we're excited about that.

DR. BUCKEL: All right, Bev.

MS. SAULS: Okay, and so, last, and this will go quicker, I'm going to run through some of the results since we expanded the survey statewide, and so I mentioned before that we had those original species that we included in the Gulf design that were expanded statewide in 2020, and

then we added three new species, in 2020, that are more important to southern Florida, the Atlantic coast, and so I'm going to talk about these species groups separately.

We actually -- We want to maintain continuity in our Gulf coast time series, since the survey started sooner on that side of the coast, and so we treat the original species as one suite of reef fish, and the three new species as a separate suite, and so I'm going to talk about them separately, even though, on the Atlantic coast, we only have three years of data for the original species, and so I'm going to focus on the three most recent years and give you -- Kind of compare and contrast what we're seeing in the Gulf, versus the Atlantic, and compare it to the MRIP and see what we can learn from that.

As I mentioned, we have three full years of accumulated comparisons statewide, and so this is the effort estimates for that original group of species, annual effort estimates, for the Atlantic on the top and the Gulf coast of Florida on the bottom, and, throughout these figures, the blue bar is the State Reef Fish Survey results, or anything blue is State Reef Fish results, and orange is always MRIP, and so I've kept everything consistent through this talk.

One thing you will notice is that there is more fishing effort on the Gulf compared to the Atlantic, which makes sense. There is more coastline, and, as I mentioned earlier, we also know that people who travel to fish usually travel more frequently to the Gulf, versus the Atlantic coast, and so we're confirming that effort is higher on the Gulf side. On the Gulf side, we've been running the survey longer, and we have seen, over time, very consistent patterns between SRFS and MRIP, where the MRIP estimates are two to three-and-a-half-times higher, consistently, across species, across years, and so it's a very consistent relationship, which has allowed us to, you know, come up with a very good calibration method for bringing MRIP estimates down to the SRFS currency for use in stock assessments.

We're seeing a little different -- It's a little different on the Atlantic coast, and you can see the estimates are closer together on the Atlantic coast, which is -- You know, it has been kind of interesting to learn, and think about, and why would the same methodology used on both coasts of Florida produce different results, and so a lot of things to think about there.

One thing you will see is that SRFS -- We estimate about 43 percent of effort on the Atlantic coast and 57 percent on the Gulf, and so about close to a 60/40 split. MRIP has about 29 percent on the Atlantic and 71 percent Gulf, and so more similar to a 70/30 split, and so, thinking about how the two surveys differ, we are directly estimating effort on the Atlantic and the Gulf coasts, whereas the MRIP survey is relying on the APAIS survey to allocate effort between the Gulf and the Atlantic, and so that could be explained, some of the differences in the magnitude change between the two surveys, if they're allocating that effort differently than we are estimating it for the two coasts, and so a lot of good stuff here that we're learning, and stuff to think about.

I've actually been talking to the Office of Science and Technology about some of these emerging trends and what we could do to maybe work together to look further into this, and I'm hoping that, maybe sometime in the near future, we could work with them on testing out an alternative FES-type questionnaire that specifically gets at where people are taking those trips when they're reporting in the FES, to see if maybe there's some different -- If how effort is being allocated between the Gulf and the Atlantic coast is explaining some of these differences, and so it's been

really interesting, and fun, to have side-by-side overlapping surveys in Florida to take a look at all these things.

On the Atlantic coast, this is what the monthly effort looks like, and you can see that, again, the MRIP is the orange, and most of the effort is in the EEZ, which is not surprising, because we only have a three-mile limit in state waters on the Atlantic side, but we do have these big spikes in the MRIP estimates, particularly during the month of July, which also coincides with when that derby fishery for red snapper has been going on in recent years, and so maybe that's causing some volatility in how effort is getting distributed, or not distributed, among the Gulf and Atlantic coasts, but you can see that most months were fairly similar, tracking well, but then sometimes were not, and so that's been interesting to look at and think about too, to try to tease out all of these things.

Now I'm going to look at some of the landings for those species. This is red snapper, and you can see that, in some years, the two surveys have similar estimates. In other years, MRIP has a really big estimate for landings, and I think that's just because of how short that fishery is, that season, and it just -- We'll see it that, in some years, one of the big boat ramps will get selected, and it happens to fall on a day that that season is open, and it really blows up the estimate, and then, in other years, you know, nothing -- None of those big boat ramps get selected, and then we don't see a big blow-up in the MRIP estimate, and so that pulse fishery definitely kind of messes with some of our surveys, when you're trying to survey over a longer timescale and you have a two-day season that blows up the fishing effort during that month.

We do see more consistency in the year-round discard estimates, and you will see though that -- So, in these figures, the dots are the CVs, which are plotted on the secondary axis, and so you can see that the SRFS CVs are, in some cases, a bit lower than the MRIP CVs, which is good, and that was one of the main goals of the specialized survey, was to get more precise estimates.

This is what those monthly discards look like, and so you can see those two peaks in July, but we also see, sometimes, just, in random months -- In 2022, in February, we had a giant estimate, probably related to maybe a high-influence intercept, where somebody reported releasing a lot of red snapper in the month of February, and we don't really believe that that many people are discarding red snapper in the coldest month of the year on the Atlantic coast of Florida, and so these are the kind of things that need to be looked at further. You will see it also caused a peak in our SRFS estimate, but not quite the magnitude that MRIP did.

Looking at some other types of species, with gray triggerfish, you can see that we've really -- For this species in particular, you know, the SRFS estimates are more precise, which is great, and we want to see that. The same with vermilion, another success in reducing those CVs.

Gag grouper, the first thing you will notice is that landings are low for both surveys, and there's not a lot of fish. The CVs aren't great in either survey, and it's probably just because it's rarely encountered in the intercept survey, and so we would really have to increase our intercept sampling efforts, I think, to improve those landings numbers, or at least the CVs on those numbers. The discards, the CVs look a bit better, and that's because I guess people are more frequently discarding them than they are actually catching one that's legal to harvest.

Now we'll take a look at those new species that were added, and these are very Florida-centric species, and also very southern-Florida-centric species, and the hogfish -- There is a bit of a hook-

and-line and spearfish fishery on the Gulf coast, but the mutton and yellowtail snapper are almost exclusively south Florida fisheries, and this is what the effort looks like on the Gulf versus the Atlantic coast for that suite of species.

Again, the estimates on the Atlantic coast are not very different. Two out of the three years, we saw that consistently high estimate on the MRIP scale, and one thing I need to note, on these figures, is the MRIP estimate -- There is no way to discern, in the Keys, between the Gulf and Atlantic coasts, and so all of the Keys are included in the Gulf effort in these figures, whereas the State Reef Fish Survey -- We were intentional about making sure we could separate out fishing effort on the Gulf side, versus the Atlantic side, and so those two -- That split is incorporated in these figures, and so Atlantic effort includes the Atlantic coast of the Keys, and the Gulf effort includes the Gulf coast of the Keys, and so that could explain some of the differences in the Gulf there in 2022 and 2023.

This is what the landings and discards look like for hogfish, and I first want to draw your attention to the CVs on these, and I took some notes off of the MRIP web query tool, and so these are Florida private boat hogfish landings estimates, compared in the Gulf and Atlantic, and so, for these figures, the Atlantic -- In these figures, I plotted the Atlantic on this side of the graph, and the Gulf on this side of the graph, and you can see the CVs are the dots here, but the -- If you look at the MRIP query page, they recommend caution against using any estimates that have a CV above 0.5, and that's a PSE of 50 percent.

They don't support using estimates at that level, and they recommend aggregating at higher levels, and so I just wanted to point that out, when you're looking at this, but, also, I want to point out that the SRFS estimates have been successful at reducing some of the CVs for these species, which is good. Again, for this one, we're just seeing consistently higher estimates on the Gulf side.

This is what mutton snapper looks like, and you can see that it's less frequently caught on the Gulf side, and more frequently caught on the Atlantic, and, again, there are high CVs for this species, that have been reduced, for the most part, through the SRFS survey. This is yellowtail snapper, and, for this one, we get pretty good CVs from both surveys. We have consistently higher effort for estimates on the Gulf, and somewhat more similar on the Atlantic side.

That was everything that I was going to go over on the comparisons of the estimates, and so I just have a few slides left, and Luiz covered a lot of this in his talk, and so I won't go into a lot of detail, but I will point you to SEDAR 72. If you're interested in this calibration method that was used for that SEDAR, there's a Working Paper Number 4 that explains the methodology that was used for that SEDAR, and this just shows you what the calibration looks like when we apply it to the MRIP-FES time series and convert it into SRFS currency.

These data were used in the SEDAR, to replace MRIP landings and discards, and they will be used to track the ACL, starting this year, in the Gulf of Mexico, and so this has been -- You know, this has been the goal right here, is to try and incorporate these more improved datasets into the assessment and management for these species that are so important for Florida, and I think Luiz also mentioned that the methodology that was used to apply the calibration was peer reviewed prior to the SEDAR, but I encourage you all to check out that working paper, if you're interested in the methodologies there.

Luiz already covered this too, and he mentioned that SEDAR 88, the Gulf red grouper, is ongoing right now, is underway, and we are providing SRFS estimates for that species, and that's also a very Florida-dominated, driven, fishery in the Gulf, and so we think that one is also ripe for the use of SRFS data for this SEDAR, and then mutton and yellowtail are coming up fast. If there are any questions, I will direct them to Dustin Addis, but we're working, right now, with -- Since these are considered sort of newer calibration, since we expanded the survey statewide, we're going through a second kind of calibration peer review, to just make sure that everything that we're using to incorporate data, into these two SEDARs in particular, looks good, and is sound.

With that, I really want to acknowledge two of my colleagues, Tiffanie Cross and Chloe Ramsey, who have done a lot of the heavy lifting, especially on some of those side-by-side tests and the results that I was showing you today, and just I really want to shoutout to them, and thank them for all their work on this project, as well as everyone on my team, and, again, just acknowledge the support that we've received through the NOAA Office of Science and Technology, and their statistical consultants, and some of the funding that we received in the early years to pilot test this work, and so, with that, I really thank you all for your long attention.

DR. BUCKEL: Thank you, Bev, for the excellent presentation. We've got questions online, from Alexei first, and then we'll go to others, and then also public comment on this. We know that folks have been waiting patiently in the public, and so we'll get to you, and so first Alexei. Then Marcel.

DR. SHAROV: Thank you, Bev. That was a really exciting and excellent presentation. There's a lot of stuff to think of, and so hopefully we'll have time to scroll through later on, and I'm so proud of Maryland, that, a while ago, we sent you to Florida, and you helped them fix the problem. Anyway, I might have missed sort of the explanation, or maybe I didn't, but clearly your survey estimates were nearly all reef species were substantially lower, or, if you look at the time series that you showed, in the latest slides, there was a clear trend of your estimates being progressively low compared to the MRIP, and is there any working explanation to that?

MS. SAULS: I knew I was going to get that question. Thank you, Alexei, and I miss my colleagues in Maryland, too. Let me go back to that slide and just show you what he's talking about. We have noticed this too, and it's a very interesting trend. Now, think about the timing of this time series, and we saw big increases in license sales during COVID in Florida, which we assume are corresponding to fishing effort as well.

Since COVID, that has started to level-off some, and I did not do a deep dive into this, but I did confirm that that trend is changing since COVID, and so we feel like we are seeing a sort of drop in effort in the SRFS estimates, since 2020, and we feel like that might be related to just effort returning back to some nominal level since that change during the COVID years. I know, personally, I don't have as much time to do the fun things that I got to do outdoors when I wasn't traveling, or doing other things, during the COVID years. Now that life is back to normal, I have less time to do those things, and so I imagine that that translates to fishing as well, and so that's sort of our working theory, right now, on why we're seeing effort stepping down in recent years in the SRFS estimates.

I can't speak to the MRIP estimates, and why they would be doing a different trend, but it's something that I would like to maybe talk about with the Office of Science and Technology about, and see if they have any thoughts.

DR. BUCKEL: Marcel and then Genny.

DR. REICHERT: I had a similar question about COVID, and so asked and answered. Thank you.

DR. BUCKEL: Genny.

DR. NESSLAGE: Thanks. I am still trying to wrap my head around the differences between SRFS and MRIP, and so this slide -- If I look at the difference in the estimate of the number of angler trips, effort, they don't look all that different for the Atlantic, and, personally, I'm not worried about the Gulf. I don't know anything about the Gulf, but, when you go to the next set of slides, for the individual species, MRIP seems to be higher than SRFS, as far as estimating the total landings, and so, if I understand how it all comes together, that would indicate that it's the intercept surveys that are different and not -- Right?

MS. SAULS: So we're calculating this effort for the whole suite of species, and so this is not total private boat effort for even MRIP, and it's the directed effort for reef fish trips, because we wanted to compare apples-to-apples for this, and so, for the State Reef Fish Survey, we're coming up with an effort estimate of private boat trips for reef fish, and so we worked with the Office of Science and Technology, when we developed our estimation code, to do a similar thing for MRIP, and so it's estimating angler trips in the MRIP survey that are targeting, and/or catching, the suite of reef fish species. It's not total trips in the EEZ or state waters for private boats. It's private boats that are targeting, and/or catching. It's directed trips.

UNIDENTIFIED: Just the blue, right?

MS. SAULS: No, the blue and the orange.

DR. DUMAS: Genny, are you saying that effort is similar for SRFS and MRIP, in the Atlantic, but landings are different between SRFS and MRIP in the Atlantic, and so you're saying -- So the difference in landings is likely due to the differences in the intercept surveys, APAIS versus SRFS, rather than differences in the effort estimation, APAIS versus SRFS, and is that what you're saying, Genny?

DR. NESSLAGE: That is what I was asking.

DR. DUMAS: Or asking. Right.

MS. SAULS: So for which species are you interested in, the new species or the original species?

DR. NESSLAGE: They're all reef fish species, right?

MS. SAULS: Yes.

DR. NESSLAGE: It seems like all of the graphs that you showed us, for all the reef fish species, showed that MRIP landings were higher, and is that correct?

MS. SAULS: In the Atlantic? No. This is effort for the original species, targeting all those original species, targeted effort for that original species group, with the Atlantic on top, and the estimates are more similar, if you look at them, compared to the Gulf. This is the landings, and I would ignore red snapper landings for this, because it's so driven by that pulse fishery season, and so let's look at this one.

DR. NESSLAGE: Yes, but we use that for the assessment and the ABC, and so that is a --

MS. SAULS: No, actually, we don't, and the assessment uses our --

DR. BUCKEL: Steve, go ahead.

DR. TURNER: Why is the effort different between the original species and the new species? Effort is effort, and reef fish effort is reef fish effort, or are you actually using targeting in defining effort, targeting, as recorded in your effort sample?

MS. SAULS: Because this was started on the Gulf coast first, for that subset of species, we don't want to interrupt our time series on the Gulf by incorporating directed effort for three additional species that weren't included in the early years, and so we are calculating effort separately for the original targeted species group and the new targeted species group, and that's a caveat. When you design a survey like this, and it's very specific to a group of species, and then you decide that, oh, we should add these species, you've got to -- You know, we had to adapt to all of that, and so that's something for anyone who wants to do this to think hard about, is what species to include in that from the start.

DR. TURNER: I don't know if I clarified or muddied the waters.

DR. BUCKEL: No, I think it clarified, and, just to follow-up on that, so you were talking about the SRFS there, where it's a different group that is targeted, but then that's -- When you did the MRIP, you had to adjust the MRIP numbers, and it's targeted for those original species, or for the new species, and so that's -- It's applied to MRIP.

MS. SAULS: Yes, and they have a whole template program out there for anyone to calculate targeted trips for whatever species they're interested in, and so this isn't developing anything new there. I don't know if I answered Genny's question.

DR. BUCKEL: Genny, did you want to follow-up?

DR. NESSLAGE: I'm still not following. The effort is similar, on slide 57, too for the new species, and so --

MS. SAULS: For the new species?

DR. NESSLAGE: I mean, close enough that I wouldn't be that concerned, and so where is the difference in landings coming from, and that's my question.

MS. SAULS: It could have to do with the way that the Keys are included in the Gulf.

DR. NESSLAGE: I don't care about the Gulf. Just the Atlantic. I mean, I care about the Gulf, but -- I care, but I don't know anything about it.

MS. SAULS: So, if the Atlantic coast of the Keys were included in MRIP's effort estimate for the Atlantic, that would increase their estimate, and these species are very important in the Keys. Does that help at least give you an explanation for why?

DR. SCHARF: Can you just -- You know, if you go back up for not the new species, but the old ones --

MS. SAULS: Just the effort?

DR. SCHARF: Well, so the effort is similar, right, in the Atlantic, but, if you go down to gray triggerfish and vermilion, the landings are higher in the MRIP, in the Atlantic, in both cases, and so where is the difference in the landings coming from, if the effort is basically the same? Is it something different in the intercepts, and so both gag -- Or not gag, but gray triggerfish and vermilion.

MS. SAULS: In what?

DR. SCHARF: The MRIP landings are higher in both cases.

MS. SAULS: Yes.

DR. BUCKEL: While Bev is thinking on that, Steve, go ahead and -- If it's a clarifying --

DR. TURNER: The catch rates are different. The catch rates for MRIP exclude the Keys in the Atlantic, whereas, in the SRFS, the catch rates on the Atlantic side of the Keys are included, and so, if your -- So your denominator is different. Your numerator may or may not be different, but your denominator can be different.

DR. BUCKEL: Genny.

DR. NESSLAGE: Okay. You said the Keys are included in MRIP, but not in SRFS, or the other way around?

DR. TURNER: MRIP, the Keys are all considered Gulf of Mexico. SRFS, the Atlantic side of the highway is Atlantic, and the Gulf side of the highway is Gulf, whereas, in MRFSS, all of the Keys are Gulf, and so the observations you're including in calculating your catch rate are different.

DR. BUCKEL: Genny.

DR. NESSLAGE: If I'm the only one having a hard time with this, just tell me to take it to the break, but so, if the catch rates on the Atlantic then are lower in MRIP, because we're not including the Gulf side of --

MS. SAULS: The effort would also be lower.

DR. NESSLAGE: Then the landings are higher how?

DR. BUCKEL: So all the intercepts in the Keys, that catch rate for Atlantic and Gulf, is put into -- It's in the Gulf, and so then, when you go to SRFS, and you have a catch rate of intercepts that doesn't include any Gulf, and those are Gulf -- Triggerfish is -- So the catch rate is -- I will let Bev weigh-in, but that's what I was interpreting from Steve, but --

MS. SAULS: The effort that is attributed to the Keys, and so MRIP applies -- They use all the intercept data from the Keys to figure out how much effort goes into the Gulf, versus the Atlantic, and all those intercepts in the Keys are considered Gulf trips, and so that gets applied to the Gulf coast of Florida, even though we know that a lot of people fishing in the Keys fish on the Atlantic coast, and so it's incorporating -- It's including more effort on the Gulf side and more catch on the Gulf side.

DR. NESSLAGE: MRIP is?

MS. SAULS: MRIP is.

DR. NESSLAGE: Then why are your SRFS estimates lower than the MRIP estimates for landings? That's still -- I am missing the last -- Then I would think it would be flipped. You are now accounting for the landings properly on the east coast. What am I missing?

MS. SAULS: Yes. No, I hear you. I -- Again, I can't speak for MRIP completely, but, if I had to take a guess, I think it has to do with how the MRIP effort is allocated to the Gulf and the Atlantic coast, based on APAIS data, and so they're allocating a lot more effort than we are to the Atlantic coast. If you go back up here, again, and we have a 60 percent effort in the Gulf, and 40 percent Atlantic, and they have 70/30, and so they're allocating more fishing effort to the Gulf than we are.

DR. CURTIS: Jeff, Vivian has her hand up. Vivian, if it's to that question, go ahead. You're unmuted.

DR. MATTER: Hi. Yes, I just wanted to note that the MRIP estimates are using all of the effort, and not just the directed reef fish effort that's being depicted and compared, and so just making that note, in case, Bev, you think that may help answer the question.

MS. SAULS: Yes, they're allocating all of that effort from the FES survey, based on where the intercepts come from and what those species being targeted are in the APAIS survey, and so all of that effort gets kind of spread out across all those intercepts.

DR. BUCKEL: Jim.

MR. GARTLAND: So I think I might understand. So the effort in that slide, the orange effort, is just reef fish effort for MRIP, correct?

MS. SAULS: Yes.

MR. GARTLAND: But then, if you go to the landings, for let's say the gray triggerfish, those landings are not that effort, and it's all effort, which is a bigger number, multiplied by the catch rate, and so I think that's where the disconnect is. It's not that effort on the orange bar, multiplied by catch rate, equals the landings bar, and it's a different effort, which is all of it, multiplied by the catch rate.

MS. SAULS: Yes, and we're getting way into the weeds of MRIP, and so MRIP has weighted -- Post-stratified sample weights that account for all of that. You take their sample weights, and you add them all for the interviews, or the intercepts, that you're interested in, and, in this case, intercepts that targeted and/or caught reef fish species, and, when you add all those sample weights up, it equals -- It totals up the total amount of effort that was allocated to that specific segment of the fishery.

DR. BUCKEL: Genny.

DR. NESSLAGE: Thank you, Jim. That's making total sense. Then my next question is, if you took the effort on this -- Can MRIP take the reef fish effort and estimate landings, not using -- I mean, I would love to see that, because that could get you out of having to pay for an expensive SRFS survey, if MRIP can be tailored to getting reef fish landings, and is that possible, or am I missing a major problem?

MS. SAULS: Can you repeat that?

DR. NESSLAGE: So is it possible to use this effort to generate MRIP landings, like in the next slide, rather than the total effort, or is that not kosher?

MS. SAULS: I mean, they could take our effort estimate and apply a CPUE to it.

DR. NESSLAGE: So their own effort estimate, the orange bars here, that you had them do that's equivalent to the apples-and-apples, or is there some part of the stratification business that won't work out, and I think Jim is following my logic, and you can say it better.

DR. BUCKEL: Go ahead, Jim.

MR. GARTLAND: What I was going to say was I agree with that, Genny, but that last piece -- If you can't, for some reason, to me, that would, in my mind, say then that MRIP should be calibrated to you all, and not the other way around, right, because I think the Florida one then would be the more appropriate one. It would be the more appropriate number for what we're trying to measure, right, and so then you would want to take MRIP to that, so that you can get the more appropriate scaling, with the advantage of the long time series.

MS. SAULS: That's essentially what we're doing. We're using APAIS data and applying it to our effort estimate.

MR. GARTLAND: Awesome. Cool, but do you see what I'm saying about flipping it?

DR. BUCKEL: Okay. I want to make sure we have time for the public to weigh-in. You had a couple of hands up? Go ahead, Steve, and then we'll go to public comment.

DR. TURNER: So how does all this complexity relate to standardization of long time series that are going to be critical for our stock assessments, especially for species that occur inside and outside of Florida on the Atlantic coast, and so it's just an idea to put out there.

MS. SAULS: Yes, and that's what we're hoping to sort out in this peer review, before the mutton and yellowtail snapper assessments.

DR. TURNER: Who is doing that peer review?

MS. SAULS: I don't think the reviewers have been selected yet for it, and it will be sometime after this month, but soon, when the final 2023 estimates are available.

DR. BUCKEL: Steve, do you want your name added to the list of potential reviewers?

DR. TURNER: Heck, no.

DR. BUCKEL: All right, Judd.

DR. CURTIS: All right. Thank you, all, for the questions. Any members of the public that wish to ask a question, or to provide any public comment, go ahead and raise your hand now, and the chair will call on you. Okay. I'm not seeing any hands from the public. There will be another opportunity, towards the end of the meeting, if you wish to add public comment then. Thanks.

DR. BUCKEL: Okay. We had some hands up online before, and so those have dropped, and so I just wanted to get to them before we broke for lunch, but one last round, for either Alexei, who is online, or members of the SSC here, with questions for Bev. Amy.

DR. SCHUELLER: I just would like to make the comment that, if this sort of gray triggerfish slide, and the vermilion snapper slide, are indeed using two different effort metrics, then they're not really a comparison apples-to-apples, and they're apples-to-oranges, and there might -- Probably there should be a caveat on this slide, because -- I don't know, but I was thinking, myself, that they're like the same metrics, but they're not, and so I would hate to confuse the matter.

MS. SAULS: Yes, and I could have pointed that out better.

DR. SCHUELLER: Just an asterisk or something.

MS. SAULS: I don't know -- I haven't looked to see how important some of those species are in the Keys, and I don't think that they are the lion's share of the landings, like -- Well, I know they're not, but the Panhandle of Florida, in the Gulf, is the dominant area for the triggerfish, and vermilion, and so that's why I really focused on those three new species, because the Keys is very important for those three species, just based on their limited distribution.

DR. SCHUELLER: Yes, and point taken, but I just -- There are so many times that things like this get blown up, and I would hate to see that happen just unnecessarily for some reason, and so caveating it is important.

MS. SAULS: Thank you.

DR. BUCKEL: Other questions? All right. Seeing none, we'll -- It's about noon, and so we'll break here for lunch, and we'll meet back at 1:30. We'll get started back at 1:30. Judd, anything else?

DR. CURTIS: Nothing else. Enjoy your lunch.

DR. BUCKEL: All right. Thanks, everyone.

MS. SAULS: Thank you.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. Welcome back to the April 2024 South Atlantic Fishery Management Council's SSC meeting. We have several presentations that we're going to receive this afternoon, and first up is a presentation from Dave Gloeckner, from the Southeast Fisheries Science Center, on an evaluation of commercial discard logbook data. If you recall, the logbook data -- If you look at the time series, there's been an increase in the percentage of trips with no discards, and that's concerning to us and the council, and the council asked for a deeper dive, and Dave is going to provide that analysis today, and so, Dave, you're on. The floor is yours.

EVALUATION OF COMMERCIAL DISCARD LOGBOOK DATA

DR. GLOECKNER: Thanks for having us. I'm Dave Gloeckner, and I'm the Director of the Fisheries Statistics Division at the center, and so basically any of the fishery-dependent data collection systems at the center are in my division. As such, I'll be giving this presentation, prepared by my staff, and as well as staff from the Sustainable Fisheries Division as well.

I think the high points here is, for the discard logbook, there is very little validation and accountability for that data, and logbook reporting compliance is not affected by discard reporting, and so we're not holding them out of compliance if they didn't submit a discard report, and so we may need to investigate how we correct that.

Self-selection is in submitted discard logbooks, and so submission of discard logbooks by those that don't have to -- That creates an issue, and approximately 15 percent vessels of the keep reporting, even though they aren't selected and aren't in the sample frame, and then we have limited observer coverage for comparisons, over most of the course of this data collection, and so we have limited usable data, and it's a 20 percent subsample of permitted vessels, and there is a zero discard reporting rate, and so I didn't have any discards, and that rate has been increasing over time, and, in 2023, we had a peak at 72 percent reports claiming no discard interactions in the South Atlantic.

As we can see, over time, this rate is increasing, starting at 2000 and up to 2023, and that varies depending on what kind of gear we're talking about, and, in general, we're up around 60 to 70 percent, and we've been increasing to over 80 percent, with a real difference for pots and traps,

that seem to be reporting more reliably, and we need to investigate why that is, but that's for future investigation.

We did have funds for implementing some limited observer coverage, starting in 2018, and through 2023, and so we did have observer data that we could compare to those rates we were receiving from the discard logbook program. What we find is those rates of no discards were much, much less for the observer coverage, of the observer-covered trips, and so what we see is somewhere around 20 percent claiming -- You know, identifying that there were no discards on a trip, versus what we're seeing in the logbook, which is, like I said, up around 80 percent, and so not a lot of data to look at, and it's pretty sparse.

The conclusions that we came to was, owing to the lack of a historical validation survey to verify the no-discard trips, and with that increase in no-discard reports through time, we do not recommend using the discard logbook data for discard estimates, and so, without a representative validation survey, there is no effective means of measuring or adjusting for the bias. Observer data, since 2018, indicates, as I said, higher discard rates compared to the discard logbook data, and current coverage rates are still low enough that it may limit our ability to make discard estimates, across all levels of stratification in which South Atlantic fisheries operate, and so across all gears, across all areas, and increased observer coverage. Through increased funding, of course, it could allow for more representative sampling, spatially and temporally, and possibly resolve this.

It's pretty straightforward, and we didn't have a lot of slides, but, essentially, we've come to a point where what we told the councils, in 1999, was we thought this was a poor way to collect discard estimates, and now we're back to say it was a poor way to collect discard estimates, and so I guess that's the end of the slide show that my staff produced, and so any questions or comments?

DR. BUCKEL: Thanks, Dave. I appreciate it. Thank you for the presentation, and I just wanted to point out, to folks, that, in addition to the PowerPoint, and that's Attachment 6a, there is also the white paper, that is Attachment 6b, and so questions for Dave? Jennifer.

DR. SWEENEY-TOOKES: Do you have any suggestions for alternatives?

DR. GLOECKNER: We haven't investigated that, and I think Erik Williams is better situated to answer that.

DR. BUCKEL: And Erik is here, and he's coming to the table.

DR. WILLIAMS: Thank you. What we will have to do is fall back to simpler methods. The observer data may be useful enough, even with the small window of time, to at least get estimates of like a ratio of discards to catch, and then you can carry that back in time, or discards per unit effort, such as trips, and then we might be able to use the coastal logbook, which is still a good source of information, and use the estimated number of trips from that and apply basically observer -- Single-point observer estimates, is really what it boils down to, and hopefully though, as Dave points out in his very last bullet point, what this points to is really what we need is increased observer coverage, and that's going to buy us a lot more, especially as you can get more years of

data and start to, you know, infer time series trends, and things like that, from observer data, and that's critical.

DR. BUCKEL: Thanks, Erik. Genny.

DR. NESSLAGE: Thanks. I was looking at Figure 1 of the report itself, and I was wondering what happened in 2007 and 2008, to suddenly increase the actual number of reports, and if that has any impact on what you've been looking at.

DR. GLOECKNER: Well, to increase the number of reports, and --

DR. NESSLAGE: Was there some kind of required reporting suddenly in that year? I didn't see, in the text, an explanation.

DR. GLOECKNER: Let me see if I can phone a friend. All right, and so there was an increase in the number of reports coming in, and so a little bit better compliance with just reporting, and submitting a report, but we still had zeroes, a lot of zeroes, being reported.

DR. NESSLAGE: I guess what we're trying to figure out is like were those potentially -- Were those folks who were suddenly forced to report, and, therefore, they just were like, whatever, I'm just not going to put any data in here, and so it's garbage, or were like the earlier reports -- Because you don't show it going -- Do you show it going back to 2002? Yes, you do, and it has been slowly creeping up, but I don't know, and it seemed odd, and I'm just wondering why there was a sudden -- I mean, that's a big difference between --

DR. GLOECKNER: I think a lot of this is process, and so, you know, it made it easier to match up the discard logbook reports to the actual logbook reports over time, and we got a better process in place, so that we could do that, and I think that's an artifact here, and is responsible for some of this, but compliance got better, and, you know, we do hold people out of compliance if they don't submit a logbook, and I think, as we go through implementation, we notice that, over time, we do get better compliance, as we start holding people out of compliance, although it's uncertain as to whether that carried through the discard logbook program, but it appears to be that way.

DR. BUCKEL: Steve and then Jennifer.

DR. TURNER: I was in charge of the logbook program at that point, and it -- I certainly don't remember much from sixteen years ago, but it could be, and I started in maybe 2005, or 2006, in that program, and it could be that we started mailing out compliance letters, and, prior to that, it may have been that there was no effort to try to increase compliance. I don't know if I'm correct, and I have a feeling that we may have done something like that.

DR. GLOECKNER: That's something that we can investigate, yes. Thanks, Steve.

DR. BUCKEL: Thanks, Steve and Dave. Jennifer.

DR. SWEENEY-TOOKES: I was actually going to ask a question along those lines, if we had seen some sort of a management measure go into effect at that point, and I feel like I'm stating the obvious, and so forgive me, but, in all of our interviews with fishers across the whole region this

year, there's definitely a sense that people are going to report zeroes, period. There is a fear that more accurate reporting will lead to new regulations, new measures, and so I'm not surprised to see this, and I hope nobody else is either.

DR. BUCKEL: Thanks, Jennifer. Other questions for Dave? Anybody online, Judd?

DR. CURTIS: No.

DR. BUCKEL: So our action item, if there's no other questions for Dave, our action item for Number 6, Agenda Item Number 6, is evaluate the findings of the commercial logbook data and discuss the implications for commercial data streams in stock assessments. I think what I've heard is do not us as-is, and Erik had recommendations on some potential ways that the analysts would take that data, along with the observer data, to create a commercial discard stream, and then the other comment that Erik -- That was on Dave's report, on the conclusion slide, and Erik reiterated, was the need for more -- You know, the funding to have observers, increased observers, or an observer program to get the discard data, commercial discard data, and others chime-in with other points you would like to make here. Jason.

MR. WALSH: So it looked like the coverage was super low, like 1 percent, or 3 percent, or something, and what is a realistic and lofty goal of coverage? Do you have a sense of something we could even shoot for, or bring to the council?

DR. BUCKEL: Good question. Does anyone have experience on what that percent coverage should look like? Jim. Jim is going to defer to Erik first. Erik Williams, back at the table. Thanks, Erik.

DR. WILLIAMS: Thanks. That's always a tough one. You know, a lot of places have always considered 5 percent to be like a bare, bare minimum. I mean, it's, obviously, dependent on, you know, how diverse your fisheries are, and that is certainly a factor, and we have fairly diverse fisheries, in terms of species caught too, and so, I mean, if you think of -- I know we have largely hook gear throughout the region, but think about how different the species complex is, even by latitude, and, you know, that complicates things, and so, when you're trying to get discard estimates for single species, it -- You know, you're really whittling down your sampling size quite a bit, in some cases, and so 5 percent is the absolute bare minimum. Just to put it in context, you know, of course, this is the Bering Sea, and they have 100 percent coverage.

DR. BUCKEL: Jim.

MR. GARTLAND: So I was thinking, and since it is a multispecies fishery, and we don't really know what a good target would be, is it worth looking at like in the Northeast, what they use for Northeast groundfish, since that's a mixed-stock fishery as well, and, you know, maybe use that as an upper bound, and, you know, as we said, if we're shooting for the moon here, maybe some number like that, but assuming we'll probably have a lower number, given costs.

DR. BUCKEL: That sounds reasonable. Do you know that number, Jim, offhand?

MR. GARTLAND: No, and I'm mostly fishery-independent.

DR. BUCKEL: Thanks. Anybody? I'm looking at Fred Serchuk. He's spent some time in that area.

DR. SERCHUK: I know nothing.

DR. BUCKEL: We know that's not true. Anything else that we want to provide here? Erik, you had provided some potential ways forward, and the details on that I don't -- I didn't write those down, and I don't know if we need to -- It may be good to have those on the record, if you could provide those again, and I think it was -- We've got the period of time where there's observer information, and the logbook reports, and there is that difference, but then you also talked about that observer data, like discards per landings, I think, the ratio.

DR. WILLIAMS: Yes, and so you will have to resort to what you can draw from the limited observer coverage, which is really limited to probably just a couple of years in the 2020s, where we had reasonable sample sizes, and work with ratios that you can pull out of that, and one of the classic ratios is just discards per unit catch, and so just ratio of discards to catch, and the other is ratio of discards to effort, and that could be trips, or whatever level of effort you're able to compute, from the discards, but then you need to be able to apply it to the coastal logbook, to sort of develop the time series, because recognize the observer coverage is really only in the most recent years. Where we will run into challenges is, of course, if we've had radical changes in regulations that would have increased, or decreased, discards quite a bit from what they are now, and I don't have an answer for that one.

DR. BUCKEL: Thanks, Erik. It's good to have that information on the record. Chris.

DR. DUMAS: Would it be useful to use the observer data to estimate the variance of discards, and use that to like make a chart that would show, depending on the number of observer trips you have, what the PSE would be on the estimate, to show like, you know, what the increased precision would be to spend additional budget to put additional observers on the boats?

DR. WILLIAMS: Yes, and excellent point, Chris. That observer coverage can get us some variance estimates, which can be used in sort of a power analysis, but, also, it will be useful for our MCBE process that we use for our assessments, so we can actually fold all of that uncertainty into the assessment and account for it.

DR. BUCKEL: Thanks, Chris and Eric. Other questions, or comments, to flesh out our action item here? Genny.

DR. NESSLAGE: Erik keeps walking away from the table. Stay put. So what do we -- What do you -- I know you've thought about this, and what is going to happen for the next few -- Or any of the future assessments, if we can't go backwards in time to those pre-regulation changes that might have happened for certain fisheries and reconstruct the historical time series, and do we assume it was zero, and then, suddenly, when we have a decent way to get at the estimates, assume a more reasonable discard estimate, and just be like, yes, we know it's a problem, but we can't make up numbers, and is that the plan, or do you have something more creative in your toolbox?

DR. WILLIAMS: Yes, there's creativity that can come in, and it reminds me of the heady days of 1999, when I was on the groundfish management team on the west coast, and one of our folks that

was on the team used to wear a shirt all the time that just said “ratios”, and so I will hammer that point home, that we’ll just start doing ratios upon ratios upon ratios.

An example of that would be we’ll take say the ratio that we get from the discards, and we’ll apply that to the logbook, and then we can look at the ratio of say selected fish from a -- Let’s say a minimum size limit goes into place, or is taken out, and we’ll look at the ratio of before and after from the assessment, and we’ll use that ratio and apply it to the discards, et cetera, et cetera, and so we can start to do ratios on ratios. At some point, you do reach a point, a breaking point, and I don’t know where that will be, and we’ll know it when we get there.

DR. BUCKEL: Erik, I’m not familiar with the data, but, if you could do a deep dive, and I guess it would be confidentiality issues, but, if you had commercial fishers that you knew, and like these are -- We don’t see increasing zeroes, and, you know, they’ve been consistently providing good discard data through time, but is there a way to pull out the -- That type of data?

DR. WILLIAMS: That’s one we haven't -- I don’t know that we’ve looked at with the observer data, and then comparing to the logbook. We’ve done that with the headboat survey, where we’ve seen like the sort of core vessels, that seem to have consistent reporting, and, yes, there is -- Again, your chances of getting that right mix of having observer conformation of what they’re reporting is good, and then you look at their time series, and they have reported consistently the whole time, and that is the combo you would want to have, and I don’t know, given the small sample sizes, how many of those incidents you’re actually going to have.

DR. BUCKEL: Thank you. Steve Turner and then Christina and then Chris.

DR. TURNER: I assume that commercial discards are a bit important, in terms of the stock assessments, in terms of quantity, and so I’m worried about giving up on a dataset before we have something to replace it with, and so I’ve thought about your idea that perhaps these 15 percent of vessels, or whatever it is that are actually reporting, might be used, even though they’re self-selected, some of them, and they’re self-selected in that they’re reporting, and the other guys aren’t, and I have wondered about, you know, using something like them as a core series, and have two strata for observer sampling, so you could verify that group, and then work another group, and I’m a little hesitant to give up -- You might even be able to use that sort of approach, back in time, with the ratios, and I’m a little hesitant to give up completely. We might have to, but, given all the changes that occurred in management, some of that might be reflected in the core people.

You could even do something like send a survey out and find out who is willing to accurately report, and that might tell you they’re accurately giving zeroes, and then you still have a problem, but you might be able to find creative ways to do something more than just simply ratios, when you have all sorts of different things like environmental factors and changes in recruitment, let alone changes in fishing and regulations impacting it, and so I’m concerned, and, obviously, I don’t have a great solution, and the center hasn’t had a great solution for a long time, and so maybe we can come up with something.

DR. BUCKEL: Thanks, Steve. Christina.

DR. PACKAGE-WARD: I was just going to say that we did a lot of environmental justice and equity work over the summer, gathering stakeholder input, and one thing that we heard is that folks

don't understand what these things are for, and why they're important, and, if we did a better job of explaining that, maybe they might respond, and so I don't know if that might be something to consider, but like what was -- It was basically like with all things that we're sending out to the fisheries, which is something to consider.

DR. BUCKEL: Yes. Thanks, Christina. Good points. Chris.

DR. DUMAS: Are there any types of things that could be used for rewards, or penalties, to try to incentivize truthful reporting? Is there anything that's allowed? We could always suggest candy, and that's always a good option, but are there any degrees of freedom to pay rewards for truthful rewarding, or penalty or change, permit fees, or license fees, or is there any kind of -- Or tie quota to truthful reporting, more truthful reporting, and you get more quota share, and I'm not --

Just leave aside for how that would be done, but there's a whole field of economics called incentive mechanism design that is all about trying to get truthful revelation of hidden information, and so I'm trying to -- I'm thinking about those tools, and how to use those, and they use rewards, and penalties, in different ways, to try to get truthful revelation of information, and so that's what I'm asking, is are there things that could be used to reward, a discount on a fee, or a permit, or probability of being observed, of having to take an observer, depends on the truthfulness of your reporting? Thank you.

DR. BUCKEL: Thanks, Chris. Erik Williams, to that point?

DR. WILLIAMS: I don't know if this really helps, and that's an interesting idea, but, just for a little history note, the headboat survey, when it was set up, they originally paid per logbook submitted, and I can't remember what they were paying the captains to submit, and I don't know if that increased truthfulness of not, but it certainly helped get that program off the ground, so to speak, and get folks reporting.

DR. BUCKEL: Thanks, Chris and Erik. Dave, go ahead. I see your hand is up online.

DR. GLOECKNER: I think the issue here is we still have no way to determine if somebody is reporting truthfully, and so that inhibits our ability to reward people for that truthful reporting. Now, I think what Steve described sounds more to me like a study fleet, and we have been tossing around some ideas regarding electronic monitoring of study fleets, and so, you know, maybe a select number of vessels that are okay with having an electronic monitoring device onboard the boat, and are okay with making sure that they discard in front of that camera.

That may be a way to, you know, improve our information on discards, and HMS actually had a question that was interesting to me, and they asked me, you know, how much video review of the vessels with EM onboard would incentivize accurate reporting on their logbooks, and so there may be some other things that we can do. You know, if we do something like with EM, then, maybe if we get accurate reports, maybe we can offer less review of the EM data, and so there are some things we have been talking about that may improve the information we get, but we also have to consider how willing is industry to do some of this.

You know, for a study fleet, you probably would need an exempted fishing permit, and my understanding is that those vessels would have to have no violations, and, discussing this with

some of the folks that are kind of carrying out some of this work, that's been difficult to do, to find vessels without violations that are willing to do this, and so there are still some hurdles. Thanks.

DR. BUCKEL: Thank you, Dave. Excellent points. Marcel.

DR. REICHERT: A quick question. Please remind me. Fish used for bait, is that a discard category, or is a discard is a discard?

DR. GLOECKNER: It's a discard, and so it's a removal not landed, and so that goes into the discard category.

DR. REICHERT: Okay. I was thinking some may consider discarded fish the ones you throw overboard, and the ones that you cut up for bait may not be considered discards, but that's just an off-the-wall thought. Anyway, thanks.

DR. BUCKEL: Chris.

DR. DUMAS: I would just like to say, again, that the whole point of mechanism design is that it gets people to reveal truthfully the hidden information, and so you set up a policy structure, a regulatory structure, where it's optimal for the individuals involved to reveal the truth about the behavior you're trying to learn about, and so, if you're interested, just go to Wikipedia and look at "mechanism design" in Wikipedia, and it will tell you a lot more about it, and it could be useful in a lot of other situations involving regulation.

DR. BUCKEL: Thanks, Chris. Fred Scharf.

DR. SCHARF: Judd, are you able to bring up the white paper on the screen? Then, if you scroll down a little bit, and that figure right there, and so, you know, on the top, those are fishermen that reported, you know, six or more trips per year, and, on the bottom, it's folks that were less than six, and so five or less trips per year, and so you see this really big increase in the number of trips that had no discards being reported in that bottom group of folks that didn't take very many trips, and so I just wondered -- I was going to ask Dave if the increase overall, in the percentage of trips being reported with zero catch, is largely being driven by fishermen that just report very few trips overall, and I just --

If that's true, I wonder if the folks that are fishing more, up at the top, where you see a little bit of that in that top panel, but it's much more subtle, and there's a lot more trips that are mixed. In other words, out of all the trips, they -- Some of them reported no discards, but, on trips they did have discards, and then, in the green, it's every trip they reported had some discards, but I wonder if that's a more accurate reflection of discards, and I just wonder if there's a relationship between, you know, the number of trips they actually include in their logbook and the proportion of those trips that have some discards, and if that could be useful in any way, as opposed to what's going on in the bottom panel.

DR. GLOECKNER: I'm going to say that would be an interesting analysis to look at. I can't tell -- I don't know that we can tell, just from these, whether that -- Whether those vessels with a limited number of trips would drive that increase, but we can look at that. Thanks, and that's something that we'll be interested to see.

DR. BUCKEL: Thanks, Fred, and thanks, Dave, for looking into that. Steve.

DR. TURNER: I would also be concerned that the discard behavior between the two groups might be different, because the people who fish less might fish differently.

DR. BUCKEL: Thanks, Steve. Other questions for Dave, or other comments, or text, that you want to get into the action item that is in blue on the screen, and I'll have you take a look at that and see if there's anything that's missing from what Judd has, or if you would like to -- Anne and then Genny.

MS. MARKWITH: I don't know if this is a question that Erik needs to answer or -- Sorry. Sorry, Erik, but, when it comes to -- I just don't know enough about the South Atlantic observer program, but, if we're recommending -- This kind of gets, I guess, to the incentivization of things, but is there any -- If they choose not to carry an observer, is there any ding against them at all, or is it just a voluntary thing that they carry an observer with them? Like I just don't know how the South Atlantic -- How it works in the South Atlantic. Like do they have to call in, and then are required to carry somebody, or like how are we going to get this increased observer coverage?

DR. BUCKEL: Dave, do you want to take that one?

DR. GLOECKNER: It's mandatory. If they're selected for an observer, they're taking one, and I think the compliance is by quarter, and so they're selected for a quarter, and they will have to take an observer that quarter. If not, they're taking a ding on compliance, and they're out of compliance, and they will probably get a visit from a law enforcement officer.

DR. BUCKEL: Thanks, Dave. Chip.

DR. COLLIER: Just to point out that the requirements of a discard logbook -- It's not in an amendment, and the South Atlantic Council just requires trying to follow the ACCSP module for bycatch, and so it's pretty general in that, providing some recommendations on what could be used for estimating discards.

DR. BUCKEL: Thank you, Chip. Kai.

DR. LORENZEN: I just wanted to make a plug here for the electronic monitoring. It's mentioned there, but it's a small point, and I think it should be a bigger point, because I think there's some very, very good experience with electronic monitoring now, with cameras on commercial vessels certainly, in the Gulf, and I think, you know, that avoids the cost of having to take an observer, and so on, and it's quite reliable, and I think it's difficult to think of good incentives for people to report, you know, discards, truthfully and fully, but, you know, taking the camera basically means that you are getting reliable information, and so I think that should be a bigger point.

DR. BUCKEL: Good, and we don't have the incentive on that Chris brought up, and so I think the incentive could be to carry the camera, right, and, I mean, that could be made mandatory, but there also could be incentive. There is some incentive provided if you are willing to test the electronic reporting or use the electronic -- Or the cameras. All right. Amy and then Steve.

DR. SCHUELLER: So I think, in the first bullet, we should say the SSC recommends not using commercial discard -- I think we should make a statement that says not directly using it as a discard time series, but I think we did talk about a couple of ways in which we might be able to use it to inform what to do, and so I think we should be more specific about looking into the data further, in an exploratory way, and it might do things like inform the minimum amount of discards that we would ever allow, using some other method, maybe, if we think there's underreporting, or, as sort of Steve brought up already, and like maybe using certain fisher persons that maybe reported routinely, and that might give a better idea to help bound, or give some uncertainty, to the discards time series, and so I think that there is a possibility of some usefulness, but not as a direct time series of discards.

DR. BUCKEL: Good point, Amy. Judd has corrected that first sentence. Good catch, because, below, we talked about how we would use some of that data, just as a way to correct for some of the issues. Steve.

DR. TURNER: Very similar, and just perhaps the SEFSC recommends not using commercial logbook data as currently configured, as a direct time series. All right. Good questions for Dave, and good discussion on this topic, and I think that's a good record to address that Action Item 6.5. I don't see any hands, and so I think we'll move on to Agenda Item Number 7, which is the Southeast Fisheries Science Center's Precision Threshold Workgroup, and we're going to receive a -- There is Attachment 7, for the presentation, and --

DR. CURTIS: Do you want public comment?

DR. BUCKEL: Yes, we do want public comment. Sorry. Thanks, Chip, and so I failed to remember the public comment on the commercial logbook, and so, if there's public comment, please raise your hand, if you're on the webinar, and we'll give you a chance to provide that input.

DR. CURTIS: I am not seeing any hands raised.

DR. BUCKEL: All right. Thanks, Judd, and so now we'll move on to Agenda Item Number 7, and that presentation is going to be given to us by Dr. Vivian Matter, who is online. Judd has got your slide deck up, Vivian, and so whenever you're ready.

SEFSC PRECISION THRESHOLD WORKGROUP

DR. MATTER: Good afternoon. This will be a short update on the progress for this Southeast Fisheries Science Center and Office of Science and Technology joint workgroup to look at the precision threshold for MRIP estimates, and so, as a reminder, this group was convened to discuss the highly-imprecise estimate scenarios that were impacting stock assessments, and it was initiated last year, and we've been able to meet a few times, and give I think just one other update to this body, last fall, and so this is just a refresh of where we were and where we're going

Some of those initial questions that we asked ourselves, and why we decided to form this group, was, you know, we were trying to come up with alternative estimation methods that were viable and could be used consistent when that precision threshold, which is basically an estimate with a percent standard error at or above 50, and, when that threshold is exceeded, what are some

alternatives we can look at, and, furthermore, how could those methods be used in a standardized way across the Southeast region, to avoid inconsistency in application, unless there is a specific scientific justification for that.

The other thing we had in mind is maintaining consistency as well, not only amongst the stock assessments in the region, but also what are the estimates -- How are the estimates being used in stock assessment, and how are those also impacting management, and so quota monitoring, and so that's just a recap of the initiation of this workgroup last year.

This slide summarizes our initial meetings, and so we did hold that scoping call last July, and, you know, we explored those different assessment scenarios, where we did have those high PSEs, and they occurred sometimes throughout the entire time series, sometimes at the beginning, and sometimes at the end, and we basically planned, at that point, for, you know, what did we want the group to do.

I will note here that, you know, that precision threshold analysis doesn't necessarily exclude high estimates that are often scrutinized in stock assessments, and so we're specifically talking about -- We're not talking about outliers, or high estimates, necessarily, that you see, in the time series, which is what people naturally kind of look at, when they're looking at these data, but it does -- We are tackling just the imprecision of some of those.

We held two workshops in the fall, and I think these two workshops occurred after our last update to you all, and they were October 30 and November 6, and, at that point, we reviewed past data use decisions that could inform the group's work, and, generally, the outcome of that, you know, meta-analysis, of all the times, in the stock assessment, where estimates were adjusted -- Most of the time, they were, as I said, because the estimates may have been high, or they seemed like out of place, or not in trend, and so we got some stuff out of there, and we were able to get some idea of what are some smoothing techniques, for example, that have been used in the past.

We further examined different alternative estimation methods and how do those alternatives impact the precision of some of these species, and we looked at example species from both regions, and, at the South Atlantic, we looked at snowy grouper, scamp, tilefish, blueline, red grouper, and red porgy, and some other obvious different species in the Gulf of Mexico, and we were also looking at exploring how the MRIP public use datasets could be used to produce alternative estimates, because, you know, we were trying to get ahead of thinking that, you know, if we come up with a preferred alternative approach, how could we operationalize that, because you have estimates that are available on the website from OST, and you also have these public-use datasets that are used by the public, with different canned programs from OST, to do different things, for example looking at domain estimations and things like that.

The public-use datasets really give the user the ability to produce alternative estimates, and we were starting to think about some of these estimation approaches could be also done, in some fashion, off the public-use datasets.

We held another meeting early this year, at the end of February, and, at that point, we were evaluating the performance of some of these alternative estimation approaches, and I listed three here that we looked at, and it was the APAIS trip subsampling approach, subsampling estimation domains, and also the simulation approach, and so I don't have, on this slide, a lot of detail about

these different thing, but I just wanted to mention that these were some of the things that the group was working on, and John Foster, at OST, worked with Erik Williams, from the Science Center, to kind of do those analyses and present those results to the group.

We also continue to plan for future work, because, at each step, we're basically doing what's next, what can we look at, look at that, see how that informs our progress, and, obviously, we're really -- We're a diverse group, from different offices, and we're trying to find time to get this work done in a systematic way, and so some of that future work that we talked about in February -- We're to continue working on those approaches, and, you know, we don't have -- We don't have anything yet to present on those results, and there are still other questions that were raised, and that we want to take a look at, and some of those are listed here in these turquoise boxes.

Some of them was to resolve the bias in subsampling and the estimation domain approach, considering some of the resampling alternatives. We're trying to look at increasing the realism in the simulation approach and determine data-driven metrics to inform decision-making, you know, to know which method should be applied, and so there's a lot of work that still needs to be done to kind of get at a solid outcome.

We're also -- Longer-term, OST is looking at small-area estimation, and, finally, of course, we are not forgetting that, you know, we do need to document, you know, the final recommendations and to distribute that information to our key data users, and we're most likely going to be putting together some form of white paper to walk through all of the different investigations that we did and final recommendations. I think our next meeting is scheduled for some time in the summer, and I would have to double-check, but that's our progress update for the precision workgroup.

DR. BUCKEL: Thank you very much, Vivian. Are there questions for Vivian on the presentation? Chris.

DR. DUMAS: Thanks for a great presentation. In your review of methods that could be used, did you guys have a chance to look at the National Academies report on data and management strategies for recreational fisheries with annual catch limits? There were some PSE-reducing methods described in the appendices of that report, Appendices A, B, and C, that could be useful.

DR. MATTER: I definitely know the report you're referring to, and I can't remember if those -- If that specific appendix was brought to the attention of the group, but it's definitely something that I will make sure to bring back to the group. Thank you for that.

DR. DUMAS: Sure, and there's three appendices, A, B, and C.

DR. MATTER: Okay. Great. Thank you.

DR. BUCKEL: Thank you, Chris. Others? Chris again.

DR. DUMAS: Another question, and so, from your initial work, have you guys identified any methods that could reduce PSE, and some estimates of how much PSE might be reduced, on average, or for a typical case, and just any sort of initial results of some methods that might be useful?

DR. MATTER: I don't think that we are yet ready to give any initial results, but I will defer to Erik, because he was working closer with John Foster on these, at the February workshop.

DR. DUMAS: Great. Thanks.

DR. BUCKEL: Thank you, Chris. Others? Fred Scharf.

DR. SCHARF: So, Vivian, in the third slide, you mentioned this exploring how public-use datasets can be used to maybe produce some alternative estimates, and can you just provide maybe some examples of what you mean by public-use datasets?

DR. MATTER: Sure, and so OST publicly -- On their website, they have -- The nomenclature they use are the public-use datasets, and so those are the microdata that are a part of the APAIS survey, and so there's three different intercept data types, and so size, catch, and trip, I believe, and so those are the data from APAIS, and from their surveys, that can be used to generate estimates.

They have the weightings in there, and they have some canned programs that you can generate your own estimates, and so, by tweaking that program, you can potentially, you know, put in some rules for a different filtering, or different stratifications, that you could generate estimates at different levels, and so, if you're talking about reducing the PSE -- You know, if you want to collapse some more strata from the typical standard approach, then that could be done in those publicly-available programs and files.

DR. SCHARF: Okay. Thank you.

DR. BUCKEL: Thank you, Fred. Others? I am not seeing any other hands, Vivian, and we don't have any action items for this item, and it was for informational purposes only, and so last chance for questions for Vivian. All right. Thanks again for the presentation, Vivian, and we look forward to hearing what your group finds out in the summer meeting. We look forward to the next report from you. Thank you.

DR. MATTER: You're welcome. Thank you.

DR. BUCKEL: Okay. The next agenda item is -- Marcel. Oh, the public comment. Maybe I will learn by the last agenda item, and so, if any of the public has a comment on that item, raise your hand, and Judd will let us know. All right. No hands raised from the public, and so now we can move on to Agenda Item Number 8, which is the SERFS 2023 Trends Report, and this is the SERFS with an "E", not to be confused with the State Reef Fish SRFS. All right, and our presentation is from Dr. Tracey Smart, and I will point you to Attachment 8, and Judd is pulling that up now. Everyone should see the first slide, and, Tracey, take it away.

SERFS 2023 TRENDS REPORT

DR. SMART: Hi. Thank you all for having us today, and we're really happy to give this presentation. We've done it in the past, and we've added some information this year that we haven't had for the SSC prior, but it was some things that we had added for the council meeting

last year, and so we're continuing that forward, and so I just want to acknowledge by coauthors, several folks at the South Carolina Department of Natural Resources that work with the programs, as well as the folks with SEFIS and the Southeast Fisheries Science Center that helped out with data collection and data analysis as well.

I'm going to talk about two different surveys today, and both of them are regional fishery-independent surveys in the South Atlantic, the Southeast Reef Fish Survey, or SERFS, which the full time series is 1990 through present, but we've been known by this acronym since about 2010, or 2011, and, prior, it was the MARMAP survey, if folks have heard that one before, and we all tend to slip us as well, and then I will talk about our coastal trawl survey, and so I'll cover some information about the survey designs, our 2023 activities, and then get into some details on abundance, length, and/or distribution, for some selected species that are under the jurisdiction of the South Atlantic Fishery Management Council, and under federal jurisdiction, and then I will talk, very briefly, about some of our 2024 planned activities.

All right. Before I start, I just want to get some caveats out of the way. This is definitely not an update of stock status, and this is only one data stream that goes into many of our assessments in this region, and, additionally, some of the constraints, stratification units, and models that we're presenting here today may be different from those that have been used in stock assessments, in particular SEDAR, and sometimes that's just because, you know, they were used in slightly different ways, or, also, for some of these species, they actually have not been reviewed, or assessed, yet, and so we don't even have a framework to start from, and so we're making the best decisions based on the survey designs.

Our version of SERFS, the Southeast Reef Fish Survey, as I mentioned, it is a collaborative effort that became so starting in 2010, and the chevron trap, that I will talk about, is our primary gear, and that began being used by the MARMAP program back in 1990, in a standardized way, and then SEAMAP South Atlantic and SEFIS joined in on these efforts, starting in 2009 and 2010, and then it became the bigger, collaborative, more expanded effort, and so those are the acronyms, for folks that are brand new or if I slip up at any time today.

Those are the three vessels that we primarily use, the Palmetto, which is a South Carolina vessel, the Savannah, which is housed down in Georgia, and then the Pisces, which I think is homeported in Mississippi, in Pascagoula.

The data that I will primarily talk about for SERFS today is the chevron video trap, and this is specifically targeting low to medium-relief hardbottom habitats, and so it's not an overall generalized survey, and it's specific for targeting reef fish and hardbottom-associated species. We sample at depths from about fifteen to 110 meters, and we have one prolonged sampling season that runs from about April 15 to October 14, in any given year, and then the trap has been used, as I mentioned, since 1990. These are baited traps, and they're soaked for about an hour-and-a-half, and that's their targeted bottom time, and then, starting in 2011, all traps have been equipped with two video cameras that face in opposite directions. One of these is used to count fish, and both are used to assess the habitat type at the bottom.

The chevron video trap universe houses about 4,300 or so trap sampling stations between North Carolina and Florida. You can see the distribution there on the right, and these were developed over a long period of time. They're confirmed hardbottom habitat, and it is done through a simple

random selection in any given year, and we target about 1,500 randomly-selected stations, for example in 2023, and that number has varied over the years, depending on funding and effort levels, et cetera.

We do have the option that, for example, if there is a fishing boat sitting on one of our randomly-selected stations, we can choose an alternate, and so you might see mention of that in some of our reports, and so MARMAP and SEAMAP are housed at South Carolina DNR. We primarily take the lead on catch-related indices, from the contents of the traps as well as life history, sampling processing, and reading, and then the SEFIS program takes the lead on video indices. We do have a publicly-available data system, through seamap.org, if you're ever interested in downloading it yourself.

In 2023, we had a really productive year. We conducted about eighty-six sampling days at-sea, and SEFIS also conducted an additional five mapping days, and we deployed over 1,800 chevron video traps and CTDs, to get temperature and salinity, to go along with our trap catches and video observations, and we also did some other gear types as well, but I'm only going to be talking about these today.

From our chevron video traps, we've collected nearly 40,000 fish, over eighty-three species, and I do have to apologize, and these numbers were incorrect in the PDF that I sent Judd the other day, and so they've been updated here, and we'll update the website, and then, from just shy of 10,000 fish, and thirty-one species, we retained life history samples of some sort, which is typically age, maturity, and fin clips for DNA.

All right, and so most of what I'm going to talk about today is our relative abundance trends. We're including today both a catch index from 1990 through 2023 as well as a video index for each species, or as many species as we can, and this includes years from 2011 to 2022. The advantage of the catch index is we're literally working up the fish onboard the boat, and so that data comes off pretty much ready to use, as soon as we get back on land, and it's a relatively quick turnaround to be able to utilize the data from the most recent years.

Videos, on the other hand, are stored and archived onboard the vessels, and then it's only once we return to land, and finish with our season, that we start reading those, and that's primarily SEFIS that is reading them currently, and that takes time, and so we often have a one-year delay in production of the video index, relative to the catch index.

I do want to remind everybody that we did not sample in 2020, due to COVID-19. We sample through multiday research cruises, with a high density of scientists and vessel crew onboard, and that was just not going to happen in that year, and so the indices that I'm going to present today are standardized through zero-inflated negative binomial models, and it's the one that we've found has been the most appropriate and has been used the most frequently in recent SEDARs, and the advantage of this one is that it seems to do a really good job of reducing uncertainty in the year-to-year estimates.

Our response variables from the catch is number of fish, corrected for the trap soak time, and then, for the videos, it's through the mean count method, and this is done by waiting ten minutes after a trap lands on the bottom, and then they analyze one snapshot every thirty seconds for twenty minutes. If anyone would like to count the vermilion snapper at the break, I highly recommend it.

All right, and the other thing that we are going to include are distributions, and these were developed through the chevron video trap catch, and so it goes through the most recent years. The catch is presented in quantiles, or five bins, and it's just based on the simple calculation of number of fish per trap hour, and we're presenting the five most recent years, and so 2018 through 2019 and then 2021 through 2023, so you can get sort of a view of what's been going on in the most recent years.

The way the color profile will look in these maps is cooler colors indicate lower nominal abundance, and warmer colors are higher nominal abundance, and it's really just scaled from low to high, relative within each species, and anywhere in white is where we don't have any sampling occurring, and I will warn you that this is sort of blown-in a little bit, because, if we just used the spatial footprint of a single trap station, you're never going to be able to see the colors, and so it is magnified a bit.

All right, and so the way the indices will be presented is we'll have a catch index that will be presented first, and that will be the longer time series, since 1990, and so, for that catch index, the red line is the annual index value across the time series, and the gray shading is our 95 percent confidence interval, and the black dots are nominal, so you can sort of see how that standardization has affected the estimates.

These have been normalized to the long-term average, which is represented at that dashed or solid line at one, and I do want to warn you that that scaling between above normal and below normal is a skewed scale, where two represents twice the long-term average, and one-half represents, you know, half of the long-term average, and so it's a bit truncated, in terms of a scale underneath, relative to above.

Then we'll pop up the video index and show how it overlaps with the catch time series, and, again, this is the shorter one from 2011 to 2022, and the focus here, again, is on that red line that is the standardized index across the time series, and the dotted line, again, is the 95 percent confidence interval, with the nominal represented by black dots in the line.

All right, and the third thing that we'll try to fit in for all the SERFS species are length compositions, and, again, these are based on catch only, similar to the distributions, and these are presented as maximum, or pinched, total length, in inches, and they're summarized over one-inch length bins. The bubble size represented for each year is the number of fish per length bin, divided by the number of fish in the total year collected by chevron traps, and there will be a red-line age graph that represents an average total length over time, so you can see if that has changed, and then, where it is available, we wanted to give you an idea on how the trap catches sort of relate to some of the population level information.

For example, if there's a commercial minimum size limit for a stock, the South Atlantic stock, that will be shown in a green arrow. A pink arrow is the length at 50 percent maturity for females, and so you can sort of gauge where the average trap catch is relative to those things. You might see some blanks in these, where it looks like there's some missing length bins, but those are the result of converting between fork length and total length and rounding, and it's not that we just never saw fish that is that actual length.

All right, and so these are the species that I will show from the SERFS survey. We picked our top-eight species, the top eight most common species, some of which are, you know, of great management interest, and a couple are of ecological interest, and then also a couple of species that didn't make that cut of top-eight, but are probably pertinent to discussions this week. Then a couple of species that are starred, tomtate and Stenotomus, we only have a trap catch index for, and not a video index yet.

All right, and so tomtate is that first one, and, again, it's probably not a huge amount of, you know, commercial or recreational fishing interest, but it's certainly important for the ecosystem. Tomtate are a very broadly distributed species in the survey, and generally in the inner shelf and middle shelf, and really broadly distributed between Florida and North Carolina. This is the index for tomtate, based on chevron trap catches, and, for the last five to seven years or so, they've been hovering right along the long-term mean, after about a decade of being pretty low, relative to their history, and so that's not a bad thing.

We always joke, and I've made this joke before, about tomtate being a unit of measurement, and their lengths, in our survey, are very, very consistent over time, although we do get some pretty large ones and some pretty small ones, but there has not been a change in the length composition from the chevron traps.

Vermilion snapper is another one of our really broad-ranging species. All four states they occur in, and all across the shelf. For the trap catch index, it's shown here at the top, with the last six or seven years, I think, hovering right around the long-term mean, after, again, a decade of sort of below-the-long-term mean, and the video index shows that same sort of pattern, where it's just sort of hovering right around that long-term mean right now, and so both indices are really consistent for vermilion snapper.

We've had a little bit of change in the length compositions in vermilion snapper over time, with the average length increasing for about the last ten to fifteen years, and particularly filling out in terms of larger fish being a little bit more represented in the most recent catches, and they're hovering right around the commercial minimum size limit, and well above the length at 50 percent maturity. I am not sure that I've ever seen an immature vermilion snapper. They're so small.

Black sea bass, it has typically been one of really broadly-ranging species, across all four states, and it tends to be a little bit more shallow water, by comparison with something like vermilion snapper, and, in the most recent five years, we do see a little bit of a skew, but our highest-abundance areas are off of the Carolinas, versus more widely distributed across the entire range, and so you see a little bit of depression in hotspots off of Florida, and this is our black sea bass catch index for the last couple of years.

Unfortunately, the downward trend has continued, and, to give you some idea on the scale, that really tall peak in 2011 or 2011, with 1,500 traps in the water, we collected about 20,000 black sea bass. Last year, with 1,500 traps, we collected not even 2,000 black sea bass. The video index has shown that same pattern over that same time series. There's a little bit of change in the length compositions from the trap catch, and it's not as distinct as vermilion snapper, but a bit of a shift towards, on average, larger fish, and there's a little bit of a truncation, in terms of the representation of smaller fish in the comps. They are hovering just below the commercial minimum size limit, on average, but still above the length at 50 percent female maturity.

Red snapper, I think, as folks have already mentioned a couple of times during this meeting, tend to be a more southerly species, but they are pretty broadly ranging now, especially in the last five years, for us, with that sort of secondary hotspot up off of North Carolina. The red snapper index, again, is very high in the last year, as it has been for about the last seven or eight years, and it's well above the long-term average, and the video index shows that exact same pattern.

For red snapper, the length compositions are kind of interesting, and we had so few fish before about 2010, and the length comps were very sort of finicky, not filled out very well, whereas we've definitely filled them out in the last ten years, with a really broad distribution of many, many different sizes, and so I wouldn't pay too much attention to the long-term time series for average lengths, because it is hard to make any conclusions about the historical portion. There is no commercial minimum size limit in the region currently, but they are averaging above the 50 percent female maturity length.

Gray triggerfish is another broadly-ranging species for us, occurring in all four states and across the entire shelf, and this is the trap index, and it's been hovering right around the long-term mean, with the exception of a couple of years below, in the last three years, but we did have a bit of a bump-up in 2023, and the video survey showed that same sort of pattern. Since this is 2022, and we're expecting a bump-up in 2023, once the videos get read, and they just haven't been read yet.

Our length compositions have triggerfish have been much been stable over time, and, you know, because we do catch so many, it's a pretty well-filled-out composition as well, and they are averaging above their commercial size limit, as well as the female maturity.

Red porgy has historically been a pretty-broadly-ranging species. In the most recent years, we're a little bit more limited in their distribution, mostly off of Georgia and South Carolina and southern North Carolina, and they tend to be in a little more deeper water, compared to something like a black sea bass, and this is our catch index.

It has been low, for the last seven or eight years, and we did have a little bit of a bump-up last year, which might be a good sign, and the video index shows that same declining trend since the early 2010s. Our length compositions have changed a little bit for red porgy over time, with, again, a little bit of a more representation of larger fish over smaller fish in the compositions, and an increase in that average total length. We did see some smaller fish, last year a little bit, in the last couple of years, although, you know, I take it with a grain of salt. They are averaging just below the commercial minimum size limit, but they are averaging above the female maturity.

For scup, which is another species that is probably more ecologically important than economically important in this region, they tend to be a more shallow-water species, a little bit more restricted distribution, compared to some of the other species we've looked at so far, and it's primarily off of the South Carolina portion of the survey, and then their numbers have actually been quite low, for the last ten to fifteen years, about since the mid-2010s, well below the long-term average, and their length compositions have seen a little bit of an uptick in the average size, although not much, and we do have a little bit more representation of large fish, in the comps, than we have had historically, and there is no current minimum size limit, and we don't know the age at maturity for Stenotomus in this region, currently.

White grunt has a much more restricted distribution, compared to many of the species we've looked at so far, primarily occurring off of North Carolina, and a little bit off of South Carolina, and they are pretty broadly-ranging across the shelf in North Carolina, where we do see them, and our trap catches, in the last three years, have been below the long-term average, after several years of above the long-term average, and the video index mostly mirrors that, and it's a little bit noisy, probably because of that shorter time series, and our length compositions have been a little more variable over time, but pretty stable in the last ten to fifteen years. There is no commercial minimum size limit for white grunt, currently, but they are averaging above their female maturity.

This is the first year we've been able to calculate an index for almaco jack. Historically, they were not very common in the trap survey, but we've increasingly been observing them, and so were finally able to get an index to converge for the trap catches, and so this is the index, and you can see that sort of increase in abundance, as well as just the observations over time, with really starting in, you know, the mid-2010s, is when we really started noticing them a lot more, with the last couple of years being above the long-term average.

They do show up on video quite well. You can tell the difference between greater amberjack and almaco, luckily, when they're swimming around, even as fast as they are, and that video index shows the same basic patterns as the trap catches.

As I mentioned, they were pretty uncommon historically, and so, again, these are very noisy length compositions historically, but they have been filling out, as the abundance overall has been increasing in the trap catches. They are averaging just about at that commercial minimum size limit, and then I haven't found any record of the female maturity yet, and so if anyone knows one.

All right, and red grouper, and red grouper is really sort of spotty in the survey range. They occur off of Florida, and they occur off of North Carolina, and sort of sometimes in between Georgia and South Carolina, and so it's a little bit of a disjunct distribution, and they tend to be kind of isolated. This is our trap catch, historical, and this is a good one to kind of show why you need a long-term time series, because it was quite different historically, compared to contemporary, and, unfortunately, the recent ten or fifteen years has been well below average.

We do have a bump-up in 2023, and this is actually eighty-six red grouper, and so we averaged one red grouper per day, which is unheard of since I started. Last year, we had sixteen total red grouper encountered by the survey, and so it was an important year for me. It was exciting, and then is the video survey. It's actually quite noisy, especially sort of earlier in the time series, and that's just because they're just sort of few and far between, when we do see them, in that shorter time series. Hopefully the video index will also see that bump-up in 2023, when we get the videos read.

Then, because red grouper are not terribly common in the traps, we do have a lot of variability in the length compositions, but, if you look kind of carefully, for example, from about 2004 over the next couple of years, you can actually see a pretty good signal of, you know, a year class coming through, which was really nice, and then 2023, I just really want to make note, with that increase in catches, it was actually well represented by small red grouper, and there are big red grouper in this dataset too, but the dots are just very, very small, because it really was dominated by smaller fish, and their average, in 2023, was right around both their commercial size limit as well as their female maturity.

Gag is another one that historically was pretty common in the survey, and it's been a little more limited with recent years. They tend to be a little bit more shallow water than red grouper, a little more consistently being found in Georgia, South Carolina, and North Carolina. This is the gag index for the last couple of years, and, again, in 2023, we saw a nice bump-up in gag numbers. I think, last year, we had talked a little bit about a lot of folks mentioning seeing small gag in estuaries and in nearshore in 2022, and it looks like those fish are finally coming into the trap catches, or not finally, but a year later, but so that's a really good sign. The video index, of course, because this is only through 2022, is still below average, and so hopefully that increase will be mirrored once we get the videos read in 2023.

The length compositions, again, there is quite a bit of noise, because gag are not necessarily that commonly collected by the chevron traps, but, very similar to red grouper, I do want to point out that, in the 2023 length composition, there are larger fish in there, but the dots are just very, very tiny, because the catches were dominated by smaller gag, and their average, probably because the catches were represented by really small gag this time around, have been below both the female maturity and the commercial minimum size limit.

Scamp is our last group, I believe, for the day, and they're a little bit more broadly-ranging than red grouper. They're found in all four states, and they tend to be a little bit deeper than gag grouper in the survey, and then this is our scamp index. I wish I could say I had positive news for scamp, the way we did for red grouper and gag, but, unfortunately, we don't. The catches are still well below the long-term mean. The video index tells a consistent story, in terms of the overall shape, and it does show that it's hovering around the video long-term mean, but I think it's because of that short time series. We really need that historical contrast for scamp, to see where we kind of are relative to where we've been.

Then our -- You know, we do maybe have a little bit of good news, and we had a fair number of small scamp that pulled down that average length composition in 2023, and it's sitting right around the minimum size limit, just above the female maturity, in the most recent year.

All right, and so I just want to note that we have a couple of other reef fish activities that we tackled in 2023, through South Carolina DNR. We had funding to deploy stereo video cameras in standardized hook-and-line sampling, along with our chevron trap sampling, in 2022 and 2023, and so the field seasons are done for that, but the goal being to compare the length compositions of fish in traps, fish on video, as well as fish on hook-and-line, to see if there are any differences in selectivity, and, in particular, whether or not there are differences in lengths between, you know, video and chevron traps is, you know, a big question for our survey.

We have also been piloting different gears for sampling juvenile snapper grouper the last couple of years, and so that field effort just wrapped up, where we were using things like small hooks, standardized hook-and-line, as well as small-mesh traps, to try to collect fish, and so we should have the results from those coming up in the next year, this year.

In 2024, and we actually just started, on Monday, and the first boat left on the first day of the season, and the weather was really good this week, and so, you know, we are planning a pretty typical year, using our three boats that we've been using historically, and we are actually adding a fourth vessel for chevron video traps. SC DNR recently replaced a shrimp trawler that they've

had since the 1980s with a larger boat, the R/V Lady Lillian, and she has the capabilities of running chevron video traps, and so we're going to be using her this year.

One of the reasons we're doing that is part of our scopes of work for this year included an expansion of the chevron video trap survey to the North Carolina-Virginia border, and so covering the entire council jurisdictional range on that end, meaning that we just needed the extra help, and then a couple other things that we're looking into, with that northern expansion, is potentially sampling the Kitty Hawk wind energy lease area, and we're talking about that this week, and then we are also planning on sampling the Carolina Long Bay wind energy lease area, and we have established stations, that we've had for many years, in that area, and we might expand that sampling a little bit this year as well.

All right, and I just want to make some notes, and one of the things that we do, that I mentioned, is we handle the life history sampling, and so age comps, maturity schedules for many of the reef fish, and, this year, we're going to continue that we are not collecting male maturity samples, and so no histology for male for our high-volume gonochorists of gray triggerfish, red and vermilion snapper, and white grunt. We found that they have -- That information has not been used as much as females, and so we're concentrating effort on females, and then we're also continuing our system where we rotate every three years on our high-volume color-coded species, on whether or not we collect maturity samples, and so our monochromes are on, black sea bass, gray triggerfish, and white grunt this year, and our reds are off, vermilion, red porgy, and red snapper. We do still record sex ratios for the gonochorists though.

All right, and the second survey that I mentioned that we'll talk about is our coastal trawl survey, and this is funded through the SEAMAP South Atlantic program, and this has been going on since the 1980s, but, again, standardized procedures in place since the 1990s, similar to the chevron traps. This is a stratified random sampling design, with twenty-four latitude-based strata, and they're fixed stations, with an annual random selection of those stations each year, and it covers a very similar range as the chevron video traps, from Cape Hatteras to Cape Canaveral, and it only a very narrow strip of coast, with very shallow water. In 2023, we targeted 102 stations per season, and we allocation stations, to optimize, or to reduce, variability among strata.

This survey is done using mongoose-type falcon nets, and this are high-rise trawls. It's relatively small mesh, because we are sampling things that are including juvenile fish, penaeid shrimp, and so things that we want to retain that are actually pretty small, and it's all shallow-water, trawlable habitats. We did have modifications to sampling in 2020 and 2021, due to COVID-19, and I'll be talking about our abundance for a couple of species, in terms of our number per hectare sampled.

I do want to note that we've had a couple of changes in our methodology in the last couple of years, due to wanting to reduce volume of personnel on the boat, and cost savings, and we run two nets, but we've been only processing catch from a single net, and so that per hectare is how we've accounted for that change, in terms of the abundance estimates. This year, we also had to reduce our number of seasons, due to funding availability, and so we did not sample during the summer this year, and we had a slightly-modified spring and fall season.

This is, again, standardized through zero-inflated negative binomial, and, historically, we've used a delta GLM method, and so one big change is using things like day of year, instead of season. In 2024, I mentioned the Lillian, and we are undergoing a renovation to new vessel, new nets, and

new doors, and so we've been measuring our gear geometry, to help with that transition, in terms of designing the new gear as well as correcting between the before-and-after change.

This is what our sampling range looked like in the two seasons in 2023, and I do want to note that we completely missed sampling stations between Cape Lookout and Cape Hatteras. That was primarily due to weather issues, in particular things like named storms, the long weeks of very high wind energy, high sea states, and we just could not get out there, or, once we got out there, we could not get gear in the water, and so that's really unfortunate, that we missed that area in both seasons.

The indices I'm going to show, this is a little bit simplified, because we don't have -- The data turnaround for this survey is a little bit slower, just because of the sheer volume, but I do have abundance indices for a couple of species, including king mackerel, and this is primarily age-zero and age-one, but we do get up to age, you know, four and five in the survey. It's a very similar setup, except for I want you to look at the black line instead of the red line in this, and that's the standardized index, and then the nominal is shown in gray. The last three years have been below the long-term mean, or, actually, the last like five or six years have been below the long-term mean for king mackerel, and, as I mentioned, this is primarily juveniles.

Spanish mackerel is another one of our federally-managed species that we collect, and it's primarily age-zero, and age-one, but we do get up into the age-five and six as well, with a little bit of a mix, and it's not as distinct as king mackerel, but the last three years have been below the long-term mean.

I mentioned we also sample penaeid shrimp, and that includes three species of penaeid shrimp, the first one being white, and this is our most common shrimp species, with the last couple of years being above the long-term mean, and including before the COVID break. Brown shrimp is a little less common in the survey, and so the time series is a little bit noisier. We've been hovering right around the long-term mean for a very long time for brown shrimp, and then our last shrimp is pink, and this is the least-common species in the survey, and our last three -- Or actually, almost up to ten years has been below the long-term mean, and, with that -- I mentioned this before, but the plans for the new boat, and so we're working on that, and we'll see how it goes, and we'll see how to deal with the data afterwards. With that, I'm happy to take questions.

DR. BUCKEL: Thanks so much, Tracey, for the great presentation. Are there questions for Tracey? Fred Scharf.

DR. SCHARF: So, Tracey, the old boat -- Is it gone, and there's no possibility of paired trawls, to look at catchability?

DR. SMART: No, and we had tried, for a while, to figure out the logistics, and the funding, to get paired between the two, and there wasn't a lot of interest in investing in keeping the old vessel, to make that happen, especially with -- I mean, we started looking at new boats years ago, and trying to identify that funding, and that window just did not line up between the two. She's in Haiti, and she's shrimping, and so she's still floating. She's still going. She made it to Haiti. Marcel.

DR. REICHERT: We talked about it a little bit, and I have a question about the video component of the survey. It's my understanding that the collection of stereo video data is to determine fish

length, and will it be halted this year, and I think it was our understanding that fish length, and fish length information, length comps, from the video survey, would become available at some point, and it would be available for stock assessments, and do you know if there are plans to resume that, and do you know if, and when, that length data may be available for assessments?

DR. SMART: I can't talk -- So part of it is a funding issue, and I can certainly talk from a MARMAP and SEAMAP funding side, as well as what we've done in the past, and so, starting in 2019, SEFIS piloted putting stereo cameras on chevron traps. It was limited coverage, and it only happened on their vessels, and I think it was only like one per set, and so not even a sixth of the survey was covered, because we weren't doing it on ours, for example, and so not the full spatial range, the full depth range, and they weren't really covered by that piloting in 2019.

That continued in 2021, but, again, it wasn't full coverage, and it was probably about a sixth of the survey being covered, and, you know, not a one-to-one. Not every trap had a stereo camera onboard, and then, in 2022 and 2023, we had MARFIN funding, through South Carolina DNR, to put two stereo cameras per set on ours, and so about a third of the coverage, and then SEFIS put stereo cameras on at least one trap in each of their sets as well, and we usually deploy them in sets of six, and it's just sort of what works.

In terms of areal coverage, spatial coverage, depth coverage, in 2022 and 2023, we actually probably have the most comprehensive stereo video coverage, where you can measure lengths from the cameras, that we have ever had. Unfortunately, that funding has run out, and SC DNR has funding to read and measure fish from the videos that we collected as part of that project in 2022 and 2023, in order to do the comparison with the trap catches, but not to do an overall length composition from stereo cameras across the whole survey range.

Then, as far as I'm aware, SEFIS has never had funding to read theirs, and so, right now, the data is just -- There is footage, and we'll know, by the end of this MARFIN project, once we finish analyzing the videos, if there is a difference, for at least some species, between trap catch lengths and video lengths, but, in terms of a full comprehensive sort of stereo-length estimate for the full survey, we have not been there yet, and so -- And I don't know where that money is going to come from.

DR. REICHERT: Thank you.

DR. BUCKEL: Genny.

DR. NESSLAGE: Thanks for this presentation. I really appreciated the length comp over time graphs that you provided. I was looking back at some of the information that's in some of the assessments, and the working papers and whatnot, and it would be really great if these could get into the assessments, in some fashion, because I'm seeing cohorts going through that I never noticed when I saw the assessments come across our desks, that are really clear in the length comps, but are mushy in the age comps, and I would love to have this as a more prominent part, and I guess I'm not looking to you, Tracey, and I'm looking more towards the back of the room, at maybe taking a closer look at this as we -- I'm sure the assessment scientists do, but it would be good if, by the time it got to us, we could see it as well.

DR. SMART: Yes, and so, if an index is used from the chevron traps, at least in terms of catch, or a combo catch-video, as we've done in the last couple of assessments, we typically provide age comps, and not length comps, only, and so, I mean, we can certainly do that, and see whichever is used, and it's just the preference has been to use the age comps.

DR. BUCKEL: Thanks, Genny and Tracey. Amy.

DR. SCHUELLER: I'm happy to follow on Genny's comment. The whole time you were giving this presentation, which I always look forward to this presentation, every time it's been given, because I always think of new things, that I wondered if, like when we're looking at these length comps, if there could be some things done, hopefully, that would be easy to the figures, to make them just like a little bit more informative, like my thoughts are -- So I'm looking at gag right now.

You know, maybe time periods where the sample sizes are below a certain level, like color the dot a different color, so you can like instantly know that, okay, that has a low sample size, and the other thing I was thinking was you made comments throughout like -- For gag, I think, the last year, there's a lot of incoming smaller fish, but the large fish are still there, and so I started to wonder if there were like dotted lines around that mean length that indicated like the 5th and 95th percentiles, or something like that, that we might be able to, by eye, sort of see time periods when there was an expansion, or a contraction, in the sizes that the survey was seeing, or if there were changes over time that are harder to see, just because of these bubbles, instead of lines, and I think that would be super useful, and I think it would be useful for the assessment folks too, and I agree with what Genny said, that it's neat to see some of the age comps come in, or, you know, okay, there's a bunch of newer, younger gag in 2022 on here, or no -- It's 2023, and like are we going to see those move through or not, and so great presentation.

DR. SMART: We're happy to make adjustments, to make this more useful to you all, and whatever will work, and I just saw Jeff staring at the little tiny dots on gag, and, yes, that's really why -- There are some there, and they're just very difficult to see, and so, yes, we're happy to make any adjustments, or suggestions, that you all have.

DR. BUCKEL: Thanks, Amy. Marcel.

DR. REICHERT: To that point, and, Tracey, you and I talked about that, and I think I actually was the one who started doing the normalizing, because you can compare species, but that's not really relevant, and so you and I talked about not normalizing, but just showing the CPUE, so your scale under the long-term average is similar to that above, and so especially since a lot of these species are now well under the long-term average, and I think that, visually, that would probably be good to have, and so I think that would be a good change, in terms of the visibility for next update, and so thanks.

DR. BUCKEL: Other questions? Jim.

MR. GARTLAND: I think this is a really cool survey, and I've liked it all along, but I'm thinking about the calibration stuff, and so I know the old boat is gone, and that's fine, right, and there's nothing you can do about that, but the Northeast Center's bottom trawl survey somewhat consistently gets down -- I'm looking at your map, because, again, I'm not familiar with the geography as much, but they sample the Raleigh Bay and the Onslow Bay regions sometimes,

right, and so I wonder if there would be a way, analytically, to use the old SEAMAP data, the new SEAMAP data, and the Bigelow data as your bridge, like an A to B and B to C thing, to get A to C, and it's not going to work for everything, but it could work for things that are --

Like I'm thinking spot, croaker, trout, things like that, right, and things that are further south, South Carolina and Georgia, it's not going to work, because the Bigelow doesn't get down there, but, for those others, the uncertainty might be -- It will probably be pretty high, but it might be -- I think the word was used, from the Albatross to the Bigelow, it was a rickety bridge, and it might help, right, and so --

DR. SMART: If my new grad student, Julia, is listening, so she's actually really interested in looking at the consistency between the Mid-Atlantic trawl surveys and our trawl surveys, for the species where we overlap, especially in terms of, you know, size ranges too, and that might be a great thing for her to look at.

DR. BUCKEL: Just to the discussion, this survey -- What's the depth? It only goes to -- It's a shallow-water survey, and so it may be more than NEAMAP, and I don't know --

DR. SMART: It goes down to about not quite ten meters, somewhere just below nine, and like thirty feet down.

DR. BUCKEL: So does the Bigelow get that shallow?

MR. GARTLAND: The reason that we, NEAMAP, exists is because the Bigelow doesn't go inside of sixty, and that's why I'm saying there's going to be a lot of hand-waving going on, but there might be something worth looking at, and I don't know, and, you know, if you can do it at the strata level, and, you know, it wouldn't be a tow-to-tow comparison, and it's a -- What do they call that, opportunistic paired tows, when you put them together in something like that, because if you -- As long as you have some level of spatial or temporal overlap, and, I mean, it will estimate if you don't have it, but just don't trust that number, but, if you have just somewhat, you might be able to at least get a sense, right, of the catches are about the same, or they doubled, or they halved, or whatever, you know.

DR. SMART: Or, if nothing else, at least it answers the question of can we use that.

DR. BUCKEL: Thanks. Other questions for Tracey? Steve.

DR. TURNER: Just information, and, for the video and trap survey, how was the outer depth defined? How was that decided upon?

DR. SMART: So it's -- Historically, it was -- This is decisions made before I was in high school, and so I will wax eloquent as much as I can. I think it was really about getting like a cohesive area that could be sampled without losing gear, because the currents pick up after you get off the shelf, and the topography of the bottom changes quite a bit, where you end up with very high relief, which means that traps are going to sit sort of cattywampus, as well as you just start moving into a more deepwater suite of species, like snowy grouper and tilefishes, versus the more shelf, and so I think, if they had been interested in tackling it, it probably would have been best to really design

it in a two-depth strata sort of way, versus one just, you know, fully randomized survey, and so I think those were some of the considerations, back in the day.

DR. BUCKEL: Marcel.

DR. REICHERT: To that point, that's why we initially -- Why initially what we called the short -- The vertical longline, or the short bottom longline, was developed, because they used that gear to sample beyond where the trap was deployed, because of the reasons that Tracey mentioned, and so that was the gear that could handle vertical relief, and we were able to set that at slightly higher current speeds.

DR. SMART: It does work out well now, where they basically ended up, because of practical reasons, and it's also where we still have some light for video reading.

DR. BUCKEL: Other questions for Tracey? Anyone online, Judd or Chip?

DR. CURTIS: No.

DR. BUCKEL: All right. This is one that's for informational purposes only, and we don't have any action items, but we're going to open it up to public comment, and I remembered this time, and so any -- If folks are online, that have a question for Tracey about the fishery-independent sampling, please ask them now.

DR. CURTIS: No hands.

DR. BUCKEL: All right. Judd says no hands, and so, Tracey, thanks very much. I agree with Amy that this is a presentation that I always look forward to, and so thank you. All right. I think it is time to take a break. We're about halfway through, and so it is -- Let's see. We'll start back at 3:30, and so a thirteen-minute break. Thanks, everyone.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. Please come back to your chairs. All right. I'm seeing everybody getting back to their chairs. All right. There's always a lot of déjà vu with red snapper, but this one is more recent déjà vu, and so we reviewed the terms of reference for red snapper at the February 2024 meeting, but that was -- Those TORs were for the research track, and that's being changed from a research track to a benchmark, and so that means some terms of reference that have to be changed, because of what comes out of the benchmark relative to a research track, and Julie Neer is here to give us a presentation on those TORs, and we have some action items related to those, and so pay attention to Attachment 9, which is a presentation, and then the action items under Agenda Item 9.5. Julie, take it away.

SEDAR: RED SNAPPER BENCHMARK TERMS OF REFERENCE

DR. NEER: All right. Thanks, Jeff. Yes, you guys saw this relatively recently, and it went to the council, and the council agreed that they wanted to move this to a benchmark, and spoiler, but research tracks are no longer a thing, starting in 2026, anyways, and so it's a good thing you guys

recommended making a change now. You were ahead of curve, and so, as Jeff said, we had to go back and make some modifications to the terms of reference.

They were set up as a research track, which produced no management advice, and so some of the things, such as give me stock status, weren't in the terms of reference before, and now they are, and so the planning team reconvened, and we looked at and worked on this, and we added a few things, and so that's what you have in front of you here, is the updated terms of reference. The red are things that were either added by the planning team or the council during their review, because we figured we might as well get it all out in one shot for you guys, and so most of the data sections are the same as what you saw last time, and there's just this one explore the evidence of changes in life history characteristics over time.

Most of the data things are fairly standard, and there has been some discussion about what would be the best measure of stock productivity, in regard to other assessments as well as this one, and so we added some guidance for the people in that group to weigh-in on that, as part of the data workshop, and I don't think there's much else.

The only other sort of change was that, during the initial version, there were a lot of surveys that were kind of hanging out at the bottom, like look at these things, and staff worked with council staff, and SEDAR staff, to pull those all into the appropriate terms of reference for data, by which working group. I think that's it for data, if anyone has any comments or questions on data TORs, and so all the black is what was there before.

DR. BUCKEL: I don't see any hands here. Anything online? All right, Julie.

DR. NEER: All right. We'll move on to assessment then. The assessment section had a few more things, and, again, the black was what you saw before, and already approved, and then we have some new -- We fleshed out a little bit more about provide estimates of stock population parameters, which you kind of left open-ended previously, and so some bullets were added, as well as a couple of additional ways to dig into how things might -- Such as the red snapper estimation project, and how might that be incorporated into the model, and looking at alternative metrics for estimating the spawning potential, if needed, and a variety of other things, and so take a look and see if you have any comments or questions.

Again, most of these things had to be added in, because this was through a benchmark, and these are things that we expect to get out of a benchmark assessment, so that we can move forward with management advice, or you can move forward with management advice. Now we're going to scroll down a bit, just to see what the rest of them are up there, and some people are actually reading off the screen.

DR. BUCKEL: Go ahead, Genny.

DR. NESSLAGE: Just a comment on the wording of Number 4. Am on the wrong section already?

DR. NEER: This is for the assessment.

DR. NESSLAGE: It's for assessment, right there, to determine the best method for incorporating SARSRP, and is that what we're calling it, into the model. Is it possible to say "if appropriate"? I just worry, and I don't want the TOR to be incorporate into the model if that turns out to not be an appropriate thing to do, and great if it is though. Just to add to that, maybe make that under the bullet, the first part of that sentence, because it really is to consider the finding and then determine if it's appropriate, and, if so, determine the best methods for incorporating it. Know what I'm saying?

DR. NEER: We can scroll and see if there's any other comments. Genny looks confused. She's pointing at the screen.

DR. BUCKEL: Go ahead, Genny.

DR. NESSLAGE: Under 11, the -- Should I not go ahead?

DR. NEER: Go ahead.

DR. NESSLAGE: Under 11, recommend levels of recruitment to be used in the projections, and then this is address the recommendations of the catch level projections working group, and just, again, a wording issue, and like -- How about follow the recommendations, or -- Well, let me take a step back. The catch level projections working group had a number of analyses that we suggested that people look at, before determining what the appropriate level of recruitment is, and I don't know if "recommend" is the right word there, and maybe it should be "address recommendations", blah, blah, blah, blah, blah, "to determine appropriate levels of recruitment", because, honestly, if they don't do what the workgroup suggests, we're going to just suggest it when they get here to the table, and so they might as well do it ahead of time and be prepared. Get rid of "recommend". Thank you.

DR. BUCKEL: Thank you, Genny. Others? If we go back up to Number 4, and I think Genny had edited it, and I just want to add -- I think it was Number 4, and so there is -- Erik, you can correct me if I'm wrong, or other members of the Southeast Center analysts, but I think the plan is that, at least for one of the approaches, the close-kin-mark-recapture, that it will be integrated into -- Because that method requires a population dynamics model, and so I think the plan is to integrate those on the frontend, before it's presented to the reviewers and us, and so there may be -- I think it's fine to keep this general, but I just wanted to give everyone a heads-up that that may be what we see for that, but it would already be -- We wouldn't say, oh yeah, go ahead and integrate it, and it may already be -- That may be done. Thanks. Amy.

DR. SCHUELLER: For Number 5, can we just say "consider alternative metrics for estimating spawning potential", and then, "for example, SSB, total egg production, et cetera", if you want, or nothing else, but like choose the most appropriate metric, or something like that. I mean, it's not -- I don't know, and it seems like it's an adversarial situation, when it really isn't, and like there's a bunch of different metrics, and like you should choose one based on the data available and what's most appropriate for the species at-hand.

DR. BUCKEL: Thanks, Amy. Good edit. Marcel.

DR. REICHERT: A quick question, coming back to your point, Jeff, and so were you saying that it doesn't happen before a stock assessment -- I'm thinking about 4, consider the findings of the final peer review report, but there may be findings of SARSRP available prior to the final peer review report that are going, or should be, included, and do you know what I'm trying to ask, in terms of should we wait until the final peer review report is available, or should -- You said, what is it, the close-kin analysis, that is kind of a parallel process, and so you said that may happen at the frontend, and do you know what I'm trying to say?

In terms of sequence, I want to make sure that we are not shoehorning ourselves into a situation where we basically are not -- You know, strictly speaking, here it says that it's the final peer review report that should be considered, but there may be -- Anyway, maybe I'm going too much in the weeds here, but do you know what I'm trying to say?

DR. BUCKEL: Yes, and the order -- The peer review of the SARSRP will happen before the -- If the benchmark, right, will include -- For example, it might include the close-kin-mark-recapture within it, and so that's the point that I was making, was more the second-half of the sentence is we're going to determine the best method for incorporating that into the model. It may already -- It may come to us already -- The plan is that it will be part of that benchmark model.

DR. REICHERT: Okay, but the final peer review report is always going to be -- That needs to be done before any of this can be considered. Okay. Thanks.

DR. CURTIS: Just to clarify, this is -- The SARSRP project is going through its own independent peer review report, and that's going to be independent of the final SEDAR review panel report and peer review process, and so that -- This is going to be prior to the assessment workshop.

DR. REICHERT: Yes, but, if that, for some reason, is not available, then that will not be considered, is kind of what I'm reading here, which is --

DR. BUCKEL: That's where the "if appropriate", right, and so, Genny, that's important language to have, because there's two approaches that are being used to estimate abundance of red snapper, and maybe both are -- You know, if the CIE review says they're both not appropriate, then --

DR. REICHERT: If it covers both, then that covers it. Thanks.

DR. BUCKEL: Yes. I think leaving it general, at this point, but I just wanted to give folks a heads-up that it may already -- At least one of the methods, or maybe both, will be already combined in the benchmark.

DR. NEER: Any other questions on the assessment section of the terms of reference? If not, we'll scroll down to the review. The review terms of reference didn't have quite as many additions as the assessment, but there are some.

DR. BUCKEL: Go ahead, Alexei.

DR. SHAROV: Thank you. I had a couple of questions on the assessment, and I'm sorry, and I had my hand up, but Number 7, on the uncertainty -- Maybe it's not the assessment, but it's certainly Number 7, including uncertainty -- Yes, to characterize uncertainty. Right there. I'm

sorry. It's 6. It says to provide measures of uncertainty for estimated parameters and derived quantities, such as biological reference points and stock status, and so, if we expect the uncertainties for reference points to quantified, when I read "provide measures", I assume they will be quantified, and so there will be an uncertainty estimated of the current F, or SSB, et cetera.

The determination of the status of the stock should then consider the uncertainty of both the reference point in estimating the quantity, and I don't see that -- Is that the intent? I don't see this being spelled out as such, as how the status of the stock will be determined, and do you follow me? So the center procedure is to treat the reference point as the single point estimate, right, but we're considering only the probability distribution of the terminal F, or the terminal SSB, when we are providing the uncertainty estimation. For the reference point, that should be a joint distribution, and is it intended to be done here or not, and I'm just trying to understand.

DR. CURTIS: Alexei, do you have a recommendation of how you want that bullet to read to reflect that?

DR. SHAROV: Yes, but I don't see the full list, and so I guess we should be saying, wherever we are determining how the status of the stock should be defined, right, and then, if there is paragraph, or a bullet point, that says that, then we should say something like the status of the stock should be defined based on the uncertainty estimates of both reference points and estimates of population spawning stock biomass and fishing mortality rates, at least as a placeholder.

DR. CURTIS: Alexei, does that --

DR. SHAROV: Yes, and that's -- Provide uncertainty for -- Yes, and it should be under 10, and we spell out that the probability -- The PDF for biological reference points should be provided, but we do not say here that, given this PDF, what would be the probability that would define that a stock is overfished or that overfishing is occurring. The probability distribution function for reference points. Is that clear, or do other members agree on that? This is being done in some assessments.

DR. BUCKEL: Genny.

DR. NESSLAGE: Chris and I are side-barring, and maybe -- Given there might, or will likely, hopefully be a new model, a new model structure, from the BAM, where we're used to seeing certain outputs, the Kobe plots, the MCBEs, the stock status, and the probability of overfishing, and I think maybe, Alexei, and tell me if I'm putting words in your mouth, but there might a concern that we're not going to see the same kind of outputs that we normally would, and so I guess maybe that's a question for the assessors, and the Science Center, and do you anticipate that this new modeling framework will provide the same sort of advice that we're used to seeing, regarding uncertainty in stock status and reference points, and, if so, then we're probably fine, but, if you're not using that same framework, I guess we're -- I thinking that Alexei has a good point in saying that there's got to be a way to get at those things, but maybe I'm off-base. Sorry, Alexei, if I am.

DR. SHAROV: Well, it's up to the group. I think -- I mean, in terms of the ability to provide the likelihood, it's a no-brainer, and you will have the PDF distribution for the terminal F, and the PDF distribution for the reference point, and you should be able to calculate the probability of

overfishing, given both quantities, I think. If this confuses people, you can table it, or -- Well, it's a final decision on the terms of reference. It's up to the group. If you think it's too early to do so, then we can strike it.

DR. BUCKEL: Thanks, Alexei. Erik Williams came to the table to comment to that point, and then I have Chris.

DR. WILLIAMS: I'm not sure that I was commenting to Alexei's point as much as Genny's point about, you know, changes to the model, radical changes to the model, and what's your definition of radical, and that's a good question, and so that's sort of the crux of the issue, and that becomes -- That has caused us problems in the past, when the TORs try to anticipate what might happen, and that's very, very tough, and, in this case, I think the one thing we possible can anticipate is it's going to be -- We're bringing very different data from any of our previous models to the table, and so we should be expecting maybe a radical change.

DR. BUCKEL: So, Erik, your argument is to keep the TORs more general?

DR. WILLIAMS: That has generally been my stance, for the last five years at least.

DR. BUCKEL: Maybe ten.

DR. WILLIAMS: Yes, maybe ten.

DR. BUCKEL: Chris.

DR. DUMAS: I was just going to say, Alexei, so would you be okay with asking for the probability distribution for the reference points, you know, if those are in some sort of, you know, closed form, that we could graph, but, if not, would you be okay with the Kobe plots, sort of giving that type of information, if it was just the output for a bunch of Monte Carlo simulations showing -- So we had the Kobe plots showing the reference points, and then showing -- The dots showing the different Monte Carlo run results, which, you know, effectively shows the probability distribution for the reference points?

DR. SHAROV: Yes, and, sure, we can generalize, and I have no problem with that. My principal point is that, if we're asking, and expecting, that there will be a description of uncertainty in reference points, then it doesn't make sense to not use -- To not account for uncertainty in the reference points when you define the status of the stock, right, and so maybe I went straight forward assuming that -- You know, obviously, there will be some sort of probability density function, for say F 40 percent, and that would account for uncertainty in growth, maturity, whatever else, and then that would certainly be used in -- You know, all together with the uncertainty in the current F estimate to generate, overall, the -- Then decide, at a certain level, you know, what's the probability of current F being above the F threshold, and so, yes, if we can generalize, generalize it.

DR. BUCKEL: All right. Thanks, Alexei, and I think we'll -- This is -- The first part of this bullet that Judd just added is identical to the second sub-bullet, and so we can maybe -- If folks are okay, we'll just copy-and-paste that up to Number 2, with your addition of determine the probability that's it's overfished, and then, if the stock is overfished, we do the following.

DR. SHAROV: Yes, that's fine, and I had one more comment on another subject.

DR. BUCKEL: Go ahead.

DR. SHAROV: It was on the -- Somewhere we were saying, or it's proposed, that the calculate the three-year geometric mean for the three most recent years, and I assume that would be, you know, sort of the definition of the terminal F, and so, in this case, the terminal F we're considering not the fishing mortality in the last year of the assessment, but rather a three-year geometric mean.

I know it's rather common for the Science Center here, but it's not very common in many other places, and I actually, quite recently, argued with people from the other region that this could be done, and so I just wanted to ask the SSC if you are in support specifically of a three-year geometric mean as the definition of the terminal fishing mortality. If everything is okay with that, that's fine, and I just wanted to sort of, you know, verify that.

DR. BUCKEL: Yes, and I'm seeing the heads of the analysts saying that seems status quo with that. Thanks, Alexei, for bringing that up. Genny has got a comment to that point, Alexei.

DR. NESSLAGE: So, again, Alexei, I think -- Is this where you're wondering if this will still be appropriate with any new modeling approach, because we will have essentially, what, a couple of -- How many years of estimates?

DR. BUCKEL: I think it's to be determined, how that close-kin-mark-recapture, if they're able to do multiple years from that.

DR. NESSLAGE: Right, but it could be as few as one, and as many as three, and Marcel says three, maybe, and it depends on the samples, the DNA samples, and so, if that's the case, we might want to reconsider that, which, again, goes to -- It speaks to Erik's point about trying to keep these as generic as possible, so that we're doing what's appropriate, given the model and the data that are available, and so, if what you're suggesting, Alexei, is that we don't be this prescriptive, and is that what you're asking?

DR. SHAROV: Yes.

DR. BUCKEL: Fred Scharf.

DR. SCHARF: So, Alexei, are you saying that, right there, maybe we should just say that F current will be defined as appropriate, given the data?

DR. SHAROV: Yes, and something like that would be more -- Yes. If that will be the three-year geometric mean, that's fine, but --

DR. BUCKEL: Thanks, Alexei and Genny and Fred. All right. Other -- We were in review, weren't we, I think? Yes, we were starting review. Go ahead, Genny.

DR. NESSLAGE: You can tell I've had sugar, and so these are the generic terms of reference, right, and so I'm wondering if we want to reorganize these. They make a little bit more sense to

me if the (e) kind of becomes the new (b), because, there, you're asking are these estimates of the stock status determination reliable, and, if not, blah, blah, blah, blah, blah. If they are, is the stock overfished, and why do you agree, and do you even need the "why do you agree" then at that point? Like isn't the question -- It deletes (b) and (c), and it's (e), right, really? If you think that what they've done is reliable, and defensible, then say so, and, if not, what are the indications, to give the managers information about stock status, and so I would just replace (b) and (c) with (e).

Are we sure that there even will be a stock-recruitment relationship used, and is that -- Do we want to just add some caveats about -- Because, in the past, it's not, right, and it's annual estimates of recruitment devs, and so do we want to just say something like, for (d), like, if a stock-recruitment relationship is used in the modeling approach, blah, blah, blah, blah, and keep your current wording?

DR. BUCKEL: Thanks, Genny. You're okay with, instead of replacing -- I think you had asked for it to replace, or do you want those is the stock overfished, and is the stock undergoing overfishing, those sub-bullets, retained or deleted? All right. Thanks, Genny and Judd. Other comments on the review, the new text in orange here? All right. I don't see any hands raised. We'll check online, I guess, Judd, please.

DR. CURTIS: Alexei has got his hand raised, but it might be --

DR. BUCKEL: Alexei, we see your hand is raised, and is that from the previous comment, or do you have another question? All right. It's down now, and we'll take that as a no. I don't see any hands raised here, and, Julie, do you have any questions on what we've provided?

DR. NEER: No, and this is helpful. The one other thing that I just wanted to make a quick comment on, before we go to your next topic, and it's kind of a segue into that, is I wanted to give the SSC just an elevator speech on changes that may be coming to the SEDAR process starting in 2026.

The Southeast Fisheries Science Center has provided, and suggested, a new method for sort of scheduling and handling our assessments. As I said, the spoiler alert is we have gotten rid of the research track category, and, in fact, the push is to get rid of all the categories and just call everything an assessment, and you will, in the future, be asked to provide guidance, probably after the council weighs-in first, on information on -- So let's say the council wants an assessment on red porgy, and you guys might be asked to provide information on what did you think about the last model, what did you think about the way it was done the last time, do you think it needs major changes, do you think it could have possibly been done in a different modeling framework, perhaps not as complex of a model, perhaps a less-complex model, things like that, and then, also, you're going to -- They're kind of doing what they're calling sort of an a la carte approach.

The question will be we want this species done, and we want this done in the next three to four or five years, and we are interested in getting management information in a timely fashion, and you guys might be asked to weigh-in on things such as, well, we think we need a data workshop, because there's been a lot of changes, or maybe we think there's been very few new information, and so we're okay with sort of more along the lines of what we used to call an update, where you update the landings streams and everything else, and you go forward with that.

You're also going to weigh-in, or the council ultimately is going to go to the steering committee and ask for this species, and it's like do we want a data workshop, do we need topical working groups, do we need webinars, do we want a CIE/SSC external peer review, and they're sort of going to they want -- For the species of interest, what pieces, and parts, do you think are required for that particular assessment, and then we'll give -- Each cooperator will give a list of, I don't know, five to eight to ten, and I'm not sure how many you will come up with, to the Science Center.

Then the Science Center will say thank you for all of that information, and then we're going to look at what you want, versus what the Gulf requested, versus what the Caribbean requested, across the stock assessment enterprise, and then they will inform the cooperators that we can do this and this and this, and we think that this is the appropriate level of complexity for this species, in terms of modeling, and we think this one might be -- It might get away with a less-complex model, but we might be able to get information every two years or three years, as opposed to every five to seven years, as you're getting now for some species.

There's a lot to work out. We just had this meeting in March, and the cooperators were given sort of homework, to go take things back to their councils, and their SSCs, and their other technical bodies, and provide information back. The SEDAR Steering Committee is having a check-in in May, to see how the initial floating of these ideas is going, and then our regular SEDAR Steering Committee in August, where we're going to try and solidify a few more things, because 2026 is right around the corner, and we're trying to roll this approach out for the 2026 species, which are yet to be determined, and so I will have more information for you at your October meeting, after the committee has made more decisions, but I just wanted to give you a heads-up, because you're going to see some of the things in the next -- Some of the questions that Judd is going to ask you about the statement of work that you're looking at for black sea bass might seem a little odd, but it's because of this new approach that we're trying to roll out.

Like I said, we don't have all the guidance yet, and we don't have all the understanding of how it's all going to -- You know, it's all well and good in the big this is a great idea, and the theory is that it's going to allow us to be more -- To get the assessments done at the proper level of complexity, to do more throughput, as well as to provide faster and more efficient and more timely management advice to the cooperators who actually need to manage these fisheries, but then it comes to me, who has to make it happen, and, of course, I have lots of questions, and so I'm happy to answer what I can, as of now, but I will do my best.

DR. BUCKEL: Marcel.

DR. REICHERT: In the current structure, the level of SSC involvement differs based on the type of assessment, currently, and so I think it would be very useful for the SSC to know when that discussion is going on, because now it's probably -- It depends on how involved, ultimately, any assessment is going to be, and so I have a difficult time envisioning how it is then determined, the level of involvement of the SSC in the assessment process, and it's difficult for me to kind of envision how that works, and so I personally would encourage you, and others, to take that with you in the discussions, because I think, for the SSC workload, that's important for the planning, and so, anyway, I just wanted to mention that.

DR. NEER: I do know that there is a very directed intent to bring you guys in, as the process develops, and get your feedback of how you think this might work and how it might affect you, and I know that both John and Carolyn stated that several times during the committee meeting, that, well, we're going to have to talk to our SSC about this and see where their role is, and what they're comfortable with as well, and so I'm sure you will hear more, but I was just trying to kind of give a little prep for the next agenda topic.

DR. REICHERT: Thank you.

DR. BUCKEL: Thanks, Marcel, and thanks, Julie. Steve.

DR. TURNER: Did I hear you say that the SSC would be involved in determining sort of the complexity of the assessment, like update, operational, benchmark?

DR. NEER: That is my understanding, and I guess it will be ultimately up to -- You will get to weigh-in, with regard to what your recommendations are. Ultimately, it was determined that what level of complexity would be decided upon ultimately lies with the Science Center, for the assessments that they conduct and lead, but I would assume that they would take your guidance into consideration when they're moving forward with those things, or I would hope they would.

DR. TURNER: So that would come to us, and we wouldn't be offering that, because I am concerned about the expertise here, having the knowledge about what's new and what's not new, and what's available and what's not, and, you know, I'm not sure that's where we're at.

DR. NEER: Well, and that's true, and I think, again, we're trying to figure out the best way to bring the information to you guys in an appropriate level that you can weigh-in on, and then, also, have it be not a top-down process, where you're being told this is what you're going to do and then the SSC being upset that they weren't involved earlier, and so it is going to be a challenge to figure out. I agree with you that there may be things that the SSC can't weigh-in on, in terms of like the latest and greatest methods, perhaps, and stuff, but you might be able to --

An example is you might be able to look at an assessment and go, well, you had four indices, but they were all uninformative, and maybe we don't need the indices in an updated model for this, and that might be something that you guys could look at a previous assessment and weigh-in on, and maybe not, and it will differ also by cooperator, because different SSCs have different expertise, and, as the SSCs change membership over time, they might also have different things as well.

I think that's one of the things that, when we come back to you with a more formal presentation of these are the things we would like you to weigh-in on, I think, at that point, it would be appropriate for the SSC to say that I don't think it's appropriate for us, as an SSC, to weigh-in on that, and we don't have the expertise, and we will defer to the lead analytic team, or something, but I'm not sure at what level that everyone is going to weigh-in just yet anyway, because we're not sure how it's all going to go, but this is a good -- These are good things that are making me think about stuff now, and I appreciate you bringing them up already.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: Thank you, Chair. Pardon me if I'm a little bit confused, but I thought there should be boilerplates for what is a benchmark, in terms of the type of things that are going to be required for a benchmark, as opposed to an update, or so on and so forth, and am I completely wrong about that?

DR. NEER: That is what we have now. That is what the Science Center is trying to get away from, and make it a more a la carte approach, so that we're doing the appropriate modeling, and appropriate data needs, for the appropriate species, as opposed to locking them into this will be done in this fashion, following this process. They're trying to make it a little bit more flexible in the process, so that they can be more efficient, and get more done, by not being pigeonholed into, well, we have to do this, and this is the model type that gives you that. It's a very different approach than what we have used in the past, and I believe it's going to be confusing for many, and we'll have to see how it goes, but, yes, that's what we have now.

A benchmark has a data workshop, an assessment series of webinars, perhaps an in-person, and then a review, and that's how it works, and an operational does not have those things, under the current structure, but the current structure is perhaps going away, and I still say "perhaps" because it's --

DR. SERCHUK: But those terms are used in other SSCs as well, and are you basically saying that the Science Center will now have the option to define what a benchmark is, and what an update is, and so on and so forth, that differs? I'm finding it a little bit confusing, quite frankly.

DR. NEER: Well, we're not going to call things update and benchmark and operational anymore, and everything is going to be an assessment. That's the nomenclature that they are recommending, and so you're going to have an assessment for red porgy. That assessment will consist of a data workshop, some assessment webinars, and an SSC review, because we don't believe there's enough changes that we're going to need an external peer review. You might have an assessment of gray triggerfish, and that assessment, that process, will simply consist of a series of webinars, and one topical working group, to look at a new age study that came out, but they're all just going to be called assessments by species, and it's confusing.

You're not the only one, and there's going to be some growing pains with this, for sure, and that's why -- That is why the steering committee is actually having what we're calling a check-in webinar in May, to kind of follow-up with all the discussions we had at our first meeting, and then we're going to meet again in August, and, if need be, again at the end of the year, to try and get -- To work out the kinks of how to do this and to find the language that will be appropriate to share with people, and you're not the only one who is confused. I have to do it, and I'm confused.

DR. SERCHUK: It seems like there should have been some discussion about that among the SSC, or in cooperation with the center about this, and it just seems that, from my point of view, this has been decided before we even got here, and I think we're a body I think that should be either consulted or work cooperatively with the center. Thank you.

DR. BUCKEL: Thanks, Fred. Chris, were you next, and then Kai? Kai and then Chris.

DR. LORENZEN: I couldn't agree more with my colleague to the right, and I think we should have an SSC discussion about that, and I have real concerns about this process, mostly -- Well,

partly because I think, if you do it appropriately, that that's a lot of planning for every single assessment, and I think there would be a lot of, you know, after the event, saying, oh gosh, I wish we had this and that and the other, which we agreed not to have, and so I really think we should have an SSC discussion and some feedback on that.

DR. BUCKEL: Thanks, Kai. Chris.

DR. DUMAS: I don't necessarily have a problem with the proposed new way of doing things, but one question I would have is, if we treat different species differently, in terms of what we do, is that going to open us up to any kind of legal liability for being arbitrary, or being -- That's a law question, and I'm not a lawyer, but, you know, if we do different things with different species, and have different processes, and, if we don't follow a template -- I know there's a lot of variation in application of what we do now, but, if there's variation at the outset, is that going to be a legal problem? Thanks.

DR. BUCKEL: Shep Grimes, NOAA Counsel, is coming to the table to address Chris's question.

MR. GRIMES: Thank you. Shepherd Grimes, NOAA General Counsel, and so, I mean, varying from assessment-to-assessment is something that somebody could bring up, right, but I would generally say, if you have explained the differences of why you've employed any approach, then it certainly should be sufficient, and it's obviously something that is technical enough that a court is going to be, or should be, very reticent to second-guess, and probably would be, but, while I have the mic, I was going to ask if the SEDAR SOPPs have been, or are in the process of being, updated, to reflect what we have, because I know I have asked before, and the research track was never even in the SOPPs, and now we're going away from the research track, and we've got SOPPs up there that do not reflect the way we're currently doing things, which could become a legal problem.

DR. BUCKEL: Thank you, Shep.

DR. NEER: What we have are the SOPPs, as well as what's called a guidance document, that documents how we're undergoing things now, which is now, obviously, all going to change again, because reviewing the SOPPs can take two to three years, as we've learned in process, and so we were trying to flesh out all the questions about the research track before we updated the SOPPs, which is why we had this guidance document, which is on the website and available, which we were following, but now I will stop updating that guidance document, as we develop perhaps something new.

I will -- I do want to comment on one of the rationales, and I just want to share this, that they were getting rid of terminology such as benchmark versus operational versus update, is those things always seem to imply levels of, you know, complexity, or also levels of all your effort, how much effort you put into something, and we have seen in the past, often, if it is an update, people might say, well, if you had done an operational, we might have gotten a better answer, or, if we had done the benchmark, and I hate the term, but it used to be called -- That was the gold standard, was the benchmark, and then, if you didn't do an update, we would get picked on for not choosing that, and so that's the rationale for calling everything an assessment, and scaling it.

It's going to be difficult, because I know we already keep saying, well, you know, it's like an old update, and, even though we don't have updates anymore, and we've moved to operational for the past three years, we still say, well, it's like an old update, and we still have that in our brains, and we're trying to not categorize things as first, second, third, gold, silver, bronze, whatever, but human nature seems to do that sometimes, but I just wanted to share that that's the rationale behind the nomenclature of just calling everything an assessment moving forward, and so I'm just passing along the information.

I actually like all of these comments, and I know that the South Atlantic intends to bring you guys in, and I'm assuming it's going to be at your October meeting, when we have an in-person discussion, as opposed to like a half-day something or other, and we'll have more guidance from the steering committee after that -- Certainly by that August meeting as well. Sorry to stir up something so late in the day.

DR. BUCKEL: Thanks, Julie, and so a couple of items before we leave Agenda Item Number 9. Judd, if you maybe just provide some text for those action items, that the SSC reviewed the terms of reference, and make edits on the terms of reference document. Thanks. Then, for receive the update on the ongoing SEDAR process revisions, the SSC received the update and --

DR. NESSLAGE: Would like to have lots more discussion.

DR. BUCKEL: Yes, that's a nice way of capturing that. Okay. Are folks happy? Steve.

DR. TURNER: In the proposed process.

DR. BUCKEL: Thank you. Ongoing.

DR. TURNER: Or perhaps in the development of the process, rather than implying we accept the process?

DR. BUCKEL: Are folks okay with what we have there? Okay. I'm seeing nodding heads. Then the last item, for Item Number 9, is the public comment. Judd, if you could check the public. Judd is seeing no hands, and so we will move on to Agenda Item Number 10.

DR. CURTIS: If there's any members of the public that wish to provide comment on the last topic, having to do with the SEDAR Red Snapper Benchmark Terms, please raise your hand. No hands.

DR. BUCKEL: All right. Thanks for checking, double-checking, Judd. So no hands for public comment on Agenda Item Number 9, and so we're moving on to Agenda Item Number 10, which is -- We'll continue to hear from Julie, and we're going to review the scope of work for black sea bass, and that's Attachment 10.

SEDAR: REVIEW SCOPE OF WORK FOR BLACK SEA BASS

DR. NEER: You're hearing from Judd.

DR. BUCKEL: Sorry. We're hearing from Judd. Sorry.

DR. CURTIS: So that was a good segue that Julie provided, with some of the upcoming SEDAR proposed revisions and how the process is going to be different, and so this is still -- We want to take a crack at kind of the black sea bass scope of work for our next assessment, while it was still fresh in everyone's minds, because we just finished the last assessment, SEDAR 76, and developed catch level recommendations, in February, and so all of the research recommendations, and other ideas coming from the assessment review, are still fresh in people's heads.

This process, of course, as Julie just explained, may change, and we may not have this same type of scope of work development for the future process, but this is, as it stands right now, how we're still conducting these scopes of work for future assessments, and so this does look a little bit different, and there is some questions in here, like trying to get some SSC feedback on if there's data workshops, and so if topical working groups are needed, in accordance with some of the changes that might be happening with the SEDAR process and what -- What do you call them, the ad hoc menu items might be added.

DR. NEER: A la carte.

DR. CURTIS: What a la carte menu items might be added to the assessment, and so I'll just start at the top, again, and it's been framed mostly from the previous scopes of work that we've done, and so the format should look fairly familiar. You know, one area here is just under the model and additional data years, and it's some language just to show that we didn't provide an actual -- Or state a terminal year, and this has kind of been the process as of late, just to provide as much data as possible up to a year prior to the assessment start date, and any preliminary or partial data that could be included of that year that the assessment has begun.

Then that last bullet, to apply that current BAM model configuration, you know, as Julie requested earlier, is are there other model configurations that the SSC wants to see, moving forward with these assessments, and this would be then a place that we could elaborate on some of those changes. I will just pause there on general model and data questions, and/or edits.

DR. BUCKEL: Questions, or edits, for the black sea bass model and additional data years? I don't see any hands here, Judd, and I know if there are any online.

DR. CURTIS: No hands online, and so, moving on to the requested data updates section, we've got a list of the things here, and here's we wanted some input if the SSC thinks a full data workshop would be needed or just one or two topical working groups, for specific topics, would be sufficient. I don't know what the guidance is from SEDAR at this point, if -- Previously, it was, if you had more than two topical working groups, then it should be a data workshop, but that may change.

DR. NEER: More than three.

DR. CURTIS: Or more than three, but that may change.

DR. BUCKEL: Go ahead, Marcel.

DR. REICHERT: In the red snapper, there was a new bullet point that looked at change, potential changes, in life history parameters, especially given the fact that black sea bass had such a steep decline, and it has been still declining, and it may be good to -- It asked to be specific, and so I made a note that perhaps looking at potential changes -- Because black sea bass has a shorter generation time than a red snapper, and I think it would be good to look at changes in life history parameters, size-at-age, transition, since it's a protogynous fish, and size and age-at-maturity. I would changes over time.

DR. BUCKEL: Examining for a change in -- Yes.

DR. REICHERT: Thank you.

DR. BUCKEL: Thank you, Marcel. Amy and then Fred.

DR. SCHUELLER: Maybe my memory is failing me, but I thought that, when we just provided projections for black sea bass recently, we said something of the order of we recommend some sort of interim analysis as a check, and then, if that was causing some concern, then we would recommend moving forward with an assessment, and I guess I don't necessarily listen -- I will be honest, and I don't listen to the council, because I'm working on other things, and I generally don't listen to the SEDAR Steering Committee, although I think I listened to some of this last time, and I guess what I'm -- My question isn't necessarily about what's on the paper, but it's more about like what happened between our recommendation and this being put together, and can someone speak to that?

DR. CURTIS: Yes, and so Jeff brought the recommendations from the SSC, after our review in February, to the council in March, and they were in agreement that, after the accepting of the ABC projections just for the two years, that we should definitely have an interim analysis to update those catch levels, after the last year of those projections, followed by then an operational assessment for black sea bass. That terminology, of course, may change, and currently though, we don't have any scopes of work for like an interim analysis or anything, and so this scope of work represents the next assessments, full assessment, whatever happens post the interim analysis, which would be somewhere around probably 2028.

DR. SCHUELLER: Okay. Thanks. That helps, because, in my mind, I'm like, well, the next step is interim analysis, and I hope we're not revisiting all life history data for that, because that misses the point.

DR. CURTIS: So I think if there's anything -- I mean, it's kind of hard to predict now, but if there was -- We could add some language in here of, if there was anything coming out of the interim analysis, that would need to be considered in the full assessment, or something towards that effect might be useful.

DR. BUCKEL: Fred Serchuk.

DR. SERCHUK: I wonder whether it would be useful, because one of the things that we know, particularly up in New England, is that we're seeing a lot more black sea bass moving because of climate change impacts, and I'm just wondering whether the issues of changes in distribution of black sea bass, relative to climate change, warming of the waters, is an issue that's worth exploring

from an assessment point of view, and I don't know whether the South Atlantic is moving up to the Mid-Atlantic, or just the Mid-Atlantic is moving up to New England, but clearly there's a definite issue with respect to the expansion of the range of black sea bass in the northwest Atlantic because of warming waters.

DR. CURTIS: Fred, that's absolutely right, and that is one of the modifications to the previously-approved assessment that I've included here in the bullets, just a little bit lower, and this came out of either, I think, the research recommendations from the SSC in February or the research and monitoring plan.

DR. BUCKEL: So, to Amy's point, at some point we'll get a scope of work for the interim analysis, or is that something that, because it's interim, there's no need for that?

DR. NEER: So it's possible the council might come to you and ask for feedback on an interim analysis. There's been a lot of it in the Gulf, and, initially, the SSC weighed-in on an appropriate index for use in the interim analyses, in consultation with the Science Center, and they received a presentation from the Science Center on we feel these are the appropriate indices for Species X and Species Y and Species Z, and, once the SSC signed-off on that, that's what they've been using for the interims.

You guys, the South Atlantic, is a little bit farther behind in that process, mainly because a lot of your assessments don't have an appropriate fishery-independent index that can be used to model these stocks, and so I guess that's going to have to be something that you might want to provide guidance on, and not on this directly, but say, you know, if there's an interim analysis, how is that going to be conducted, and maybe the Science Center can provide some more information on that at your next meeting.

DR. CURTIS: If you recall from February, during the review of that black sea bass last assessment, and discussion of the interim analysis, you had seen -- The SSC had seen an interim analysis done for vermilion snapper, where it was not recommended, because it did not follow the index very well, but, for black sea bass, it did follow the trap index very well, and so that was recommended to serve as the index for the interim analysis, and so that is, I guess, the recommendation from the SSC at this time, and the center could probably run with that. If they need anything else, then maybe the SSC -- They could come back to the SSC to provide it, but I think Erik is going to speak to that.

DR. BUCKEL: All right. Erik Williams has come to the table.

DR. WILLIAMS: Thanks. Just to be clear about interim analysis, you will recall how many meetings we had to discuss vermilion snapper, and all the analysis that went behind that, and I don't know if it to that level needs to be done for every species, but at least something very close to that has to be done before you can take an index that's pulled out of an assessment and make an ABC adjustment based on how that index is behaving, and so I would just warn you that, if you think about what we had to do for vermilion snapper to get to that point, we're almost better off just doing an updated assessment model, and put in the most recent data and give you some results, and it's going to be probably an easier process.

DR. BUCKEL: Go ahead, Steve. Erik, you may not want to leave. It may be a question for you.

DR. TURNER: So, back in the model and additional data years, and the last bullet is apply the current BAM configurations, and, yesterday, we saw a lot of information suggesting that there could be an environmental effect. Now, I doubt that, in a couple of years, we would be certain that there is an environmental effect, but were we, I don't think you could include it in the BAM configurations, and so do we want to think about that possibility?

DR. BUCKEL: What do folks think about that? Should we make that a little more general, to apply the current BAM configuration or other appropriate -- Thanks, Steve. So, Erik, I had a question on the amount of time for the interim, versus what we're talking about here, redoing the -- Or just providing updated data within the current -- Within the SEDAR 76 assessment, and so that whole process -- It took a long time with the interim, and that was working through things, but, if we felt -- I think, what I remember from the vermilion, is that we were happy with the approach, but it's just that --

The methodology we were happy with, but it was the lack of the fit to that index, and that's what we didn't recommend moving forward with management, but the overall methodology we felt was sound, and folks can correct me if I'm wrong, and so would that save time, if the methodology has been worked out now, and the SSC says, yes, we like that, and would that go faster that redoing the black sea bass assessment? I just wanted to clarify that.

DR. WILLIAMS: There's still going to be a hefty amount of analysis involved, and I say that because you have to look at, you know, the variance that's in the index, and the uncertainty in the model, what's driving the index from the assessment model, and how to then interpret any changes in the index, and I would say that one example of why black sea bass might actually be a bad case is what seems to be driving that index is declining recruitment.

If you were to, let's just hypothetically, say take that assessment and have the terminal year be the peak of before that index decline, and then apply that index method, we would have been ratcheting down the ABC to beyond zero, almost, given that decline in the index, and so there's an example of where the index method would have failed us, essentially, and so that's the kind of analysis we have to do to see, you know, what do you do with that index information, and how do you adjust your ABC.

That's where you have to do a big simulation study, with various inputs, stochasticity, to see, okay, what if it's being driven by this, or that, and what do we know, and what do we not know, and, in my opinion, it just seems easier to just throw in new data, just do a very compressed assessment update, and don't run it through SEDAR, and don't -- Just grab the newest data, and even do a reduced report, you know, a ten-page report, that says here's the model, and we ran it with the updated data, and here's the key results, and go for it.

DR. BUCKEL: Thanks, Erik. Any comments to that? All right. So we're working through the scope of work for black sea bass. Chip is here.

DR. COLLIER: I mean, the big question with that is the ABC recommendation is going out in 2026, and we want to get new information for the stock, and we need to know whether or not it's going up or down, and so I don't care if it's called an interim analysis, or the more updated version, but what can we request to get updated ABCs around the 2026 timeframe? There's going to be a

lot of assessment requests in that timeframe, and we've already been told that we have exceeded our request for assessments in that timeframe, and so I'm just curious. What can we request in 2026?

DR. WILLIAMS: You can request whatever you want. I mean, I can't predict what our center workload, or even my branch's workload, is going to look like in 2026, and so -- But I would say that the other thing to keep in mind, with these simpler index-based approaches, is, because they're simpler, there's more uncertainty, and so, by definition, we should be expecting bigger buffers between OFL and ABC, and so, I mean, it's just -- It's a tradeoff. I mean, do you want to use something very simplistic, with a lot of uncertainty, and, if we characterize that uncertainty properly, we may end up with a much bigger buffer than if you just update the assessment, and I don't know.

DR. BUCKEL: If updating the assessment is faster than the interim analysis, then I think updating -- You know how long it's going to take, and if it's going to be shorter to do a -- We'll call it a quick update, and I think the SSC would all agree with that.

DR. WILLIAMS: The tradeoff to this still is, and it may be in 2026, and the tradeoff is that data pull, getting all the data to update, is a challenge, and it continues to be a challenge, and so I don't know. I'm hypothetically thinking that that will improve by 2026, and I would hope, and there's a lot of measures going on in place in the center right now to make the sort of data provision process a lot faster, and a lot easier, and I don't know how far along we'll be by 2026.

DR. BUCKEL: Good point, and it's not just the analysts' time, but it's also the data providers' time. Thanks, Erik. All right, Judd. We're in potential modifications to the previously-approved assessment.

DR. CURTIS: Yes, and so these potential modifications came, again, from the research recommendations from the last assessment, from the SSC's recommendations of the review of SEDAR 76, as well as the research and monitoring plan, the latest iteration of that, and I forget which years that goes through in 2026.

DR. BUCKEL: Marcel.

DR. REICHERT: The first bullet point goes back to what I mentioned earlier, and I hope someone proves me wrong, but it looks like it's highly unlikely that we will have any of that. There may be some data from the calibration study that they just completed, but that may still not be available at that time, and just -- Still, I think we should probably leave that bullet point in there, but --

DR. BUCKEL: Marcel.

DR. REICHERT: The whole recruitment issue -- Unless I missed it, I think it would be good to add that, or at least refer to that study, and is it -- Maybe I missed it. That's the next point. Okay. Sorry.

DR. CURTIS: Maybe you want to move that up into the modifications specifically, but we had -- I added this here, and, you know, Kyle's group has been working on that low recruitment at the center, and so incorporating any of those recommendations -- They had conducted -- I don't know

if they've conducted a procedural workgroup, and I might have the wrong terminology, but they've got the workgroup looking at investigating the low-recruitment trends, and so the scope here is meant to reflect how to integrate those into this next assessment, but, if you want to add that specifically, we can absolutely do that.

DR. REICHERT: No, and I think -- I don't think it makes much of a difference to leave it here or move it up. I was more thinking about the link of this with environmental factors, and that goes back to -- I already forgot who made that recommendation in terms of the model. Perhaps we need to think about some different approaches, if indeed environmental factors are playing a significant role in that. I'm not sure how to incorporate that.

DR. BUCKEL: Amy.

DR. SCHUELLER: So I was looking at the second bullet under potential modifications, and is that what we're saying, that we want to move this, and so incorporate catch level working group recommendations means the recruitment projection advice given by that group, right? Okay, then we need to clarify that bullet.

DR. BUCKEL: Catch level projections working group.

DR. SCHUELLER: Because we had like a red snapper ABC determination working group, at one point, and we've had like a bunch of working groups, where, to me, "catch level working group" is super ambiguous, and so maybe refer to the actual report title, or document, somehow, and I haven't said anything about the topical working group yet, or whatever this is we're going to do, and, I mean, I -- It's says "procedural workshop", and there were some edits that Judd did, and we had a big discussion about that topic at this meeting, and it seems like there's some recommendations to be made for future considerations, and, as I've been squinting at Tracey's presentation, I think there's even more stuff in there, and I guess I'm -- I think, whatever we write, we need to make sure we allow enough time for it.

I don't want it to be like a one-off week thing, where something is written that is not really helpful, and so I would envision it being more than a week, and clearly the center is already working on it, and so it's kind of an odd situation, and I'm not sure what to do with it, but it's clearly something that needs to be addressed, and I think it's going to take a while, and so like putting it in here seems too late, and it's not just for black sea bass, and it's not even just for the species that are like listed on the list, because, if you looked at the presentation that Tracey gave today, there's like the Stenotomus species index looks -- And the length comps are -- They would suggest that should be maybe considered.

Then I was looking at both the -- I think the trawl survey stuff, for Spanish and king mackerel -- If you ignore the 2016 point for king mackerel, those both look the same concerning -- The 2009 to 2011 crashed down in abundance as well, and so I'm starting to be a bit more concerned that this is more species than we're recognizing, observed in more gears and datasets than we're recognizing, and it's going to take a lot of time, and then I also pulled up Wally's paper, and I feel like, if those indices were scaled to their mean, and stuck in an assessment, they might give different answers, and I'm concerned about that, and, of course, that's me eyeballing a panel figure in a paper, but I think it needs more work, like a lot more work.

DR. CURTIS: So then do you recommend removing this whole section here, because it's likely premature for the next black sea bass assessment, integrating any of that, those recommendations?

DR. SCHUELLER: I mean, if this isn't happening until 2026, hopefully we're working on it over the next two years, and it feels like we're not putting together a topical working group, or a procedural workshop, for this particular assessment, and it's like a bigger, overarching issue, and I don't know where we put that. Like I don't know what the process is for where we put that, but we need to do something, and clearly the center is doing something, but I feel like maybe there needs to be a little bit more holistic group, or something, working on that, and not to step on toes, because clearly I'm sure they want to write up a paper and such, and so --

DR. BUCKEL: Maybe there can be a second iteration, where that core group, or the core of that group and some SSC members, or others that the SSC identifies that have the expertise to move that forward, with some of the items that you just mentioned, the adding other species, et cetera. Marcel.

DR. REICHERT: I completely agree with Amy, and perhaps, you know, this can be part of this, but perhaps we can lift that out of this scope of work and make a recommendation that, as an SSC, we feel that this is a -- To come to a useful product, that it may be a longer process and that we can perhaps recommend something that Amy mentioned, so we can work on that. You know, I agree that, if we start working on it when this becomes a reality, then we are probably too late, and so perhaps we can lift it out and make that a separate recommendation, and including black sea bass, but not specifically focused on black sea bass.

DR. BUCKEL: Genny.

DR. NESSLAGE: A number of us been chatting about all the wonderful presentations we've had so far at the meeting, and there may be things that that group, right now, is not exploring, that perhaps they are thinking about exploring, and, if they're not thinking about it, I think the SSC is going to want to see something, and who does that work, and in what order, but, before it gets put into an assessment, or we recommend that it gets put into an assessment, perhaps we're going to want to see that work done, and so I guess is it possible, tomorrow, when we're writing up our recommendations, that, like Marcel was saying, that we pull that out and that our recommendation is that the SSC be involved in whatever product gets used in future assessments, for multiple species, and help guide where that's going, because we have concerns for multiple stocks, and not all of the approaches they are exploring -- It may not be all of the ones that we are interested in and concerned about as well, and so maybe we can work on that wording tomorrow.

DR. BUCKEL: Yes, that sounds good, and I think -- Judd, you deleted that, but I think the topical working group, a second iteration, or a continuation of the one that's currently -- Whatever form that takes, and we'll talk about that tomorrow, but that part can be deleted from here, because we want that done before the assessment, but I think a general text, in the section above, about incorporating any new information on recruitment, environmental recruitment, relationships. Amy.

DR. SCHUELLER: I also don't think we should use the words "determine causation of low-recruitment trends", because I'm like not sure we're going to do that, and I think we're going to explore data, and have some hypotheses about the possibility of low-recruitment trends.

DR. BUCKEL: So "investigate"?

DR. SCHUELLER: Yes, "investigate", and I know I'm being very nit-picky, but this feels like, yes, we're going to figure it out, and I'm just not that confident that we're going to figure it out. You all know, and there's like tons of things that we all scratch our heads about around this table constantly, and so --

DR. BUCKEL: Okay. Other -- Amy, go ahead.

DR. SCHUELLER: I'm sorry, and so that also says -- It says "investigate causes and how to integrate into the assessment, if possible". I mean, just put "if possible" after "assessment", because -- I can come up with a whole bunch of hypotheses that could be possible, and not all of them are things that we might be able to put into the types of assessments that we have, and currently do and have data for, and so -- Just because -- Even if we did roll out and find the cause, we might not actually be able to put it in this assessment, because it might be something outside of the purview of a single-species assessment, and so I guess tamping expectations again.

DR. BUCKEL: Thanks, Amy. All right. I don't see any other hands. Judd, is there anything else that? I guess the suggested topical working group process, we can -- We're going to talk about that, and what we've decided is that that would happen well before this assessment, and so we can table that for tomorrow, and delete it from here, I think, right, and deleting the topical working group from this -- It's not going to be part of this black sea bass assessment, and it's going to happen before the black sea bass.

DR. SCHUELLER: I mean, I think -- I don't know who this goes to next, but sort of leaving it like that, and then maybe making a comment, and saying why we did this, with some explanation, would be probably helpful for the council getting this, and they will want to know why did we delete that, and I think we need to be really clear about why.

DR. BUCKEL: The continuation of the current working group, or some future iteration of that is needed, but it needs to happen before the assessment, or as much work as possible be done before the --

DR. CURTIS: When we're going through these items with the council, you know, I can have that in my back pocket, to explain to them why it's being moved from that spot to the top, and it's a more holistic idea that needs to be tackled now.

DR. BUCKEL: Yes, and I don't know about -- Everyone is onboard with some kind of working group. Steve.

DR. TURNER: Moving backwards, under requested data updates, first bullet, the second sub-bullet, stock productivity and steepness, and I suggest that gets changes to approaches for projecting future recruitment.

DR. BUCKEL: Amy.

DR. SCHUELLER: What does that mean?

DR. TURNER: You know, we're not -- I don't think we want to be boxed into, you know, some stock recruitment and steepness, and, I mean, we used a three-year average, and so that's why I'm trying to get away from, but go right. You're the assessment folks, and so I feel like that language is boxing us in, but maybe I'm wrong.

DR. BUCKEL: I think the first -- That's a sub-bullet underneath this, to review any new and updated information, to determine if it warrants consideration, and so, if there's new information on stock productivity, or stock-recruitment steepness, but, if not, then it wouldn't be -- I don't think it's boxing in, but it's just saying review what's out there. Others weigh-in, please. Amy.

DR. SCHUELLER: I like your comment, Jeff, and I do think that it's like we've done what we've done, and, if there's anything new, to indicate we should do something different, let's consider it for stock productivity and steepness, and then that would have some ramifications for projections, which I think is captured in the second bullet, which is incorporate the catch level projections working group recommendations, which speaks to those different options, and so like there is a framework, in that document, that says, if you have this, do this, and, if you have this, do this, and it gives guidance, and so that's why I said what do you mean by that, because it could have meant -- It was ambiguous, to me, and it could have meant review the whole guidance provided by that working group, which is a much bigger task, and so I guess my vote is to delete that. I'm curious what other people think.

DR. BUCKEL: I think it is captured in the catch level projections working group document, and so -- Okay. Fred Scharf.

DR. SCHARF: I don't know what other folks are thinking, but my first thought, given what might be happening in separate topical working groups, the low-recruitment group, the potential for life history changes to have occurred over this time period, and I think we need a data workshop. That's my first impression. I will leave that on the floor.

DR. BUCKEL: So is there going to be -- I guess that's a question, and is there going to be new information on -- Is that something that usually comes out of Wally's group, and so is that something that's on your research plan, or do you do that -- Do you update age-at-maturity, changes in size-at-age, transition age, size-at-maturity, and is that something that you're doing regularly, or do you need the research funds to do that?

DR. BUBLEY: Typically, we will look into that, anytime an assessment comes up, and just sometimes a cursory glance, to see if anything has changed, and other times we'll dig into it further, and so, if it's an occurrence -- In instances like this, where maybe we need to look into it more, that's something that we do, and I mean, it goes along with the assessment processes, and we will explore that if needed.

DR. BUCKEL: Go ahead, Amy.

DR. SCHUELLER: If we're going this like a la carte method, can we -- I mean, I guess I hate to see a data workshop happen where like, you know, Wally and his group shows up, and they're like, yes, we dug into it, and there's nothing different, and so I guess -- I don't know what everybody else's a la carte menu looks like in their head, but, I mean, I could imagine there would

be an option where it was like a preliminary look into whether or not there's even data to address that, and whether or not there even appears to be a change, and, if no, then no data workshop, and, if yes, have one, and is that something we can recommend in our a la carte?

DR. BUCKEL: I think so. Julie says yes.

DR. NEER: Just, in general, the goal is to say this is the species we want, and then to do some preliminary work, and I don't want to call it a triage overall, but of all the data that was used last time, and do we have a new index that we need to look at, and do we have a whole bunch of new life history information, and do we have -- If the answer is no, no, no, and we're just updating everything, then likely the center will say thank you for that recommendation of a workshop, but we don't see that it's needed, and here's why, and we'll still update all the data, but that's part of why we're trying to start having these conversations about do we think there's going to be any new information.

I mean, right now, maybe not, and we can always plan on it, and, if we don't need it -- It's always easy to say, you know what, we don't need to have this workshop. What's more difficult is to go, holy smokes, we didn't know that there was X, Y, and Z, and then trying to stick that in, when the workplan has already been developed, and so that's part of this, is the brainstorming of like what do we know, and what might be available, and let's get it all on the table, and then we can investigate whether we need X, Y, and Z pieces to this overall assessment process, or can we get away with two webinars and Wally sends us a working paper, and that might be appropriate.

DR. BUCKEL: Wally and then Marcel.

DR. BUBLEY: I will say, if this is how we're looking forward to doing it in the future, definitely deadlines would be nice to know, as to when this is, because, on average, we are working on these data going up to those data deadlines, and so, I mean, we're kind of jumping from one assessment to the next, and so, if we need to start doing it slightly different, we need to know about that in advance, so we can plan accordingly.

DR. REICHERT: Wally made one of my points, and I remember that we would always be working like two years ahead of schedule, and so changes in the SEDAR schedule is always messing the data providers up, but, and I may be misinterpreting what you said earlier, Amy, but, you know, it's called a data workshop, but I think you, or someone, mentioned that it's not just new data, and there is some new methodologies, recruitment and some of the other stuff, and so, if it's data workshop that purely looks at the data, then, yes, maybe we don't need one, and I'm not sure whether that's feasible. There are many other aspects that are related to data, but that are more about interpretation of data and analyses and models, that may require a bunch of people to get together for a couple of days and talk about it, and so I think a meeting, whether you call it a data workshop or something else, may be needed.

DR. BUCKEL: So maybe a data workshop, if deemed necessary, something like that.

DR. REICHERT: But not just about the data, because, again, then we are shoehorning ourselves into -- I think it would be good, prior to that assessment, to talk about some of the other stuff that we talked about today and in our previous meetings.

DR. BUCKEL: Julie.

DR. NEER: It is supposed to be looked at, this new approach, in sort of more of a holistic thing, and it's not supposed to be we're only looking at data. The other piece you would weigh-in on is, well, do you think we need an assessment panel, with a series of assessment webinars, that will look at how do we incorporate a new recruitment indices, and how do we incorporate a new modeling technique to grab onto different things, and so this template, as we're clearly seeing, is not useful under the new process, and we're talking about it already, how to modify it, and to help get the information we need, because that's -- You may not need a data workshop, because there's not a whole lot of new information data-wise, but there might be a lot of things that change in the model, and so you might think that we don't need data, and we just update it, but it would be useful to have a panel, with Science Center and SSC representatives, to look at new modeling techniques.

Maybe we do that over three webinars, right, and so it is going to, I think -- This is an excellent exercise, because it's helping me process how we're going to get the information that we need out of you guys and to the people who make these decisions, and so I appreciate these discussions, and I think it will help, you know, and so don't get too hung up on perhaps the bullets in this template.

DR. BUCKEL: Amy.

DR. SCHUELLER: I'm trying to think about how I would -- How is this a la carte plan going to work, and, I mean, I hear all these things, and I think the thing that catches us up in assessments, a lot, is that we're like trucking along, doing our best job, and then like something comes up that we totally didn't expect, and like we already had these conversations, and we didn't know it was going to smack us upside the head, but it did, and like the current situation is that it's like really inflexible, and I guess I'm wondering like how is the SEDAR Steering Committee discussing how to enter in flexibility.

In my mind, I was thinking that -- Like you used "a la carte", which, to me, is like a restaurant metaphor, right, and like the data are the hors d'oeuvres, and like you could come to the table and take that order and get that sort of squared away, and then move to the next plan, and I guess what I'm wondering is was there any discussion about like developing workplans in stages, as we move through, rather than this sort of rigid workplan from start to end, where we don't even know what we're going to smacked upside the head with, or maybe we're not going to get hit with anything, and we're lucky, but I like hardly do any assessments where that is true, and so I -- I can't envision this yet, and I don't know if everybody does envision what they think it is, and so maybe I'm just ahead of everyone else.

DR. NEER: The developing things in stages, as things go along, was called the research track, and that's exactly how that process was set up. We had data, and then we had a chunk of assessment time, and then we didn't know if that was enough time, and, if it wasn't, then we had these checkpoints of this is when we decide if we're going to review or not, and, if not -- That plan, unfortunately, ended up taking two to three years, and not producing any management advice, and that didn't work so well, and so that's not an option anymore, but I think the goal of this whole sort of revamp of the process is supposed to allow -- It's to make sure that we are focusing on the complexity that is needed for the assessments that need more complex modeling, and not as complex models for the assessments, or the species, that don't need it.

Overall, that will improve throughput, one, and timeliness, two, but, additionally, it should free up what we call white space, if you've ever looked at the grid on the SEDAR schedule of how things are, so that it will allow more flexibility. Instead of going okay, this assessment is taking longer, and so now this pushes this one back three years, and hopefully, by right-sizing, or scaling the assessments appropriately in complexity and data needs, it will allow some more flexibility to, one, deal with hang-ups that happen, but, two, also be able to go, oh, this is a squeaky wheel that we need to kind of stick in, and, look, we have a seven-month window where maybe we could do this. It doesn't help the life history folks that need two years out, but we know that already, and so, yes, there's a lot of moving pieces.

The goal is to also help that -- Like you said, you don't know what's going to come out of the woodwork and knock you on your bum, and so hopefully this other process will, one, let you -- Also, the converse is you say this is going to be hugely difficult, and we need five months to model it, and then you go, oh look, and that worked right away, and, well, now I have this window of time, or whatever, and someone is working on something in their garage now, on a laptop, and they're going to solve all our problems, but, yes, there's a lot of ideas that hopefully will filter to the top and allow these changes, under this new process, and we will, of course, wait and see, because we thought some of these things would filter out through the research track, and, unfortunately, it was not successful. I hope that helped, sort of.

DR. BUCKEL: Kai.

DR. LORENZEN: I'm not sure if I'm adding anything new, but I just think there's a lot of potential for regret. You go in, and, you know, you didn't do all these things, and then you say, oh damn, and we need to go back.

DR. NESSLAGE: We ordered the wrong appetizer.

DR. LORENZEN: We ordered the wrong appetizer. Exactly.

DR. BUCKEL: Okay. Go ahead, Julie.

DR. NEER: Chip wanted me to mention that, from the council's perspective, we're trying to get more throughput, and that's what the Science Center was trying to find a way to accomplish for us, because it's not just more throughput, and it's also timely advice, and so they're linked together, and we need a few more assessments, but, more importantly, we need assessments that come not with a terminal year that's three years behind, when it gets to the management, and five years old by the time they implement the management, and so there's two pieces of that puzzle, and the SEDAR -- The center is working on that piece, through SEDAR, and then SERO is also trying to find ways to shorten up their time window as well, and so those are some of the things that we're hoping to gain out of this new envisioned restaurant of assessments.

DR. BUCKEL: All right, and so, Julie, do you have -- Judd, I guess you were the presenter here, and do you have what you need?

DR. CURTIS: Yes, and I think we're good for right now, and thanks for the input, and I've realized that we probably need to reframe how we're going to go about doing these scopes of work, as we move forward, but that's all we need for now.

DR. BUCKEL: Just for clarification, that was a scope of work for the -- What was going to come after an interim analysis.

DR. CURTIS: Correct.

DR. BUCKEL: So what we've heard from the center, from Erik Williams, is that the interim analysis would likely take more work than just a quick -- What we used to call an update, a quick update, and so do we want to talk about that at all, that quick update, the timing of that, and that would be in place of the interim analysis that we had recommended to the council at the March meeting, and so just -- Marcel.

DR. REICHERT: Can you clarify that, what you just said?

DR. BUCKEL: At our February webinar, we left that webinar -- We came out of that webinar with a recommendation to the council, that I presented in March, that the SSC recommends an interim analysis be done, and I don't remember the timing, but that was going to be before this assessment that we just talked about, and Erik, today, said that interim analysis will take more time than just updating the data streams and redoing the SEDAR 76 assessment, and so what I'm asking is do we need to provide you, Judd, with some text on that, for Marcel to present in June to the council?

DR. REICHERT: So my question, and that's why I was asking for that clarification, is, are we as an -- Do you mean to say that we, as an SSC, are now recommending that perhaps and update is more efficient than an interim?

DR. BUCKEL: That's what -- I mean, that's what the center told us today.

DR. REICHERT: Okay.

DR. BUCKEL: That's not the SSC saying that. The center informed us about that.

DR. REICHERT: Thank you. That was the clarification that I was -- Sorry, and it's late in the day.

DR. CURTIS: I think, Jeff, and I was just looking at our February report as well, and so the SSC strongly recommended that an interim analysis be conducted in 2026, to review assessment projections, and that the operational assessment be conducted in 2029, and so, if the interim analysis takes a different form, I think the timing would still stay the same for 2026.

DR. BUCKEL: That's to Chip's point that they need that for the ABC, because the current -- We only provided ABCs through --

DR. CURTIS: Through 2026.

DR. BUCKEL: Yes. Marcel.

DR. CURTIS: Whatever form that assessment takes, we need management advice for 2027, moving forward.

DR. BUCKEL: Yes. Correct.

DR. REICHERT: Since this is for 2026, and so there's some time, and perhaps -- This may be a question for Erik, but, if we recommend an update, then you would -- The science center would work on a different path than if we would request an interim, or can we ask whatever -- That we are requesting whatever process will lead to updated management advice in 2026, and do you know what I'm trying to say, and so to give a little more flexibility, because, if the interim analysis ends up being relatively timely, then we can use that. Anyway, but does that make sense?

DR. BUCKEL: Erik.

DR. WILLIAMS: I think a better way to phrase it is you're asking for an analysis that can be the basis for an updated ABC, and just leave it at that, because, yes, I have hinted that I think an update would be quicker, but, again, I am positive that part of that was based on our data provision improving tremendously, and not being the big burden that it is now, and so, yes, I mean, we really have to see where we are, and I think that really what you guys are after is advice that can be used to update the ABC, and leave it at that.

DR. REICHERT: Irrespective of the shape that takes.

DR. WILLIAMS: Exactly.

DR. BUCKEL: Sounds great. Thanks, Erik. So there is side conversations happening about what are we talking about with the interim versus a quick update, and that is something that would take place before the black sea bass stock assessment that we just reviewed a scope of work for, and that is in 2029, and is that correct, 2028 or 2029? It's out there, very far out, but what we need -- Judd is going to --

DR. CURTIS: So this was expected for 2027, but it's probably going to be pushed to 2028, with the red snapper benchmark that you have in that slot.

DR. BUCKEL: That's for the scope of work that we just spent time on, for Agenda Item Number 10, and the separate item that we're talking about is we need something done before this, to get ABC advice, because we only gave ABCs for three years, and so we need something to get ABC advice to the council, and that originally was an interim analysis, and it may still be, but we're going to have general language that we need something done, some type of analysis done, so the SSC can provide SSC recommendations starting in 2027. Thanks, Judd, and so that's going to happen before the black sea bass scope of work that we just talked about. Marcel.

DR. REICHERT: I apologize if I missed this, but now I hear that the potential schedule is -- As listed in this document, it's --

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

DR. REICHERT: Okay, and well I think that would be -- Well, but I think that it would be good to either delete it from the document or -- Because that -- Anyway, I think it's important that we have an expectation, and, if those dates are already not there, then that should not be in there. Thank you.

DR. BUCKEL: Thanks, Marcel. All right. Is this clear for everyone? There's going to be two analyses for black sea bass, one to get that ABC advice for 2027 onward and then another assessment that will hopefully take place in 2028.

DR. LORENZEN: Two assessments of different magnitude.

DR. NEER: Yes.

DR. BUCKEL: Two assessments of different magnitude, as Kai just put, and I like that. Okay. Any other comments on black sea bass? If none from here, then we're going to go to public comment on Agenda Item Number 10.

DR. CURTIS: I am not seeing any hands online.

DR. BUCKEL: All right. Well, we went over again today. Apologies, and thanks for sticking around for another thirty minutes. We'll stop for today, and thanks for everybody's hard work today, but we'll get started tomorrow morning at 8:30, and we have just a morning session tomorrow, hopefully, and I shouldn't jinx us. Judd has got one parting comment.

DR. CURTIS: Just an update that Will provided an updated Agenda Topic 11 attachment, and so that's now on the website, as is the updated Florida SRFS presentation that Bev Sauls provided this morning, and Tracey's -- A PDF of Tracey's presentation as well has been updated, and so those are all the most recent versions on the website.

DR. BUCKEL: Thanks, Judd. Thanks, everyone. Have a good evening.

(Whereupon, the meeting recessed on April 17, 2024.)

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APRIL 18, 2024

THURSDAY MORNING SESSION

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The Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at The Crowne Plaza in North Charleston, South Carolina on April 18, 2024, and was called to order by Dr. Jeff Buckel.

DR. BUCKEL: All right. Good morning, SSC. Welcome back to the South Atlantic Fishery Management Council's Scientific and Statistical Committee for April 2024. We have several agenda items, 11, 12, and 13, and then some -- We'll get to Other Business, elections, and then a

consensus statement on the responses to the action items that we've produced over the last three days, but, first up, I'm happy to introduce Dr. Will Patterson, who is a faculty at the University of Florida and who is heading up the South Atlantic Red Snapper Research Project, and he's with us today to give us an update, and I will point to Attachment 11 that contains that presentation. Will, take it away.

SOUTH ATLANTIC RED SNAPPER RESEARCH PROJECT UPDATE

DR. PATTERSON: Thanks, Jeff. I'm not sure --

DR. CURTIS: Will, I'm making you presenter. It looks good.

DR. PATTERSON: All right. Well, thanks, Jeff and Judd, and thanks for the opportunity to come talk about the project that we've been involved in for the past few years, estimation of U.S. South Atlantic red snapper abundance. It's a large team of folks, with many institutions involved, as well as state agencies along the eastern seaboard, from North Carolina to Florida, and then NOAA Fisheries as well.

Again, our study team is quite broad, and there are lots of diverse skillsets and expertise. The top-left are the folks from the University of Florida, and the top-right are folks from Texas A&M Corpus Christi. The genomics and genetics portion of the project is led by Dave Portnoy at Texas A&M Corpus Christi, and the middle row are folks that are at NC State University, and affiliates, and this team is led by Jeff Buckel, and I don't think I had USGS on the front slide, and I need to put it there, but Nathan Hostetter is the assistant unit leader there at NC State with USGS, and so we have a broad team of a lot of quantitative ecologists at NC State, and Jeff heads up the hierarchical modeling component of our study.

The bottom-left are folks from NOAA Fisheries, and Nathan Bacheler, and Wally Bubley, on the right-hand side of the screen there, and the two of them work together, and there are several surveys involved with camera trap data, SEFIS, MARMAP, SEAMAP South Atlantic, all under the umbrella of SERFS, and so they are critical participants in our study, collecting camara trap data, as well as fin clips, from fish offshore.

Kyle Shertzer and Eric Anderson are quantitative ecologists, and Kyle, obviously, runs the red snapper stock assessment in the South Atlantic, and he and Matt Damiano are working on integration of our study results into that assessment model. Eric Anderson wrote the software, the code, for the CKMR estimation model, and he's actually at the Southwest Fisheries Science Center, but he works closely with Dave Portnoy and Chris Hollenbeck and Liam Kehoe and others, on simulation work, as well as he will be a resource when we actually get to estimating population size.

Bev Sauls and Ted Switzer head up fishery-dependent and fishery-independent groups at Florida FWC, and they have just been phenomenal in collecting tissue samples in particular for this study, and Wally Bubley, from South Carolina DNR, and Dawn Franco, in Georgia, also have been enormous and really -- You know, the team overall has dedicated a lot of effort, and attention, to this project, and so we're very thankful for the level of dedication, and, in particular, the amount of resources that the state agencies, both in personnel time and in collecting -- Sometimes, you

know, borrowing ship time here and there to collect samples for this, and it really has been a coastwide effort, and we're very appreciative of everybody's efforts here.

Our project has four key objectives, and the first is to estimate the distribution and density of red snapper across the U.S. Atlantic shelf, from North Carolina to the Florida Keys, with remotely-operated vehicles in unknown or unconsolidated habitats, and one of the reasons to examine this had to do with trying to understand the distribution of red snapper across the shelf in the region, but, also, there were some regions in the Gulf of Mexico for which red snapper were estimated to occur, away from structured habitat, and that wasn't the case in Florida waters, from that study, and the U.S. Atlantic shelf, from North Carolina to the Florida Keys, is more similar to the West Florida Shelf and other regions of the Gulf of Mexico, but we still wanted to test this.

Secondly, it's to develop a hierarchical Bayesian integrated abundance model to estimate the age-two-plus red snapper population size, based on the SERFS data, the trap-camera data, and the ROV survey data, from objective one. Third is conduct genetic close-kin-mark-recapture analysis to estimate the age-two-plus red snapper population size, and fourth is to integrate and reconcile the study results with the Atlantic red snapper stock assessment model.

This was an important component for our team. We wanted to make sure that, well ahead of when results would be available, that we had planned for and had started the process of integrating the capabilities of CKMR, as well as the Bayesian integrated abundance model approach, the hierarchical model approach, into the stock assessment model itself, so that we would be able to more effectively utilize study results for management in the region and realize the full potential of what's been invested in taxpayer dollars here.

To start, the Bayesian hierarchical modeling approach involves ROV sampling, as well as trap-camera data, and so the objective of this, again, is to estimate population size with a CV of less than 0.3 from trap-camera, ROV, and habitat data, and the CV of 0.3 was prescribed in the RFP, the original RFP, for the South Atlantic Red Snapper Research Program. The original RFP only had CKMR as the method of choice, and we decided, as a team, that we could probably produce two methods, or two estimates, given the extensive camera-trap data in the region, and our ability to do ROY surveys pretty nimbly, efficiently, and cheaply, and so this component, again, wasn't originally called for in the RFP, but we thought it would be useful to have two estimates independent of the assessment model.

Our approach here is to integrate red snapper density estimates for multiple survey methods, to jointly estimate red snapper abundance at three spatial scales, one at the survey site, which is approximately a thousand square meters, two at the grid cell, which is a twenty-five-square-meter size, and, lastly, the entire study area, which is about 100,000 kilometers squared, and second is to construct habitat suitability, informed from study video data, fishery-dependent data, and informed priors from previous studies and mapping, and I will talk about some of those previous studies, as well as ongoing mapping work that's going to be really important for bringing home this modeling approach and producing the best results possible, and then, lastly, to produce separate observation models to account for different detection probabilities and effective sampling area of ROV, traps, and cameras mounted to traps. I will talk a little bit about some experimental work we've been doing to estimate those detection probabilities and effective sample area, or ESA.

Just sort of a framework for pulling all this together, right, and so it's really critical important, when working with these gears, to understand issues in detection, and covariates that affect detection, as well as the effective sample area, in particular for trap-cameras, which are baited, and so we've appreciated this from the frontend, and so work had been done in the region, and we've done some additional work to examine the effective sample area of the trap-cameras. This feeds into the multiple survey methods to estimate red snapper density.

Then we have a whole other aspect that's examining spatial covariates and correlation, and, you know, different covariates can affect our estimates of red snapper abundance in a couple of main ways. One, they can affect detection probabilities at the local scale, but then they can also affect the distribution of the red snapper across the shelf on larger scales, and so we're digging some work to dig into spatial covariates as an important component of the study, and these various sources of information are input into the spatial abundance model, tracking the variance through the model, so that we can appropriately estimate the uncertainty in the estimate.

As I mentioned a moment ago, there has already been a considerable amount of research, both in the Atlantic as well as in the Gulf, for my group, and examining the red snapper reaction to and effective sample area of trap-cameras, and so Nate Bacheler and Jeff Buckel and Kyle Shertzer, and others, have done quite a bit of work examining the fine-scale behavior and movement of red snapper, as well as environmental conditions that affect, or influence, trap catch and camera detection.

In the eastern Gulf, we've done quite a bit of work, from the Great Red Snapper Count study, to estimate red snapper reaction to gear, and also our ability to accurately estimate the size of fish, using stereo cameras, or lasers, and so there had been quite a bit of work done, again, heading into this study, but we've also been working to further that.

In the case of the spatial covariates, also some recent publications have demonstrated the amount of information, or pulled together the amount of information, that exists. Steward et al. does a fantastic job of mapping out and estimating the regional distribution of natural reef habitat and artificial reefs in the region. Pickens and Taylor, in 2020, and this is an edited tech memo that has actually several components, and I'm showing here their estimate of red snapper habitat suitability in the region, and the areas of highest density correspond to areas of hardbottom habitat that exists in the region, and there are some areas where interpolation is required, because of the lack of sediment distribution, or reflectance, bathymetry data, et cetera, and so there is an ongoing effort, and it started last year, and it will continue through the summer, using the R/V Pisces, and Chris Taylor and Nate Bacheler and others are involved in this work.

You can see the crisscross patterns of the track lines that are shown in the map, which are the regions of mapping, heading from north to south, from North Carolina to Florida, and these aren't being mapped in one continuous transect, but, instead, you know, different regions of the shelf are being picked up as the ship is available. The goal is to have this completed by the end of 2024, and so we're hoping that the ship cooperates, the weather cooperates, and all the mapping gets completed for the region.

We have several years of data, obviously, that have been collected through the SERFS program, and so this is the spatial region. You know, from 2011 forward was more expansive than earlier MARMAP or SEAMAP South Atlantic coverage, and so this is the study shelf, from Cape Hatteras

down to south of Canaveral, just south of Canaveral, and you can see the chevron traps and cameras on the deck of the ship being deployed, in the left-hand image.

In the center, these are standardized trap catch and video sum count estimated from a paper in review that Nate Bacheler leads, and you can see the confidence limits that are presented in the fits to the data, and, importantly, the trajectory of these fishery-independent estimates of abundance, for both trap and video, continue to increase over time, since the last stock assessment, and, on the right-hand side, we have, again, the standardized trap in blue, the standardized video count, the sum count data, in orange, and then, across the X-axis is structured habitat, and so very similar patterns between the two of these.

You know, obviously the trap catch and the video are being measured on the same drops, but, interestingly, we see that, you know, the catch rates, for both of these gears, or observation rates, really, you know, increase at about 20 percent, and then, at higher levels, they tend to drop off, right, and so there's kind of a dome-shape here. When there's lots of continuous hardbottom habitat, red snapper abundance, or catches in these gears, drops down, and so they tend to like areas where there is some structured habitat, but red snapper forage, at least in the eastern Gulf of Mexico, away from reef habitat, and, if they have the same behaviors in the Atlantic, then this distribution is consistent with those foraging behaviors.

The maps that you see here, these were produced, again, by Nate Bacheler, and these are heatmaps that show the distribution, from a regional perspective, from the trap data on the left and the camera data on the right, and so the distributions, you know, clearly look very similar between the two gears. They're highly correlated, and, you know, the numbers that you see in the camera are highly correlated with the numbers of fish that are caught in the traps.

You can see two general centers of abundance, one off of northeast Florida that continues up to offshore of Georgia and into southeastern South Carolina offshore waters and then another center of abundance off of southeastern North Carolina. Importantly, these maps are constructed to show a continuous distribution across this range, but we know that the hardbottom habitat isn't continuous, and so this isn't to imply that, across the entire spatial coverage of these maps, the densities are high. These are reflective of the distribution of natural bottom as well.

For the ROV research that we've conducted in the region, we've utilized nearly two dozen, twenty total, fishing vessels. We worked cooperatively with charter fishing captains for this work, and the ROV that we utilize is quite small and nimble, and our entire gear weighs a couple hundred pounds, and so we're able to hop on and hop off of vessels across the region, and so we spend less time steaming from place to place, but instead travel by truck, or car, and then jump on a boat, go offshore for a couple of days, and then come back. Joe Tarnecki and various technicians have conducted this research across the shelf, and, again, we're very thankful for the cooperation that we've had from industry, and the for-hire sector of the recreational fishery has been phenomenal in helping us accomplish this research.

The ROV itself, again, is pretty small, and it weighs less than ten pounds, and we have -- The orange housings that you see are stereo cameras, and then we have a camera mounted on top that's actually shooting the video from which we count fish. We drop a CTD at each site, and then we run transects across the bottom and then count fish along that transect, and our goal is to sample a

thousand square meters at each site, and so you can see this along the ridge off of the east coast of Florida, where that video was taken.

ROV sampling, and, again, this is in the Bacheler et al. paper that we have in review, and we have 282 random sites along the shelf, from north of Cape Hatteras through the Florida Keys, and so that region north of Hatteras, and the region in southeast Florida is not covered by the SERFS survey, and so these data are the only observations that we have for those regions, and you can see the black dots, in the map on the left, and these are the actual ROV stations, and then the red circles are places where we saw red snapper, and so a few red snapper seen in the Keys, and one site off of northeast Florida produced the highest observations of red snapper, but, for the most part, these stations, which mostly were sandy bottom, didn't -- We didn't observe red snapper, and so, again, this is very similar to what we found in the eastern Gulf of Mexico, in that we just didn't observe red snapper in that system unless we had some extent of natural bottom, hardbottom.

The figures that you see on the right, the top row, the Y-axis, this is the proportion of stations observing red snapper, and, on the bottom, we have the mean density of individuals per hundred square meters, and so those are the two rows. On the left, we have structured habitat as a percentage of bottom, estimated from our transects, and on the right is habitat complexity, and so complexity is -- It's a sort of composite of the rugosity of the habitat, as well as its relief, and so one is lowest complexity, and three would be highest complexity.

What we see is that, in the ROV data, we really don't pick up -- We didn't pick up any red snapper on the open substrate, and so, again, in 197 of the 282 random sites, there was no structured habitat, and it was just sand bottom, and we didn't see red snapper in those habitats, and, even the twenty-four stations where we had the 25 and 20 percent coverage, we didn't see red snapper, any red snapper, among those sites in our data, but, when we got to 25 to 50 percent coverage, you can see that was the highest numbers of red snapper, and the highest densities observed.

Similar to what Nate and the camera trap data, that Nata demonstrated with the camera trap data, once we get to higher levels of the percentage of bottom covered with structured or natural reef habitat, the probability of observing red snapper, and the mean density of fish, drops considerably.

As far as the habitat complexity goes, the more complex the habitat, the higher the probability of seeing red snapper, and the higher the density, and so it appears that red snapper tend to prefer somewhat isolated higher-structured, more structured, areas, but, again, surrounded by sandy bottom, which allows them to forage effectively away from reefs, but then have the structure of the reef, perhaps, to avoid predation themselves.

Next, I'm going to talk a bit about our efforts to estimate the effective sample area and the fish density from our camera and trap data, and so the first -- We had some existing data, again from work that Nate Bacheler and Kyle and Jeff Buckel, and others -- Some work they had done off of North Carolina, in an area which is referred to as Chicken Rock, and so they built a VPS array in this region, and, on the right-hand side, the triangles -- Excuse me. In the bottom-left, you can see the black circles, and these are the locations of InnovaSea VR2Tx, I believe, receivers, that were deployed across the bottom. Then you can see the tagging locations, in the white circles, and then the various drops of the baited tarps with camera gear shown up in the other symbols.

On the right-hand side, on the bottom here, the different-colored circles -- These are the tracking, the geo-position estimates, from tagged red snapper in the system, and so there were sixteen red snapper tagged with InnovaSea acoustic tags that were tracked in the three dimensions. The way that VPS works is that, if you space your receivers close enough together, such that any ping from one of the tag transmissions is received by at three receivers, then you can triangulate X and Y.

Then the Z, the depth, is estimated, because these tags -- You can order tags, and they utilized tags, that had depth sensors, and so pressure sensors that then relay depth information to the receivers, and so the receivers are picking up recording at different times, based on distance from the receiver, the actual ping, and then part of the data that are being transmitted are the pressure sensor data, which can be used to estimate depth, and so we can track these fish three-dimensionally.

Over the course of this study, there were thirty-one camera samples, and so we had repeated counts of marked, unmarked, and unknown red snapper, and then Viviane Zulian, who was a post-doc at NC State for a couple of years, and now she's moved on to Clemson, but she, and Nathan Hostetter and Krishna Pacifici developed an N-mixture plus a marked approach, and then this was tested via simulation, to examine their ability to estimate the effective sample area, using the marked fish.

Again, the detections of these marked individuals allow us to estimate the ESA, and so this project, this study, was conducted for other purposes, and one of them was to measure red snapper spatial, or behavioral, relationships to the bait plume of the camera-traps, and fine-scale movement was also examined, independent of that, but these data did exist, that we were then able to incorporate into the N-mixture and marked approach, and so we took advantage of an existing dataset.

This paper is in revision now at the *Canadian Journal*, and the simulation study has shown that the count data alone produced biased estimates of density, or abundance, and they increased as fish movement increased, but, in the integrated approach, where we have the N-mixture model plus the marked fish, which is shown in blue at the bottom, we get unbiased density estimates across multiple levels of fish movement, and so what we see, in the bottom here, is estimated lambda, and this is the estimated density of fish that are being observed, and then space use, along the X-axis, goes from zero to one to two, and so sigma is increasing, and this means that fish are moving more, and they're utilizing a larger space.

As they move around that effective sample area is changing, and so, when we just use the N-mixture modeling approach, which we thought about using initially in this study, you can see that, as fish space use increases, the bias increases, and the dashed line that you see, that goes across at 0.15, this is the known density of fish in the simulation, and so we're overestimating, as fish movement increases, with just the N-mixture modeling approach, but, with the marked fish, now we can effectively estimate space use, as well as density, and, therefore, the effective sample area of the trap.

On the right-hand side, you can see the effective sample area estimates that are shown there, and how they change if the bait plume heads away from the camera, or is sideways from the camera, or towards the camera, and so we can use covariates then to estimate effective sample area, which will then scale the abundance estimates, and the catch estimates, to the effective sample area, decreasing at different types of bait plume dynamics.

That was a great start, and we felt like we expanded our information, and our knowledge, about effective sample area, but we thought there was probably more to do in this realm, and so we designed some spatial capture-recapture experiments, in the third round of funding that became available through the South Atlantic red snapper program, and this was one of the chief objectives, was to conduct these spatial capture-recapture experiments, to further estimate the effective sample area of trap-cameras, as well as ROVs, for red snapper, and this is being done, again, with three-dimensional telemetry arrays, the first of which was deployed off of southeast North Carolina in 2023, the summer of 2023, and then, this weekend actually, we'll be deploying a hundred receivers off of northeast Florida, to conduct similar experiments in an expansive area of natural hardbottom in that region.

Adult red snapper are captured with hook-and-line, and tagged with acoustic tags and released with descender devices. The tags have depth sensors, and again can be tracked in three dimensions, and then conducting paired sampling with the ROV and trap-cameras to conduct this spatial capture-recapture analysis.

Nathan Hostetter has been a leader in developing these tools, and, you know, this spatial capture-recapture uses the spatial dynamics of movement so that it links these joint encounter histories, and so whether you recapture fish alive, in the case of observing with the cameras on ROVs, or the trap-cameras, or you can also have dead encounters, that occur through fisheries interactions, with the movement histories that are, in this case, being tracked and recorded through three-dimensional telemetry.

This allows for the number of fish in a given area to be sampled, as well as then also to estimate the movement of fish through time, and we can also measure covariates in the system, and so, again, we think probably even a more effective way to estimate the effective sample area of traps, and, importantly, then to be able to measure covariates in the future, or, you know, from our previous -- Utilize the covariates that were measures in previous sampling, temperature, depth, salinity, et cetera, dissolved oxygen, and that can then allow us to utilize those covariates to scale the ESA of previous samples, so that we can estimate density of red snapper.

On the right-hand side, these are detection limits that were estimated in a previous paper published by Nate Bacheler and coauthors, and you can see the dashed line, the red line, and this is the probability -- This is the 50 percent, or 0.5, proportion of signals detected, and so, basically, the 50 percent probability of detecting a given ping from one of the fish tag transmissions, and then you have distance across the X-axis, and so this is the sample, or excuse me, the detection information that's needed for the spacing of our arrays.

Early arrays used less than 200-meter spacing, but, for these ESA arrays, based on this work, this analysis, by Nate, we determined that we could go out to 300 meters, or probably a little farther, but we wanted to be conservative, and, at 300 meters, we have about a 60 percent probability of detecting a transmission in the system, and so that was what Jeff Buckel, and his team, utilized in the summer of 2023, off of North Carolina, and it's the spacing that we have for the summer of 2024 off of Florida, and, again, the array that will be deployed next week.

This is the work that Jeff, and his team, did in 2023, and so the VPS array included twenty receivers, and it was deployed around Chicken Rock, the same region as the previous work, and this was done in August of 2023, again with 300-meter receiving spacing. This time, forty-five

red snapper were tagged with external telemetry tags, and you can see the external tag, in the bottom-right, that has a number that can be picked up by the camera, and so this external tagging approach -- There's a paper by Runde et al., out of Jeff's lab, that was published a couple of years ago, that looked at a variety of different external tagging techniques and approaches and evaluated things like speed and ease of use, the durability of the tags, how long they stayed on the fish and how quickly you could get fish back in the water, and so this zip-up approach was determined to be the best approach among the various methods that had been used in the Gulf and the Atlantic, and so that's what we're utilizing here for this work.

Sampling occurred in August, September, and October, and, in August, late August, there were eighteen of the SERFS chevron traps deployed on the Pisces, with paired ROV, and so Joe Tarnecki, and a couple of other folks, were able to go up and deploy the ROV, to sample concurrently with the chevron traps. Unfortunately, we had some other work going on in September and October. We had a hurricane that came through in the Gulf and caused some problems, and we had to go find receivers that we had on the bottom here after that, and so we weren't able to do the paired sampling for the next two trips that were done, and you can see the type of traps -- We're calling these the NC light chevron traps.

They're the same dimensions as the SERFS chevron traps. However, they're just made up of -- The rebar, that goes into the traps, is a little bit lighter gauge, and it makes it easier to deploy and retrieve off of the NC State center console, versus the large ship, the Pisces, but the dimensions of the traps are exactly the same.

Receivers were recovered in November of 2023, and there were 1.3 million detections of tagged red snapper among the twenty receivers deployed, and, from that, we got nearly 200,000 GPS position estimates, and so the video analysis has been completed for that. Joe Tarnecki did that here at UF, and we saw one fish, of the tagged fish on video from August, ten from September, and thirteen in October. We saw a few more of those on the ROV data, and I don't have those listed here, and sorry about that, but, yes, we were able to detect the fish, obviously, with the VPS array, and then we've observed them with the cameras.

Now the ESA analysis will begin in earnest this spring, with Chris Custer, a new post-doc that's been hired at NC State, and he'll be diving into these data, and he starts in about a month or so, and so the ESA analysis will then ramp-up from there.

The 2024 telemetry work that's being done off of northeast Florida, you can see the map on the left, and this is off of Daytona Beach, and this is an area for which Nate had some multibeam and reflectance data, and we have a pretty good idea of what the distribution of the habitat is. In the image on the right, the red are the shallower sites, and so you can see some of the structural complexity of the expansion hardbottom areas. In the very top corner of the array, top-right corner, there's a ridge that runs through that has several stations that are present there.

The circles, the larger circles, that are black, are stations within the sampling frame of the SERFS survey. The red ones were the ones that were randomly selected for this year to be sampled, and the pink circles are the VPS, or the InnovaSea, acoustic receivers to be deployed in a VPS array, to try to capture this region as best possible, and so we'll be doing -- In early June, we'll be doing the paired sampling with the ROV and the SERFS trap-camera gear. This weekend, we're going to deploy the receivers offshore, and then, in another week, we'll go back and do the acoustic

tagging, allow the snapper to acclimate for a few weeks before we go back then and do the paired sampling with the camera-traps and the ROV.

Next, a large component of our project is focused on close-kin-mark-recapture, and so the objective of this component of the study is to estimate red snapper population size in the U.S. Atlantic. Secondly, to estimate red snapper genetic population structure in this region, to go along with the extensive data from the Gulf of Mexico.

The approach is to conduct fin clip sampling of Atlantic red snapper. Our initial simulations said that we needed to sample at least 2,500 fish per year and to perform the CKMR estimates with a CV of 0.3 or less. In the first year, we were successful in getting nearly 7,000 samples, and, in the meantime, the most recent red snapper stock assessment indicated the population size had increased substantially from the numbers that we had utilized for the initial simulations, and so we had a new target now of 5,000 fish per year, and we've well exceeded that, and so we feel pretty good about our sample sizes in CKMR, and I will show you what those distributions look like.

The second part of the approach was to develop genotyping in thousands GT-seq panels, to allow high-throughput sequencing of 400 microhaplotypes, and these are SNP, or single-nucleotide polymorphism, containing loci, and then sequencing of fin clips, and this is with the ddRAD, to confirm putative kinship relationships, that are estimated through GT-seq sequencing, and so to perform the ddRAD sequencing and then estimate population size using the CKMR model, developed by Anderson.

These are the samples that were collected by various members and groups associated with our team in the summer of 2021, summer of 2022, and summer of 2023, and so you can see our fin clip DNA samples have gone from about 6,100 to 6,300 to nearly 6,900 across these three years. You will notice that, in the dark blue, this is the Florida Fish and Wildlife Commission fishery-independent samples, and these come from Ted Switzer's group, and then we have the next two are FWC recreational landings samples, and then FWC discards, and then FWC commercial in the gray, and so these are all different teams of folks that are led by Bev Sauls, and so Bev, and her teams, are clearly our sampling MVPs, and they've done a tremendous job, and they continue to be very motivated, and dedicated, to get samples, and to all the fishers out there, who have, over very short recreational seasons, allowed access to their catches.

This is really important research that we feel we're doing, and we're really appreciative, after a long day on the water, and, you know, the various management issues that people are concerned about, and it may not be the way that you want to do, to spend a few minutes answering questions and allow us to take some fin clips, but, again, it's really helpful, and Bev, and her team, have done a tremendous job of organizing this and doing the sampling, which they take biological samples from these fish, regardless of the fin clipping, but it's been -- So this has been stacked onto their typical work, and, again, they've just been phenomenal.

We've also got quite a bit of samples from SERFS, and so this is SEFIS, led by Nate Bacheler, and the SEAMAP South Atlantic and MARMAP, led by Wally Bubley, and so SERFS also has been really tremendous in getting us tissue samples. Again, while they're at-sea, they're taking tissue samples from various species, and so this is adding to their day, but, you know, having to collect paired fin clips from each fish they touch, but we're really appreciative of this, and, again,

it's allowing us to get broad spatial coverage, through those surveys, that we perhaps wouldn't be able to access otherwise.

Then, lastly, in North Carolina and Georgia, and so this is Jeff Buckel's group, and then Dawn Franco, and her agency in Georgia, have been doing a good job, allowing us to, again, broaden our range and pick up samples in areas where we perhaps wouldn't have them otherwise, and so we're very thankful for everybody's effort, and attention to detail, with fin clip sampling.

When we take a fin clip, right, the fin clips are fixed in DMSO, and so this is salt-buffered, and it will -- This is easy to ship through the mail, and it's different than ethanol, which is not easy to ship through the mail, and so we're able to ship out these tissue vials, and this is Dave Portnoy's group, at Texas A&M Corpus Christi, and they ship the vials, to make sure everybody has their vial stocks up and ready to go at the beginning of each season, and so, a fish that we touch, we take a fin clip, and other data, like size, and sometimes we're able to weigh the fish, and, in some cases, we get otoliths.

In the case of the regulatory discards, we only can take a fin clip, and so we wouldn't otherwise have the age of the fish, except for a new approach that I'll talk about in a moment, called epigenetic ageing, and so, from these fin clips, the DNA can be extracted and utilized to estimate genetic population structure, and so on the top-right is a figure from Portnoy et al. 2022, where we reported the population structure and connectivity between the Gulf and the Atlantic. Sort of the main conclusion, from that analysis, was there were significant differences in the genetic -- In the population genetics between the Atlantic and the Gulf.

In the Gulf, there was some indication of isolation by distance, but it wasn't as strong as the difference that we see between the Atlantic and the Gulf. However, you will notice that we only have -- The predominant samples were off the Carolinas, and only one locale was sampled off the east coast of Florida in that analysis. Obviously, we're utilizing the DNA from the fin clips to conduct kinship analysis, to then estimate population size using close-kin-mark-recapture, but we can also utilize the DNA to determine the sex of the fish.

This is ongoing work in Dave Portnoy's lab, but we have working models for red snapper and red lionfish now, and so we're able to -- Because we've mapped the genomes, and I say "we", but Dave has mapped the genomes, he and his group at Texas A&M Corpus Christi have mapped the genomes for these species, and then we're able to look at sex-linked genes and then develop primers to identify these in samples for which we don't have the sex information for, such as regulatory discards.

Also, for regulatory discards, development of epigenetic ageing protocols, and models, enable us to estimate the age of the samples without getting their otoliths, which obviously is a lethal approach, and so this process of epigenetic ageing is based on the methylation, or demethylation, of regions within the DNA molecule, which are called CpG sites, and so this is simple cytosine next to guanine, and so, when those two base pairs occur next to each other, and the "p" is phosphate, and these regions can be methylated, and so you have a methyl group that attaches to the surface of the molecule.

It doesn't cause a mutation, or affect the behavior of the molecule to sequence proteins, et cetera, but it does tend to become methylated at regions that are being switched on, upregulated, or

downregulated, during development periods in the lifespan of the animal, and so this approach of estimating the degree of methylation at a given CpG site, or a suite of CpG sites, across time, and an animal's lifespan, have been utilized to develop what are referred to as epigenetic clocks, in humans, whales, you know, a whole suite of vertebrates, and now other taxa as well, and we've developed this -- Again, Dave Portnoy's group, at Texas A&M, has developed this for red snapper, which I will talk about in a second.

This issue of red snapper population connectivity with the Gulf of Mexico is critically important, right, because we're assuming that we're dealing with a genetically-distinct population in the Atlantic to estimate population size, but there have been some larval transport analyses done, in a recent paper by Mandy Karnauskas et al., that estimated, depending on the model used, and certain assumptions, that, you know, up to 20 percent of the red snapper sampled off of northeast Florida could be contributed by the Gulf of Mexico, and so we have different critical migration behaviors in the simulations, and then different hydrographic models that are shown, in the three columns on the right-hand side there.

As little as 5 percent, using the South Atlantic Bight GLM model by Ruoying He et al, and then HYCOM and the Mercator models, and they have more uncertainty, but higher estimates of the percentage of Atlantic recruits that were estimated to be spawned in the Gulf.

There's a bit of uncertainty with this analysis, despite the, you know, massive amounts of money that have been spent on red snapper research, and relatively few of their larvae have been sampled in the water column, over the course of fishery-independent samples, directed studies, et cetera, and so the behavior data for these, for the larvae in this model, these five physical models, were borrowed from a range of other snapper species, like lane snapper, vermilion snapper, gray snapper, and so that's one source of uncertainty in this, and the second, you know, issue is that, genetically, we haven't seen this connectivity, with the caveat that we haven't historically done a very good job of sampling in this region off of northeast Florida.

We now have over 20,000 tissue samples from this region, and so the population structure data, and the comparisons to the Gulf, will be much more comprehensive, and, secondly, we're working with FWC, and so Bev, and her bosses there at FWC, have dedicated a fulltime technician to sample in southwest Florida this summer, to enable us to increase the number of tissue samples that we have from that region, especially for spawning adults, and so they'll be sampling the landed catch in southwest Florida.

In the past year, we've been sampling from Tampa down to about Charlotte Harbor, and we have a couple thousand samples from those regions already, and then FWC, again, will be sampling farther south this year, down to Venice, and couple that with the 20,000-plus tissue samples that we have already, and then we'll be sampling again this year for tissue samples, and, in the Atlantic, you know, that should put us up near 30,000 samples, and we should be able to address the population connectivity question quite comprehensively for this species.

Again, epigenetic ageing involves DNA sequencing to test for the methylation at various CpG loci, and the DNA molecule for a given species across its lifespan, and a couple of papers here by Nick Webber, who is a PhD student in Dave Portnoy's lab at Texas A&M, and so the Webber et al. 2022 papers were studies with, you know, fairly small samples sizes for red snapper and red grouper, out to age twenty-seven for red snapper and out to age fourteen for red grouper, but they

showed very close correspondence between otolith-derived ages and the epigenetic age prediction. You can see the R-squared, for these models, are greater than 0.99, in both cases.

Now, the epigenetic age prediction that you see in these models -- This is from a jack-knifing, or a leave-one-out approach, and so the estimated age, for each individual sample, is done by removing that fish from the dataset, recomputing the elastic net regression model, and then predicting the age of that one fish. At the bottom, it's a recent paper that just came out in *Canadian Journal* in which we utilized eye lens radiocarbon to develop consensus ages of otolith-aged blackbelly rosefish, and so this is a deepwater scorpion fish, and these were sampled in the northern Gulf of Mexico, and we had forty-four fish, in the clock model shown on the left, and these were actually sex-specific clock models for males and females. They perform better than combined-sex models, but not by much, but I'm showing you the best model fits here.

Then, on the right-hand side, the predicted ages for this approach, is similar to above, and this is a leave-one-out approach, where the sample is removed, and the model is recomputed, and then the age is predicted for the sample that was left out of the model, and so that's -- The jack-knife prediction is what is shown on the left. On the right-hand side, we have twelve samples that weren't used in the epigenetic modeling at all to develop the regression models, and these were then -- The ages were predicted using the elastic net regressions that you see on the left, and the mean absolute error is less than half a year, out to sixty years, for these fish, and we don't have a decay, or a diminishing, of our ability to predict age in older fish.

Currently, the red snapper clock model is being expanded, by Nick Webber, and we were hoping that we might be able to show results of the modeling here, but we're not quite to that state yet, and this model is being developed for western Gulf of Mexico red snapper, and then applied to eastern Gulf red snapper, and to South Atlantic red snapper, and so we have 112 samples, from ages zero to twenty-seven, in the dataset. The sequencing has been completed for all these, and we have 5.79 billion raw reads, and so each of these are 150 base pairs long.

Nearly four-million CpG sites were identified in the red snapper genome. Of these, 224,000 were present in at least 80 percent of the individuals that we analyzed, and that was our cutoff, and 11,254 of these CpG sites were age-correlated, and so those 11,254 are now being -- These age-correlated CpG sites are now feeding into the regression approach, which will select, you know, probably on the order of a couple hundred CpG sites that best predict age in red snapper, and so this is the clock that we will then utilize to predict age for the regulatory discards, so that we have the age data for those, you know, thousand, to nearly 2,000 fish, in some years, collected by the FWC fishery-independent group, that will enable to greatly expand the data available to do CKMR analysis.

CKMR analysis has been around now for about decade or so, at least the published papers. You know, the Australians have been working on this since the late 2000s, or early 2010s, and the first, you know, large-scale study published came out in 2016, by Bravington et al., estimating the absolute abundance of southern bluefin tuna, using CKMR, and, basically, if we have a population of fish, and Sample A is, you know, a sample of a given size, and Sample B is a sample of the same exact size from that population -- If we had two half-sibling pairs, or one pair of half-siblings in Sample A, but then we had five pairs in Sample B, Sample A is going to be estimated to be much larger than in Sample B, because the probability of finding a kinship pair would be the same, because the population sizes -- You know, if the sample sizes were the same for these two

populations, then, you know, the more half-sibling pairs we find, the lower our estimate from that population.

This is sort of the basis behind CKMR analysis, is doing the sequencing to produce these half-sibling pairs, right, and we need several sources of information. We need accurate life history data for the population, and we need accurately-aged samples, and, again, that's where our otolith ageing and epigenetics comes in, and we need to have an adequate sample design, and so that was our simulation analyses done on the frontend, before we started taking samples, and then we need to have sufficient resolution in our genetic data, and so, for the first year or so of the study, Dave Portnoy, and his group, and Allison Monroe, his post-doc, spent quite a bit of time developing the GT-seq panels, and the ddRAD work had been done previously, and so that was already worked out, but developing the genomics pipeline, to make sure that we had sufficient resolution in the genetic data, and, you know, that work has been quite successful, and so now we're into the stage of mass-sequencing the fin clip data, the fin clip samples.

I just wanted to point this out, and this is from a paper that Bravington and Carroll published at the end of last year, and, in this book on applied environmental genomics, the title of the manuscript was "The Practical Magic of Close-Kin-Mark-Recapture", and it's sort of tongue-in-cheek about magic, but examining what does it take to do a sufficient job to estimate population size using CKMR.

They produced a diagram, on the right, and so you start with sample design, and then you conduct your sampling, and then you do your genotyping, and then this goes to kinship discovery, and then back to population estimation, and, through this process, you can refine your estimates of variance, so that can feed back into design, so you can improve your process as you go, and I just -- I found this recently, and I wanted to include it here, because this is the exact approach that we've been taking in this study, and so we did -- You know, based on the genome and his group had already produced, Dave Portnoy and his group had already produced for red snapper, we had a really good sense of the amount of genetic variability that we would find.

We were able to then also use Eric Anderson's CKMR POP model to do simulations to estimate the number of samples that we would need to -- Given the population size and life history parameters for red snapper, the life history -- Excuse me, but the population estimate from the stock assessment model, what kind of sample sizes of fin clips we would need to estimate population size with a CV of 0.3 or less.

Then we've conducted our sampling, you know, genotyping, and optimizing the genomics pipeline, and all of that was going on at the same time, and now we're in the phase of kinship discovery, and then, eventually, at the end of this year, or early next, we'll start the population estimation, and so where are we now?

We have successfully genotyped 10,347 individuals with a GT-seq panel, and, again, this is the panel that was produced from our first couple of years of looking at the variability in the genome, and finding these microhaplotypes that were best able to be utilized to estimate putative kinship relationships within the genomics data, and we were able to sequence 5,532, or 90 percent of our samples, from year-one.

Again, part of this feedback loop is we want to get this to 95 percent, and the 10 percent -- The nearly 10 percent that weren't able to be sequenced, the biggest issue is with ambitious fin clip samplers sticking just a little too much tissue in the tubes, and that seems -- You know, sometimes it seems like more is better, but this can actually inhibit the tissue becoming fully saturated with the fixative, and that can cause DNA to degrade, and so we just really want a very small fin clip, and this has been communicated to our team.

So far, from year-two, 4,815 fish have been sequenced, all the way through the GT-seq pipeline, and that's one time through. Then we look at the samples, and this happened in year-one as well, and this is a very common approach, but we look at the samples for which we didn't get adequate DNA, and we go back and use a little more intensive approach in the DNA extraction stage, and this number will go up, through a couple of extraction processes, and hopefully we'll also exceed 90 percent, getting closer to 95 percent, eventually for the 2022 samples as well. This will likely be completed in the next month, and then, by the end of summer, we'll have all the 2023 samples extracted, and sequenced, through the GT-seq pipeline as well.

Among the samples that we've sequenced to-date, using the GT-seq panel, the putative-related individuals, or kinship relationships that have been identified, we have nine pairs of parent offspring, and we have thirty-three pairs of full siblings, and 107 pairs of half-siblings, and so the GT-seq is designed to be inclusive, right, and so there could be some false positives that result from GT-seq, and the GT-seq, you know, translator -- You know, the process is sampling thousands of individuals, and hundreds of loci, right, and so it's genotyping in the thousands, and that's where the "GT" comes from, and so we're sequencing thousands of individuals, at hundreds of loci, and so it's very efficient, but the ddRAD then flips around, and, for ddRAD, we're sequencing hundreds of individuals at thousands of loci.

The ddRAD step is to confirm the kinship, and that's why the bullet above says "putative", because we're not 100 percent sure yet that that's true, and so we've been working through the year-one samples, using ddRAD, and so far we've identified, or confirmed, four pairs of full offspring, or, excuse me, of full siblings, and twenty-two pairs of half-siblings.

Our ongoing ddRAD genotyping is for the 103 additional putative kinship pairs, and, again, that should be completed in the next couple of months, and so our goal is to have all the sequencing wrapped up, and done, by the fall of 2024, and we're well on track to accomplish that.

There have been quite a bit of -- As CKMR has risen in popularity, and we're seeing more and more applications of this cutting-edge approach, but there are also a suite of studies that have been done, simulation studies, to basically examine how -- How wrong can we be, how biased will our estimates be, if some assumption within this process, or some bit of information that's required is an unknown, and so, if we're not meeting assumptions, or we don't have all the information we need, how wrong can we be?

Paul Conn did a simulation study, published a few years ago, where they looked at dispersal issues and population connectivity, and so that speaks to the Atlantic and Gulf connection, and then there have been sort of an overview paper, by Waples and Feutry, and other examples are looking at ageing error and the age structure of the populations and how not understanding the full age structure, or actually misestimating age, what impacts those can have, and so we have this rich

now body of literature, growing body of literature, about CKMR and where errors can pop up, and what the implications of those might be.

Fortunately for us, we've considered all of these, and we feel like we're in pretty good stead, as far as the life history data, our ageing accuracy, et cetera, and we're working on the population connectivity question, but we wanted to also connect some simulations based on mortality estimates, fecundity estimates, and the maturity schedule, especially how these can shift through time as populations recover and we have density dependence, or compensatory mechanisms, within the populations.

This is work that has been ongoing by Chris Hollenbeck and Chris Anderson, and now Liam Kehoe and Dave Chagaris have been involved, and Kyle Shertzer as well, and we're to the point now where the simulation models are almost fully built, and we expect that to occur in the next couple of months, and then we'll be able to do these life history simulations to examine how errors in these estimates impact CKMR estimates, so that we're able to fully account for sources of uncertainty in our estimate.

The work that Liam is doing, as part of his dissertation, involved red snapper, obviously, connected to this study, and also blacktip shark, which we feel like is -- Given the fishery for blacktip shark in the Gulf, it's a likely candidate for CKMR, and it has a life history that's very different than red snapper and other teleosts, and so these are the two species that Liam and Chris and Chris have been working on.

Again, there's been quite a bit of recent research, mostly coming out of Australia, utilizing close-kin-mark-recapture, and so, you know, when this study was first funded, from the South Atlantic Red Snapper Research Program, you know, it was a cutting-edge technology, and it still remains a cutting-edge technology, but I just wanted to convey that there's this growing body of literature where this approach has been applied, and I'm not going to walk through all the various studies here, but I will just say that, given the population size estimates for red snapper, our sample sizes are going to be the most comprehensive, and I think our GT-seq panel, and the number of microhaplotypes that we're looking at, is going to be the most comprehensive dataset that has been yet reported.

There may be some other folks working on similar studies, and so, again, we feel pretty good about, you know, our thinking ahead, and trying to cover all the bases here, and, again, one of the critical components of doing CKMR analysis is to have sufficient resolution in the genetic data, and we feel strongly that we'll definitely have that, to an extent that hasn't been seen in some of these previous studies.

Our next component that we've been working on, and, again, this was from round-three funding, was estimating our ability to estimate South Atlantic red snapper discards using tagging simulations, and, you know, obviously, this is an issue that the SSC, and the council, has grappled with, over the past decade or so, and NOAA Fisheries, in setting seasons as well, and there was a recent RFP, last year, from the Southeast Fisheries Science Center, working with the South Atlantic Fishery Management Council, to come up with ways to try to estimate discards and to mitigate issues related to dead discards.

The objective of our simulation work was to design a tagging study, utilizing either conventional or gene tagging, that could be utilized to estimate exploitation and the magnitude of discards in the private recreational fleet, right, and so our approach focused on northeast Florida, where 90 percent, or greater than 90 percent, of harvest and discarding occurs.

The second is to explore both conventional and genetic tags in a simulation framework and to develop operating models, and simulation models, that we can use either tag type, and that was a heavy lift, but we're there now, and operating model monthly population dynamics, with an individual-based tagging simulation model, on the simulation side, and then to develop, and code, a Barker joint encounter estimation model, and so, on the estimation side is to use this Barker joint encounter, which we can use live and dead recoveries, and this also enables us to continue to mark through time, and so we'll have increasing numbers of marks in the population, for a multiyear study.

Then Number 5 is to evaluate the precision in catch-release and harvest probability estimates across tag numbers and various reporting rates, and so this is work that's been led by Dave Chagaris, again with Liam Kehoe, as the PhD student who is working on this as part of his dissertation, and so, you know, Liam is doing a lot of simulation work with both the tagging simulations as well as the life history CKMR simulations in this study.

So far, our progress on the tagging simulation work is Dave and Liam have done some preliminary work, ahead of a workshop that we held in Cedar Key in June of 2023, and, in that workshop, we discussed the modeling approach, and we talked about initial model development, and we also talked about tagging logistics and our ability to get gene tags from the fishery, what kind of conventional tags would have to be used, high-reward, variable-reward, et cetera, and so we talked about all those various logistics within that two-day workshop, and folks came from all over the east coast, and some folks participated remotely as well.

We're going to have a follow-up online workshop, and it's scheduled in a couple of weeks, on May 2, to review the modeling work that Liam and Dave have done over the past months, and to discuss simulation results, and I'm not going to go through all of those results here, because they haven't been vetted through the full working group, but I can share some preliminary findings.

First of all, high-precision, and so CVs of less than 0.2 and low bias, and age-specific survival rate estimates, have been determined from simulations based on conventional tagging, but these are affected by reporting rate uncertainty, right, and so that's the key sort of limiting factor, is reporting rate, and can we afford to, one, come up with a level of tag reward, and Matt Catalano, for the Gulf red snapper research, estimated that a reward of $250 was a sufficient incentive to get to a 95 percent reporting rate. Would that hold in the South Atlantic? That's an important question, and, if we did variable rewards, can we then use that to estimate what the reporting rate is? We think that's probable.

Next, gene tagging is feasible, right, and the modeling works out, but it would require obtaining tissues from private recreational discards, and so this is more tricky, we think, than even reporting rates of conventional tags, because this would require some group, and it could be a small participating group of recreational fishers who provide fin clips from discarded fish, but we would need to have full participation of whatever subset that was, and we would need to be able to accurately estimate what percentage of the overall effort is within our fully-participating group,

and those are two parameters that we're not quite sure we can accurately estimate, and so that makes gene tagging less feasible, we feel, probably than conventional tagging.

Again, the gene tagging challenges are angler participation, training, getting materials to them, having them preserve specimens, or samples, in a way that maintains the integrity of the DNA, and that can be tricky, and, lastly, a large portion of the total catch is likely to be inaccessible to our sampling, and it's less important that a large portion is accessible to our sampling, but what's important is that we can accurately estimate that proportion, and, again, that's problematic.

I just wanted to reiterate that we're going to have a follow-up workshop online, on May 2, to go over the results that Liam and Dave have produced, and then also to talk about some of these logistics and what we think is perhaps the better approach to move forward.

The last component is integrating red snapper population estimates into the assessment, the stock assessment, and into fisheries management, and so we've been evaluating two potential approaches here. One is to scale the current assessment model estimates to these externally-derived abundance estimates, and the second is to integrate new data and population estimation process into the assessment model, and so this has been the focus. B has been the preferred alternative, and the focus, of Kyle Shertzer and Matt Damiano, and so Matt finished his PhD last year, at NC State, and he was originally funded to work as a post-doc with Kyle, through a MARFIN grant. However, he has recently been hired as a fulltime assessment scientist at NOAA Fisheries. Matt is still working with Kyle on this integration, but he's got other job duties that have kind of taken him away from this.

Kyle has two different positions for the same job currently advertised, one as a research scientist and one as a post-doc, and, you know, hopefully we'll be able to hire somebody, through that process, to move forward, but, as another piece of information, there are other groups in the country that have been working on this process, because of the growing recognition of the utility of using CKMR as an independent estimate of population size and the need to integrate that into assessment models, and so Andre Punt, and others on the west coast, have been working toward this, and Kyle himself has done work on his BAM model and utilizing -- Incorporating CKMR population estimation into the model.

We feel perhaps, and, you know, it's kind of early to say, but perhaps this process is not going to be quite as arduous as we thought it could be, and so we have some reason for optimism there, but, again, this is an ongoing process, and hopefully we'll soon have somebody that's going to be devoted to this fulltime, working with Kyle and Matt, to integrate this.

The timeline, you know, of study components, and the project started in April of 2021, and now we're in April of 2024, and so ROV and SERFS surveys and data analysis, that's all been completed, and I will just show you the next slide, and we still have Bayesian hierarchical integration model parameterization ongoing. We think, in the next month or two, we'll have a working model. We have a working model now, but we'll have more of a finalized working model to utilize the ROV and SERFS data, and then, once we have the ESA estimates, we'll be able to fine-tune the model to produce population estimates using the camera-trap and ROV optical data.

Our fishery-independent and dependent fin clip sampling, we thought we were going to sample through 2023, and that's been completed, and that was part of the focus of our research. We do

know that Congress, in the Fiscal Year 2024 budget, has allocated another $1.8 million towards reef fish research in the region, and there's several steps, you know, before any of that funding would make it to Sea Grant for the South Atlantic Red Snapper Research Program, but we decided that we would try to collect -- That we will collect fin clip tissue samples in 2024, to try to continue this time series for CKMR, and at least we'll have the samples, if funding becomes available to do the sequencing.

Our thoughts here are twofold. One, we see this as a demonstration project, at least for U.S.-managed fisheries, for CKMR, and so we're taking that potential very seriously and trying -- You know, not that we wouldn't have tried to do our best job possible otherwise, but it has maybe a more profound meaning than just Atlantic red snapper, and another reason why we would focus, again, on sampling in 2024 is, now that we will have a time series, we're developing a time series, and we have three years of data, and this would add a fourth, and there are other things that could be done, once we start to get time series of data, and it's not just a one-off population estimate, but now we can track cohorts through the model, and we can track recruitment trends, and so it comes a much more powerful approach.

We decided we would go ahead and collect samples in 2024, and it wasn't part of the original plan, and, again, if funding becomes available to do the sequencing, we'll have that available. Similarly, if funding becomes available to operationalize our tagging work, and our simulation modeling has been done, performed, to optimize study design and produce the most reliable results for estimating discards and discard fate, and then we would be able to operationalize that as well.

As far as the sequencing, panel development occurred a little longer into 2023 than we had envisioned, but we felt that process was successful, and necessary, and DNA sequencing was meant to be completed by late 2024, and we're still on track to do that, and the genomics and CKMR analyses -- So part of that is simulation work, which has been ongoing, and then, once we have the full kinship analysis completed, it should be fairly easy to integrate that into an age-structured CKMR model to estimate population size.

We've already started working on study integration, and we have some papers that are published, and we two -- One in revision and one in review and one that should be submitted in the next couple of weeks, and then other work that will come from the ESA analysis, and then Dave Portnoy's team is working on some papers now related to various aspects of the genomics components of this study, and so our goal is to have a lot of the assumption stuff done, in particular, prior to reporting-out final results, but we're writing, and submitting, papers as we go.

Model development and integration, again, is ongoing, and then additional calibration experiments and the tag simulation study -- We're hoping to soon wrap up the tag simulation work, and the calibration experimental work will be completed by the end of this year, and we will do the ESA tagging in northeast Florida in May, and we'll pick up those receivers in July, and send the data for VPS analysis, which will take a couple of months, and so hopefully the NC State team will -- They'll be working with Jeff Buckel's data from North Carolina, in the spring and into summer, and then we'll present them with data from northeast Florida, by early fall, late summer or early fall, and then they will be able to analyze those data as well, which are critical components for the hierarchical modeling and the final stages there.

Lots of moving parts, but we feel like, you know, we're on track here, and there are a couple of areas where we're a little bit behind, but we feel that, you know, time and effort invested on the frontend is going to make things more efficient on the backend, such as with GT-seq panel development, and the ultimate deadline, for us, is August of 2025, to have the final report done to Sea Grant. We feel like we're well on-track for that, and that's critical for the benchmark assessment for Atlantic red snapper that will follow thereafter. Again, we still have a ways to go, but we're well on-track to meet those deadlines.

There are lots of folks to thank for helping us along this process, and the team at South Carolina Sea Grant, led by Sea Grant Director Susan Lovelace, has been phenomenal to work with, and the steering committee has given us, you know, helpful feedback along the way. We've given them annual, and sometimes more frequent than that, updates of our progress. The various port agents, fishery observers, agency scientists that -- Other than the ones that I've already discussed, and, you know, lots of incredible effort that has been put forward by the various agencies, and, again, we're very thankful that they see the value in this work, and they have provided, you know, match, that hasn't been recorded really, but by effort, and by resources, allowing scientists and ship time, et cetera, to be focused towards this, and it's been really, really helpful.

Various charter captains that have helped us collect samples, especially with the ROV, and then personnel, the physical personnel, from all these various agencies have been phenomenal, and we've been able to report out on time, and have had no physical issues with the project, which, you know, can pop-up in projects of this magnitude, but we've been well-served by various physical staff along the way there, and we're very thankful for their participation as well. Okay, Judd, and that's the end.

DR. BUCKEL: Thank you very much, Will. We'll open things up to questions from the SSC. Fred Scharf.

DR. SCHARF: Hi, Will. This is Fred Scharf. It's nice to hear from you, and thanks for the presentation. I just wanted to ask about the -- Just if you might talk a little bit more about what you've been sort of seeing so far in the ROV and the trap data, in terms of the spatial covariates that you talked about, and maybe which ones that you think are likely to be most important in impacting, you know, detection probability, or catchability, in the traps, and I was kind of thinking about whether some of those may operate at different spatial scales, and just hear some of your thoughts about those.

DR. PATTERSON: Thanks, Fred, for the question. It's good to hear from you. You know, in this region, perhaps the number-one environmental covariate that affects the distribution of reef fish, as well as their detectability with optical gear, is probably upwelling, and so, as the, you know, Gulf Stream is formed, from the Florida Straits and moving up off the Carolinas, but, as the Gulf Stream meanders offshore -- The farther it meanders to the seaward side of the system, we have cold, nutrient-rich water that's upwelled onto the shelf, and sometimes it can be upwelled fairly high into the water column.

That upwelling -- If the water is cold enough, it will cause the fish to redistribute, and move up in the water column, or even move horizontally, and Nate Bacheler has observed this, and reported this, as it affects the SERFS camera-trap results, and then you also have the detectability issue, and

so, when you get these upwelling events, the water can become quite turbid, and so that affects our ability to detect fish.

One, they can move, because of this process, but then their detectability can suffer as well, and so, you know, measuring the physical parameters of the water, you know, helps us to determine the presence of this, and Ruoying He has this high-resolution transport model that he's able to compute an upwelling index that can be on a fairly fine spatial scale, and so we haven't gone to utilizing that upwelling model to predict where upwelling may have been observed, but we do have the data, the hydrographic data, from the sampling that should enable us to utilize those covariates, or to incorporate them into our estimates, and the ESA analyses that are being performed -- You know, we're measuring the water quality parameters as we go, and so there may be some things that pop out there, that we're not fully anticipating at this stage, but that ESA analysis should help us to better understand some of those dynamics as well.

DR. SCHARF: Great. Thanks, Will. I appreciate it. I hope the rest of the project continues to go well for you.

DR. PATTERSON: Thanks, Fred.

DR. BUCKEL: All right. Thanks, Fred and Will. Other questions for Will? Marcel.

DR. REICHERT: Hi, Will. Thanks for that overview. It's a tremendous amount of work, and I've got a quick question about the epigenetic ageing that is on slide 23. Can you talk a little bit about the variability in your relationship between the epigenetic ageing and the otolith-derived ages, or are you guys still working on that?

DR. PATTERSON: The model, at the top, this is for red snapper sampled in the western and eastern Gulf of Mexico, and so otolith-derived ages are on the X-axis, and epigenetic age prediction is on the Y-axis, and so this is the only model that we have that is sort of a proof-of-concept model, that Nick published a couple of years in the *Canadian Journal*, and so you can see, from this, that the epigenetic age prediction is really accurate, and the -- You know, red snapper have a fairly low index of average percent error, but the percent error here -- The agreement is stronger than the agreement that we typically see between two readers.

However, you know, a very important caveat is it's a pretty small sample size, and so I can better answer that question, Marcel, in a month or two, for red snapper, but, if you look at the plot below, and that's for blackbelly rosefish, the work from blackbelly rosefish, I think as well as the preliminary work that was done for red snapper and red grouper, should give some indication of the likelihood of success here, because blackbelly rosefish are much more difficult to age, and the average -- The index of average percent error between using the epigenetic approach, relative to the consensus ages, and again using eye-lens-derived radiocarbon and two readers to develop these consensus ages, was much -- The index of average percent error was much lower for the epigenetic approach than for two otolith agers.

Eric Chamberlain reported age and growth and age validation for blackbelly rosefish from the Gulf of Mexico in an earlier paper, utilizing this eye lens core birth year radiocarbon signature approach, and so he demonstrated that ageing was accurate, but somewhat imprecise, but, you know, not a

horrible level of imprecision, and the index of average percent error, from his work, was around 6 percent.

You have to remember that these fish, you know, can live to be nearly a hundred, and so 6 percent for a hundred-year-old fish is not the same thing as 6 percent for a ten-year-old fish, but the agreement that we see between the consensus age estimates and the epigenetic predictions is much stronger than the agreement between two independent readers.

The last thing that I will say is that there's a group in Australia, that is led by Ben Mayne, who has done quite a bit of work on epigenetic ageing as well, and they take a slightly different approach than Portnoy's group. In the Australian approach, you know, Ben, as part of his dissertation research, he developed an epigenetic clock for zebrafish that were reared in tanks for sixty weeks, and so five years, and that's about as long as zebrafish live, and so he did all the sequencing, based on those tank-reared fish, and he developed his regression models, based on the tank-reared fish sequences, and so then he had a fish clock, and he developed primers.

I think there are, you know, twenty-some of these CpG sites within his clock for zebrafish, and he's been applying that clock to various other species, and what you see is that the clock remains fairly accurate, even for fishes that can live to be close to 100 years, but you start to get some imprecision -- The imprecision starts to increase for the older ages, and that's likely because of the epigenetic processes, the methylation processes, that are measurable in a fish out to five years are different than what you're seeing in fish that can live to be sixty, eighty, a hundred years old.

The blackbelly rosefish work that Nick Webber has done demonstrates that, if you sequence the genome for that long-lived species of interest, and then develop a clock that's specific to that species, you can get high precision, as well as accuracy, into an old age, and so these non-lethal methods have been demonstrated, in these two different approaches, to be accurate, and the approach that Portnoy and his group are utilizing also demonstrate high precision for a very long-lived animal.

DR. REICHERT: Thanks, Will. It's very cool stuff, and I look forward to the next iteration. Thanks.

DR. PATTERSON: Thanks, Marcel.

DR. BUCKEL: Genny.

DR. NESSLAGE: Thanks. To this slide, and to these studies, and I admit this is all cutting edge for me, and I'm an old-school, I guess, stock assessment scientist, and so I need to catch up, but I guess I'm just wondering, having not read these papers, I admit, but, when you say these are accurate methods, is this based on comparison with consensus ages, which we know may be biased already, and so that means that this one-to-one line may be biased, and, if they are, then the one-to-one line just means that these ages are also biased, or do we actually have true accuracy estimates, like from radiocarbon dating, or something like that bomb radiocarbon stuff, that would actually get at true accuracy out to older ages? Thanks.

DR. PATTERSON: Thanks for the question, Genny. This is a really important consideration, because, for most marine fishes, we're just not going to have known aged individuals, and, also, if

you're growing fish in tanks for decades, you know, what impact are you having on the epigenetic ages of fish relative to its true age? That's where the wild sampling of fish I think is a benefit, because we're sampling fish under the same conditions that we're then attempting to age fish that have produced these epigenetic -- You know, the percent methylation, or demethylation, across different CpG sites within the genome.

That's the first thing, is, yes, it would be fantastic if we had known aged individuals. We have a chance for that in some of the west coast fishes, which are tagged, like sablefish, as one-year-olds, and they're recaptured sometime later, and that's very helpful to develop their break-and-burn ageing approaches, but it could also be really helpful to develop epigenetic ageing, and so the first component is, yes, absolutely, if we had known aged fish, that is ideal, but we want them from wild fish, and not necessarily from tank-reared fish.

The second component, about the consensus ages, that doesn't mean that they're accurate, and it just means that you have agreement. If you have a low index of average percent error, that means you have precision, but not necessarily accuracy.

For the early work that we did on red snapper and red grouper -- Like the red grouper samples were only out to age-fourteen, and there's really strong agreement for red grouper, especially, you know, fish that are just a decade or so old, and, for red snapper, red snapper have, perhaps among reef fishes in our region, the clearest, easiest to age otoliths. I mean, they're not sciaenids, but their opaque zones are really clear, and easy to interpret, and, you know, we typically, in both regions, the Gulf and the Atlantic, end up with an index of average percent error of 2 percent or less, even for, you know, datasets where we have thousands of samples, and so, again, that speaks to precision, and not accuracy, of the otolith-derived ages, but red snapper age estimation has been validated every way that I know of that it can be validated.

There's been bomb radiocarbon work, and there's been verification work done with marginal increment, marginal condition, and there's been radio nuclei work that Scott Baker did back in the late 1990s, and early 2000s, at LSU, and there's tagging work that we reported, and so to corroborate growth rates between otolith-derived age estimates and tag recapture data, and so we're pretty confident in the accuracy of the red snapper age estimates.

For blackbelly rosefish, the way that we produced the consensus ages is that -- So we have fifty-six fish in the total sample, and Derek Chamberlain and I read the otoliths, and we had done that previously for the paper that he reported a year prior to this, but we only had, I think, thirteen samples initially where we had eye lens radiocarbon, and so the eye lens is protein, and, like otoliths, it's not resorbed through life, and so the protein at the core of the eye lens represents the birth year, and so that's the natal -- It's like coring an otolith to get the radiocarbon signal, but the protein is organic carbon, instead of carbon that's predominantly coming from dissolved inorganic carbon, and so it's useful for fish, even at-depth, where otolith carbon is depleted in bomb radiocarbon the deeper you go.

We had the two agers, and then we had the radiocarbon data for all of the samples, and then we -- When we got the radiocarbon data back, some of our ages -- You know, we differed by, you know, four or five years, and most were within three years, and I think maybe 80 percent, and I would have to go back and look at the data, but there was a strong agreement, but some imprecision. The bomb radiocarbon showed us, overall, that ageing was accurate, but, when we differed, we used

the radiocarbon data then to produce a consensus age, and so you can't just use radiocarbon data, especially on the descending limb, in my view, and some people do.

You can't use it to predict age very well, but it's very useful to tell you whether your age estimates are accurate, and you have to have a sufficient sample to do that, but I think it is useful in this application, because we can use the bomb radiocarbon data to then -- To be sort of the decider, right, the arbiter, between the two age estimates, to help us produce a consensus age.

When doing age validation, obviously, you don't want to have two readers like immediately reading the same sample, and talking about that, and you want them to do it completely independently, but, in this case, we're trying to get as close to known age estimates as possible, to build the epigenetic clock, and so each of us aged independently, and we had the radiocarbon data, and then we discussed, okay, well, where is the best prediction here, or, excuse me, what's the best age estimate, to go into the analysis, and then, from there, we turn the data over to Nick Webber.

He does the sequencing, and then he fits his models to our consensus age data, and so we do have that radiocarbon data incorporated into this for blackbelly rosefish, and the fact that we're getting predictions, in the application data, that are even more accurate than what we see in the test data, just by a little bit, but we feel pretty strongly that, overall, this approach is effective, and so I hope -- You know, there's some more details here that we could talk about, but I hope that answers your question.

DR. BUCKEL: Genny just gave two thumbs-up, Will.

DR. PATTERSON: Okay. Thanks.

DR. BUCKEL: So that answered her question. Thank you. Amy.

DR. SCHUELLER: Good morning, Will. Thanks for the presentation. I have two questions left, and you just answered one of mine in your response to Genny, and so thanks for that. My two questions are have you recaptured the same individual genetically at all during any of this work? I don't know if you know that yet, since not all of the genetic samples have been processed, and then my second question is, for the full and half-sibling pairs that you have identified, have you guys looked at the location of collection for the individuals, to see whether or not they are like closely located on the same reef, or they're spread across a large area, and I guess I'm asking that because -- Well, I mean I think it tells us something about other things that we have questions about, and I will stop there.

DR. PATTERSON: I'm sorry, Amy, and thank you for the questions, but I was focused on your second question, and I forgot your first one.

DR. SCHUELLER: I just wondered if you had recaptured any of the same individuals in the genetic data.

DR. PATTERSON: So I don't know the answer to that, except that we just met, last week, with Allison Monroe and Nick Webber and Dave Portnoy, and we were going through the results to-date, and they didn't mention having one of the discarded fish show up, and so that was a regulatory discard that was released alive, show up in the data as a recapture, right, and so there's only, you

know, about 15 percent of our samples, in a given year, that have been released alive, and most of them come in as landed fish, or they're sacrificed fishery-independent samples.

The fact that -- I mean, that would -- You know, so I can't answer your question, and I will just say that I don't know, but I don't think so, because that would be something that would jump out, and that we would discuss, because we did discuss full siblings and half siblings.

The second part of your question is absolutely, if there are -- You know, one thing that full siblings can tell us about, perhaps, is the randomness of samples, and so we're aware of the potential usage of that type of information, but we haven't done the spatial analysis yet, and, again, in our recent call, we talked about that, and that will be something that we will do, once we have more data, and what we've been focused on, in the near-term, you know, is examining the putative kinship relationships that have been identified through the GT-seq sequencing with ddRAD, and so we're still sort of -- You know, we're still at the throughput phase, and we're not really into the bioinformatics and spatial genomics phase yet.

DR. BUCKEL: Thank you, Will and Amy, for the question. Other questions for Will? How about online? Do we have Alexei?

DR. CURTIS: No hands online.

DR. SHAROV: No, I don't have -- I have 10,000 questions, and we might need another thirty days to think of them, but it's an overwhelmingly interesting presentation. Thank you.

DR. BUCKEL: Thanks, Alexei. All right. I don't see any other hands here, Will, and we're going to have public comment next, and is that right, Judd?

DR. CURTIS: Yes.

DR. BUCKEL: So, any members of the public that are online, on the webinar, please raise your hand, if you have any questions or comments.

DR. CURTIS: We've got Dewey Hemilright. You're unmuted, Dewey. Go ahead.

MR. HEMILRIGHT: Thank you, and thank you, Will, for the presentation. It's pretty amazing, the work being done, and I hope it continues, and it's pretty interesting on the in-depthness of what's going on, but it still doesn't get to the point of how do we reduce the dead discards in the recreational industry, and it's pretty clear that it shows, in one of your slides, where 90 percent of the fishing, and discards, is coming from, and so I hope the SSC will take that into account in some of the recommendations it makes to the council, because it seems like they need real help in understanding the actions that are needed to fix this issue. Thank you.

DR. BUCKEL: Thank you, Dewey. Other public comment, or questions?

DR. CURTIS: I'm not seeing any other hands raised for public comment.

DR. BUCKEL: All right, Will. There are no other questions here, and we don't have any discussion on this, Will, and so we will let you go, unless Judd has any parting comments, and so,

Will, thanks so much for the in-depth and really broad topics that you covered today, and it's an impressive breadth of information, and results, and thanks so much for your leadership on this large project, and thanks for the presentation.

DR. PATTERSON: Thanks to you all, and thanks for the opportunity to let you know our progress, and, in the coming months, and year, we should cross the finish line, and we'll have something, some final estimates, to show you.

DR. BUCKEL: Great. Thanks so much, Will. Have a good day. Okay. We are exactly at the midpoint of the morning, and so we'll take a break, and we'll go for a little longer break, to give you time to check out, if you haven't had a chance to do that, and so twenty minutes from now will be 10:35. All right. Enjoy your break, and we'll see you back at 10:35.

(Whereupon, a recess was taken.)

DR. BUCKEL: All right. Welcome back, everyone. Let's get going. I see that everybody is back at their chairs. Thank you. Okay, and so the next agenda item is Agenda Item Number 12, and we have a presentation from Jennifer on the SEP meeting summary.

SEP MEETING SUMMARY

DR. SWEENEY-TOOKES: Thank you. I don't know how much of a presentation it is so much as I'm going to give you a run-down, but I just wanted to mention that this is my first time giving this report. Scott Crosson, who has been with us, and leading us, ever since I joined the SEP, and I believe this was his last meeting, and so it's been wonderful working with him all these years, and so I just wanted to make sure that we note that.

We have a really great critical mass of people on the SEP right now, in large part thanks to council staff, who really did a lot of outreach, and I believe it was this year and last year, and we have a great number of people on there now, and we had a really productive two-day meeting, or I guess it was one day split across two, and so I asked Judd to put up our agenda, so that you can sort of see the things that we dealt with.

The first thing that we looked at was the National Academy of Sciences report, and there was an ad hoc committee of the National Academy assembled in 2023, and they drafted a consensus report where they were addressing equity in the distribution of fisheries management benefits, and, specifically, they were tasked with determining the categories of information that are required to adequately assess where, and to whom, the primary benefits of commercial and for-hire management accrue and determine what information exists within those categories and what additional information, if any, NOAA would need to collect, and then identify obstacles to this.

We, as a committee, really agreed with the report's finding that there's a big lack of data sources for use in better understanding equity and distributional issues in the Southeast. We did have a few recommendations that we looked to Michael Jepson and Lisa Colburn's social indicators, for some information there that we were able to give them some ideas of some historical documents, some existing publications, but we really did want to emphasize one of their arguments, that the SEP really agreed with, which is that equity is not a bounded thing that we deal with in one group, and

then we check-off the box and say now we can move on to what we're really here to do, and so we really were arguing that it needs to be integrated into everything that we're doing.

Secondly, we heard reports on amendments and ongoing plans, and then we looked at the South Atlantic Fishery Management Council's stakeholder engagement meetings, and our task here was to learn about these meetings that council staff is planning, in collaboration with council members, where they're planning to go to each state, at different times of the year, for a series of meetings between the council members of that state, council staff, and interested stakeholders.

They talked about those meetings a little bit, and we really emphasized that the goals, and the expectations, of those meetings need to be really clarified, that we're a little concerned that the sentiment of wanting you to meet your council member, so they can hear you, might not actually be that much of an incentive to folks. That, if there's not a clear end result of this hearing of me, that it might not actually bring people out, and, in fact, it might increase frustration, and so they're really going to make sure that that gets clarified with the council.

My understanding, and correct me if I'm wrong, is that this is very much a council-driven endeavor, and so they really want to make sure that that's clear, and so we gave a lot of tips on how best to facilitate these meetings, what it would look like structure-wise, and really emphasized that council staff are going to be integral to the facilitation, and the success, of these meetings.

Next, we looked at the council staff's best fishing practices outreach evaluation workshop, and they're looking here at -- They've been doing a lot of really great work, across the region, about descending devices, best handling practices, best fishing practices, and they're feeling that they're sort of to the point now where we need to come together and look at what's been done, what still needs to be done, and where do we go from here with all of these efforts.

Really, it was more of a discussion about the structure of what these workshops could look like, and they have planned topics about building consensus, from experts in the field on what are the best handling practices, and what are the best outreach efforts that have been made about handling practices, sharing that information, setting future directions for research about perhaps now compliance, or how do we go forward with these next steps.

There was a lot of discussion about best workshop formats, and a lot of us have had a lot of workshop experience across the east coast in the last year or two, and so we had a very animated discussion about how workshops really need to be structured and product-based, and, you know, a presentation, and then discussion, without any then reporting-out and building something, might not be as productive as other avenues, and so there was really a lot of urging that they sort of build a shared vision of what happens with the best practices going forward, creation of a consensus statement, something along those lines.

Next, we looked at the social and economic metrics, and we looked at the stock assessment and fisheries evaluation website, and that is the product of a lot of work by council staff, Chip and Judd and Christina and Mike and -- Who else should I be naming her, Judd? It was a lot of other folks, and everybody has been working really hard at this, and so it's beautiful. There is a lot of great information in there, and we spent a lot of time scrolling through it and discussing what information was there. The interface is very user-friendly.

Of course, because we're scientists, we always want more, and so then we made lots of suggestions of other things that could be placed in there, mostly as a linking to external resources, linking to things like community profiles, or landings reports, historical information, that sort of thing, but you will be presenting these to the SSC, I hope, at some point as well, Chip?

DR. COLLIER: Yes. In October.

DR. SWEENEY-TOOKES: In October, and they're beautiful, and you all will love them. We got an update on the Citizen Science Program from Julia Byrd, and she and Meg Withers have been doing a lot of great work. They summarized four key things that they're working on right now, four of many key things that they're working on right now, but they talked first about a citizen science project idea portal. It's a website where people can go and propose research ideas, and so it's meant for citizens who think that I think that, you know, folks should research X, Y, Z, and so it's a place for them to go put that idea.

We also heard about the SMILE project, and that's a citizen diving project, and the SciFish, which is the recreational reporting app, and FISHstory, and so the SEP really wanted to recognize that council is doing some great citizen science work, and that we like this idea of the portal of matching researchers to citizens who are interested in similar research projects, and we did discuss maybe a little bit of concern about opt-in bias on the SMILE project, but that's sort of a problem with all citizen science projects, right, is who actually is going to take the time to participate, and what sorts of data will they be providing.

We also thought that FISHstory was a great opportunity to collaborate with the states, and engage the public, and there is a little bit of concern about upward bias on catch and length, given the public's preference to photograph, you know, their best fish, and only share successful trips, and so a little bit of concern about that, and then we had a very long and extensive discussion about equity and environmental justice, looking at the identified items from our last meeting.

We're really trying to wrap heads around directives that are coming down from the agency and then how can these things be carried out, and what do we do with this? You know, we all agree that this is important, and it needs to be incorporated, but how, and why, and what does this look like, and so there was a lot of sharing of resources, a lot of discussion about training of council staff, and possibly the council, if I remember correctly, looking for resources that exist, and so we spent time pointing them to things like the EPA, which has a lot of training on environmental justice and equity issues, pointing them to existing communities of practice around environmental justice in the Southeast and the Caribbean, as well as really, in a nutshell, giving them concrete suggestions.

There's a beautiful list that you will see in the report, and I don't want to detail it now, because the notes are excellent, and extensive, and so I couldn't even begin to do this list justice, but some really concrete ways to increase equity, ranging from things like considering where meetings are held, to considering what language they're held in, to considering having a greeter who speaks different languages at the door of a meeting, and, you know, really ways to make folks feel like they are welcome, they are wanted, and they belong in the process.

Again, in this discussion, it came up again that there is the potential to create an EEJ advisory panel, or they also mentioned and/or adding someone who can speak to equity issues to advisory

panels, and the SEP agreed, pretty firmly, that it shouldn't be an either/or situation, and that, yes, it's great to have an advisory panel that speaks to these issues, but, if they're separate, and bounded, and sitting over here, while all the rest of the fishery business goes on over here, that that's, by its nature, inequitable, and it's probably not going to solve any problems, and so we need to not silo EEJ efforts, and we need to treat it as a checkbox, but really think sincerely, and realistically, about how these issues need to be incorporated into every step of everything we're doing.

The last thing that we really dealt with was revising our name. In February of 2023, the U.S. Court of Appeals for the 5th Circuit in Texas, in the Gulf -- Let's see, but challenged a final rule in the federal electronic for-hire logbook, and this was all based around the discussion -- The critique was based around the use of the term "socioeconomic", and so there's some great handouts, if you're interested in pursuing it further, but, in summary, they term issue with the term encompassing both social and economic topics if only economic questions were being asked in the federal for-hire logbook, and included in that proposed rule.

The court said that there's a common association of the term with demographics, or societal status, rather than purely economic or social topics, and so, I think partly motivated by that, we had a discussion about what does "socioeconomic" mean, and there's a diverse group of scientists on the SEP, and we tossed out lots of ideas, and there was suggestions that we become the Social Science Panel, because we are all indeed social scientists, but then that's the SSP, and the SSC, and that's just going to get messy, and there was some discussion of cesspool, which I never did fully understand where there was coming from, and so maybe someone else can explain that, and I'm not sure what we were pointing to with that.

We did note that there was really a diversity of us, that in fact there are no sociologists on the SEP, and so we shot down the idea of it being the Sociologists and Economic Panel, and we have anthropologists, and we have social scientists, but we have no sociologists, and it was very amusing. We are also not the Social Committee, which was another comment that was raised, and so, after much animated and very amusing discussion, and just take a look at the transcripts in a few weeks, we determined that we are all best served by moving forward as the Social and Economic Panel, and we removed the lack of a hyphen, which we never had anyway, and we are now the Social and Economic Panel, and so everything basically stays the same, but that checkbox is done.

After that, we voted for a new chair and vice chair, and that is why I am speaking with you, and so I am now the chair of the SEP, the Social and Economic Panel, which I will proceed to say wrongly for the next year, I'm sure, and that is the end of my notes.

DR. BUCKEL: Thanks, Jennifer. Any questions for Jennifer on the SEP meeting summary?

DR. SWEENEY-TOOKES: I forgot the most important part. Jason Walsh is the vice chair, and so he's actually over there making sure that I'm saying the right things, and it's a very hard job, and so, yes, please recognize Jason Walsh as the vice chair as well.

SCS8 MEETING UPDATE

DR. BUCKEL: Congratulations to you both for your new chair and vice chair positions. Thanks for your service. All right. Seeing no hands raised here or online, we'll move into Agenda Item Number 13, which is the Scientific Coordination Subcommittee, the eighth workshop of that subcommittee, the meeting update for that. That formerly was called the National SSC Meeting, and that's going to be held in Boston, Massachusetts, this August, and Judd is going to give us a summary on that, and we've got a couple of action items, and so take a look at Agenda Item 13.5, the action items there.

DR. CURTIS: Thanks, Jeff. If you look at the action items, and I'm going to go through just the agenda and some of the subtheme topics, quickly, to give you an idea of what we're in for for the SCS8 meeting, and then, also, we're looking for potential SSC members interested in participating at the national SSC meeting, and then being able to bring back some information from there and turn them into some of these actionable outcomes for each of these regions, and so let me bring up the preliminary agenda here.

We got some input from each of the different SSCs, if you recall, in the fall, on various themes and subthemes, and so, eventually, all those ideas were submitted to the planning team. The New England Fishery Management Council's SSC is the organizing body for this meeting, and, two years ago, we had it in Sitka, Alaska, and that was the North Pacific that was in charge of that organizing that meeting, and there was a lot of great ideas that came out of that meeting, and conclusions, that people thought, you know, were still worth investigating even further, and so this meeting kind of takes a lot of those ideas, and topics, that were generated from the previous meeting, and applied into this meeting as well, and the idea here is then to come up with some things that are more actionable moving forward. The overall theme is this applying ABC control rules in a changing environment, and then you see kind of an overview of the themes down below.

The expected attendance is around seventy members, comprised of SSC members from all the different regional councils, Science Center representatives, keynote speakers that are either international or outside of the SSC or the Science Centers, other NMFS staff, and then we'll have Janet Coit, and some of her staff, presenting in some of the opening remarks for the meeting.

The general structure for the meeting is kind of a continuation, again, of the meeting, the last meeting, in Sitka, which everyone thought was a very successful blueprint, or successful kind of setup, where we had several different subthemes, and each had a keynote presentation, either one or two, and then there were several case studies from each of the different regions that were discussed, and then, from there, we broke into different discussion groups and had a list of kind of breakout topics and discussions, in each of the smaller groups, and then had a more global reporting-out stage, where all the different ideas from the workgroups were voiced, and some unifying conclusions and discussion items were all put together, and that seemed to work very well, and so we're continuing that format.

It's most preliminary, and it's getting there, and they're still working on some things, and so, just looking at the various subthemes, and I brought this to the SSC, when we were looking for potential case studies presenters, and the first subtheme is this advances in ecosystem science and assessment to inform ABC control rules in a dynamic environment.

Again, we'll have keynote presentations, and several case studies, and the second subtheme was the application of social science to achieve management goals under dynamic conditions, and this

is going to be a little bit different, where we're going to have more of a round-robin, it sounds like, from each of the different councils' SSCs, a social and economic representative discussing how they are using some of the social and economic data in stock assessments and in fishery management policies in the different regions, and so this subtheme might be structured a little bit different, and we're still in the development of how that's going to all unfold.

Then, lastly, the Subtheme 3 is the adaptation of reference points, control rules, and rebuilding plans to changing environment, and so, afterwards, you know, a synthesis will ensue, and that will be the end of that meeting, and, as hinted at, there will be some expectations for participants to have some -- To do some follow-up work, potential follow-up meetings, on how to implement some of these findings, moving forward, to turn them into these actionable items on a regional level. I guess any questions on the agenda, and the format, at this point? Okay.

Then, secondly, as part of our action items, we're looking for potential members that would be willing to participate in the national SSC meeting. Now, before you all start raising your hands, we do, of course, have limited space, and priority is given to people that will be presenting a case study, and so Jie had a case study that was selected for the meeting, and so he will be presenting his case study, and will be one of the representatives. The other slot, so far, that fits into the -- Or case study that we're presenting is coming from Kyle Shertzer's group, looking at that low-recruitment, and I think that's going to be critical, based on our discussions we had earlier, and how this is such an issue in the South Atlantic, not just with black sea bass, as we were going through that scope, but in a lot of different other species, and how to look at this more holistic approach of what's happening environmentally and how that's affecting the low recruitment.

Kyle is excited to present, and he won't be going in-person, but potentially one of his workgroup members might be able to travel for that, and so we're discussing who might be that representative, and the planning team was -- They preferred presenters of case studies to be SSC members, but, you know, exceptions can be made, and we saw that at the last meeting as well, that they don't all have to be SSC members, and that's just such a great example of one of the main, I think, issues that we have in all of our fisheries in the South Atlantic, and so it would be a fantastic case study to present.

Third, right now, which is another case study being presented, although this is -- It's Andrew Ropicki, who is a Social and Economic Panel member for the South Atlantic, and he's going to be attending, but he's going to be presenting his research, that is more Gulf of Mexico-centric, and looking at the ITQ program down there, and so it's a little uncertain, and I need to talk to Ryan Rindone, at the Gulf Council, to figure out if he's going to be a Gulf slot or a South Atlantic slot. That would be the third seat assigned, and there's five total seats, and he would be potentially the third spot.

The fourth spot would be reserved for the either outgoing or the incoming SSC chair, and then the fifth spot would be myself, and so, if you are interested, you can go ahead and raise your hands now, and we'll take a list of people down, and then we'll discuss with ExCom and the council staff, council staff and the council, on what kind of space we have. There might be potential for other space as well, given that, if NOAA members attending, the councils can't pay for NOAA members, and so that might open up another potential slot, and so it doesn't hurt to raise your hands now, if you're interested. Again, the dates are August 26 to 28 in Boston, Massachusetts.

DR. BUCKEL: Just to reiterate the low recruitment, that was mentioned particularly in the New England Fishery Management Council, and they are struggling with that too, and so they were anxious to hear how we've been dealing with it, and, obviously, we'll be interested to see how they're addressing that, and so, if someone from this group would like to represent that, from Kyle's team, that would be great.

DR. SCHARF: Just as another carrot, I looked, and the Red Sox are home during those three days, and so you could go to a game at Fenway.

DR. BUCKEL: Yes, Kai.

DR. LORENZEN: (Dr. Lorenzen's comment is not audible on the recording.)

DR. BUCKEL: Thanks, Kai. Genny has a question. Go ahead, Genny.

DR. NESSLAGE: I am not volunteering, and so Kyle, or someone on that team, will be presenting, and will anyone else from the SSC be presenting on our approaches so far? This is really an SSC meeting and not a Southeast Center working group, and it should be the SSC's approach, and I'm not sure that we're completely onboard yet with what their conclusions, and their complete analyses are, and how we will respond to that, and I think that's what needs to be -- Both need to be presented, and so maybe a joint presentation, with Kyle's group and whoever the SSC members are, would be ideal, in my opinion. Thanks.

DR. BUCKEL: I mean, the way we're dealing with the recruitment, right, is -- The big issue has been with the projections, and so the catch level projections workgroup, and would someone from that be interested, and that would -- That's where we're dealing with it in projections, but then --

DR. LORENZEN: I'm thinking, I mean, there should be several people from the -- I'm sort of surprised, since we have mostly non-SSC people on the list, and it seems strange, because it's a national SSC meeting.

DR. BUCKEL: Can you go through the list again? We've got Jie, who is --

DR. CURTIS: So we've got Jie, an SSC member, and we've got Andrew Ropicki, who is a Social and Economic Panel member, and then we have the other case study that was selected was the low recruitment workgroup presentation that Kyle is spearheading, but, obviously, that's a Southeast Fisheries Science Center initiative.

Genny has got a great idea, I think, if we could integrate an SSC member into the fold, and discuss then not only the work that the center has been doing, but then also some of the input from the SSC, either vis-à-vis the catch level projections recommendations, and that workgroup, or how the SSC is going to integrate some of those low-recruitment work from the workgroup moving forward, and I guess -- Kyle, I don't know if you're online, and I will unmute if you have anything to add to that, if you're amenable to having an SSC member join the workgroup and potentially present some of this work.

DR. SHERTZER: Absolutely. We would welcome any collaboration on that. We do someone identified from the Southeast Fisheries Science Center who can give this presentation, in

collaboration with anybody from the SSC, and as well as the working group. The structure of this talk, that I had in mind, would be to, one, present what the issue is, and then, two, to present how it's been handled in the past by the SSC, and, three, to present some alternative ideas on how it might be handled in the future, and that will require some simulation work that we're attempting to do now, and so that's my thoughts on it, but certainly we would welcome any collaboration from SSC members.

DR. BUCKEL: Amy.

DR. SCHUELLER: Just to remind everybody who was on that SSC catch level projections workgroup, I chaired, but other members were Jie, Chip, Scott Crosson, Judd, Chris Dumas, Genny, Fred Scharf, and Erik Williams, and so, I mean, Jie, and not to put you on the spot for more than one thing, but he's going to be there, and that's a potential overlap.

DR. BUCKEL: Christina.

DR. PACKAGE-WARD: If we need a social science person too, I would volunteer, and I think it would be helpful to be part of that conversation that they're going to have, and I don't have a case study, per se, but I think being involved in the conversation would be helpful.

DR. BUCKEL: That's great, because, as Judd mentioned, it may not be case study presentations, but more of what the SEPs are doing in the various regions, and so thanks.

DR. CURTIS: Thanks, and I don't think that I made that perfectly clear, but, right, and we're looking for a presentation on the social and economic panels from each of the different councils, and so thanks for volunteering. Okay. Well, Kyle, who is the person from the center that was going to participate, or present, the work at the SSC meeting?

DR. SHERTZER: Matt Damiano has agreed to give this talk, and he's been more involved in the simulation phase of this, of how we might be able to handle these issues, and he's been less involved in the actual low-recruitment workgroup, but he's interested in going, and he's willing to give this presentation.

DR. CURTIS: Great. Excellent. Thanks for letting me know, and I will reach out to him. If there's no other volunteers at the moment, look at your calendars, if you want to marinate on it a little bit, and then, if it strikes your fancy, you can email me, but we need to start thinking about participants within the next month. Probably by the end of April, I need names.

DR. BUCKEL: Thank you, Judd. Anything else on Agenda Item 13? All right. Do we want to go to Consensus Statements, Other Business, Public Comment next? Dustin.

OTHER BUSINESS

MR. ADDIS: This is in regard to black grouper. Florida is coordinating with council staff, from the Gulf and the South Atlantic, to do a joint meeting sometime this summer, hopefully, to discuss next steps on black grouper. Florida has contracted a consultant group, Nature Analytics, to -- They've been under contract for a few months, and they've been working on a technical report,

and an infographic report, and they want to present their analytical findings on black grouper to both SSCs, and they're recommending management procedures, and we want to discuss future steps regarding an MSE approach for black grouper, and I just wanted to give you guys a heads-up.

DR. BUCKEL: Thanks, Dustin. Judd, is that something that we might do on our summer webinar?

DR. CURTIS: Yes, and that's something that I've talked with the Gulf Council representation, as well as Luiz and Bev, about trying to organize a joint meeting, and, if we can find time to do it, and there was a possibility to join the Gulf's meeting in July, for just an hour or two, when they hold their webinar. If we cannot do it jointly, then we will be meeting in July, at a different time, to cover some other business at the South Atlantic, and so we could add it there. I guess one question is how critical is it that we do this as a joint review, or can this be separate reviews from the Gulf and the South Atlantic SSCs, just given the nature of the difference in operation between the two committees?

MR. ADDIS: I think as long as both SSCs, you know, look at it, and we get input on future steps, and I think it would be easier if we were all together, but either way.

DR. BUCKEL: Judd, did you have other Other Business?

DR. CURTIS: Thanks, Dustin, for mentioning that. That was on my radar as well. Just a couple other things, and I notified all the SSC members whose term is ending, and are up for reappointment, and so they're all aware of that, and then I sent out a reappointment -- The reappointment instructions, or new appointment instructions, for new members, and so everyone should have received that, and I encourage everyone that is currently sitting on the SSC, whose term is up, to reapply.

The other piece of Other Business I have is, with the transition of the red snapper research track to the benchmark-type assessment, in February, we had gotten names of people that were interested in serving on either the assessment development team, the ADT, or broken out into data and/or assessment, and so we populated a few of that list with data and/or assessment people from the SSC, but there is -- I currently have only two people involved in the data workshop right now, and there are additional seats available for anyone that wants to participate in the data workshop or the red snapper benchmark assessment. Timing-wise, that's going to take place around this time next year, 2025, and I think it's either the week before or the week after our April SSC meeting.

DR. REICHERT: Can you remind us who is currently on that list?

DR. CURTIS: Let me pull this up.

DR. SCHARF: Also, Judd, is it in-person or a webinar?

DR. CURTIS: It will be -- The data workshop will be held in-person. Okay. Here's what I have so far that had volunteered at our meeting in February for the benchmark assessment, is Steve Turner and Wally Bubley at the data stage, and I have Dustin, Jie, and Steve Turner for assessment, and we're still looking for people for review, but we don't need to worry about that just yet, and

so, really, additional data slots are available, and, if anyone wants to participate in the data workshop, we can accommodate them. Marcel? Great.

DR. SCHARF: Is that here in Charleston, or is it somewhere else?

DR. CURTIS: Julie, is the workshop going to be here in Charleston or elsewhere?

DR. NEER: Thanks, Judd. The plan is to hold it here in Charleston, and that's usually where we meet, and it's centrally located, and it helps with council staff and the admin support for a large workshop like that. It will be either, like Judd said, the week before or the week after the SSC meeting, because we moved the data workshop week, so that we weren't making you guys move your meeting week.

One other thing to note is that the process will actually start this November, with a data scoping call, and there will likely be at least one data webinar prior to the in-person workshop in April, and there might actually be two data webinars, depending on what we might need to cover prior to it, and so, essentially, you would start in November with a webinar, one or two additional webinars in early 2025, and then the workshop in April of 2025, and note that we do have usually four or more working groups, and so, if we could get a few additional SSC members who might be willing to help spread yourselves out among the different working groups, that would be helpful, and we have, as Judd said, currently, with Marcel's addition, three people.

DR. CURTIS: Thanks, Julie, for that clarification, and so anyone else from the committee interested in participating in the data workshop? Anne? Thank you.

DR. BUCKEL: Thanks, Anne. Are you good, Judd? All right.

DR. CURTIS: All right. That's good. We have four members for the data workshop, and so thank you very much, and that's all the other business that I had right now, Chair.

DR. BUCKEL: Okay. Other SSC members have any other business? Julie, I see your hand, and is it back up, or is that a holdover?

DR. CURTIS: She pulled it down.

CONSENSUS STATEMENT AND RECOMMENDATIONS REVIEW

DR. BUCKEL: Okay. I see you pulled it down. Thanks. All right. I don't see any hands raised, here or online, and so we'll move on to the next agenda item, which is our consensus statement. Judd has been taking notes throughout the week, and he also has received some written input from SSC members, and so thank you for sending some summary notes, and he has those color-coded, so we know what we've already seen and then what's new, I think.

DR. CURTIS: Yes, and so the blue text is what was added live during our review of each of the agenda items, and then red text is either additions or edits that were provided by various SSC members, via email, and I incorporated them into this document.

DR. BUCKEL: So we work by consensus here, and so we're going to read through the text now, but you will get a second chance to look at this when Marcel, maybe, sends the SSC draft report out, and it won't be coming from me, and so please read through, and, if you see items that you don't agree with the wording on, we'll adjust that, or, if you have additional text that you would like to add. Marcel.

DR. REICHERT: Just delete the beginning of that first sentence, and add a bullet.

DR. BUCKEL: Genny.

DR. NESSLAGE: I'm not sure what the sub-bullet, the first sub-bullet, is about, and it certainly doesn't belong under that first dash, or second dash. I think that was all about the issue of equilibrium, versus what the MSE can provide, regarding short-term projections, and maybe we just need to say something to that effect, that we recognize that this study is looking at relative performance of different management measures at equilibrium, but that, to actually make final management decisions, we will need short-term projections, likely from the MSE and the stock assessment, or something like that, if we're making final management decisions, and I think we agreed this could still inform what direction management should explore options, but the final management decisions.

DR. BUCKEL: Genny had -- The SSC recognizes that this study is looking at an equilibrium time range to compare the strategies on a relative -- We agree that it works for comparing them on a relative basis, or something like that. Marcel.

DR. REICHERT: It may be logical to -- You deleted it, and okay, and I thought maybe just switching them, because I was the one who said that maybe -- The current modeling may already have some of that information, if you look at some of the slopes of the trajectories, and that's why -- Anyway, that's why that first bullet was there.

DR. BUCKEL: Genny is cringing, and I think Kyle recommended against using this for any -- So that would really come out of either the MSE projections or the assessment projections, and so everyone agrees with that? Kyle, if you're still online, you can chime in, but that was my understanding.

DR. REICHERT: I was the one that brought it up, and I'm okay with deleting it.

DR. BUCKEL: Thanks, Marcel. Genny.

DR. NESSLAGE: Sorry, and can you make that its own bullet point, because the earlier one -- The second dash was my point about this, and the MSE, are all about management strategies to end overfishing and rebuild, but we're going to need new strategies ASAP, once that's done, and that process probably needs to start too, if we're going to actually be effective in the long-term, and so they're two different points. Thanks.

DR. BUCKEL: If you recall, this is making recommendations to the MSE team, using this paper's results, and we decided to list strategies that were a lower priority, based on the results from the Shertzer et al. paper, and those are listed here. Jennifer.

DR. SWEENEY-TOOKES: Instead of "difficult to implement", could we rephrase that bullet point to be "could be inequitable in practice"? I didn't really like the implications of the way we had phrased it at first.

DR. BUCKEL: Marcel.

DR. REICHERT: If you go up, didn't we discuss why, or wasn't it important to say why those were -- Because the results of the modeling showed that they didn't accomplish the goals, and we said that --

DR. BUCKEL: That's in that last bullet, and maybe that last bullet needs to be -- The listed strategies do not have a --

DR. REICHERT: Thanks.

DR. BUCKEL: Thank you. So it that -- This list of strategies, that's the list that's above, and is that -- Should that say "this list of strategies"?

DR. CURTIS: I think the idea was to capture that these strategies have been evaluated, and they were deemed to not be effective, and so the SSC was wanting to capture that, so that we're not revisiting it years later and saying, well, why don't we try size limits, and it's because they were a low priority, so we have the documentation.

DR. BUBLEY: Well, I think -- Kai, weren't you the one that brought this up, but I think it was somewhere along the lines of, when recommending for MSE approaches, to not exclude these, because you still would want to have them in there to show that they're not effective, and so I think that was the point.

DR. BUCKEL: Thanks for the reminder of that.

DR. LORENZEN: You don't have to spend a lot of time perfecting those, but they should be in there, because we should know the things that we know don't work.

DR. BUCKEL: So maybe be a little more direct to the MSE team.

DR. LORENZEN: I mean, they should retain those strategies in the MSE, I think.

DR. BUCKEL: Jennifer.

DR. SWEENEY-TOOKES: Should we rephrase "bag limits" to be "species-specific bag limits"? Did I follow that correctly? Genny is making a face at me, and so maybe --

DR. BUCKEL: This is just -- The Shertzer et al. paper was just red snapper.

DR. CURTIS: I think that's a good clarification though, because there is talk of aggregate bag limits around the council table, and so having that clarification is probably important.

DR. BUCKEL: Good catches, everyone. Let's move on to the next question. Marcel.

DR. REICHERT: Was that compliance specifically relative to descender devices, or was it the more general? Did we make a more general recommendation? I remember that we were talking about that relative to descender devices, but it may be that --

SSC MEMBER: It was the retention compliance, full retention to the --

DR. REICHERT: Okay. Thanks. Thanks for that. Okay. Well, nevertheless, it's good to --

DR. BUCKEL: But I think it can be "or other management strategies", or "regulations", just to -- Because there may be others that we -- That the council explores and that will require us to know about compliance. The reduction in effort brings about a reduction in F, but they explored reduction in effort, and so maybe change that "e.g., barotrauma mitigation and reduction in effort".

One thing on the effort reduction that I'm concerned about, when it gets to the council, is that they may need more information on the distribution of the number of -- So, for an individual vessel, or individual angler, the number of trips made annually, and so, if a lot of those are just one trip annually, then you don't have any way to reduce that individual, or vessel, 75 percent, right, because it's just -- Maybe they're just going one or two times a year, and so then that requires, you know, taking out individuals that are not able to participate, to reduce that effort, versus, if there is lots of trips per individual, or vessel, then you can -- You know, everybody gets to stay in the fishery, but you're just reducing their number of vessel trips, or individual, and so I think the council will need -- Or maybe that's a separate workgroup, or some analyses, of vessel trips per year, and individual trips per year, for this fishery. That will be needed, I think, for those types of decisions. Chris.

DR. DUMAS: I think that's a great point, Jeff, and I was just going to say -- If you scroll up to the point that begins with "ways to implement effort", and maybe rephrase to that to say "investigate alternative ways". Then you've got capping vessel trips, angler trips, and maybe add to that list some of the things that Jeff just mentioned, and so I think that goes in there somehow, and so there's -- Like lotteries or trips or tags or -- Lotteries on trips or something analogous to the tags used in hunting.

DR. BUCKEL: Thanks, Chris. Others?

DR. DUMAS: Then the rest of that sentence, the "to see if", and, instead of "to see if", "also investigate", because it's sort of a separate point, but "also investigate potential nonlinear responses". Thanks. That may be feasible, and I don't know if that's even necessary, because there may be options that work for commercial, and there may be other options that work for recreational, and that's the whole point, is to explore different alternatives that might -- Some might work for recreational, and some work for commercial, and some might work for both, and so I don't know that we know at this point.

DR. BUCKEL: Great. Okay. Then our last question was would these strategies be applicable in a multispecies fishery, and what are some of the hurdles? I think those are the two big ones, the area closures and effort reductions. Marcel.

DR. REICHERT: Should it be area and temporal closures? Thanks.

DR. BUCKEL: Yes. Thanks, Marcel. All right, Judd. I'm not seeing any hands, or cringing faces.

DR. DUMAS: On the shifting of effort, that would apply temporally as well as -- Shifting of effort from spatial and temporal, or temporal.

DR. BUCKEL: Good. Okay. Moving on, the next item is the low recruitment, and there was no action needed, but we had some suggestions for that low recruitment workgroup.

DR. CURTIS: This is all new text that was added from the email contributions from other SSC members, and so you're seeing this for the first time, unless you drafted it, of course, hopefully.

DR. BUCKEL: Marcel.

DR. REICHERT: I think that the first orange is basically repeated in the red, and so that can be deleted, and perhaps -- I made that comment.

DR. BUCKEL: All right, Judd. I think you can scroll up there.

DR. REICHERT: The very last point, I'm wondering -- Not too long ago, we talked with Kyle, and he said he would be happy to have SSC input, and so, rather than forming a new working group, maybe adding a representative, an SSC rep, to the working group, and that may avoid some duplication of work, and maybe reduce some meetings.

DR. BUCKEL: All right. The group that added this is a thumbs-up that they're okay with that, Marcel, and I agree.

DR. REICHERT: I would "SSC representation" rather than "a member", and so that gives a little flexibility, whether it's one or two or -- Especially since Kyle said that he welcomes that input.

DR. BUCKEL: Genny.

DR. NESSLAGE: Thanks. To this low-recruitment issue, absolutely that makes perfect sense, efficiency-wise and whatnot, if Kyle is open, if folks are open to that, but I would invite Jim -- We had a little sidebar conversation about whether the council wants to think more broadly about developing an ecosystem working group, the way perhaps the Mid has done, and I know we have one that advises on the ecosystem model, that's very specific, but, as more and more of these issues start to pop up, or more and more concerns are going to come up, it might be good to have -- I don't know, and, Jim, this was your idea, and I'm going to put you on the spot and see if you would be willing to speak to it.

DR. BUCKEL: Jim.

MR. GARTLAND: I guess the general was, I mean, looking at the number of species that are being impacted by these low-recruitment problems, and the potential for it potentially being an environmental driver that could possibly affect others as well, that we just haven't thought of yet, and, you know, again, from what I understand, the Mid -- They have formed kind of an SSC

ecosystem working group, to try to operationalize ecosystem approaches in the Mid-Atlantic and to deal with problems that are cutting across multiple FMPs, and so I didn't know -- I mean, when I saw the presentation here, it almost seemed like an analogous situation, but in the Southeast, and so I didn't know if an analogous response, for example the formation of a subgroup to kind of focus on these, and future issues, would be useful.

DR. CURTIS: To that, we have formed a number of working groups in the past, that never really met, because they weren't -- We didn't really have an actual charge of duty, but we had formed like a regimes shift workshop, comprised of SSC members, as well as like an MSY proxies reference points workgroup, that was developed after some of the black sea bass assessment discussions, and, given that none of those have really had a chance to meet, or have needed to meet, having something that's maybe more general would be a good idea, and that could take the form of something that's more of an ecosystem-based approach, like they have in the Mid-Atlantic. Again, we have the Ecopath/Ecosim/Ecospace, and that should be -- I think we're getting close to a new model, Chip, and that will be reviewed by that group, that is right now comprised of just Alexei, and so we would need to add to that group, but, yes, that's it from me.

DR. BUCKEL: Chip, is that something that that group could be expanded, to not just be providing guidance on that particular product, the Ecopath with Ecosim and Ecospace, but to broaden it to address broader ecosystem questions, maybe using Ecopath, but maybe not?

DR. COLLIER: Just thinking about this a little bit, we do have a Habitat and Ecosystem Advisory Panel now, but they're more kind of on the habitat side of things, and not necessarily analysts into some of the data, and so I think it would be good to have something like this, to help guide some of the ecosystem discussions, because I think we get into some of the more theoretical at the Habitat AP, or Habitat and Ecosystem AP, and this could help, having a group that could really take some of their ideas and put pen to paper, and I think that would be probably beneficial, and John can slap me in the back of the head if I'm speaking out of turn.

DR. CURTIS: I think, at one point too, when we were populating that Ecopath/Ecosim/Ecospace special group, there was a recommendation, from the SSC, that we could bring in outside expertise, if it wasn't available at this table, and we can still do that for those particular topics, but that could be part of this larger, more holistic ecosystem-based SSC group, workgroup.

DR. BUCKEL: That sounds good, Judd. I've got Marcel and then Dustin.

DR. REICHERT: Unless we need to make some of those decisions now, perhaps we can put that on maybe our webinar, just to evaluate what working groups we have and which ones we could potentially consolidate, or which ones we could -- Since they haven't met, or maybe the issue isn't there anymore, but just weed out -- Build them out or round them off. Would that work?

DR. BUCKEL: Judd, I'm looking at you, and so Marcel asked about the summer webinar to discuss the different workgroups that we have, and think about what the charges are for each, and, if we have to drop some, if they're not going to meet, and then consider the Ecopath with Ecosim -- That that may broaden the charge of that group.

DR. CURTIS: Yes, absolutely, and what I can do is just build a -- Or share the table that I've built with the current members of each of those various workgroups, and then we can discuss which

ones should be dissolved or combined into a more holistic ecosystem group, and I think that would be a good idea.

DR. BUCKEL: Dustin and then Alexei.

MR. ADDIS: If you're considering bringing outside expertise in, I have a suggestion for my group, and we hired Becky Scott, and she's really experienced in Atlantis and Ecopath modeling, and so just if you're looking for somebody, to add somebody.

DR. BUCKEL: Thanks for letting us know about that, Dustin. Alexei.

DR. SHAROV: I am feeling very lonely, currently, on the Ecosim and Ecopath working group, and I definitely support the expansion of the group to a larger scope, and not just limited to the models specifically, but, with regard to Ecosim and Ecopath, I would say that, I mean, we have -- This group relied, obviously, on the very good experts at the FWRI, the Florida Fisheries Institute, and those folks are maintaining it, and running it, and the role of the SSC members was more sort of more strategic, right, and so don't fear if you don't know Ecosim and Ecopath in detail, and you should not withhold yourself from participating, and so, yes, that's a good idea, and I support it. Thank you.

DR. BUCKEL: Thanks, Alexei. Amy.

DR. SCHUELLER: We've tasked ourselves with making workgroups many times in the past, and sometimes those tasks have been successful, and we've had a statement of work, and we've moved forward, and we have created documents that we then use by our future selves, and that's good, but we also create workgroups where then they never actually meet, or do anything, and I'm not really sure why some are successful and some aren't, whether or not that's like support from like the council, or just internal shuffling within the SSC, or a lack of a pointed task, with like an end date, and so I feel like this is a bigger discussion, about workgroups, because I know I've volunteered for workgroups that then have never met, and I've not known why, and so I guess I'm just saying all this, so that we should think about this in a more holistic way, and how, if we do want to task ourselves with a workgroup, are we going to make it successful.

DR. BUCKEL: Thanks, Amy. Genny.

DR. NESSLAGE: If it's at all tempting to council, and the staff -- If the issue itself isn't tempting enough, I would just argue that, with the national SSC meeting coming up, there will be recommendations coming out of that that our group will probably want to mull over, and consider, and that would be very pointed, and we could develop a very specific statement of work that, at least for the next year, perhaps could be effective to helping the South Atlantic Council move forward on some of these issues.

DR. BUCKEL: Thanks, Genny. That would be very helpful. So an item to add to the summer webinar, to talk about our work on the workgroups. All right. Judd is jotting that down. Any last comments, before we leave this? Should we have a sentence that maybe summarizes it? So there's going to be SSC representation on the current center's low-recruitment working group, but then do we want to have a sentence saying, and it could be separate from this paragraph, that, for this issue, and future ecosystem issues, the SSC will discuss -- All right. Thanks, Judd.

All right. The next agenda item that has a response from us, and there was no action needed on the Florida SRFS, and so we didn't have any text there. On the discard logbook, we do have text that we've seen before, and Steve had -- Steve, was this the agenda item that you had the recommendation about the incentives that Chris brought up? If you want to let us know your thoughts, your additions.

DR. TURNER: I haven't thought about it in addition to this text, and so -- But anyway, thinking about what Chris said the other day, I was thinking that it would be sensible that we might request the NOAA Center, and/or the Regional Office, to work on -- To work with fishermen, or the public, on incentives they might be interested in that would increase reporting and/or discards.

My thinking started out with taking a fraction of the quota, a substantial fraction of the quota, and holding it back if commercial -- Increase reporting to a 100 percent requirement, and, if say 80 percent, some percent, of the reports actually came in, and appeared to be accurate, then that quota, the next year, might be given back to the fishery, but, if it wasn't accurate, there wasn't sufficient reporting, the stock might actually benefit, and so, if there's increased reporting, the assessments might benefit, and I think the Southeast Center did something like this, several years ago, with late reporting on commercial landings, monitored by the council, where we published not what someone reported, but whether they reported, and the timeliness of reporting, and so then the dealers were able to self-enforce.

Anyway, my text -- I had some text here somewhere, and it's pretty simple, to request that the SSC, and or SERO, investigate approaches for incentivizing increased reporting in particular discard reporting, but this could go for electronic reporting, and you could do the whole thing, and so I think -- Anyway, that's my suggestion.

DR. BUCKEL: Thanks, Steve. I appreciate that. Fred Scharf.

DR. SCHARF: Related to the previous topic, I have a bunch of notes related to the Florida Reef Fish Survey that I will add later, but I just want to -- Related to the calibration methods, and some of the questionnaire issues, some of the things we talked about, and so I'll add those later, but I just wanted to let folks know that I will put them, and so, when you review it, don't be surprised if stuff shows up there, just comments and things like that.

DR. BUCKEL: Thanks, Fred. Kai.

DR. LORENZEN: I would maybe add, under the electronic reporting, that, you know, it's been used, very successfully, in HMS, and experimentally in the Gulf, for reef fish, and so I think it sounds a bit like a far-off possibility there, but it's actually, you know, being used, and is thought to be very effective. Monitoring. This is basically camera systems that are connected with, you know, positioning information and so on, and it's very, very rich, and very reliable, data by now.

DR. BUCKEL: This agenda item was the commercial discard logbook data, and that that electronic monitoring could help with the recreational discarding too, and I don't know --

DR. LORENZEN: Absolutely, and, actually, there are trials for that, at the moment, and there will be as part of the red snapper -- You know, the exempted fishing permit, and they'll be trialing electronic monitoring on private rec boats.

DR. BUCKEL: All right. Thanks, Kai. Is everyone happy with the text here? Fred had brought up that there was the issue with the non-reporting, for the vessels that had very few trips per year, versus the graph that had the -- I think it was greater than six trips per year, and the trend wasn't strong in the absolute values, the percent zeroes.

DR. SCHARF: Yes, and there was -- Well, there were two issues, right, because there was that increase in just the report compliance, right, and like that happened -- That coincided with the increase in the proportion of zeroes, and so that was the first thing, right, and so there was a -- You could just type-in that the increased proportion of zeroes, of zero discards, coincided with increased report compliance, because it jumped up in 2007, and it seemed like -- But the other issue was that the zero -- The proportion of zero discards was high for fishermen that took very few trips, and it was not that high for folks that took a lot of trips. It was high for fishermen that took very few trips, less than five per year.

DR. BUCKEL: For both of those, if I recall correctly, Dave mentioned that he was going to look into both of those, and so, Judd, I don't know if you want to capture that, that the center is going to look into these issues. Steve.

DR. TURNER: Kai, in the Gulf of Mexico, are cameras being used with the electronic reporting, or is it just reports?

DR. LORENZEN: No, and it's camera, and it's monitoring using cameras, and it's not -- I think, for the reef fish, it's sort of experimental, but it's being used, in a fairly large scale, for the HMS, for the pelagic longline fisheries.

DR. TURNER: I know the HMS is doing it, and I didn't know it was used for the reef fish.

DR. LORENZEN: It's not a -- I don't think it's an established program, and I'm not 100 percent sure, but I know they've been doing it, and they've been trialing that, on reef fish boats.

DR. BUCKEL: All right. Let's scroll down, please.

DR. CURTIS: For the red snapper benchmark terms of reference, I just added a statement there that the SSC has made the edits, and recommendations, and those will be reflected in that revised document, and then we will include that in the briefing book for the council, for their June meeting, and the same goes for the scope of work, and there's maybe more discussion that needs to happen about the format of that document.

DR. BUCKEL: Before we leave black sea bass, we had a discussion about the -- That was the scope of work for the next assessment, but then we did have discussions about how we'll provide an ABC estimate for 2027, and that will happen before this assessment takes place, the discussion about the interim, versus a quick update, and I think Erik -- That was to be determined, what approach would be used, but maybe the center is going to -- I can't remember exactly our language

there, that we came to a conclusion on that, but it wasn't to say either -- To settle on either one of those at this point, but that was still up to look at which one would be the faster approach.

There is a tradeoff that Erik -- That I thought was a really important point, that the council may want to know about, that the interim analysis -- There will be higher uncertainty there, and so we would probably go with a higher P*, for example. Marcel.

DR. REICHERT: It would be to trade off between the uncertainty and timing, correct?

DR. BUCKEL: Potentially, I guess, and that was my -- I was going to say tradeoff, that the interim could happen potentially faster than an update assessment, but Erik wasn't sure about that, right, Erik, and there was some uncertainty if that was going to actually be faster, and that's good, and it's captured well. Thanks. Amy.

DR. SCHUELLER: Can we change the language? It says the interim analysis, or the update assessment, will be used, and I don't know if that's true, and it would say "is requested by the SSC". I mean, we're not the ones that are going to set the work schedule, and it doesn't mean that it will be on there, because we've put it in our report, and, I mean, we had discussions, on our webinar, that, if we did not get any analysis to update the ABC for black sea bass, that the numbers would stand as they were in what we've already provided, legally, and so I think that -- I guess time will tell, and we don't necessarily have direct purview over that.

DR. BUCKEL: Great point, Amy. We do have that language that the ABC for 2026 would roll forward until there was a new ABC, and so we'll request it, and, if we get it, great. If not, then we have something that can go in place. Thanks for that reminder and the change in the language to request. I mainly wanted the council to be aware that what we had recommended out of the webinar was this interim analysis, and now we want to -- We want the center to have more flexibility on what approach to use, and let the council know that. All right. Thanks, Judd.

DR. NEER: Jeff, before you move on, you did not review terms of reference for black sea bass, and you reviewed a scope of work for black sea bass.

DR. BUCKEL: Good catch. Thank you.

DR. NEER: Thanks.

DR. BUCKEL: Thank you. Good catch. All right. Does that catch us up for the consensus statement? So the other information, related to the report, is that the report will be provided to the council by noon on Friday, May 10, or somewhere close to that, for inclusion in the briefing book for the June council meeting. I think that's it for the consensus statement, and then next is Agenda Item Number 16 and any public comment.

DR. CURTIS: If there are any members of the public wishing to give their comment, please raise their hands on the webinar. I am not seeing any hands for public comment.

ELECTIONS

DR. BUCKEL: All right. Thanks, Judd, and so we're moving on to Agenda Item 17, which is Elections, and so this is the end of my two-year term as chair, and, normally, the vice chair would become the chair, and so that would Fred Scharf, but Fred is unable to take on the SSC chair duties, because he is taking on the departmental chair duties at his university, and so he has bowed out of being chair of the SSC, and so, instead of just nominating, and electing, a vice chair, we're also going to do a chair today. We'll now open the floor for nominations for chair.

DR. SCHARF: Before I make a nomination for chair, I just want to thank Jeff for his service for the last two years.

DR. BUCKEL: Thanks, everyone. I've enjoyed working with everyone on the committee.

DR. SCHARF: I would like to nominate Marcel Reichert for chair, if he's willing to accept that nomination.

DR. BUCKEL: Before we ask him if he'll accept, are there any other nominations for chair? All right. I'm seeing no more nominations, and so, Marcel, do you accept the nomination?

DR. REICHERT: I accept the nomination.

DR. BUCKEL: All right. Thank you. Given that we have one candidate, we'll approve the new chair through acclamation, and so, all in favor, please join me with a round of applause for the new chair. *(Applause)* Thanks very much.

DR. REICHERT: Thank you.

DR. BUCKEL: Okay. I will now open the floor for nominations for vice chair.

DR. SCHARF: I would like to nominate Wally for vice chair.

DR. BUCKEL: Any other nominations for vice chair? All right. Seeing no more nominations for vice chair, Wally, do you accept the nomination for vice chair?

DR. BUBLEY: I accept the nomination.

DR. BUCKEL: All right. Thanks very much, Wally. Again, we have one candidate, and so we'll approve the new vice chair through acclamation. All in favor of Wally being the new vice chair of the SSC, please join me by clapping applause for the new vice chair. *(Applause)* All right. I really appreciate it, Marcel and Wally, for stepping in. I look forward to your leadership over the next couple of years. All right. Judd, any other --

NEXT MEETINGS AND WRAP-UP

DR. CURTIS: Just the next meetings you see are on the board, and we'll probably have a June or July webinar, TBD. We'll consult with ExCom and find a week that look appropriate, and then our next in-person will be October 22 to 24, here in Charleston, and you see the next meetings for

the South Atlantic Fishery Management Council as well. The next one is in Florida, in Daytona, and our new chair will be attending and providing an SSC report.

I just want to say a big thank you to Jeff as well, for his leadership for the SSC, and working with him has been great, over the last two years. I met Jeff when I was a graduate student, and he provided me a lot of good guidance, and telling me what to do, while I was a graduate student, and, over the last two years, it's been great to be able to return the favor and tell him what to do, and so thanks a lot, Jeff.

DR. BUCKEL: Judd, thanks for keeping me straight. Much appreciated. All right. Marcel.

DR. REICHERT: One practical thing. In terms of the report, I'm hoping to get the report out to everyone by April 24, if you can provide me comments by May 3, and then I can get that to you by May 10, and is that kind of the timeline that we discussed?

DR. BUCKEL: Yes, and May 10 was the -- That sounds like a good plan, Marcel. Thanks.

DR. REICHERT: Okay. Thank you, everyone.

DR. BUCKEL: Fred Scharf.

DR. SCHARF: Just an observation that we're moving from a North-Carolina-based leadership team to a South-Carolina-based leadership team, and so it almost occurred to me like a BACI design, and so we'll have to see where things go in the next couple of years.

DR. BUBLEY: Does that mean Georgia next year?

DR. REICHERT: Exactly.

DR. BUCKEL: A BBQ cookoff, North Carolina versus South Carolina, might have to take place. All right. Thank you all for a job well done this week, and thank you, Judd, for your help over the last two years, and for taking notes this week, and, again, while dealing with the webinar and all the other things that you have to deal with up here, and we appreciate you organizing the agenda, the overview, and the documents, and getting folks lined up for presentations, and so thanks for all that work.

I also appreciate assistance, and guidance, of the staff from the council, the staff from SEDAR, as well as staff from the Southeast Fisheries Science Center that joined us here in-person, Erik, as well as those online, and thanks to council member, Amy Dukes, for being here in-person. We appreciate that, as well as council members that have joined online this week, and we also thank NOAA General Counsel rep, Shep Grimes, for your help this week, and, with that, the April 2024 South Atlantic Council SSC meeting is adjourned. Everyone have safe travels home.

(Whereupon, the meeting adjourned on April 18, 2024.)

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June 7, 2024

April 2024 Scientific and Statistical Committee Meeting Attendee Report:

Report Generated:
04/18/2024 02:08 PM EDT

Webinar ID	Actual Start Date/Time
208-257-187	04/16/2024 12:23 PM EDT

Staff Details

Attended	Interest Rating
Yes	Not applicable for staff
No	Not applicable for staff
No	Not applicable for staff

Attendee Details

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Duration	# Registered
5 hours 17 minutes	86

Last Name	First Name
Council	South Atlantic
Collier	01Chip
Curtis	Judd

Last Name	First Name
Allen	Shanae
Atkinson	Sarina
Barrows	Katline
Belcher	Carolyn
Bianchi	Alan
Binion-Rock	Samantha
Bradshaw	Chris
Byrd	Julia
Coffill-Rivera	Manuel
Craig	Kevin
Cross	Tiffanie
Curtis	Judd
DeJohn	Frank
DeVictor	Rick
Dukes	Amy
Gore	Karla
Griffin	Aimee
Guyas	Martha
Hadley	John
Helies	Frank
Hemilright	Dewey
Hordyk	Adrian
Iberle	Allie
Iverson	Kim
Johnson	Hanna
Kalinowsky	Chris
Kean	Samantha

Klasnick	01Kelly
Lee	Max
Lorenzen	Kai
Malinowski	Richard
Mathews	Joe
Matter	Vivian
McClair	Genine
McPherson	Matthew
Mehta	Nikhil
Murphey	00Trish
Neer	Julie
Neidig	Carole
Newman	Thomas
Nuttall	Matthew
Oliver	Ashley
Peterson	Cassidy
Potter	Caroline
Ramsay	Chloe
Seward	McLean
Sharov	Alexei
Shertzer	Kyle
Skinner	Glenn
Smart	Tracey
Smillie	Nick
Spanik	Kevin
Strelcheck	Andy
Thompson	Kevin
Travis	Michael
Turley	Brendan
Vaz	Ana
Wiegand	Christina
Willis	Michelle
blough	heather
gloeckner	david
mybalzich	will
oden	jeff
thomas	suz
vara	mary

Webinar Question 4

ok

Webinar Response 4

Attendee Report: Scientific and

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04/18/2024 02:18 PM EDT

Webinar ID	Actual Start Date/Time	Duration	# Registered
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Yes	Not applicable for staff	Council	South Atlantic
No	Not applicable for staff	Curtis	Judd

Attendee Details

Attended	Interest Rating	Last Name	First Name
Yes	59	Adler	Kelly
Yes	40	Alhale	Sydney
Yes	61	Allen	Shanae
Yes	46	Anderson	Stacey
Yes	42	Atkinson	Sarina
Yes	53	Barbieri	Luiz
Yes	54	Barrows	Katline
Yes	40	Belcher	Carolyn
Yes	59	Binion-Rock	Samantha
Yes	72	Bradshaw	Chris
Yes	55	Byrd	Julia
Yes	44	Carmichael	01 john
Yes	57	Cathey	Andrew
Yes	33	Cheshire	Rob
Yes	70	Coffill-Rivera	Manuel
Yes	41	Corbett	Ellie
Yes	45	Cross	Tiffanie
Yes	100	Curtis	Judd
Yes	87	DIAZ	JOSE
Yes	38	DeVictor	Rick
Yes	46	Decossas	Gary
Yes	71	Dukes	Amy
Yes	34	E Brown	Julie

Yes	90	Folks	Christian
Yes	46	Foss	Kristin
Yes	41	Futrell	Hailey
Yes	84	Gandee	Savannah
Yes	41	Griffin	Aimee
Yes	90	Gunderman	Alexis
Yes	55	Guyas	Martha
Yes	49	Hadley	John
Yes	93	Harrell	Jade
Yes	41	Helies	Frank
Yes	91	Hemilright	Dewey
Yes	39	Howington	Kathleen
Yes	85	Huber	Jeanette
Yes	52	Iberle	Allie
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Yes	40	McClair	Genine
Yes	42	Mehta	Nikhil
Yes	38	Mroch	Ray
Yes	57	Muffley	Brandon
Yes	53	Murphey	00Trish
Yes	39	Neer	Julie
Yes	36	Neidig	Carole
Yes	94	Newman	Thomas
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Yes	90	Peters	Anne
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Yes	50	Potter	Caroline
Yes	45	Privoznik	Sarah
Yes	44	Ramsay	Chloe
Yes	92	Robbins	Megan
Yes	77	Rosenthal	David
Yes	34	Sedberry	George
Yes	57	Seward	McLean
Yes	97	Sharov	Alexei
Yes	38	Shertzer	Kyle
Yes	47	Smillie	Nick

Yes	40	Spanik	Kevin
Yes	60	Spratt	Paige
Yes	35	Stemle	Adam
Yes	93	Sweetman	CJ
Yes	46	Thompson	Kevin
Yes	39	Travis	Michael
Yes	31	Turley	Brendan
Yes	39	Vaz	Ana
Yes	35	Vincent	Matthew
Yes	91	Wiegand	Christina
Yes	34	Willis	Michelle
Yes	40	Withers	Meg
Yes	41	gloeckner	david
Yes	96	mybalzich	will
Yes	99	oden	jeff
Yes	100	thomas	suz
Yes	36	vara	mary

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Yes	for staff	Council	South Atlantic
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Attendee Details

Attended	Interest Rating	Last Name	First Name
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Yes	70	Anderson	Stacey
Yes	85	Atkinson	Sarina
Yes	35	Bacheler	Nate
Yes	47	Barrows	Katline
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Yes	38	Bianchi	Alan
Yes	54	Binion-Rock	Samantha
Yes	50	Bradshaw	Chris
Yes	38	Byrd	Julia
Yes	37	Cathey	Andrew
Yes	36	Chagaris	David
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Yes	73	Corbett	Ellie
Yes	53	Crosson	Scott
Yes	99	Curtis	Judd
Yes	78	DeVictor	Rick
Yes	61	Dukes	Amy
Yes	57	Floyd	Brad
Yes	42	Foss	Kristin
Yes	36	Glazier	Ed
Yes	98	Guyas	Martha
Yes	40	Hadley	John
Yes	95	Hemilright	Dewey
Yes	92	Huber	Jeanette
Yes	44	Iberle	Allie
Yes	91	James	Emma

Yes	32	Kellison	Todd
Yes	96	Klasnick	01Kelly
Yes	38	Klibansky	Lara
Yes	38	Lee	Max
Yes	44	Malinowski	Richard
Yes	94	Marhefka	Kerry
Yes	33	Mathews	Joe
Yes	93	Matter	Vivian
Yes	37	McClair	Genine
Yes	42	Mehta	Nikhil
Yes	53	Murphey	00Trish
Yes	42	Neer	Julie
Yes	98	Neidig	Carole
Yes	95	Newman	Thomas
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Yes	66	Sauls	Beverly
Yes	34	Schlick	C. J.
Yes	66	Sedberry	George
Yes	74	Seward	McLean
Yes	99	Sharov	Alexei
Yes	48	Shertzer	Kyle
Yes	37	Smillie	Nick
Yes	58	Strelcheck	Andy
Yes	50	Thompson	Kevin
Yes	37	Wiegand	Christina
Yes	47	Willis	Michelle
Yes	46	Withers	Meg
Yes	70	gloeckner	david
Yes	97	mybalzich	will
Yes	92	oden	jeff
Yes	100	thomas	suz

April 16, 2024

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SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL SSC

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