SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SOCIOECONOMIC PANEL OF THE SCIENTIFIC AND STATISTICAL COMMITTEE

Town and Country Inn
Charleston, South Carolina

April 17-18, 2023

TRANSCRIPT

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Dr. Andrew Ropicki
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Attendees and Invited Participants

Shep Grimes
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Other attendees and invited participants attached.

The Socioeconomic Panel of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at the Town and Country Inn in Charleston, South Carolina on April 17, 2023, and was called to order by Dr. Scott Crosson.

INTRODUCTIONS

DR. CROSSON: Welcome to the spring 2023 SEP meeting of the South Atlantic Council. I'm Scott Crosson, and I'm the chair of this illustrious subcommittee, and so, before we do anything, we're going to go around, starting with Adam, counterclockwise, and introduce ourselves for the record. After that, we'll go ahead and approve the agenda.

MR. STEMLE: Hi, everyone. My name is Adam Stemle, and I'm an economist with the Southeast Regional Office of NOAA in St. Petersburg.

DR. CHEUVRONT: I'm Brian Cheuvront, and I don't have a job. I used to be Myra Brouwer, and I was the Deputy Director for the South Atlantic Council for Management.

DR. CRANDALL: Hi, and I'm Chelsey Crandall, and I'm the social science lead at Florida Fish and Wildlife, and we're in Gainesville, Florida.

DR. CROSSON: I'm Scott Crosson, and I'm the chair of this committee, and I'm also an economist for NOAA Fisheries at the Southeast Center in Miami.

MR. HADLEY: John Hadley, and I'm council staff, an economist on staff at the South Atlantic Fishery Management Council.

MS. WIEGAND: I'm Christina Wiegand, and I'm the Fisheries Social Scientist with the South Atlantic Council.

DR. ROPICKI: Andrew Ropicki, and I'm an Assistant Professor at the University of Florida, in Marine Resource Economics, and also the Florida Sea Grant Marine Economics Specialist.

DR. WHITEHEAD: John Whitehead, and I'm an economist at Appalachian State University.

DR. HUNT: Kevin Hunt, and I'm a Professor of Human Dimensions at Mississippi State University in the Gulf, and I teach -- I do social and economic research, and I teach fish and wildlife policy and law and human dimensions.

DR. SWEENEY-TOOKES: I'm Jennifer Sweeney-Tookes. I'm an applied anthropologist and Associate Professor of Anthropology at Georgia Southern University in Statesboro, Georgia.

DR. CROSSON: All right. The next item on the agenda is actually approving the agenda, and I'm sure that everybody has looked over this carefully, and is there any objections to that? Seeing none, the agenda is approved. I'm sure you also have all read the minutes from our last meeting, a year ago, and does anybody have any amendments to those minutes from last year that we all recall so well? I apologize, and there are members of the SEP that are online, including David Dietz. David, can you say hello?

MR. DIETZ: Sorry that I'm not there, and I apologize, and I'm David Dietz. I was the socioeconomist for the North Carolina Division of Marine Fisheries when I took this post, and I now work as the Manager of Standards Oversight for the Global Seafood Alliance, based out of Portsmouth, New Hampshire.

DR. CROSSON: Okay, and so, continuing with the agenda that we have right now, is there any objection to us approving the minutes from last year? Seeing none, I'm going to sign this piece of paper that John has given me, and then the next item after that is public comment, and so I guess we're going to open it up for any public comment that we might have.

MS. WIEGAND: If there is anyone online who would like to make public comment, just go ahead and raise your hand, using the little function on the webinar, and we'll recognize you.

DR. CROSSON: Okay. All right. Well, seeing none, we're going to move on to the second agenda item, which is -- It looks like John and Christina are going to go over existing council amendments that are ongoing right now, and there's probably quite a flurry of those.

RECENT AND DEVELOPING SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL AMENDMENTS

MS. WIEGAND: This is Attachment 2 in your briefing book, and we're just going to go over a couple of the amendments that the council has on their plate right now, but the full list is provided in your briefing book. Some that may be of specific interest to this group, one being Amendment 48, which is the wreckfish ITQ program modernization, and those of you that have been on the SEP for a while might remember when we first started talking about the wreckfish ITQ program as part of the mandated ITQ review that occurs every five years. That review was completed in September of 2019, and the council has been working on the amendment process since then, to try to make some changes to the fishery that were noted as needed through that review, and one of the major ones being modernizing the program.

Right now, it's the oldest finfish ITQ program in the country, and it was still operating using sort of a paper-based coupon system, and so, while this amendment covers a number of things, the biggest part would be moving from that paper-based coupon program to an electronic program. Additionally, they're looking at some small changes to permitting requirements, addressing some allocation issues, offloading site and time requirements, and considering options for, you know, hail-in and hail-out or vessel monitoring systems.

We're reaching the tail-end of development of this amendment, and we held public hearings in March, and the council is planning to consider it for formal review in September of 2023. Then it will have to go to the agency for review, and, of course, development of an electronic program may take some time before it's able to be implemented, but the council process for it is nearing completion.

Then there's Regulatory Amendment 35, and this is a discard mortality reduction and red snapper amendment, responding to the latest stock assessment for red snapper, which was SEDAR 73. Unfortunately, red snapper are still overfished, and overfishing is still occurring, primarily due to

the large number of fish that die after catch-and-release, and so a big part of this amendment was looking to address that.

One of the things that the council has done was started a best fishing practices outreach initiative, where we're going to be spending a significant amount of staff time organizing trips to tackle shops, having seminars with local charter captains, sort of in partnership with the Sea Grant fellowship that we talked to you guys about at the last meeting, and so this is really sort of making an effort to get this information out to the public and build relationships with people in the fishing community to help increase, you know, the knowledge of best fishing practices, like the use of descending devices and things of the like.

MR. HADLEY: All right. I will finish it out here. I will mention, with the Reg 35 item, that we're going to sort of come back to that, I think tomorrow with Scott's presentation, and it's going to pick up on some of the research that's being done on recreational discards and potential EFPs and whatnot that may ensue here in the near future in the South Atlantic region, and so that's kind of a primer for that as well.

Moving on down, we have Amendment 46, which is looking at developing a private recreational permit for snapper grouper anglers, and so, there again, focusing on private anglers and not for hire, and trying to get a better idea on the universe of anglers, as well as help integrate into existing sampling programs, such as MRIP, to help with the precision of recreational catch and effort estimates, and so that will be developing likely through the end of this year and on to next year.

Then, moving on down, this is another item that is sort of a primer, that you will hear more about later on in the SEP agenda, but there's a snapper grouper management strategy evaluation that is currently underway, and you will hear more about that from Chip. However, it's looking at sort of a holistic view of the snapper grouper fishery, trying to -- Since it is a multispecies fishery, trying to come at it as a high-level approach, looking at the fishery as a whole, rather than on a species-by-species basis, and looking at how we can possibly change that fishery to address some of the ongoing issues with recreational discards and any sort of improvements that could be made to the fishery. As part of that, and really as -- Again, we'll get into this a little bit more, but there was some discussion, at the March meeting, on integrating some aspects of angler welfare into the MSE overall project, and so there will be some targeted questions towards the panel along those lines.

Then we have an upcoming additional amendment on the unassessed snapper grouper species, and so this is sort of a small laundry list of species within the snapper grouper complex that are going to be addressed through one amendment, and, really, what's going on here is trying to integrate the updated recreational estimates, and so the Fishing Effort Survey estimates, into a catch level recommendation for these unassessed species, and so they're all landings-based, and, being landings-based, with that new rescaling, if you will, of recreational catch estimates, you're going to be looking at changing allocations when you're updating the catch level recommendations.

I imagine this is probably something the SEP will be hearing about next year, but it's also potentially an opportunity to employ some of the suggestions that the SEP had last year, when discussing allocations and looking at allocations between species, and sort of prioritizing those, and the tradeoffs between those, for maybe some that are more commercially important, versus

some that are more recreationally important, and bringing those into the allocation decision, and so that will be an upcoming amendment.

Then we also have the Comprehensive ABC Control Rule, and the SEP has looked over aspects of this in the past, and this amendment has moved along and has been approved for NMFS, and it's working its way through rulemaking, and so that's kind of the highlight of some of the items that are kind of closing the loop that the SEP has discussed, or some items the SEP may find interesting, or may be seeing either later in this agenda, at this meeting or at a later meeting next year, potentially, and so I'm happy to field any questions on that. All right. If there's no questions, we can move along.

DR. CROSSON: Thank you, John, and so I did not send this out earlier, but, for those of you who are new to the SEP, I try and make this a group writing exercise, with me as the editor, and so I usually assign -- Not everything on this agenda needs to have somebody assigned to it, to try and keep track of it, but I do assign them, so that people can at least try and take some brief notes, and get those to me in the next week or so, after the meeting is over, so that I can write them up, because what ends up happening is that this committee's recommendations get written up in a report that is then handed to the SSC, then the SSC approves it, and then it becomes part of the official council record.

For the citizen science item, which I think is the next one that's coming up, I would like Jennifer and Chelsey to take the lead on keeping track of that discussion and writing up things. For the COVID discussion, which is the item after that, I have Kevin and Brian keeping track of that. For the portfolio, I had Chris, and do we know where Chris Dumas is?

MR. HADLEY: I haven't heard from him.

DR. CROSSON: Then he gets off maybe for this one, but then, for the portfolio one, which is really quite interesting, and I think we're going to get to it today, Andrew and John, please keep track of that. The feedback on the research recommendations, the council staff can track those things, since it's primarily for them. For the port meeting, Kevin and Jennifer, please keep track of that one as well, and the socioeconomic component of the MSE, if Chris Dumas appears, then he will be doing that. Otherwise, Andrew and John are on it again, and I think that's it. The last thing is me giving a presentation, which is more informational, and so you're welcome to give me feedback, and I will incorporate it into the model that we're building. Go ahead, John, if you have questions.

DR. WHITEHEAD: If Chris shows up --

DR. CROSSON: If Chris shows up, he's going to get the MSE. He's going to be doing the lead on the MSE thing, which is much further down in the agenda, but he's not here yet, and so I can't assign him. I wanted to assign him to do stuff on the portfolio, but he's not here. Go ahead, Kevin.

DR. HUNT: (Dr. Hunt's comment is not audible on the recording.)

DR. CROSSON: I have you for the COVID, which I think is Number 4. I am doing this based off of -- I mean, I know most of you on this committee already, and, for those of you who are new,

I looked over your webpages, and tried to get a feel for what you do, and so I tried to assign things that hopefully are kind of right up your alley. John.

MR. HADLEY: I will work with Scott, and I will send an email around to everyone, so you have it in writing on some of the items, and you can keep track of that, if that will help.

DR. CROSSON: Yes, and I apologize for not having done that ahead of time, but, for the one that's coming up next, we have citizen science, right, and so council staff is going to be doing a presentation on that, and, again, for that one, please, Chelsey and Jennifer, keep track of that and do a writeup.

CITIZEN SCIENCE PROGRAM UPDATE

MS. BYRD: All right. I guess I'm going to take it away. For those of you who I haven't had an opportunity to meet yet, I'm Julia Byrd, and I am the Citizen Science Program manager for the council, and so, today, I just wanted to give you guys an update and share some results from some of our pilot projects, kind of updating you on things that have gone on since you all's last meeting in the spring, and then we're going to be asking for some input from you guys on a research project that we're working on with some familiar faces, and I will talk a little bit more about that in a few minutes.

First off, since you all met last spring, one of the most exciting things that we have had happen is that we have hired Meg Withers, who is over on this side of the room, and she's our Citizen Science Project Coordinator, and so Meg used to do some work with Tracy Yandle, while at Emory, who is a name that's going to be familiar to some of you guys, and she has kind of jumped right in, and we're thrilled to have her, and she's worked on a variety of citizen science things, but is really leading the charge on one of our projects, SAFMC Release, which we'll talk about in a few more minutes.

Also, I just wanted to let you guys know that we worked with some colleagues at NOAA to put out a special issue of AFS's *Fisheries* magazine that's focused on citizen science. It came out in November, and there's a link in the presentation, if you want to check it out, and there's an article on FISHstory that's included in that special issue. If you want to learn more about what's happening in the Citizen Science Program, other than kind of the presentation today, we did a seminar, a couple of weeks ago, with NOAA's Central Library, and so there's a link to that presentation, if you're interested in checking it out, as well.

Then the next thing that I wanted to do is update you on a couple of projects and then share results from one of our projects, FISHstory, and some results from some program evaluation work that will kind of take you into some of the feedback that we're hoping to get from you guys.

First off, I wanted to share that we have a new citizen science project that just got underway at the end of last year, and it's called SMILE, and so Size Matters Innovative Length Measurements, is that SMILE stands for, and so it's a project where we're working very closely with REEF, and so REEF is a non-profit organization that's been doing citizen science work with recreational divers very successfully for a long time, and so it's with them, SECOORA, and the University of California San Diego's Engineers for Exploration Program.

This project is really focusing on partnering with recreational divers to collect length information on some of our data-limited species, and so the project is developing kind of a handheld stereo camera that a diver can use to collect video, where length information can be gathered, and so the project is really focused on building that handheld stereo camera and then pilot testing it in the Florida Keys.

The next project that I wanted to just provide a brief update to you guys on is our SAFMC Release project, and this is a project where we're working with fishermen to collect information on released fish, in particularly trying to learn more about the size of the fish that are being released and information that helps us better understand how many of those released fish survive, and so things like the depth they were caught, was a descending device used before the fish was released, was there shark predation, things like that.

This project originally was piloted back just to collect information on scamp grouper. In August of 2021, we expanded it to collect information on species of shallow-water grouper, and then, last spring, right after you all met, we added red snapper to kind of the species list that we're collecting information on, and so now our kind of participants are collecting information on eleven different species in the snapper grouper complex, using a free app called SciFish.

If you're interested in checking out some of the data that we -- That our participants have provided through the program, Meg did an awesome job pulling together a 2022 data summary, and there's a link at the bottom of the screen, and so you can link and kind of check out the information that we've learned through our participants' efforts thus far.

Then one of the things that we've really been focusing a lot of our effort on is kind of recruitment and retention for this program, and so we've done a lot of different kind of outreach strategies, and, as far as recruitment goes, we've been very excited to be able to partner with so many kind of agencies to help us kind of spread the word about Release, and we've been working really closely with Ashley Oliver and Christina on the council's best fishing practices campaign, and so we're really doing a lot of best fishing practices and Release outreach together. We're also posting things on social media, and we've been really lucky to be able to co-host a number of kind of seminars with charter captains, in a few different areas, where they will kind of do a seminar on bottom fishing, and then we're able to share information about the project, as well as kind of the best fishing practices campaign.

As Christina mentioned, Ashley and Meg have also done a lot of work visiting tackle shops to share information about the program, and kind of build relationships with kind of tackle shops, since that's kind of one of the places that fishermen get kind of trusted information.

As far as retention goes, we have been putting out a monthly newsletter, to give our participants kind of updates on what is happening in the program, and we do this annual data summary that is shared with them as well, but one thing we've learned is that, you know, just because someone signs up for the program, it doesn't exactly mean that they will log a release, and so Meg has just launched our participant recognition program, and so that's a new program that launched last month, and we're trying to kind of really celebrate the accomplishments and achievements of our participants, and so we're really excited to kick that off. There're more information on our kind of milestones for this year in the link on the bottom of the screen.

That's a little bit on a couple of projects that are kind of underway now, and the next thing I wanted to do is share some results from one of our pilot projects, FISHstory, with you guys and talk a little bit about the next steps for this project.

This is a project where we're using old, historic fishing photos to help us better document kind of the catch composition and the size composition of the for-hire fleet prior to when kind of catch monitoring programs were in place in the South Atlantic, and one of our key partners for this program was retired fisherman Rusty Hudson, who some of you guys might know, but this is a picture of a young Rusty with a red snapper.

The FISHstory project had kind of three primary components, and the first is we were trying to digitize and archive these historic photos, and, through the pilot, over 1,300 photos were digitized and archived, thanks to Rusty. For the second component of the project, we're gathering information on for-hire catch composition from the photos, and, to do that, we used the online crowdsourcing platform called Zooniverse, and so we had over 2,100 volunteers that made over 35,000 individual kind of species identifications and counts. Through the pilot project, we also had a validation team that was made up of scientists and fishermen, who were kind of our fish ID experts that helped review some of the photos when there was substantial volunteer disagreement, and they reviewed about 180 photos through the pilot project.

Then the last component of the project is we developed a method to estimate the size of the fish in the photos, using the lumber and the leaderboard as kind of a scale, and, through the pilot, all of the photos on our archive were reviewed for king mackerel, and king mackerel were measured, when they were present.

Before going into kind of results, I wanted to first just give you an overview of the photos themselves, and so these photos were all from kind of the Daytona Beach, Florida area, and they represent kind of Rusty's family's fishing fleet. They departed -- They're mostly from boats that departed from two kind of areas, Inlet Harbor and the Timmons Fish Camp, and so the orange star on the map kind of shows you where those are along the Florida coast.

The photos range between 1949 and 1975, and the majority of the photos were from the 1960s, and then there are a similar amount from the 1950s and the 1970s, and then we had some photos that didn't have a year attached with them. The photos represented -- We had photos representing trips from every single month of the year, with the majority being from between April and August, and that likely mimicked the effort in that fleet.

We had over seventeen vessels represented in the photos, but the majority of the photos were from the five vessels on the screen: the Flamingo, the Mako, the Broadbill, the Marianne, and the Miss Juanita, and, before going into results, I again just wanted to share a couple of the photos with you guys, so you can see kind of the range of difficulty of the photos that we had in our archive, and so here's one photo, and this is one that we think is on the easier side of things, and there are not that many fish in the photos, and the fish are spread out, and the photo is -- The resolution is good, and there are no people standing in front of fish, and there are only two species, king mackerel and little tunny, and so this is a fairly easy photo.

On the other end of the spectrum, you have a photo like this, which we very lovingly call a dumpster fire, because it's really hard to count and identify fish in this photo, and so, even though it's color, the resolution isn't great, and there is lots of fish, lots of species. If you kind of look in the back, you can see that there's lots of fish hanging on stringers, and so fish blocking one another, and there's also a wheelbarrow full of fish, and then there are people standing in front of fish too, and so I just think it's helpful to show kind of the difficulty of photos in the archive, once we get into kind of how the volunteers collected data and we go into results.

Within Zooniverse, we had kind of two different ways that volunteers could help us analyze the photos, and Zooniverse called those different ways workflows, and so we had one that was an easier workflow, where we had members of the public helping us count the total number of fish in the photos using a marking tool, and so, on the screen, you can see kind of green Xs on the fish, and blue Xs on the people, and so that's how people would kind of provide those counts for us.

We had ten volunteers review each of the photos for this easier workflow, and we looked at the preliminary data, and we didn't feel like we needed the validation team to review this workflow, and so all of the photos in our archive thus far have gone through this easier workflow.

Then we had a second workflow that was a little bit more challenging, where we asked volunteers to help identify fish into sixteen species, or species groups, and to document any fish that were obstructed, where they weren't able to ID them, and so what we ended up doing is having kind of a tiered data collection system, via kind of two steps, and, in the first step, we asked volunteers to kind of count and identify the four species groups that kind of were important the council, and we manage those species, but they also occurred most frequently in the photos, and so red snapper, amberjack, king mackerel, and grouper, and then we asked people to kind of identify those obstructed fish.

Then, before moving on to the next photo, they would provide binned counts of everything else in this kind of species list that you can see on the screen. Since this was a harder workflow, we had twenty volunteers looking at each photo, and, when there was substantial disagreement, our validation team would review those, and so we got a thousand photos complete through this kind of harder workflow through the pilot.

Kind of one of the first results that I wanted to show you guys kind of compares the counts from the 180 photos that our citizen science team and our validation team read, and so, when you look at this graph, on the bottom of the screen, you'll be able to see kind of the different species groups and obstructed fish, and then you can see the difference on the side of the graph, and so, the closer to zero you are, the more similar the counts were between these two groups, and so, if there was a positive difference, that means the validation team counted more. If there was a negative difference, that meant the citizen scientists counted more.

When you look in general, the agreement is pretty good, and there were a couple of species groups where you saw kind of biased counts, and the validation team counting more than the citizen scientists, and those were black sea bass and snapper other, and a couple of reasons why we think this might be the case is, a lot of times, black sea bass would occur on kind of the bottom tier of the photos, or they would be the species that are in baskets, or wheelbarrows, or things like that, and so maybe easier for volunteers to miss, and then snapper other -- That category is any snapper

besides red snapper, and red snapper are some of the most frequent fish within the photos, and so I think there some misidentification between snapper species could have been going on there.

The biggest differences between the groups were those black sea bass and snapper other, but then there are also larger differences between kind of obstructed fish and red snapper, although you don't see that same bias, and so, for obstructed fish, we weren't that surprised to see the variation, and we found out, very quickly, that that was a pretty subjective category, and so we weren't surprised to see that spread. With red snapper, again, it's one of that most frequently-caught fish within the photos, and so we think that's kind of contributing to some of that variation that you're seeing there. I do want to note that some of the other species were found not very frequently within the photos, which may be playing into kind of that small variation that you see with some of those other species.

We felt that, from looking at this kind of comparison, that, for kind of the four species that were found most frequently in the photos, we would be able to use kind of the volunteer counts to get us information on catch rates for kind of the grouper, the amberjack, the king mackerel, and the red snapper, and so there's more information, kind of on our webpage, that can show you some of that catch rate information.

The next thing that I just wanted to briefly touch on too is the third component of the project, where we were developing a method to estimate fish length, and so it was kind of a multistep process, and we were testing the protocol and training our length analysts, who were kind of fish ID experts, and so I just wanted to kind of share some results of the length compositions that we were able to get from these photos.

The length compositions that I'm going to show you are for king mackerel by decade. We can produce annual length compositions, but the sample size varied between decades, and so we would likely need to group years together, but, just to give you a sense of the information we were able to gather through the photos, you can see this is a length composition from the 1950s, and you can see the mode is at about twenty-nine inches fork length. If you look at the 1960s, you can see that shift to slightly smaller fish. If you look at the 1970s, you see that shift to slightly larger fish, and so that's just kind of some of the key findings from this project.

This has been a really awesome project to work on, and our staff have loved doing it, and I think some of the key takeaways from this pilot are the methods that we developed to kind of analyze these historic photos show a lot of promise. Volunteers can make really valuable contributions, and, in this case, not only were they volunteering to analyze photos through Zooniverse, but they participated in our validation team, and a lot of folks, we have found out, are willing to provide photos for the project, through volunteering.

Identifying fish in some of these photos can be challenging, like the dumpster fire photo, and so I think we learned a lot, through the pilot, to help us simplify data collection that I think will help us improve data quality, and I think the work that we've done in the pilot will help make things more efficient, moving forward, and one of the most exciting things from the project, for us, was that fishermen seem really interested in sharing their historic photos and stories, and so we've had a couple other fishermen who have contacted us, after kind of seeing information on FISHstory, to want to share photos with us, and then another fisherman from the Outer Banks area helped

connect us to folks at the Outer Banks History Center, which has a whole archive of some of these historic photos that we're going to be able to incorporate into the project.

The next step for this project is we're really excited, and we got a grant from ACCSP to help us move FISHstory from a pilot to a full-scale project, and we'll be partnering with NC State and the Southeast Fisheries Science Center on this project, to help do that, and we're really interested, right now, in trying to expand the geographical and temporal range of our photos, and so one of the things we're planning on doing, at upcoming AP and council meetings in the fall, are scanning nights, where we're going to invite members of the public to come in, and we'll scan kind of hard-copy photos for them, and so we're really excited about that, but that's a few key findings from the FISHstory project.

Then the last thing that I wanted to share information with you guys on was something that we kind of shared a little bit of information with you when you all met last spring, and this is a project that we've been working on with Rick Bonney, who is a kind of director emeritus at the Cornell Lab of Ornithology, and he has been our kind of citizen science guru, or Yoda, advising our program since its inception, and so this is a project where he has been working to help us begin establishing kind of baseline information on levels of knowledge about confidence in and trust in using the citizen science process of collecting data for fisheries management.

This information is going to help us evaluate kind of one of our program goals, and so, last spring, we let you guys know that, as a first step, Rick Bonney had completed interviews with six fishermen, six scientists and managers, and the idea was kind of the information gathered through these interviews would help us design what we thought would be an online survey to gather broader information from kind of fishermen, scientists, and managers around the region.

The interview results weren't available yet, and so I just wanted to share a few results from you guys and then talk a little bit more about next steps, this kind of second step to gather information from a broader group of folks.

Just to give you a little bit of information about Rick Bonney's work, he conducted eighteen interviews, and they were done by Zoom, and they took about thirty to forty-five minutes each. All of the interviewees were highly experienced, and they were all familiar with the council and the stock assessment process, and our kind of fisheries management process, and most of the fishermen who were interviewed had been fishing pretty much their whole lives, and so three were commercial fishermen, and then there two charter boat captains and one private recreational fisherman.

I just wanted to share some of the kind of interview key findings on some of the theme areas that Rick asked about, and the first is kind of opinions on the health of the South Atlantic U.S., and that varied among these three groups. Most of the scientists he talked with felt that many species were declining and in poor health. Managers tended to feel that the stocks were doing better than the scientists thought they were, especially for the species that are being actively managed, and fishermen were among the most pessimistic about the health of the fishery. The folks that he talked to -- All but one stated that it was getting harder to catch fish, and they often used terms like "depleted resources" and things like that.

Regarding the sufficiency of data to support management, scientists tended to feel that there were sufficient data available, especially for the species that are receiving stock assessments now, and only one scientist strongly felt that more data were needed. Managers all thought that more data were needed, and only one manager said that sufficient data are available, and only for some species, and fishermen mostly felt that more data are needed, and four said that more data are needed, and one noted that scientists rely too much on modeling, and another said that scientists and managers need to obtain more data from fishermen, as they're the experts that are on the water.

Looking at familiarity with citizen science, the scientists interviewed were generally familiar with citizen science, but not really engaged, and four had not engaged with citizen science projects or data, and managers were more involved than scientists, and half of the managers interviewed had participated in at least one citizen science program, and then fishermen were among the most engaged, largely with council-related projects, with five having participated in some way.

Then, when asked specifically about our program, our citizen science program, all the scientists were at least passingly familiar, and three knew about its goals and objectives, and two had advised on current projects, but none of them were familiar with our list of research priorities. Most managers interviewed didn't know the specifics about the program, and they weren't familiar with our research priorities either, and then most fishermen were familiar with some of the specifics, some having actually participated in our projects, and then one was familiar with our research priorities, but noted they were really broad.

When asked about their support and faith in citizen science, the scientists were all generally supportive, but they stressed the need for sound project design, and they offered many caveats. The managers were very supportive, with over half stating that they thought that fishermen would be able to collect a lot of great and useful data, and then the fishermen didn't seem optimistic about the utility or uptake of citizen science, and many of them felt that the scientists and managers wouldn't use or trust the data, and two noted that fishermen mostly won't participate.

Some of the kind of key conclusions that Rick took away from this work were that scientists need to be convinced that projects have sound design and that their data are truly needed, that managers need to be convinced that scientists will use the data, and that fishermen need to be convinced that scientists and managers will use the data.

One other thing he noted was that the fishermen audience needed to be studied in much more detail, and there are really kind of three audiences, the commercial, private rec, and for-hire sectors, and, within those sectors, there's a large variety of opinions, and so he noted that more interviews with members of each of those audiences would be helpful, and he also noted that key to the success of our citizen science program is doing more research into the needs, desires, and motivation of fishermen and how best to reach fishermen, and so he noted that that would likely require funding.

That brings me back to where we were last spring with all of you guys, and we came to you to try to get some initial information about kind of how we gather information from a broader group, and, through some of the connections that you guys provided, we were actually able to get a little funding for this project to move forward, which was super exciting, and so kind of the next steps in this project are to collect information from a broader group of scientists and managers, and Rick Bonney is going to be leading the charge on that, and he's planning to do an online survey, and

then, to gather information from more fishermen, there's some familiar faces that are going to be kind of doing this work, and Jennifer, along with Tracy Yandle and Bryan Fluech, who is with Georgia Sea Grant, are going to be leading the charge to do this work and conduct more interviews with fishermen.

That is kind of teeing things up for me to kind of hand the ball over to Jennifer, and she will share their kind of plan to gather information, through interviews with more fishermen, and there are a couple of things that we're hoping to get some feedback from you guys on, but, before handing things over to her, I know I just shared a ton of information, and so I wanted to see if you had any questions about any of the information that I presented, before I hand things over to Jennifer.

DR. CROSSON: Brian.

DR. CHEUVRONT: I was glad to see all the great stuff that's coming out of FISHstory, because that was doing great things even back when I was still with the council, but one of the things that was new that you were talking about was the difference between the fish identification that was done by the online average Joe's, looking at the fish pictures and identifying the species, and then professionals doing it.

As I was thinking about it, I was thinking about the differences between the two groups and wondering -- You know, of course, the professionals do this, and that's their jobs, what they do all the time, and I began to think about the individuals, and I was wondering, and have you done, or is it possible to do, any kind of analysis on the individuals who are looking at the pictures, and the reason why I'm asking this is because you're now able to have some kind of a baseline error measurement, and so I'm wondering -- Are you able to see like how many times does a single individual look at pictures and provide you with data, and how many pictures are they looking at, and do you know what that range is?

I can imagine that somebody might look at only four or five pictures, and somebody might look at 150 pictures, and is there a difference, over time, based on how many pictures they're looking at, and I'm thinking in terms of ramping-up, and do they get better over time, or, if they're looking at a lot of pictures, is there a fatigue factor, because you mentioned that maybe they're missing things like fish in a wheelbarrow or something like that, over time, and, in fact, that maybe, if you can figure out, if the data are available, that maybe there are some parameters in there that maybe -- If you're looking at that data, if you find out that there is a ramp-up there, that maybe you ought to ignore the first five pictures that people are looking at, and just automatically throw out the first five pictures that people look at, and say, okay, they need to learn a little bit more, working with real pictures.

I know there is some training that's involved in them coming in and doing that, but, when they're really doing it, and going one picture after the other after the other, there may be still some room for error in there, and I don't know, and I don't think you -- I don't know if the data are there to help you to do that or not, and you won't know unless you actually look at at least a subset of the data, and I don't know if that will actually be helpful to you or not, or if the data are there that allow you to do that kind of analysis, but it might help you to tighten up some of that, because, as I recall, there are lots and lots and lots of people -- You had no shortage of people volunteering to look at this, and so I wouldn't look at it as throwing away data, and I would look at it as a way of improving the quality of your data, because you had so many observations.

I just was thinking of that, as you were talking about it, and thinking that, okay, you might be able to get a little better data quality if you were able to look at sort of within groups, instead of just between groups, of observations, and it's just a suggestion, just an idea, and you can take it for whatever it's worth, if you think it might be helpful to improve that quality for the future, because you've got more datasets coming in, which I think is fantastic.

MS. BYRD: So I will start to address that, and then Chip did a lot of the analysis, and so he can address that too, and so I will say that those data do exist, and we can pull them and look at them, and what we saw was there was like some super volunteers, is kind of what we call them, who did -- Every time we dropped new photos, they were in there doing photos, and then there were other people who were more casual data collectors, and I think that's a great idea, to look at that sort of thing. I think Chip did a little bit of it, but probably more could be helpful.

Another thing I will note too is that one thing we noted, in kind of the casual volunteer, is I think asking people to collect information on sixteen different species categories is a lot, and so, you know, I think, when we ask people kind of those first four, where they were using a marking tool, getting them to do smaller groups of photos at a time I think is another thing that we can do to improve data quality, and that's based on some of the information that you're kind of talking about and looking at how long -- How many photos people did and how long they were analyzing a photo, that sort of thing.

DR. CHEUVRONT: One of my other thoughts that I had on that was it might be -- You might find out limiting people on how many photos they can do during a session. If you find that there is a fatigue level or something, that might be something worth doing too, and just say you've done the limit for today, and you need to come back at another time if you want to do more.

DR. CROSSON: Kevin, you had a question?

DR. HUNT: Yes, and, along those lines, did you -- Like I would say, compared to the experts, that you had groups of people who were spot-on, and those who aren't, and that you whittle it down to a list of people who agreed with the experts to continue on this project, as opposed to -- Like you said, how many people looked at these, you know, and you had a wide range of counts, and so which counters were closest to the experts, and just go back to those people, rather than open it up for the world to count. Is that kind of -- I mean, did you have a list of people that you originally went to?

MS. BYRD: So we used a lot of different outreach methods to try to recruit people to participate in the project, and I think one of the things that the Zooniverse platform allowed us is they have a huge community of people who love doing projects like this, and so some of the folks -- There are chat boards and things like that that you can chat with people about, and so some of them definitely knew fish, knew fish ID, and they were fishermen, and they may have recognized someone in a photo, that sort of thing, and then there are other people who didn't know anything about fish ID, who were coming for the first time, and I'm not sure that Zooniverse allows you to limit participation in a live project to certain people.

It's kind of you're hoping that the central tendency -- That enough people are going to get to that central tendency that, if some folks are kind of off, or -- That their errors aren't going to kind of

change that central tendency, and so I don't know that we could limit participants, but I think some things that we talked about doing is trying to plan our outreach strategies so that we're going to more people who have fish ID expertise who might want to volunteers, things like AFS student chapters or, you know, doing a competition with them, or things like that.

I mean, so I think there will always be -- I think we want that with Zooniverse. We want members of the public who may not know anything about fish ID to come in and try the project, and maybe they'll be really great at it and get hooked, but I think there are things that we can do to better hone our outreach strategies, to hopefully get more people who have some of that knowledge already to participate, and then, Chip, I don't know if you wanted to say anything, since you kind of looked at the data in-depth

DR. COLLIER: We looked at the data in quite a bit of detail, and, you know, this was our first time doing FISHstory, and so we learned a lot, and one of the things we learned was do not have a catch-all category, because everybody interpreted that differently, and that's why we didn't do a lot of comparisons with some of the expert users, compared to the validation team, is they were calling it different things, and that's why you see the other snapper, blocked fish, or I can't remember that title, but -- Obstructed fish. People were using that term differently, and we need to clean that up a little bit, but, for some of the big species, people were going in, and they were doing fairly well.

The other thing is, as we said, this was a pilot project, and there were a lot of people that would go in and nibble on the bait a little bit, and then see that dumpster fire, and they were done. There was a lot of people that only looked at one photograph, and we looked at eliminating those, and it did not make much of a difference, because what we were doing is we were going with the median value, and so whatever was in the middle, and that's what we were going with, and the ones on the ends didn't make all that big of a difference.

We did several deep dives into this, and Julia had to keep pulling me out of it, but it's really interesting data, and there's all kinds of stuff in it, and I worry about trying to limit the number of photographs that people can do, because, if you look at that ideal photograph, there were quite a few of those, and people can knock those out pretty quick, but, when you do hit a dumpster fire, that's the end of your day. I mean, it wears you out.

DR. CROSSON: Chelsey and then Jennifer.

DR. CRANDALL: Forgive me, and I'm jumping into a world where I don't know all the jargon, but do you see a future for these machine learning AI-type techniques, to help with elements of this workflow?

MS. BYRD: So that's something that has come up before, and I guess the short answer is maybe. You know, I think some of these photos can be really hard, and so I don't know enough about kind of AI and machine learning to know if they will be able to pick up some of the nuances in a photo that's kind of fuzzy and in black-and-white and like all of those sorts of things, but it's something we're really interested in exploring.

I know that I was somewhere, and someone at the Southeast Center mentioned that there's a project looking at some of the Caribbean fisheries, and so it seemed like some of the challenges that we

may have with these photos that they may have with those photos, and maybe we can learn from one another, and so it's something that definitely we want to explore, but we haven't done that yet.

DR. CROSSON: Jennifer.

DR. SWEENEY-TOOKES: I love getting these updates every year, to start there, and this is all going along really nicely, but I was wondering, and jumping-off of what Brian mentioned, and he mentioned limiting the number of photos, but I am trying desperately to remember the actual methodology of what people go through when they sit down to volunteer on the Zooniverse platform, which I don't recall, but I wonder if taking sort of that idea and tweaking it and letting people be experts in like three species, right, and like here's a red snapper, and here's a whatever, and so now, any time you go through these photos and you see that fish, mark that fish only, and then running it through with different groups, and I don't know if that would help them to really become very familiar with just their species that they're focusing on, and maybe give you more accurate and consistent results.

MS. BYRD: Yes, and that's -- I would have to go back in to figure out how one could set something like that up in Zooniverse and kind of shunt people into this species or that species or, you know, Species X, Y, or Z, and I think one of the things that we heard, and we're all a bunch of -- There are a lot of fish ID experts that were on the design team, and a lot of people said, you know, limit the number of species that people are doing, so they can just hone-in on three or four or whatever it is species, but we wanted to see if people could do more species groups.

I think -- You know, I think the dumpster fire photos make it hard for you to do that, but, if you get some of those easier photos, it's easier to kind of be able to pick out multiple different species, and there's kind of a training guide, and Allie Iberle, who is on the council staff now, did an awesome job setting up the project, and there's a tutorial and training guide to tell people to hone-in on different things for different species, but I think we need to simplify data collection, period, to improve the data quality, and have folks hone-in on a smaller number of species each time, and it doesn't mean that we can't have them hone-in on these species for these photos, and then, if we want to try three new species, they can go back and do that that way.

I think it will be easier for people to be focused on three or four species, and there's another project that NOAA is doing right now called Ocean Eyes, and I think they have six species that they picked out of their kind of universe of video to have people focus on, because they were concerned about kind of overloading people. Chip, jump in, because I know you have --

DR. COLLIER: The other benefit of limiting the number of species is you can tell people to click in a certain area. If you remember the workflow that Julia was talking about, with the mark technique, you actually get an X, Y coordinate, and so, if you limit the number of species, you can use that X, Y coordinate and have experts go through, and then you can see where the errors are coming in, why somebody might be missing a certain fish or not, and so there's a lot more techniques that can be used when you're using that mark technique. I think it leads -- It can lead us in the right direction to get a lot more accurate numbers.

DR. CROSSON: Julia, you had some -- Did you have more, another question, Kevin?

DR. HUNT: It was just on the measurement, since I didn't know, and that seemed, to me, as something that AI could probably do on photos, but do you groundtruth those with current photos of fish that we know that is thirty inches long, that was caught last week, and here's the picture, and is that how you guys trained and checked the --

MS. BYRD: So Chip actually built a fish leaderboard in his backyard, and we had boards of known length that he hung up on it and then took pictures, like they were pictures that we used, and so we used that to test how kind of accurate and precise we could be, and then, also, within the photos -- Some of the photos have things like oil barrels, which are a certain size, or Rusty's mother was in the photos, and she was a certain size, and so we used that as another way to try to gauge how accurate we were being, and so those were kind of the two techniques that we used, and we found that we were getting -- I can't remember the percentage off the top of my head, and Chip might, but about within two inches, and so, like for the king mackerel stock assessment, that size is about right for the bins they're using for the length comps, and so there are lots of steps in setting up the method that we used, and we tried to test it in a variety of different ways, to get a sense of the kind of precision and accuracy.

DR. HUNT: Are we going to see -- Because the graph with the 1950s, 1960s, and 1970s -- When the real catch data started, are you going to overlay that on there, so we can see that?

MS. BYRD: Yes, and that's a next step, and it's something that has come up before, and so we have that. Do we have it for the lengths? I think we do have it for -- We did a seminar on FISHstory that has more of that recent information in there, and I can share kind of where you can find that presentation, but, yes, I think that's -- I know, when we presented to the Mackerel AP, that was something that they were really interested in seeing, too.

MR. HUNT: A timeline for like when regs went into place, and stuff like that, because you would likely see maybe changes, and that would be interesting.

DR. CROSSON: You have a list of discussion questions, and do you want us to try and go through those?

MS. BYRD: I think, before we do that, I want to hand things off to Jennifer, and the discussion questions are focused kind of on their interview process that they'll be doing, and so, Jennifer, if you want to come on down, and let me get out of here.

DR. SWEENEY-TOOKES: We are really excited to be working on this, and we just wanted to thank the council staff, and the council, for deciding to go ahead and fund our proposal for their call for proposals that came out this spring, or, actually, before the holidays, and so I'm very excited to be working on this.

We are digging in at that point where Julia left off on decoding the motivations. You know, the fishers said they would or wouldn't be interested in participating in citizen science, but there's not really much data on this, and so we are responding to their RFP, and they were asking for researchers to study and document the interests, motivations, and concerns of fishermen who might participate in the SAFMC's growing citizen science program.

What we proposed was a qualitative-interview-based approach that would provide a really in-depth understanding of motivations and experiences with science, and then, also, a really tailored sampling and a very robust recruitment strategy, to ensure -- Well, it's to aim at representative sampling, and so we're looking here at trying to have sort of a nuanced analysis of their reasoning surrounding their decisions to participate in citizen science or not to participate in citizen science, and so, throughout this whole very quick presentation, I will be pointing us back to this sort of big guiding question of how and why the fishers participate, or not participate, and how do we dig into that.

Of course, there's always background literature, and I'm going to just skip over this, and we were looking at background literature on trust, trust in management, trust in fisheries management, who has the highest levels of trust, and where has it been studied, where has it not be studied, and how is different depending on scales and institutions, and so we could dig into that later, if you would like, but I am going to skip over that.

We are basically presented with this huge area, this huge problem, of four states, commercial and charter and recreational anglers, and it just kind of felt like that quote that we've all heard about, you know, how do you eat an elephant, and you just have to take one bite at a time, and so it's a one-year project, for a very limited budget, and so we kept sort of circling around this big question and asking ourselves, well, how do we take some bites out of this huge problem, and this huge sector, or this huge population, in a way that's going to be useful, and so that's what I will be walking us through, to get your feedback and your suggestions on.

The way that we chose to attack this was to make a series of choices, and, again, keeping that question in our mind of how and why do fishers participate or not participate in citizen science efforts in the South Atlantic, and so we're going to start with commercial. We'll come back to recreational in a little bit, but we're going to deal with commercial right now, and so we went first to the NOAA database of all Southeast Regional Office vessel permits, and it's an FOIA database, and it's available to anyone who wants to see it, and it's all of the current permits, and it's been updated, I think, every month since -- I don't even know when, and it's been updated twice since we last looked at it.

We went to this database and found that there were 19,000 permits in the region, and so that's probably a little bit more than we can do in one year with the budget we were given, and so we started refining that and looking for permits that had the clearest ties to the region, and so we took any permit holders with addresses outside the four-state region, and we eliminated them. We looked for permits that were held by corporations, or by businesses, that didn't have the addresses, and we eliminated them, and so we were able to whittle it down a little bit, but this is still a really overwhelming number, and so we were trying to figure out how to break that bite down even further.

We really thought through the variety of species that the SAFMC manages and realized that we had just a little bit of a natural experiment presenting itself here. We can look at two contrasting fisheries, and we sat back and thought, you know, maybe this is a good way to understand trust in science and trust in management, to look at motivations for engagement and barriers to participation, and so we have this opportunity to contrast a highly-contentious fishery with one that is relatively collaborative, right, and so we're looking -- Instead of all of those 19,000 permits, we narrowed it down to snapper grouper, the snapper grouper complex, with, of course, all of its

numerous species, but it has commercial and for-hire permits that cover the entire complex, and mackerel, specifically king mackerel.

There are currently 536 commercial snapper grouper permits and 1,664 for-hire snapper grouper permits. Mackerels are not quite as clean, and there are commercial permits for king and Spanish separately, and there are 1,237 permits for king mackerel commercial. For the for-hire sector, the king and the Spanish and cobia are all covered under this coastal migratory pelagic permit, and so here we have 1,635 coastal migratory pelagic permits.

I am going to stop right here and stay that we understand, and acknowledge, that there is like this huge complex of snapper grouper, that king and Spanish are different things, but, from now on, I'm just going to say snapper grouper and mackerels, just for brevity, and so, obviously, this is a much better number, right, and we went from 19,000 to somewhere around 5,000 or 6,000, right, and so much, much better.

It's still way too many people to actually talk to understand motivations and barriers, and so we took those two targeted fisheries and we went back to NOAA's snapshots of human communities, right, and this is a website that's updated as often as it can be, and it hasn't been updated in quite some time, but we're looking here at data on the top landings in commercial and for-hire sectors, and so you can see that -- You can't see, but, if you have it in front of you, you can see, in the bottom corner there, there's a picture of what we have for each of the different communities in this website that has all of the landings, the highest landings in that area, and we went through and looked at the top landings in each of the communities on the South Atlantic coast, in this region, and looked for the communities that have the highest number of landings that would be covered by snapper grouper or king mackerel.

Just as a side note, I checked-in with the NOAA employee who is responsible for those updates, and she said, we're working on it, we're working on it, but it's not ready yet, and it won't be ready in time for us to use it, and so I tried to go down that avenue, but we went ahead and winnowed down to just the communities and the region that has both of these species being landed there.

Then, once we targeted those communities, we went in and divided those into really four working segments. We're looking here at both geography, but also some cultural and fishing affinities that go on, and so, rather than approaching this from like the four-state model, we're using a much more sort of geographic, culturally-defined model, and so, once we went through and went through all of these steps, we end up with a really much smaller randomized set of participants that we'll be targeting.

I am going to go back to recruitment and how we're targeting them and talk about recreational anglers for just a second, because that's like a whole different problem. Recreational anglers, there is no comprehensive federal licensing, right, and there's not an entry database to go to, and we know that a high number of anglers may only participate every few years, and determining the population of resident anglers is difficult, and so, instead, we decided to focus on what we're calling anglers with a demonstrated sustained interest in recreational fishing, and we're defining that as people who are belonging to an organization that focuses on rec fishing.

We're going to be working through these established orgs, working through things like the International Gamefish Association, the CCA, any other saltwater recreational angler clubs in the

region, and we're going to be asking you later for suggestions as to what others might be, but we'll be doing the recreational recruiting through those groups.

When I say "recruiting", we have -- For each of those four geographic segments, we have identified all of the federal permit holders in both sectors, and we'll be taking those populations and creating our own database out of those and then randomizing those lists, and we're going to be approaching people in a random sample from those lists, and so we really personalize targeted recruitment of those individuals, to solicit the study participants, and we'll be sending personalized postcard invitations to the home addresses, addressed to that individual person, and we'll send two of those, and we're going to be searching out phone numbers, trying to call that specific person, inviting that specific person to participate in the study, and, after two postcards and one phone call, if we still can't get anyone to talk to us, or they tell us to go away, we'll move on to the next name in that randomized database.

For the anglers, working with the organizations, you know, this is a little bit more of a wildcard, and we'll be asking them for their support in publicizing the study, in whatever method they are using, Facebook groups or newsletters or direct emails, whatever they're willing to let us do. With recreational anglers, we'll be polling all of the respondents into a centralized pool and then pulling random samples from that pool.

We will be investigating the hows and the whys, which means we're using semi-structured open-ended ethnographic interviews, qualitative interviews, looking for qualitative data about barriers, about interest, about trust in science and management, the motivations for engagement, and we're really looking to dig into why and how people are interested in participating, or why and how people really want us to go away and don't want to engage in citizen science efforts, and trying to dig into how we can make some of those changes, make some of those shifts, and, of course, we'll be using grounded theory for this, right, going in with an understanding that we don't know exactly what those problems will be yet, and so having to shift those interview guides, shift those questions, as needed throughout the process, to really get those answers of the why and the how and the barriers.

That brings me then -- We didn't say a timeline, and this officially started about fourteen days ago, and so are literally at the here's what we're going to do stage, and so we've thrown this together to come here and talk to you, and we're at the stage where we're starting to pull the interview guides together, and also questioning our methodology and questioning our sampling and wanting to make sure that we're taking into account the best available knowledge out of all of you all's brains as well, and so that's really where our discussion questions come from, and I even put them on slides, and so I can pause now and questions that people already have, and then go into the discussion questions, or how should I do this?

DR. CROSSON: I mean, normally, we would ask people if they have any questions, and then we'll start working our way through the discussion.

DR. SWEENEY-TOOKES: Perfect.

DR. CROSSON: Okay. I don't see any questions, and that's fine. We're going to go through those, and it will lend structure to what we're trying to answer, and so let's pull up those discussion questions, whoever has control of the screen. All right.

DR. SWEENEY-TOOKES: So the first one has to do with those geographic zones, and we were basing this on the landings data in those community snapshots, which, unfortunately, are probably about ten years old, and so we know that those are not representative of what is happening right now, but there's no other data out there for us to rely on, and so we would love any ideas, any advice.

DR. CHEUVRONT: One of the things that I suggest that you might want to do is to look at some of the recent FMP amendments, and look at some of the socioeconomic sections in there, particularly some of the stuff that Christina has written about communities in there, and see if there is some matching of the information that you have from your initial analysis on those communities, and see if they kind of line up with what she has done in the last few years, because I know there have been some amendments in recent years, and that will just give you some groundtruthing, to make sure that you're on -- That you're headed in the right direction with this.

I wouldn't say, out of hand, that what you've done is not correct, and it may very well be just fine, and so what you may find, in some of the work that Christina has done -- That it gives you the support that you need to say, based on what we have found in analyzing this work, this seems to be pretty close to probably what is currently the case, and I'm sure that Christina would be glad to help you with that. Well, I'm not her boss anymore. Sorry.

DR. SWEENEY-TOOKES: Yes. Thank you.

DR. CROSSON: Any additional comments? I certainly don't disagree with the geographic breakdown. I mean, it's as good as any, and keeping the Keys separate is always a good idea. Brian.

DR. CHEUVRONT: But I did have a question about it. Since you've got sort of a geographical, or regional, breakdown for the commercial and the for-hire sector, do you think that there might be something similar that you might want to consider for the recreational as well? I don't know, and I don't know if you've considered something like that, and I don't know if there is anything that could help you figure that out, and I don't know if that is something that you really have thought about, and I really don't think that, necessarily, a recreational fisher, or angler, in the Florida Keys is going to be the same as one off of the Outer Banks in North Carolina, but I don't know how to quantify that, or even qualitatively explain that, and I don't know that literature well enough to say that, but it's something I think worth considering, to see -- Just to provide some cohesiveness between the different components of what you're looking at.

DR. SWEENEY-TOOKES: Yes. Thank you. It's a great question, and, as we were looking at the different angler organizations -- You know, they seem to be so broadly sweeping across the region that it's hard to tell, at this stage, what those differences might be. That being said, the geographic segments will primarily guide like what order we're handling the different areas in, just to provide some sense of structure to this, and so we will be, for each of those geographic segments, be recruiting commercial and charter and anglers in those areas, and so hopefully using grounded theory, and then, you know, being immersed in that place for that particular period of time, will allow some of those cultural differences to emerge, but we'll be sure to pay close attention to it. Thank you.

DR. CRANDALL: In speaking to that, about the rec anglers, are you envisioning people who live in those regions and fish there or people who fish in those regions? I am thinking of Florida, where there are so many folks inland that travel to places to fish on the coast.

DR. HUNT: You have eliminated some people outside like the local travel zone, who may be much more specialized than the people you're picking. They are spending more, and they are vested more, to make that trip, and so I don't know how you capture those, but I think you need to capture some of them, to answer the question of is there any differences between those folks.

DR. SWEENEY-TOOKES: These are really good questions, and this is where we sort of were spinning and chasing our own tails, and we had to keep coming back to our goal is to figure out why people are willing to, or are not willing to, participate in citizen science, and so, if they come to Florida every year from Chicago, right, and spend this big money, and are from out of the area, but for their big trip in Florida every year, those are probably not people that are vested enough in that place to participate in citizen science either way, right, and so that's sort of how we decided we're going to need to be targeting people who probably live within the region.

DR. CROSSON: I mean, this is similar to -- It's sort of what MRIP went through with the Coastal Household Telephone Survey, when they had to upgrade the methodology, because they were focusing on surveying people that lived on the coast, and so I don't know, but I think it's good point, what you're bringing up. It's hard to do citizen science if you're going a couple of times a year to the coast.

DR. HUNT: But what we don't know is are the people from outside making a short trip here and there, or are they spending three months in the local area, or up to six months, and claiming their home residence in another state, but, you know, are down here in the local area a lot longer than maybe what we're anticipating.

DR. CROSSON: Chelsey and then Brian.

DR. CRANDALL: Could the MRIP data tell us if there's any hotspots where folks are coming from to that region, and I'm thinking, when I say outside of the region -- I live in Gainesville, right, which is central Florida, smack dab, and would not be on any of those places, but there's some hotspots where folks from Gainesville go to the coast to fish, and so that might be -- You know, with high frequency, and so it might be that pool of potential citizen scientists that we might want. I recognize that it's really hard, and I know we're like expanding your pool, as you're talking about narrowing it down, and so it may also just be one of those things where we're like, okay, maybe not, but --

DR. CHEUVRONT: I think you will probably find those kinds of hotspots in all the different areas, and like I know, in North Carolina, you're going to find -- If you go to Carteret County in North Carolina, you're going to find a lot of folks from the Raleigh-Durham area going fishing out of there, but one of the ways that you can get around some of the questions that I think Kevin has is a question that you should ask some of those recreational fishers is do you have an in-state fishing license, and that right there will tell you whether they're coming from far off or not, and you can only get an in-state fishing license if you are a resident of that state. It doesn't matter whether you have a house there or not. I mean, I used to be a resident of North Carolina, and I have an out-of-state fishing license for North Carolina now, and so --

DR. CROSSON: An in-state annual fishing license actually especially would tell you.

DR. CHEUVRONT: Yes, and that would be the other thing, is to check to see whether it's an annual license or a five or ten-day license, whatever they happen to sell.

DR. SWEENEY-TOOKES: So I wonder if -- I think that probably this will answer itself, in that we'll be recruiting recreational anglers through those organizations, and so maybe that's a place for the person who lives there six months out of the year to say, yes, I'm here, and I'm fishing, and I'm a recreational angler, and I care about this, and I would be involved in citizen science, and self-select into the study, versus the people who really are only there for a couple of days, and so maybe the answer is that they will decide whether or not they're relevant to the citizen science efforts, for good or for bad.

DR. CROSSON: David is online. David.

MR. DIETZ: The organizations, are they all like dues-paying, and is everyone required to pay an annual fee to be a part of these organizations? There's a certain layer to that, in only talking to people who are willing to sort of extend an increased investment for their participation, and are we missing a group of people who -- How do you get people who aren't willing to be a dues-paying fishermen to also contribute to citizen science, and I don't know if that's within kind of the frame of your --

DR. SWEENEY-TOOKES: I am really sorry, and we're not able to clearly understand what you just asked.

MR. DIETZ: Can you hear me at all?

DR. SWEENEY-TOOKES: We hear volume, but some of the words are tricky to decipher.

DR. CRANDALL: I might have captured it, and so let me know if I captured it in my brain, but was your question that, if we're only contacting people through organizations that might require dues to be paid, then that's sort of a limiting factor on who it is we may be hearing from, and that may be a --

MR. DIETZ: Yes.

DR. CRANDALL: Okay. Cool.

DR. SWEENEY-TOOKES: That's a great question. That's a great question, and you're right. That's a problem.

DR. HUNT: Well, if you -- If you're selecting for your highly-specialized people, right, and is that what you're trying to do? I thought that's what you said earlier on in the presentation.

DR. SWEENEY-TOOKES: Well, the overarching problem, the overarching question, is what are the barriers on the opportunities for participation in citizen science, and it's a council-asked question, and so we are looking for people who are, or are not, willing to participate in citizen

science, and so you don't necessarily have to be financially able to participate, and so we could be eliminating people who would participate in that manner.

MR. DIETZ: That was exactly my question, and is it purely about avidity that we're looking for, or do you want to make sure that you're getting a representative sample, because I think we are selectively biasing towards people who either have more willingness to pay to be involved in these processes or just disposable income to do so.

DR. HUNT: From all the studies that I've done, you're looking at about 20 percent of the people say they're a member of a fishing club or organization, and so you're already knocking out 80 percent of the population who may participate, and a lot of people join these clubs who don't join these clubs for clubs, and they're joining it to get a magazine, and they don't really understand the club, and they've just got that I want the bumper sticker on the back of my car, or truck, and so, yes, it's just -- I would say that we are self-selecting for a little more avid people, and I don't necessarily think that you have to be avid to participate in citizen science.

DR. SWEENEY-TOOKES: I'm glad that you all raised these issues, and I agree, and then I will point us then to our Discussion Question Number 2, which is what are your suggestions? How do we get around this then?

DR. CRANDALL: Could there be a survey screener that could go out, or would that just be a mess and really annoying and just take more time?

DR. SWEENEY-TOOKES: Sadly, not in this timeframe and amount of money.

DR. CRANDALL: I guess I was thinking online, but I'm sure that excludes folks who didn't provide email addresses, et cetera, and so it has its own problems. Florida does, but maybe other states wouldn't. We have a license database with the emails, but other states may not, and so --

MS. BYRD: To talk a little bit about that, Florida does, and their license, the SRFS, is very targeted, and so it is for bottom-fish anglers, which I'm sure there is overlap with people who are mackerel fishermen too, but it may not capture everyone, and the other states don't have that. Their license frames are broader, and there is also states -- Getting access to those license frames is an issue too, for some states.

DR. CRANDALL: Good points. Good points.

DR. CROSSON: I don't have a suggestion, and I was wondering if we could move to the third -- Chelsey, go ahead.

DR. CRANDALL: I'm just throwing things out, and so is there a need to have it be randomized in this case, or would this be a space where maybe we want to go to a snowball and really focus on some key informants and ask them to recommend people, given all the difficulties?

DR. SWEENEY-TOOKES: There really isn't. I mean, it's more important, we think, with the commercial and the for-hire, but there really isn't, and that's probably where we will end up with rec anglers.

DR. CROSSON: Let's move on to Question 3, because we have other agenda items today, and this is a big set of questions.

DR. SWEENEY-TOOKES: These might be quick, and I didn't go into the methodology, and we will be doing -- We will be offering people the option of in-person interviews, when Bryan Fluech and I are in-town, versus telephone interviews, when they're, you know, puttering out to their fishing grounds, versus Zoom interviews, or video interviews, or Facetime, whatever they prefer.

The nice thing about having a collaborator on the other side of the world is that we can do phone interviews, and Zoom interviews, any time of the day or night, and so, obviously, Tracy is doing the interviews from New Zealand early in the morning, while people are heading out to the fishing ground, and so she was wondering about your thoughts on like the preferences on that, but, maybe more importantly, in the interest of time, is that we're planning to address, in the interviews, themes about attitudes to and willingness to work with management , and also the fishery conditions, looking at social and economic well-being and trust, and then, also, social networks, and so, if the time allows, or if the space allows, are there any other themes that you would recommend that we address that we haven't already listed there?

DR CHEUVRONT: The only thing that I can think of is potentially, as a generational thing, is, the older some of your respondents get, the more resistant they may be to some of the video and technology things, and it just may be because they're not familiar, and so it may be phone and in-person, but that would be the only thing. The only thing would be is if you can give an option and let people choose, as much as possible, but I don't think any of that is a hindrance, but, you know, if the only option is a Zoom call, some people will say, oh my god, I can't do that, and I've never done that before, and I can hardly work my phone. I'm related to those people. Not me. Of course not me, and I can do that now.

DR. SWEENEY-TOOKES: We 100 percent agree, and we always give the example of the clam farmer who is still printing his labels on a dot matrix printer in Georgia, and so, yes, we 100 percent agree, and it will be completely their choice of a telephone interview, a Zoom interview, or in-person, and the only limit on in-person is when I can be there.

SEP MEMBER: Is it possible to do a chat interview, because, going off of what he said, basically, I know people in my generation that avoid picking up the phone like a plague, but, if you text them, they will write back instantaneously, and so the video chatting is also -- Nobody really likes to be on camera that much, after the pandemic, and phone calls are also hit-or-miss, and so, if you give the participants the option to chat with you, and I don't know what method you could use, and if you have an SMS, or just a messaging account, and to do it that way, and you might have some more luck with that, and I've actually been thinking about that myself, with some of our interviews, if moving away from the phone, towards more of a chat-based messaging system, might actually get us better responses, and so that's just a thought.

DR. SWEENEY-TOOKES: It's tricky in these open-ended questions though, right, because no one wants to text back and forth three times and then answer. How much trust do you have in the council right now? I mean, unless we're going to get an earful, right, or a screen full, in that case, and that's fine line to walk, right, as a social scientist, when you're doing these open-ended interviews, you know, the quality of the data, and the accuracy, or the honesty, of the responses, and I don't know what will happen with those if they're typed out.

SEP MEMBER: If it's anything like me, they will see the message, think about it, and then you'll see the three dots for the next five or ten minutes, while maybe they think out what they want to say, and so you might have more of an impulsive response when you're talking to somebody on the phone, but you might have a more thoughtful response if they're given the time to chat it out.

The second thing that I was thinking about this is it offers some more flexibility with your interview schedules, because you could maintain two or three chats, over the course of a couple of hours, versus trying to pin people down for specific times on phone calls or video calls or things like that, and so, again, you could send them the questions, and they could think about it, and they could get back to you a few hours later, and then you could come back and circle back, but, again, it's just a new thought.

DR. SWEENEY-TOOKES: It's fun to think with, and do you think maybe even starting off in chat, and would that maybe sort of warm people up a bit, and then we could say, well, could we talk about this in-person?

SEP MEMBER: The other thought is 90 percent of the phone calls that I get to my cellphone is from an odd number that I don't have saved in my contact book, and my phone pretty much marks everything as potential spam now, and so that's a huge issue I think that we haven't talked about enough with phone surveys nowadays, is that most cellphone companies have screening services, and, if you don't have a number saved in your address book, most people, A, aren't going to answer, or, B, there is the potential that it gets flagged, but cold-messaging people out of the blue, saying I'm with so-and-so, with the government, or a university or anyone, I don't know, and that's an interesting question, but you might -- I would say I would be, just as a person in my demographic, I would be more willing to look at a text message, read it, and then consider responding to it than I would just looking at a number that I don't know.

DR. HUNT: Can you contact them somehow with a link to a website with all your questions that they can look at their questions, think about them, and then, one, do they want to participate in the survey, and, if they do, then they've already got the prepared set of questions, and then you can schedule an interview and follow-up after they've looked at them, and you're kind of just going through them, after they've already pre-screened the questions?

DR. SWEENEY-TOOKES: I mean, I can absolutely send a text, and we'll be sending two warning postcards before we ever try a phone call too, and so --

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

DR. SWEENEY-TOOKES: Yes, and I can send them to a website, and I can warn them that I will be texting, and warn them that I will be calling, and so, methodologically, as an anthropologist, we don't give our questions ahead of time, because that allows people to formulate what they think is the right answer, rather than responding with their actual thoughts, and so we usually tell them, you know, we're going to ask you about trust in management, and Scott is laughing at me.

DR. CROSSON: This is like what they always say about psychologists, and like you never trust what the psychologist is doing when they ask the questions, right, because they have some ulterior motive.

DR. SWEENEY-TOOKES: Right, and we find that, oftentimes -- I mean, Julia and I were just talking about this the other day, and it's not uncommon to sit down to do an interview with a fisher and they spend the first ten minutes just yelling at you about how much they hate the council, or NOAA, or pick your poison of the day, and then, past that point, they realize that, oh, you actually care what I have to say, and you're listening, and then they open up, and sometimes those turn into two-hour interviews, and so something gets lost when they see those questions ahead of time, and the data that you get is not the same, and, if the entire point of the interviews is trust in management, or willingness to participate, it might be even doubly problematic.

I hear what you all are saying, and I am wrestling with this, and you've given me a lot to think about, because, yes, how do we do anthropology in the twenty-first century, when nobody picks -- I don't pick up my phone either, and, I mean, who answers an unknown number? Nobody, but, yes, these are good questions.

DR. CROSSON: Any additional themes that we think that might be useful for Question Number 4?

SEP MEMBER: I have one theme, and do you talk to them about the convenience of being able to participate in management, and like are council meetings, and things like that, conducive to their schedules, just general things like that, and would it be easier to do an online participation, or would it be easier to have focus groups online, versus us trying to schedule them around maybe alternative times, things like that, and that would be something that I would be interested in hearing a theme of, is really, you know, how can we get you involved, and, you know, what's the easiest way to bring you in, and is it a scheduling issue, or is it just that you don't want to.

DR. HUNT: Is there any other populations that can give you information about this, people who are already in other citizen science programs? If you're just interested in the theory of why do people participate in citizen science, is that -- Are we different here?

MS. BYRD: I would say one thing that's unusual with kind of what we're doing with the program is that our fishermen who participate will be collecting data that would be used in the management process, which can affect them specifically. There's a lot of literature about citizen science out there, and some other people around the table probably know even more than I do, and so there's lots of literature available, but I think getting information from our fishermen will be very eye-opening, and one of those reasons is because, right there, collecting data on a harvestable resource that they are harvesting, that their data could impact them in some way, and so I think what -- That is different than some of the studies that have been done in the literature. There are some other studies that have been done, but I think that makes it a little unusual.

DR. CROSSON: I would like to know where -- I mean, I guess maybe this is part of social networks, but I'm always curious where they get their -- What they rely on right now for their current sources of information about the status of the fisheries. Is it informal networks? Is it what they see on the water, or is it what they hear on the management process, or is it the spam emails that they get? What is it?

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

DR. CROSSON: Yes, word of mouth, but how? Brian.

DR. SWEENEY-TOOKES: If you want the answer from Georgia, when we last did a social network attempt, it's me, myself, and I don't trust anyone else. I don't call anybody, and they don't need my business. They don't need to know my business.

DR. CHEUVRONT: You know, one of the things about, you know, when I was doing research in North Carolina with commercial fishermen, and a lot of them were very untrustworthy, when it comes to management, and they say, you know, we don't believe, you know, that us telling you information about our businesses and what we're going to do -- You're going to turn around and use that against us, and one of the things that we would tell them, in response, is that, you know, you feel like you don't have a voice now in what's happening, and, if you're not willing to talk to anybody, you're still going to have no voice.

In this case, if you will at least talk to us, we're going to present this information back to those who do make the decision in aggregate, and so they don't know that this came from you, and they have no idea who this came from, but we're going to take all the other information from all the people just like you and present it to them, and so now you're going to have a voice.

You don't have to go to a meeting, and you don't have to do anything, and we're going to do all the work, and it was surprising the amount of involvement that we would get. We would routinely, and this was back in the dark ages, and Scott knows well, because he was doing it after I was doing it, and we would get well over 90 percent participation rates in our surveys that we would do with people, and they didn't always like the outcome, and one of the things that I was struggling with, when you were asking about information about other things, was about optimism related to fisheries.

The problem was that, when we would ask that question about, you know, optimism for the future of fisheries, it was almost always negative, and, if I had the ability to ask those questions over again, I would ask now what would you do to make it better, because I think that was one thing that we kind of missed, at least when I was doing the surveys, is what would you do to make it better, and we didn't always ask that, and so -- I guess, at the time, I was naïve enough to think that maybe not everybody thought that everything was horrible, but pretty much everybody thought that everything was horrible, and, you know, we kind of disguised how we asked that question, by asking, if a young person came to you and asked you about -- They're thinking about getting into fishing, and what would you tell them? Almost, invariably, they would say, no, don't do it.

They would, because they would say, you know, the fisheries are getting -- They're in bad shape, and all this kind of stuff, and it's a hard way to live, and management is going to put you out of business, and they would come up with all these things that they could tell you about how making a life on the water is going to be very difficult for you, and they would tell you that they would tell their kids -- They won't take their kids on the boat with them, because they don't want them to fall in love with being on the water like they did. I mean, it's really a tragic thing, and so they will tell you all the reasons why they wouldn't do it, and some of them the kids would do it anyway.

DR. CROSSON: Okay. I would like to wrap up this agenda item, if that's all right with everybody, and take a ten-minute break, because Ed Glazier is going to present via webinar, and so we'll let the staff get that set up.

DR. SWEENEY-TOOKES: Thank you, everyone.

DR. CROSSON: I'm sorry. It's in-person. Great. Okay. Ten minutes.

(Whereupon, a recess was taken.)

DR. CROSSON: All right, and so we're going to resume the meeting now. The next item up is the COVID 19 pandemic and South Atlantic fisheries, and I just wanted to call attention to the fact that -- I was discussing it with council staff, and we're going to be fiddling with the agenda a little bit, because some people are presenting via webinar, and just not Ed, and so, after we do this -- After Ed does his presentation, and we do feedback, we're going to do Number 7, which is the Mackerel Port Meeting Recommendations, and then we'll see where we're at. That might be it for the day, and then we could start off tomorrow with the portfolio stuff with Steve Cadrin and Jason Link. Anyway, Ed Glazier is here to discuss the COVID pandemic.

THE COVID-19 PANDEMIC AND SOUTH ATLANTIC FISHERIES

DR. GLAZIER: Good afternoon, folks. My name is Ed Glazier, and I'm working at SERO, as an anthropologist, and Matt McPherson has been helping me work on this presentation, and he's at -- He leads the Social Science Branch at the Science Center. I'm going to talk about the pandemic and try to focus on South Atlantic fisheries. We did a survey of a broad set of regions, and so I'll talk about some of that, too.

If you're interested later, this presentation comes from NOAA Tech Memo 233, and I'm just going to basically pull bits and pieces from the tech memo into the presentation. My own background is in anthropology and fisheries, and so I want to give some anthropologic context. I want to talk a little bit about -- I am going to make a brief note about pandemics, past and present, and then I will review the approach we did to do a phone survey, and I will relate some key descriptive findings from the South Atlantic, with some comparison to other regions, and then I'll just talk a little bit about the indications of change going into 2021 and see what you folks think about pandemic research over the long haul.

Just a quick note about the pandemics and the history of their effects on marine fisheries, I just wanted to define "pandemic" a little bit, and so a localized increase in the incidence of a communicable disease can be termed an outbreak. Outbreaks that spread over large areas that are epidemics, and epidemics that extend across continents are called pandemics, and, based on this definition, pandemics are increasingly likely, and difficult to manage, as humans move around the world more easily than in the past, bringing new and evolving pathogens with them.

COVID-19 is not the first pandemic to affect broader human activities, and, from an anthropological perspective, fishing has long been, and remains, a vital human activity. The earliest example in the literature that I could find relates to bubonic plague, bacterial evidence of which was recently found in a hunter-fisher-gather population from over 5,000 years ago in what

is now Latvia, and there's a little bit of debate about that, but, anyway, measles, mumps, smallpox, and other diseases, had an incalculable effect on Native Americans after contact with Europeans, who had developed some immunity, through previous epidemics.

A more recent example is the Spanish flu epidemic, which reached Bristol Bay, Alaska in 1919, just as indigenous fishermen were starting their highly-interactive summer fishing activities, and, by the end of the salmon season that year, more than a thousand villagers had died from the disease, leaving behind 238 parentless children. No doubt there are other examples that could be identified through further research.

I want to note that the viral, bacterial, or fungal proteins that cause disease in humans have little significance of themselves, but, when linked to a human host, replication can be rapid, prompting a debilitating immune response in certain people. In the case of severe acute respiratory syndrome, viral response involves severe breathing problems, in the short-term, and, in certain cases, neurological and other problems in the long-term. As we know so well, the spread of COVID-19 and its variants has been rapid, causing suffering and death, financial hardship, and major challenges to systems of healthcare, economy, governance, and education, among others, worldwide.

As you can see in graphics developed by the Small Business Administration in 2021, the pandemic brought widespread economic disruption to the U.S. during 2020. Businesses closed, and unemployment surged to levels not seen since the Great Depression. The leisure and hospitality industries were particularly hard hit.

Changes in domestic marine fisheries occurred rapidly, with mandated closures and stay-at-home orders triggering shocks across the well-developed system of fisheries, fishery management, and fishery research. Revenue dropped precipitously, as a $200 billion industry, recently employing some 1.7 million workers, essentially stalled.

The first domestic case of COVID-19 was documented in January of 2020, and, as we know, there was much initial uncertainty about the disease and how to respond around the United States. While we don't have data in-hand to indicate the effects of actual disease and death among fishery participants, initial shutdowns, established in the absence of clear, long-term response strategies quickly began to generate unprecedented social and economic impacts.

Given the ubiquitous nature of pandemic impacts, major declines in seafood production and revenue occurred across the U.S. As you can see in the graphic developed by NOAA Fisheries in 2021, the pandemic clearly led to broad declines in the South Atlantic region during calendar year 2020, and both graphs here depict universal declines in landings revenue during 2020, relative to a 2015 through 2019 baseline average.

The national situation lead NOAA Fisheries' social scientists to address the basic research question of how regional fisheries were affected, and a randomized phone survey approach was developed to consult harvesters, seafood distributors, and for-hire operators in various regions. There was an initial survey at the six-month mark, which included the Caribbean, and this presentation covers the second phase of work, which was undertaken in February of 2021, just along the eastern seaboard and the Gulf of Mexico. At that time, there were over twenty-seven million cases of the

virus identified in the nation, with the death toll exceeding 463,000 persons, and, as of this April, the death toll exceeds 104 million persons in the United States.

Just a little bit about the sample frame, and so, across the Gulf, and the eastern seaboard, there was the frame, and once adjusted for different problems, it was about 16,000 people, and, of that frame, we had 1,828 persons ultimately participate in that calendar year one work, and we did some archival research and some observation of fisheries around the country. The phone survey was done by SEMIS staff at the University of Miami.

Here is a little bit about the sample, and you can see the adjusted frame there, and then the number of completed surveys. There were 200 on the commercial harvest side, 192 on the for-hire side, and then fifty-five dealer, or seafood processors, and distributors that were consulted. There's a lot of numbers throughout this slide, this presentation, and so, if you need to go back to a slide later, I will be glad to do that.

The survey instruments included two kinds of questions for each group, basic attributes of the business operations in question and pandemic impacts to those operations, and, on this slide, we present some basic characteristics of South Atlantic and other regional fishing businesses. I tried to provide some information from other regions, where notable, and the intent here was to examine general useful variables that could at once capture the situation of the day and also function as a springboard for future research and monitoring.

Here, we note that years of experience were similar across sectors and study regions and that fishing was the main source of income for the majority of respondents in both sectors. Of note, most respondents, in both sectors, reported owning one vessel, but at higher frequencies in New England than elsewhere. As can be noted here, both commercial and for-hire vessels in the South Atlantic tended to be a bit smaller than in other study regions. Meanwhile, commercial crew sizes were smaller in the South Atlantic as well, but, at roughly three persons, for-hire crews were larger here than elsewhere.

As can be noted in this slide, much commercial fishing activity in the South Atlantic occurs only in state waters, with a relatively large percentage of for-hire activity occurring within and beyond three miles, and, as we might expect, relatively few folks, active in the South Atlantic and other study regions, fish only in the federal zone.

Pandemic impacts were truly widespread across all of the regions during calendar year 2020. Almost 90 percent of respondents reported experiencing some sort of pandemic impact that year. The percentage of fishermen who ceased fishing for some period of time was also very high and very similar across regions.

Fishing ceased altogether for many folks during the early months of 2020, with roughly half of respondents in all regions stopping for between one and three months. A small number of operations went out of business, and some of those sample sizes were pretty small, but both the incidence and duration of no fishing was somewhat greater among for-hire operations, and decisions overall to stop fishing on data related both to mandatory shutdowns, and then subsequently to factors such as seafood pricing issues, compromised linkages to supply chains, near-term public hesitancy to undertake charter fishing, in that case, and various other factors not addressed by the survey instrument.

Reported reductions in overall business activity during 2020 was accordingly extensive across regions. As it regards changes in performance during the latter part of the year, most respondents reported worsening conditions. The sole regional exception is New England, where the majority of respondents stated that business performance levels actually improved between July and December. The source of improvement is not readily apparent, although an increase in landings revenue relative to a 2015 to 2019 baseline was documented only in New England during 2020, and this occurred during October of that year.

Certain authors, and there is some papers out there worth reading, assert that this relates to increased sale of fresh products directly to the public and also to wholesalers selling to other wholesalers who deal in frozen products. Also, a notable on this slide is the high percentage of for-hire respondents who reported improved levels of business performance in the Southeast, especially during the latter half of 2020.

With regard to specific pandemic impact factors on business operations, loss of crew members was deemed most important among commercial respondents, and government restrictions were deemed most important among for-hire operators, with thoughts of concordance between regions.

Finally, the vast majority of commercial operators in all regions reported revenue losses of around 45 percent for 2020, when compared to 2019. The average reported loss among commercial operators was over $200,000, in the South Atlantic and elsewhere, but with significantly greater losses reported in New England, where reductions in revenue were similar among for-hire operators across the study regions. In absolute dollar terms, losses among for-hire operations were greatest in the Gulf region, at around $63,000, the smallest in the Atlantic, or South Atlantic. Sorry.

I love this shot, and I did a whole lot of looking around for commercial guys with masks on, and I could find very few, and I don't know what that tells us, and I couldn't find any in North Carolina. This guy is from Maryland, obviously, but I'm not sure what it all means.

Then I wanted to move on to seafood operations and businesses in the South Atlantic sample. Very few were processors only, and business owners and/or operators, reported more years of experience here in the South Atlantic than elsewhere and most sales reportedly are localized within state, and with relatively little sales overseas. This is similar to other regions, again with the exception of New England, where owners, or operators, reported much higher levels of national and international sales. Of note, South Atlantic seafood firms employed significantly fewer persons than in other regions. Generally fewer and not significantly, in statistical terms.

Seafood processing and distribution firms in the South Atlantic, and elsewhere, reported pandemic impacts at very high levels, similar to firms in the harvest sector. Of note, roughly half of the overall sample reported ceasing operations for some period of time during 2020, with a relatively higher percentage of South Atlantic firms, closing for between one and three months, than in other regions. Percent reductions in business activity were well above 50 percent across-the-board, and, with the exception of New England, most of the overall sample reported stable or worsening conditions during the second-half of 2020. New England operators reported improving conditions during the second and third quarters, at much higher rates than elsewhere.

Reported loss of employees was most extensive among South Atlantic firms, as was the percentage of respondents reporting revenue losses during 2020. Losses, in absolute dollar terms, were higher in other regions, speaking to differences in the volume of seafood handled, with relatively small, low-volume operations predominating in the South Atlantic. I say that with a bit of uncertainty myself, but I need to have a closer look at that.

More than one-third of seafood businesses contacted in the South Atlantic stated that they did not apply for financial assistance in 2020. This percentage was similar elsewhere, with the exception of New England, again, where a much higher percentage of owner-operators did indeed ask for financial aid. Of note, most South Atlantic owners, or operators, reported cash-on-hand buffers lasting only between three and four weeks, with longer-duration buffers reported elsewhere.

Finally, an important adaptive mechanism during disaster situations involves social coping mechanisms, and there's quite a large literature on this, and family and friends were particularly important, in this regard, in the South Atlantic, whereas government assistance was not considered important among sampled folks here, and there's a fairly small sample size there, but it's of interest.

Moving on to a bit of a summary here, in summary, the pandemic, and especially mandated shutdowns early in the event, generated extensive and widespread impacts among fishing and seafood operations across the east coast and Gulf of Mexico during calendar year 2020. An extensive review of fisheries literature makes clear that this occurred in coastal regions throughout the world. While researchers are beginning to examine long-term outcomes, data are just now emerging to aid in analysis of the study regions covered by this survey effort.

This will be a challenging effort, given the fact that the event is ongoing, and because so many social, economic, and biophysical factors affect fisheries performance during any given year. A quick review of landings and revenue data from the Southeast, the larger Southeast, makes clear that such complexities are indeed considerable, and the pandemic impacts are not readily parsed from other sources of change.

These data come from the Southeast Fisheries Science Center. While preliminary data indicate that overall landings revenue increased by 17 percent between 2020 and 2021 in the Southeast, there is a lot of variability across managed fisheries and species, and, the more I look at it, the more I can't quite figure out what's going on. Further analysis, ongoing monitoring, and other sources of information are clearly needed before definitive statements can be made about a change going into 2021 and beyond.

I also wanted to have a look at -- Thanks to Anthony Mastitski for this graphic, and it's been really helpful here, and so I wanted to look at prospective change at the community level in the South Atlantic, in terms of landings. As can be seen here, there is much variability in commercial landings among the leading landings communities in our region, and there really is no clear and consistent signal of improvement during 2021, and, with some reflection, I think it seems likely that ongoing uncertainties, restrictions, market conditions, supply chain issues, and other factors were continuing to constrain fleets in certain communities, but not in others, during the second year of the pandemic, and, you know, this is stated without due consideration of interannual variation in the availability of marine resources across this broad and dynamic ocean region.

Finally, while we're beginning to look at effects on private recreational fisheries, in part with an observation-based hypothesis that these have grown rapidly since the pandemic, and at least in my hometown, which is Wilmington, North Carolina. A hard look at available data, and probably new data sources, will be needed to make any definitive statements here as well, and, in conclusion, we are, or may be, emerging from a kind of global disaster that hasn't occurred in at least a century, and, while some uncertainty lingers, it is certain that all domestic fisheries were severely impacted and that more work is needed to understand long-term outcomes.

From an anthropological perspective, this event reveals just how social humans really are. We have not easily given up close-proximity interaction with others, even when this behavior involves profound risks. There may be no easy solution, in the absence of readiness for the next event, and without having derived lessons from what has happened to our species since 2019.

In the fisheries realm, the issues are worthy of continued attention, despite the complexities involved with such attention, potentially involving the development of policy, that ideally would function to minimize any future impacts, and that's all that I have right now, and so your ideas, questions, insights are most welcome. It's kind of a sobering event.

DR. CROSSON: Comments from the committee, or questions?

DR. GLAZIER: I think part of the impetus for asking me to do this was whether 2020 was an anomalous year, and it clearly was, but the specifics of that, for fisheries and species, it's going to take some work, I think.

DR. CROSSON: Brian, go ahead.

DR. CHEUVRONT: I think, like so many things, the pandemic has probably changed, permanently, in some ways, some things that have occurred in fisheries, and, I mean, I retired during the pandemic, and so I'm not going to have that first-hand observation of it, but I'm wondering, now that my closest observation of fishing now is on an individual recreational level, and I know that -- Maybe other factors are involved, but my observation is that there's a lot more recreational fishing that is going on, and we clearly did see a lot happen in 2020, and there was a lot more recreational fishing going on, and it was one of those things that you could do by yourself, and not have to be around other people, and that -- I'm wondering if that's going to last and it's going to be something that time is going to tell.

I think it's interesting, and I don't know -- I'm not a hunter myself, but I haven't noticed the kind of uptick in hunting that I have in fishing, and that's an interesting phenomenon in itself, I think, but clearly some things have changed, and it's going to have to be a real longitudinal study that's going to have to tease some of that out, and I think some of the doomsday things that people were saying, particularly the commercial fisheries -- Yes, there were some changes and things, but I think, economically, we may not have as much doom and gloom as we thought, because prices have gone up so much, much more than we would have expected would have normally occurred, I would think, had the pandemic not have happened and the prices have remained high, at least from my own observation.

It is going to take a lot of time, and a lot more data collection, and I don't know what data, other data, collection instruments have gone online, if there have been any since the pandemic have

occurred, and do we have those instruments that are going to capture those changes, and I'm kind of guessing that, on the commercial side, we probably do, and I don't know if we might be able to capture that through like MRIP or anything like that, but --

DR. CRANDALL: I know states have data on that, and I know there's other groups that have been exploring that, the COVID bump, that increase, and I think that they've seen it in hunting too, but I would have to check that. I know a lot of the conversations have been retention of those folks who got outdoors during COVID, but I know that there's at least a few folks looking at that over time, looking at that increase in participation and whether it's sustained, and I can say, in Florida, we saw some increases in fishing, but closer to home, and so there's some interesting dynamics there, where the effort was changing, and where they were doing it, too.

DR. HUNT: Freshwater agencies have done the COVID bump, and a couple of things on the hunting that you mentioned, and, you know, the reason it's probably not increased as much in the hunting, and, one, angling is much more of a family-oriented activity, and it's a year-round activity, and then you have RBFF, Recreational Bonefish Foundation, which was well positioned to recruit, you know, people at the start of the pandemic, the take me fishing, the take me boating, discover boating, all that had been in place for five years, and, basically, they captured the windfall of all that, and hunting has not kind of been as prepared, on that side of recruitment, and now it's, yes, retention, and they're already seeing some drops in retention, but it's not necessarily gone back to pre-pandemic levels. I am interested in that -- Like, on your graph, you had, in your discussion -- Because some -- I guess this is total landings or total -- What have we got here, on your left? What's on your Y-axis?

DR. GLAZIER: Total landings.

DR. HUNT: You've got a few places, in the retirement stuff, that Brian was bringing up -- In Key West, you know, you have a few locations in here that landings are better during the pandemic than they were pre-pandemic, and that may be a result that people flock to Key West, especially if you had money in place down there, and a lot of people have retired, and you guys, I guess, are seeing that on mahi-mahi, or dolphinfish, whatever you guys call them, down there, with a lot more effort in the Keys since then. That may be exacerbated by the pandemic.

DR. GLAZIER: Yes, and I think effort is key here. Landings might not be the best indicator, whereas we took a look at MRIP data from around the region, and there just was not a clear signal going into 2021, but we were looking at landings, fish captured, whatever, but I think a better indicator there would be amount of effort, and I think that's part of the MRIP mail portion of the survey, and maybe the same -- You know, it would be nice to know how many trips commercial guys were taking too, versus landings, given so much variability in what goes into landing fish over time.

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

DR. GLAZIER: It was just commercial landings of the top commercial landings communities between 2015 and 2021, or 2016 to 2021.

DR. CROSSON: One thing that I heard firsthand, from talking to commercial fishermen, was that the economic aftereffects of the pandemic, especially the supply chain disruptions, had an impact

on commercial fishermen, both on trying to ship their products and also on trying to keep their boats maintained, and it was even worse in the U.S. Caribbean, when I was down there a year or two ago, and there were boats that could not get out, because they couldn't get things fixed up, because they were still trying to get parts shipped down there to the Caribbean, which is always harder than it is on the mainland. Then I would imagine, also, the labor issues, with the great resignation that everybody talks about, and that probably may be an issue for the commercial fishing fleets as well.

DR. HUNT: Has demand for fish rebounded? Do we know anything about demand for fish?

DR. CROSSON: For commercial fishing?

DR. HUNT: For any. Yes, for commercial, for store-bought fish, and has the demand increased over the past year? We've lost some commercial fishermen, and you would expect, you know, if the demand increased, that these guys are going to be going out more, or more will enter into the fishery, and do we have any info on demand?

DR. CROSSON: Andrew.

DR. ROPICKI: Generally speaking, during the pandemic, you know the early stages at least, demand for seafood purchasing, like retail outlets, and like supermarkets, went through the roof, and it just wasn't necessarily the stuff that U.S. fishermen were catching. As far as a bounce-back, like in terms of demand for U.S.-produced seafood, or -- Because I don't think there was really a big drop.

DR. HUNT: No, but tastes have changed through the pandemic. You know, like you said, oh my gosh, I can't find my fish, and I've got to have tuna. You know, at the start of the pandemic, people were hoarding, and getting what they can, and the question is then, over a year-and-a-half, everybody tastes have changed, and you might have scaled back on some things, and are we seeing that same demand for fish products pre-pandemic now, and that's all I'm interested in.

DR. ROPICKI: I don't know, specifically. I mean, we did some research at UF, and, you know, I -- Not to say that this stuff is wrong, but, when you look at seafood more generally, and think that the U.S. isn't a major player, seafood supply chains actually held up really well, and, you know, stuff moved.

DR. CROSSON: David is online.

MR. DIETZ: It's an interesting question, and I think the context that I'm in right now is more on the national side, and the phase we're in now, and so just tremendous inflation and price changes and cost-of-living and things like that, I have seen decreased demand for high-value seafood product and a lot of substitution potential for imports and lower-value product, or just going back to more traditional pork, chicken, and potentially lower-value animal proteins as well.

I think, just from a demand standpoint, it's a really shifting landscape right now, as people are navigating a very complicated economic, you know, system, environment, in the U.S. right now, and so rounding out that to Question 1 here as well, I think leave the data as it is, and don't -- I think the story is far from finished, in terms of what all these price effects and disruptions are

actually going to look like, long-term, and I think, yes, maybe the direct, you know, pandemic response may be going away, but we're in sort of a new phase of sort of the economic adjustment from all of those issues and recalibration. I really hope you guys could hear that.

DR. CROSSON: No, and thank you. We did.

MR. HADLEY: I just want to provide a little bit of context for some of the discussion questions here, and I want to thank Ed for his presentation, and I think, you know, some of the initial changes that were exhibited in the commercial and recreational fishing communities were very notable, but, you know, things have bounced back in various manners, and, as a little bit of background on these discussion questions, often times we're using recent years as baseline scenarios for both the economic and/or social analyses, and so that's one thing that we've kind of run into, is, you know, how to address these, and whether or not to use them -- Is it a one-off year, and should you use that in your baseline, or should you maybe not, and we've kind of been addressing it on a species-by-species basis, but that's kind of the reason why that discussion question was added in there and separated out, looking at Discussion Question Number 1, between commercial and recreational data.

Then Number 2 is just sort of -- Just getting a little bit of discussion from the SEP on some of the pandemic impacts that you think -- We've touched on this a little bit, but just some of the pandemic impacts that are likely to persist in the future, and it sounds like some of the participation rates are elevated, and maybe not as high as they were, but, you know, something to think about as we move forward in tying those into analyses of management and other issues, such as loss of infrastructure, movement of commercial landings online, and so is there a change in the supply stream for commercial fisheries, those sort of items, and so that's kind of a little bit of background on those two discussion questions, and so, with that, I will turn it back over to the SEP.

DR. CROSSON: David opined about keeping the data in, for the purposes of management and evaluation, and what do the rest of you think? I didn't hear a clear answer. Brian.

DR. CHEUVRONT: I think, in the past, when we've had issues before -- Like, for example, we've had weather events that had severely interrupted landings streams and things in the past, and we've traditionally not thrown out those interruptions to what has happened. We keep them in, and I don't -- While this is a different category, and it may be even a larger impact, and we don't know what the long-term impact is going to be, I'm not seeing the evidence yet that we should throw it out, and I think the bigger problem is that some of the sampling that used to be done, that had to be stopped during the pandemic, is a bigger issue than what I think we're discussing right now.

I think we're going to get more data that are going to help clear it up over time, but I think we should keep the data that we have, and, if you need to asterisk it, as you're discussing it, I think that's probably okay, but I wouldn't throw it out yet, at this point, because, at some point, it's going to help explain the long-term trend, or whatever that's going to be, and I can't see any reason to toss it out at this point.

DR. GLAZIER: Brian, I wonder -- Given that the declines were universal, does that argue one way or the other, versus a disaster event, which almost always is localized, such as a hurricane?

DR. CHEUVRONT: I say that of a hurricane because I used to deal with things like hurricanes on a state level, coming from North Carolina, and that tended to impact almost the entire state, when we had something like that, and I hadn't had to deal with it so much, like a hurricane in North Carolina affecting, you know, an FMP analysis for the entire South Atlantic, but I think you're right that it might not have done that, but, yes, this is a universal impact.

Regionally, I think your analysis has shown that there are regional differences, and I think, at this point, based on what we know, those differences that you have pointed out are really helpful, and, to the extent possible, those kinds of differences should be shown in whatever analyses can be done, and just leave it at that, and just say this is what we know, and whatever we can do in the future would be great, and I think there's a lot of research there available for people to carry out in the future, whether it's doctoral dissertations that can come out of this, or by federal and state agencies that can do the work to help flesh all of this out.

DR. HUNT: I agree with keeping the data, because what I'm thinking is, yes, what's that dissertation going to be, and what I'm looking at is I don't -- This is not like a hurricane, where everybody was impacted equally, because we had now told everybody to go fishing, and now we saw a shift, and we saw increases in recreational participation, that likely created less demand for commercial fisheries, because people were catching them, and so the landings might have increased among the rec, and does that continue through time, and, you know, was anything -- Did the recs replace some of the lost landings of the commercial, and does that maintain itself over time? To me, that's a very interesting question. You know, we're already seeing some reductions in participation rates, and I don't know about saltwater as much as freshwater, but, to me, yes, I wouldn't throw it out, that's for sure.

DR. CRANDALL: Sorry if I missed this, but can you help me understand the concerns with keeping the data in, and are we thinking -- When we say "the data", is it all of it, or are we breaking it apart, and maybe we want to keep the landings in, and not the effort, or those sorts of things?

MR. HADLEY: I think the options are, you know, very wide-ranging, and so there is the option to say this is a one-off landings data point, or a one-off effort data point, so that maybe we would use that, or wouldn't use that, and where this comes into play, on the management side, or analysis of management, is we're wondering if it's going to throw off your baseline in a way that isn't reflective of what might, or is likely to, happen in the future, and so I think that's where the concern is, but, there again, it's -- You know, it's speculation as to what the future will hold and if those trends will persist or not, and so that's kind of how it's been handled so far, is sort of a one-off species-by-species.

DR. CRANDALL: That makes sense, and so, to that point, maybe the asterisk of let's see what happens, but it's in there, but we know, because that second question, which you kind of hit on, is a research question itself, and will these things persist over time, and we'll see.

DR. HUNT: I think it's important -- You guys are talking landings and effort, and, to me, those are interrelated, and, you know, we've lost commercial fishermen, I'm assuming, from this, and the question is does that maintain, and it's now at a lower level, and, therefore, they can catch -- They can have higher landings with less effort, because there's not enough competition.

I think those two need to kind of be presented together, and that would be very helpful, if you can draw an effort line on this maybe, and have them both -- You know, like that graph, and that's commercial, and what was the commercial effort, and then recreational, and see how those things are all interrelated, and I think that's an incredible time series analysis, to see how -- Because hopefully we're back to normal, in three years, you know, and everybody has forgot about the pandemic, and hopefully we don't have one for a hundred years, but I think we're going to have to wait some time to really figure out what were the impacts of the pandemic, and I don't think we can answer it, you know, all in 2023.

DR. WHITEHEAD: I agree with what's been said, and I would like to add that I think, whenever it's feasible, that you do a with and without analysis, because you do an analysis with 2020, and my first question is, well, what about without out, and vice versa?

DR. CROSSON: Are there further comments or questions? We went through some of this back when we had the great recession, and there was discussion, and, related to that, the extremely high spike in fuel that preceded the great recession, and so there were questions then, but I would say that, unlike the great recession, the COVID economics were quite different, because there was such massive relief at the federal level, both fiscal and monetary, and so it changed things quite a bit, and, if anything, people had more disposable income.

DR. GLAZIER: Maybe that's a dissertation.

DR. CROSSON: Okay. I think we're done with this item. Thank you, Ed. Next, we were going to move to Item 7, which was the mackerel port item. We're moving down the agenda a little bit, because the next one, that was supposed to be the portfolio issue, the presenters are not available today. Christina is going to give us a presentation on the mackerel port meetings next. Thank you.

MACKEREL PORT MEETING RECOMMENDATIONS

MS. WIEGAND: All right, and so, diving into king and Spanish mackerel, the council is at the very beginning process of trying to plan these mackerel port meetings, and so I'm going to sort of briefly give you all a background on the king and Spanish mackerel fishery, just as a refresher, and we'll talk about some of the current things that are going on in this fishery that are sort of the impetus for starting these port meetings, go over the goals and objectives of the FMP and how that's relevant to this process, talk about the possible purpose, maybe the structure, and then I will dive into the next steps, before I get to the discussion questions.

Again, I just wanted to note that the council is at the very beginning stages of planning, and so just a little background for the king and Spanish mackerel fisheries, and these encompass a huge range, all the way through the Gulf up through the Mid-Atlantic Council's jurisdiction, to that sort of, you know, New York/Connecticut/Rhode Island line out in the water, and they're part of the Joint Coastal Migratory Pelagics Fishery Management Plan. This is a plan that the South Atlantic Council manages jointly with the Gulf of Mexico Fishery Management Council, which sort of means that -- You know, there are some exceptions to this rule, but, generally, any management changes that the South Atlantic Council wants to make, the Gulf Council must also concur with.

Then, in addition to king and Spanish mackerel, Gulf cobia is also a part of this management plan, and we only manage the Gulf stock of Gulf cobia. As of right now, there is no plan to include cobia as a part of this port meetings process, the logic being, one, that we've sort of just recently addressed management of Gulf cobia, and, two, it sort of interacts separately from the king and Spanish mackerel fisheries.

All of this really came about from the Mackerel Cobia Advisory Panel. For a couple of years now, first back in April of 2019, and then again at their most recent October 2022 meeting, they've been asking for the council to conduct a series of port meetings, up and down the coast, to gain a more holistic picture of these two fisheries. Back when the idea was first presented to the council, in April of 2019, there were a couple of other, you know, management things underway, one of which being the Spanish mackerel stock assessment, and the council felt that they did not want to sort of go out and start talking to fishermen until they had updated information with which to present them as part of the discussion, and so, with that stock assessment wrapping up, and I will talk about that in a minute, it seemed like the time was, you know, really ideal to start having this series of port meetings.

Like I said, there are a couple of different things going on right now with the mackerel fisheries that are likely to have an impact on the port meeting process, the biggest of which is probably the Atlantic Spanish mackerel stock assessment. This was originally completed in July of last year, and it has gone through a couple of sort of SSC reviews, SSC requested changes, and just some back and forth between the SSC and the Science Center.

Sort of, ultimately, the council has requested that the SSC provide catch level recommendations of some kind at their April 2023 meeting for review by the council at the June 2023 meeting, and so we are moving forward with catch level recommendations of some form for this stock assessment, and I'm not entirely sure what that will look like, but, if you're interested, stick around this week, because the SSC will be talking about it on Wednesday morning.

There are also a couple of other things going on with the mackerel fisheries right now, one of which is the AP requesting the council to review the current split season that exists for commercial fishermen that fish in the Southern Atlantic King Mackerel Zone, and, while that's just sort of one small thing, it is indicative of the changes that particularly king mackerel has gone through over the last -- I mean, since I've been with the council, and so the last five or six years, and they've been sort of subject to a lot of small management changes here and there, sort of making it clear that maybe the current management structure isn't serving the fishery as well as it ought to, and that it has resulted in a management system that is incredibly complex, and it might be ideal to sort of take a step back and look at that fishery more holistically, as opposed to making these sort of small, piecemeal changes that they've been subject to over the years, which, of course, can be incredibly challenging for fishermen to keep track of.

Then the other thing that's been going on recently are discussions surrounding little tunny, and this is a species that used to be a part of the Coastal Migratory Pelagics Fishery Management Plan, and it was removed back when Magnuson was reauthorized, and we were moving forward with things like ACLs and accountability measures, but, recently, the council received a letter from the American Saltwater Guides Association, requesting that the council consider readding little tunny to the CMP FMP.

The council has discussed it, and it's not something they're moving forward with at this time, but it is clear that this is a topic of interest for the public and that it very much ties into the king and Spanish mackerel fisheries.

Then, last, but not least, on here we've got the long list of CMP FMP objectives, and I'm not going to go over all of these right now, but the point of this is that we're looking to sort of -- As we start going through stock assessments and revising allocations, it's important that the objectives of these fishery management plans are up-to-date. The ones for the CMP FMP have not been updated since the early to mid-1990s, and so I think it's pretty clear that these are likely dated FMP objectives and that there might be a different perspective of fishermen who are currently participating in this fishery.

Some of the things we've got here -- Objective 1 focuses a lot on maintaining optimum yield, and Objective 2 talks a lot about, you know, avoiding regulatory delay, while ensuring that there is sufficient public input into management decisions and incorporating new scientific information, and you've got the idea of achieving robust fishery reporting and data collection systems, minimizing gear and user group conflicts, minimizing waste in bycatch, appropriate management to address different migratory groups, and optimizing social and economic benefits, and there are all pretty general objectives, and it's likely worthwhile to have members of this fishery, as well as the council and the AP, discuss whether or not there are some needed changes to these objectives, perhaps to be a bit more specific and to serve the fishery a bit better.

What is the council really hoping to achieve with these port meetings? This is something we've only sort of recently started to talk about, and, at the last council meeting, we had them sort of throw a list at us, to tell us all sorts of the different types of information that you would like to receive from conversations with fishermen.

First and foremost, of course, is review and discussion of those current management objectives, but they also really wanted to get, you know, a greater understanding of the complexities of the mackerel fishery, and these are incredibly dynamic fisheries, and, like I said, they're over this huge range, and so all the way through the Gulf up through the Mid-Atlantic region, and one of the things that we've heard a lot from fishermen is that there's been expansion and movement of these fisheries, and we're seeing things like Spanish mackerel and king mackerel much further north than we ever used to, and so the council is interested in how that is affecting the fishery and how fishermen are responding to those changes.

How the fisheries are utilized and valued by, you know, the different fleets and the different sectors, the dynamics of the commercial fleet, and this is especially important for the king mackerel fishery, and those fishermen are incredibly mobile, and they often participate in different areas of the Gulf or South Atlantic based on the season or where the markets currently are.

Environmental factors, like water quality, algal blooms, how those are affecting the fisheries, how do king and Spanish mackerel interact with other important fisheries, and then, finally, what gears are currently being used and how that has changed over time. For Spanish mackerel specifically, there have been a number of changes in popular gears, based on different state or federal regulations that have gone into place, and so that's sort of the list of things that the council threw at the wall at their last meeting that they would be interested in learning more about.

They did narrow down a little bit on the meeting design, and I will say this is something that we're likely going to be talking about for a number of upcoming meetings, but they decide that they wanted the focus to be on king and Spanish mackerel specifically, again excluding cobia, because we've sort of already dealt with that through a recent amendment process, and it's a very separate fishery from the first two, but noting that things like cobia and little tunny are likely to come up during discussion, and making sure that staff is prepared to gather information on those two species that may be useful to the council, but not let it overshadow the main focus of the king and Spanish mackerel fisheries.

They noted that they want the meetings to be open to all members of the public, all stakeholder groups, commercial, recreational, and for-hire fishermen meeting together in the same room, and that the meetings should be held in key communities throughout the Gulf of Mexico and up the Atlantic coast to at least southern Massachusetts.

Again, we're still at the beginning stages, but the next step is, of course, what does the council actually want out of this, in terms of a final product, and what do they want to see that's going to help them move forward with management of this fishery, and, of course, the first are those revised goals and objectives, but then also a final report that will include notes from all the meetings held, but also some type of thematic analysis that will identify different patterns and differences among the different meetings.

One of the things that we will need to be talking about, at some point, is how we intend to make these meetings interactive for participants, but also still record the information we would need to move forward with a more in-depth analysis, and so we're still in the planning stages, but these are the thoughts that we've got right now.

The next steps is we're going to have the Mackerel Cobia AP -- They actually meet this Friday afternoon, and so we'll be talking to them about port meetings and talk about their goals and objectives for this process, and they were the ones that originally requested that we conduct port meetings, and so it makes sense to have a more in-depth discussion with them about what they would like to see come out of these port meetings and how they see it moving through the management process, and, of course, we'll be discussing a much more developed structure for how these port meetings will be facilitated, including maybe a draft list of questions that will be used to help guide discussions, based on some of those topics that the council said they were interested in.

Then, of course, we'll be coordinating with as many people as possible, state agencies, and the Atlantic States Marine Fisheries Commission has agreed to work with us on this project, and then we're presenting to the Gulf Council in a few months, and we would also be interested in, you know, working with the Mid-Atlantic and New England Fishery Management Councils as well, given that these fisheries do go up through their area, and we intend to go meet with fishermen in those areas, and they're likely to have more connections with community members there than we may have here.

With that brief presentation, I've got a list of sort of discussion questions here, and we're looking for a little bit of input on what types of facilitation methods that you think should be considered, and we're certainly not looking to nail down a specific one at this time, but things that maybe we, as staff, should look into, how we might try to organize the wide variety of items that the council

would like to have the stakeholders discuss, and sort of the best way to gather their thoughts on short-term versus long-term management solutions and, you know, making sure we're giving them realistic expectations for what can happen through the management process.

Then, also, how we can identify key communities to hold port meetings, and this is not, I guess, dissimilar to some of the work that Jennifer has been doing to try to identify key communities, and landings are always an option, and permits are always an option, and we certainly work closely with our advisory panels, to make sure that, you know, fishermen that are participating on those, that are already leaders in the communities, are helping us plan these port meetings.

Finally, and perhaps of biggest concern, at least for me, is how we can separate these port meetings from other stakeholder meetings that the council undergoes. The council often goes out for public hearings on specific amendments, and, of course, a few years ago, they did the snapper grouper visioning process, and then we currently have a number of management strategy evaluations going on that also have stakeholder-driven meetings, and so there's a lot of asks of fishermen right now to come out and talk to us about management, and so it will be important to find a way to distinguish these port meetings from those other types of meetings.

Then finally -- Like I said, the final report is a long ways down the road, but we want to start thinking about sort of the final products now, so that we make sure that our methods of capturing information fit well with what we want to go into that final report, and then I will sort of stop there, before, you know, we go back to the goals and objectives and have you guys discuss how you feel about those.

DR. CROSSON: Jennifer.

DR. SWEENEY-TOOKES: Did I understand correctly that it was really the Mackerel Cobia Advisory Panel asking the council to do these port meetings?

MS. WIEGAND: Correct. This was an idea that came from the Mackerel Cobia Advisory Panel, and they asked that the council conduct these meetings.

DR. SWEENEY-TOOKES: Then they probably have some idea of what they want covered and how they want them run. I mean, I'm sure you've already thought of that, but starting there, and what is it that you want us to ask people in these port meetings, and what data are you hoping that we'll gather, and what do you think is the best way to run these port meetings, and how do we distinguish this, and can you all vouch for us? You've already thought of this, I'm sure.

MS. WIEGAND: They're getting not this exact same presentation, but a very similar presentation this Friday.

DR. SWEENEY-TOOKES: Right, and I think I will be there.

DR. CROSSON: Brian.

DR. CHEUVRONT: But, ultimately, whatever comes out of these port meetings hopefully will lead to some action, and the port meetings -- Right now, as I look at this, we're looking at the goals and objectives, which, ultimately, to be changed, have to go through an FMP process, but,

theoretically, I would think that the council would want more than just a change of goals and objectives out of all this effort to go to port meetings, and is the council's final objective -- I hate to use the same term as goals and objectives, but are they looking to change any kind of management procedures, and, I mean, is there a bigger goal that the council has for wanting to do this sort of a process?

I'm just thinking back to when we did this with snapper grouper and what a huge, monumental pain in the ass this whole thing was, and then we got it all done, and we took it the council, and they couldn't make up their minds of how they wanted to put it into action, and we had two amendments that took forever, and it was a terribly difficult thing, and I know that Myra is probably cringing back there, because she had to do all that work, and it was really difficult, hard stuff to do, for the council and the staff, and this is a really tough process, to make something good come out of this, and I'm just hoping that there is some bigger good that is planned for the final outcome of this, because this is a really big undertaking. It sounds nice and fluffy and everything here, but it's not an easy thing to do, and I'm just hoping that the council realizes how big of a bite off the elephant that this really is to do this.

MS. WIEGAND: So they've talked about the information they want, and I would say perhaps this is -- I mean, I don't want to guide the council's thought process too much, but I do think that, aside revising those goals and objectives, ultimately, they hope that this better understanding of the fishery will improve management of Spanish mackerel and king mackerel in two ways, and so the Spanish mackerel stock assessment is coming down the pipe, and they're going to need information on this fishery to determine how they want to address what comes out of that stock assessment.

While I can't ultimately say what's going to happen with that stock assessment, I do think it's going to lead to a need for some pretty substantial management changes, and the council doesn't have sort of this style of information to go on.

Second, the king mackerel management has become I would say burdensomely complex, with these small, individual changes that the council has to keep making, and that it would ultimately streamline the process a little bit for them to be able to take a step back and look at the fishery holistically, so that they can then implement a management system that maybe functions for a bit more than a season and doesn't require these consistent changes, you know, every year.

DR. CHEUVRONT: That makes sense, because mackerel management is hugely complex, and so what they're really -- It sounds, to me, like what you're saying is what they're looking for is something other than the results of a stock assessment to help them figure out if -- Perhaps maybe there's a better way to manage these species, but they don't know what that is yet, and they're just hoping that these port meetings will lead them in that direction. Okay. I feel better about that, because just to do it just to do it would be a huge undertaking, and there was a lot of pressure, in the past, to do these things, but it wasn't clear why. They didn't have really a goal, and I was just hoping that there was a goal to do them at this point, other than goals and objectives. Okay. Thanks for that clarification.

MS. WIEGAND: I will say the council is very cognizant, I think, of the challenges with visioning and moving from that visioning process into management, which is why they've sort of steered away from calling this visioning, and the AP members have joked that this isn't visioning, and

they just want a glance at the fishery, and so my hope would be that we can sort of learn from a lot of the work, the hard work, that went into visioning, as we go into port meetings, and I will certainly be taking advantage of Myra and Julia, who I know were a part of that visioning process, to provide some guidance on how to structure these port meetings in a way that's ultimately going to help us achieve those goals and objectives.

DR. HUNT: Chelsey is grinning over there, and so I think she's got a question.

DR. CRANDALL: You were next, I think, right?

DR. HUNT: No, and I'm going back to our earlier conversation, when you're saying where do we have these port meetings, and 82 percent of the population lives in large cities, and most of our anglers come from large cities, and are you going to have one of these in Atlanta, Charlotte, Columbia?

MS. WIEGAND: I think that all depends on how we decide to identify where the key communities are. You know, when I think of key communities for something like mackerel, I don't necessarily think of Atlanta, or Charlotte, and surely most of the population lives there, and I'm sure there are particularly recreational anglers, which is going to be the hardest to capture, that come from those areas to participate in fishing, but I think of places like, you know, Cape Canaveral and Volusia County, where there is a huge population of mackerel fishermen, and so I think it is going to be a challenge to identify particularly private recreational anglers that participate in these fisheries, because we just don't have the information in the same way that we have for commercial fishermen.

For commercial fishing, I can look at where, you know, federal permits are located, for example, to narrow it down, but it's a little bit different, given that we're trying to include all three sectors within this, and so I welcome any suggestions with how to capture that, and, like I said, we'll work with, you know, state agencies and the other regional councils, who have a bit more knowledge of fishing communities in their areas, and where people are coming from, but sort of any advice that this group may have on other ways to go about identifying key communities, aside from, you know, general stakeholder and agency staff knowledge and landings and permits, and I would certainly welcome.

DR. CROSSON: There's all the king mackerel tournaments that seem to be quite a hot feature along the South Atlantic coast, and so whoever is organizing those, and trying to perhaps have a meeting shortly before or after one of those, when lots of different participants are there, because those are big economic drivers, when they happen. Of course, that's a very select group, and they're looking for very select things with king mackerel, that other anglers, and certainly commercial fishermen, may not be desiring, but that's an important component. Chelsey.

DR. CRANDALL: I mean, I will say that my default is grinning, and so sometimes that's just my face, but I do have -- I've been thinking through the first question, the sub-bullets and all that, and struggling to come up with a suggestion without that narrowed-down what are we really trying to get, because, as we know, there's probably infinite methods that we could suggest right here, right now, and I don't know if that's helpful, for me to list out all the different things that we possibly could do, or if it's really we need to know -- The more that it can be focused down to a key kind

of subject area, right, that will help drive all these questions about where we really need to target and all those methods we use and all those things.

MS. WIEGAND: Absolutely, and I wish the SEP was meeting at sort of a different point in this process, so that maybe we had this narrowed down a little bit more. I will say, in terms of facilitation, one of my biggest concerns is that, for a long time -- What fishermen are used to is public comment. They're used to getting up, and you have three minutes to talk, and then you sit back down, and it's not a situation in which they're really allowed to have a two-way discourse and discussion, both with each other and with managers, and so one of my biggest concerns is sort of how to facilitate that, given that it's something that fishermen have not traditionally been asked to do.

DR. CRANDALL: That's a good point, and we've been struggling -- "Struggling" is not the right word, but working through that, because we have like basically taught folks that that's how they engage with us. What we've done, in some cases, is explain, on the frontend, that this is going to be different, and, you know, we know it's how you're used to doing it, and sometimes we'll leave time at the end, for those who still want to have that -- You know, they have a comment they came with, and they still want to stand up and do that, but, first, we're going to do it this way, and we're going to start doing it in a different way.

You're right, that sometimes it sort of a shock, and there's an expectation to come at it in that one way, but it can be so great to break it down in those other ways, and we've had four corners, where folks break out, and we've had other small group breakouts, and so I'm excited to explore ways to do it here.

DR. ROPICKI: I had one thought with the port meetings, and it might be worthwhile to separate the three groups and, you know, have port meetings for all three at each location, but have them meet separately, and then, whatever you come back with, you know, the AP can discuss, where you've got a group that's used to working together, because I'm not sure about the mackerel fishery, but, you know, snapper grouper -- It would possibly get contentious, or likely get contentious, and so --

DR. CRANDALL: Just another follow-up, and so I was thinking through, and you may be familiar with these examples from Alaska, where they basically treated the workshops as focus groups, right, and published on those, and so I can't remember the methods that they used, but there may be things that we could explore from there.

DR. SWEENEY-TOOKES: I am thinking that, this last summer, the Atlantic States -- I don't remember who held it, and I know that the Mid-Atlantic hosted a meeting on climate change scenario planning, and they used some really structured conversations, some really structured discussions, where people were given like these are your possible puzzle pieces, to build this new puzzle with, but you can only use three out of the four, right, and so I wonder if talking to them -- Because I hosted the meeting, and I'm thinking about how to present fishers with, you know, here's all the different things that you could do in a new management plan, but you can only have half of them, and so prioritize them, and sort of look to see where priorities lie, if they're forced to make those selections. I could probably dig out materials from my brain, and my computer, if you wanted to talk about it some more.

MS. WIEGAND: Does anyone have any thoughts on how to distinguish these meetings from all of the other asks that we have for fisheries stakeholders right now? I will say that the mackerel fishermen were -- Unless they also participated in the snapper grouper fishery, they were not involved in visioning, and, you know, the MSEs are for snapper grouper and dolphin wahoo right now, and so these are not necessarily asks of mackerel fishermen specifically, unless they're already participating in some of these other fisheries, but thinking specifically of like private recreational fishermen, or charter fishermen, who tend to participate in a wider range of fisheries than say a commercial fisherman, who would need to hold permits in all of these fisheries, and how to best not confuse which process they're participating in and what the outcome of that process will be.

DR. HUNT: I think that Chelsey had it right there. Call it something different, but then offer them something different as well, and what can -- You know, rather than just have a public hearing and see who walks through that door, can it be something a little less informal, like a focus group, but can accommodate a large number of people, more than you would have in a focus group, multiple focus groups the same night, to accommodate all the people who are in there, and give them beer.

MS. WIEGAND: Then I guess my last sort of question, before I run you back to the current goals and objectives of the CMP FMP, is considering broadly focus groups, gathering information in a more discourse-oriented way, what sort of final products we might be able to present the council with, aside from, you know, general notes and a summary of the meeting. My background is doing, you know, grounded theory and thematic analysis, and so that's where my mind tends to go through, but I would be interested in hearing if this group thinks there are, you know, other unique products that might help drive the council discussion relative to management changes or changes to the goals and objectives, so that, you know, those types of analyses can be kept in mind as we talk about how we want to structure and facilitate these meetings.

DR. HUNT: All of our extension people, universities, usually are now having to document their effectiveness, and, usually, what they're doing now is having a questionnaire at the start of one of these things, to capture some key information, and there may be some knowledge-based things on the mackerel fishery, and then how -- Afterwards, do the same thing and how the meeting might have changed perception on some topics, so they can document change, or document knowledge gain, or whatever the goals of this is going to be, and I don't know if you guys can do surveys, you know, but, if you had a ten-question questionnaire -- If you have a ten-question questionnaire that every participant who wants in the door completes, that is stuff you don't have to rehash in the meeting, or say we already collected that information from you all, and we don't need to discuss that, to keep it really focused on what you need, and I don't know.

MS. WIEGAND: I will say that I like the idea of gathering public input at the start and end of these, and we cannot conduct surveys, as the council, unless we go through a long and slightly arduous approval process, but we can solicit public comment.

DR. HUNT: Don't call it a survey.

MS. WIEGAND: All right. Well, if we don't have any thoughts left on the first four questions, one of the things that I did want you all to sort of very briefly do is look at the current goals and objectives of the CMP FMP, which I've got on the screen right here, and I know that this group isn't necessarily experts, or well-versed, in the specifics of the king and Spanish mackerel, or the

cobia fishery, since this part does actually encompass cobia, but just sort of a brief overview, if you see any sort of that's a red flag, and I'm not sure why this would be a goal or objective of the fishery, or, based on my knowledge of fisheries, it seems like there is a big hole here, and why is that not included, if you have any input on that, that then can be taken to the council, because they are going to be discussing these goals and objectives at upcoming meetings.

DR. CROSSON: I mean, I would just comment, particularly for king, almost more than any other species that pops into my mind that the South Atlantic Council manages, that optimum yield, in terms of keeping the fish, and the pressure on king is not necessarily as important as it is for a lot of other species, and there are a lot of people that go out for king and do catch-and-release, and the fact that the tournaments exist are kind of verifying that, right, and some people don't like the taste of king mackerel, and I know that I'm kind of iffy on it myself sometimes.

When I look at Objective 8, about maximizing the social and economic benefits, I tend to think of like the fact that optimum yield for the king mackerel, for the recreational component, may mean getting that trophy fish and being able to track that landing, okay, or having a higher encounter rate than you would otherwise, and so the recreational component may be aiming for something different than the traditional optimum yield, the way the council tends to measure it, and I think that's particularly important for the king mackerel fishery, and so that's something that I would bring up also, in the context of -- If I was talking to recreational anglers, and recreational angling groups, and also I guess potentially the charter/for-hire industry, that's something that I would bring up, is how do you visualize what you're trying to get out of king, versus, you know, a gag grouper, or a mahi-mahi, or something like that, that is considered to be something that's much more of a flesh fish.

DR. SWEENEY-TOOKES: If they're doing an overhaul, and rethinking all of this, Objective 5 really jumps out at me. I mean, are we really basing things on what was happening how many years ago? That is worth exploring, I would say.

DR. CHEUVRONT: Allocation though haven't changed between the commercial and recreational sectors for mackerels since the 1980s, or something, and is that correct?

MS. WIEGAND: That's correct for king mackerel. The king mackerel allocations were set in Amendment 2 to the FMP, which was something in the early to mid-1980s. The council did discuss those allocations during the amendment that addressed the most recent stock assessment, and they chose not to change the percentages, but, because of, you know, the updated stock assessment, and the switch to FES, it was, in a sense, a reallocation, but the percentages have stayed the same since the 1980s.

Spanish mackerel has gone through a little bit more upheaval, which will, you know, provide some background to Objective 5, and the original allocations were set in Amendment 2 or 3, and I believe it was the amendment that identified separate migratory groups for Atlantic and Gulf Spanish mackerel, and they were set based on the longest time series of landings at the time, which I believe was from sometime in the 1970s through to maybe 1983, 1984, 1985, around there, and it was just set to be the proportion between the two, which resulted in approximately a 75 percent/25 percent allocation, commercial/recreational, and I can't remember the exact number, off the top of my head, but it was something similar to that.

A couple of years later, there had been, you know, a pretty big increase in recreational harvest, and the council, at the time, was concerned that high commercial harvest by the deepwater runaround gillnet fishery in the 1970s had affected recreational harvest, and so, as a result, the allocations didn't accurately reflect how the fishery operated, and so what they ultimately decided to do was allocate Spanish mackerel 50/50, commercial/recreational, under the logic that both the commercial and the recreational sector could easily harvest the entire TAC, total allowable catch, as it was at the time, and so 50/50 was then the most equitable allocation.

Then, in 1998, there was a situation sort of where the recreational fishery had not been getting anywhere close to their sector ACL, whereas the commercial sector was regularly up against theirs, and exceeding theirs, and so the council, at the time, did sort of a 5 percent transfer to the commercial sector, which gets us to our current allocation of 55 commercial and 45 recreational, and so there is sort of a brief history of Spanish mackerel allocations and sort of some explanation for why Objective 5 is in the FMP.

DR. HUNT: I will ask that question. Will that reduction to the recs, how did that change their social and economic benefits? If you go to Objective 8, if we're trying to maximize those, because, if it's a catch-and-release fishery, and the fish weren't being used, they got allocated now, and the recs have less fish to catch, and so is that what you're looking for? I mean, who defines these benefits in Objective 8, and are they spelled out?

MS. WIEGAND: I mean, the Objective 8, as its written, is very broad, and so optimize the social and economic benefits, and I certainly don't want to speak for the fishermen or the council on how they would like to see those specific terms defined for the mackerel fisheries. I will say that catch and release of king and Spanish mackerel, and how that relates to the social and economic benefits of these fisheries, has been a topic of great discussion at the advisory panel level, sort of the difference in the value of a fish to a commercial fisherman on the dock, versus the value of a fish to a recreational fisherman in the water, so that they can then encounter them. I certainly can't speak to which direction the council will go on identifying, you know, specific benefits, when it comes to allocations, but I will say that it's certainly been a hot topic of discussion.

DR. CROSSON: If we don't have anything else, then you're good?

MS. WIEGAND: I'm good. Thank you, guys, for your input. This was very helpful.

DR. CROSSON: Give us just a minute, while we look at the agenda. Okay, and what we're going to move to next -- Chip has two presentations to do, but he's going to do one of them on the management strategy evaluation that's ongoing with the council, the economic and social components of that, and so we're going to get that set up, I guess.

SOCIOECONOMIC COMPONENTS OF THE SAFMC SNAPPER GROUPER MANAGEMENT STRATEGY EVALUATION

DR. COLLIER: This is Attachment 8. Just a little bit of background, we do have a one-pager that we put together for you guys on what we're doing, as far as the South Atlantic Fishery Management Council's management strategy evaluation, and we want a little bit of feedback from the Socioeconomic Panel, and basically what data do you think would be good, and available, to use

in this, and we'll start with that, and then we can -- As we think about research recommendations coming up for the future, it might be good to think about what could be good future recommendations on what research is needed to better inform some of those social and economic questions.

The South Atlantic Fishery Management Council started on their management strategy evaluation late last year, in December of last year, and they provided guidance for Blue Matter to start work on this management strategy evaluation, and, essentially, a management strategy evaluation is a closed-loop simulation tool where we can look at what these different management strategies could potentially end up looking like, and you want to be able to evaluate those on a similar group of objectives, and so the objectives can range from biological objectives to economic objectives to a variety of ways to evaluate these. It's Attachment 8, if anybody is looking for it.

One of the ways that our MSE is differing from many MSEs that are out there is it's trying to address a multispecies fishery, and, when you're thinking about the snapper grouper fishery, it is quite challenging, because not only on a trip do you come back with multiple species, but, at a stop, you can catch multiple species, and you can catch maybe ten species at a stop, and so it truly is a multispecies fishery, and it's a hook-and-line fishery.

One of the biggest issues that is coming up in it is the number of released fish in the private recreational fishery, and this is really coming to a head for species like red snapper, where we have just a two to three-day season where you're allowed to land fish, but discards are happening throughout the year, or releases are happening throughout the year, and some of these releases will die, just through the normal catch-and-release process, and some of it's due to barotrauma, and some of it's due to hooking injury and other issues that come along with that.

Although red snapper is the poster-child for this, other species, such as black sea bass and greater amberjack, have high levels of releases in the fishery, and so it's going to be -- It's important to look at how we can optimize this fishery, in order to make it better off for the recreational fishermen and also prevent overfishing, and so this is what we want to talk about today.

At the March meeting, it was brought up that we need to consider angler welfare and angler well-being, and we thought what other group than the SEP could help us figure out what is good to measure in angler welfare and angler well-being, given that the information that we need is readily available, and it can go back in time, but we don't want to have to wait six months to analyze all the data, and we would like to do it fairly quickly and have it available, but, if there is some great ideas that you guys have, it would be awesome to hear it, and we can put it into the research recommendations, as part of my second presentation that I will be giving tomorrow. With that, we do have the --

DR. HUNT: Do you have a definition for "angler well-being" and "angler welfare"?

DR. COLLIER: I do not, and that's why I'm here.

DR. CHEUVRONT: When they asked the question about that, did they put it in any kind of context, because, when you're asking a group full of social scientists and economists, we all have lots of different definitions of what those terms mean, and we need some clarification. I mean, you ask a psychologist what "well-being" means, and that's a lot different than when you ask an

economist what "well-being" means, and so we're going to need a little bit of help figuring out what we're talking about here.

DR. HUNT: I totally agree, because, as a quantitative scientist, and this is kind of my forte, you have a construct, well-being, and that has subdimensions, and what are those subdimensions, and then how do you measure those subdimensions, and so you would come up with three or four statements that measure each subdimension, and then go to anglers to respond, and then you run a confirmatory factor analysis and things like that, but you kind of -- Yes, there's a lot of legwork that has -- Like did you guys just come up with these terms, or did you pull them from the literature, like for the definition, from a psychologist, and here's the definition of "well-being", or "welfare", from an economist, or is this -- Are we very general right now?

DR. COLLIER: We are extremely general right now, and we have not defined these terms, and they were brought up as what we need to do, in order to have a good operational management strategy evaluation, and so what we wanted to do was come to the professionals that have worked in this arena, and without having to do a new survey, because we don't have time to do that, what information could we consider that would be useful for describing angler welfare and angler well-being?

DR. CROSSON: I have the definition, and my definition is based -- I'm speaking as an economist, but my definition is also based on the fact that the reason this management strategy evaluation project exists is because anglers are very unhappy with dead, discarded fish, and so I think the -- I would incorporate the value of a retained red snapper, or whatever the species is that's under consideration, because that's what the anglers want out of this. They want to be able to keep more fish, and so, if you're going to compare the different management strategies, that should be one of the outputs that you're looking at, and we have that information readily available already.

DR. CHEUVRONT: I was trying to think about -- Because, when I made my comment before, I tried to stop and think, okay, if this is terms that fishermen were using, what did they really mean, and my first thought was are they talking really about trip satisfaction, and that was what my thought was, and then I immediately went to constructs like Scott was just talking about. Okay. If that's what "well-being" is, is their happiness, their welfare, and is that what they're calling welfare and whatever? Then, yes, and are there enough fish out there to catch, and are there decent fish to catch, and is it worth my time and effort to go out and do this, and that might be the way that a general layman might construct the use of these terms around fishing, I guess.

DR. CROSSON: This is very heavily -- This says, right up there, the snapper grouper fishery, right, and I would not put -- I would not use that same term for like the king mackerel fishery. As I said earlier, there may be other reasons that people catch king mackerel, but, for the snapper grouper fishery, there is very little evidence, that I have ever seen, that people enjoy the catch-and-release aspect of snapper and grouper, because the release is usually a dead fish floating away that's getting pecked by gulls, and so people are unhappy with that, and so the output of this I think is that we should be utilizing the consumer surplus estimates that we have already for a retained snapper grouper species.

DR. HUNT: I was expecting the economists to say something like utility, and what offers the highest utility, but is that -- How would you define "utility"?

DR. CROSSON: That is in dollar terms, because I'm an economist, but, yes, and it's just -- It's a quantifiable number, and I'm not saying that it's everything that ever is about fishing, because there's others reasons that people fish, but it's certainly -- We have contingent valuation studies, and there is even revealed preference studies, and we have a lot of studies, in the Southeast, showing that this is how anglers value retaining their catch for the snapper grouper species, especially the big boys, like red snapper, and so those are the ones that -- I would pull that into the MSE. It's not -- It doesn't require a bunch of new research. It's available, and there is multiple studies of it, and so that's what I would utilize.

DR. CRANDALL: I am just guessing that a lot of the other measures that we might think of, when we talk about welfare, won't have data that exist that we can use right now, and it almost sounds like a future research project would be to work with anglers to figure out what are the important components that they define as part of their welfare and well-being, when it comes to this fishery, but I don't -- I am struggling to think of even trip satisfaction data that I'm aware of that you could pull in right now.

DR. HUNT: I think Brian brings up a point, along with Chelsey, that there is a conceptual framework there that really -- What is -- I mean, what is -- I guess we've got two constructs here, angler welfare and angler well-being, and then how would a psychologist approach that, and how would an economist approach that, a sociologist, an anthropologist, to at least see that all on one graph, or one slide, that we know what you have already that you can do, but what are we missing, more importantly, and you may or may not be able to collect it, and we don't have enough money, but at least we know the full realm of the definition of "well-being" and "welfare", within the fishery, whether we have a bunch of unknowns, which will be the case, because you said that you have data, right, that you can just pull, but that's only two or three of the maybe fifteen different ways that we could study well-being, or welfare, and at least tell the council that these are what we don't have, and are you interested in collecting that information. I not volunteering here, but I think that would be a useful exercise.

DR. COLLIER: All right, and so what I heard was consumer surplus estimates, contingent evaluation studies, as potential trip satisfaction, and value of retained fish, and those were some of the items that were suggested to do currently, and are there other items that we should dive into? You know, we want to limit this to maybe a total of seven evaluation criteria, and so we don't want to open it all the way up, because we do have to have at least two of them, one that says that we prevent overfishing and the other says that we prevent overfished, and so those are two evaluation criteria that are already there, but the others -- You know, I think it would be good to get a lot of potential ways to understand how the stakeholders feel about these things, once again coming back to welfare and well-being and what they want of the fishery, and so I'm just making sure that I heard you guys right with the four items, four or five items, that I had listed. If there's others that we should look into, I will look into those as well.

DR. CROSSON: I have another one, because I've seen it utilized in other management strategy evaluations, and, if there's some way of measuring encounter rates with species, some CPUE-type thing, that's something that anglers also care about, and the one that keeps popping into my mind -- It's one of those Great Lakes fisheries, but it was presented at the National SSC Meeting in San Diego a few years ago, where somebody from Michigan State presented something about walleye, or one of these other Great Lakes fisheries, but they explicitly compared the commercial catch with the encounter rates that recreational anglers would have, and the management strategy

evaluation was trying to build basically a production possibility frontier of trading off those two variables, and so, if there's some way to do that for snapper grouper species, that might be something that also would be -- Especially for the angling community, it would be of value. It's a lot easier probably on a closed ecosystem, like you have in the Great Lakes, than it is for what we have in the ocean, and I acknowledge that.

DR. ROPICKI: You mentioned catch per unit effort, and so how does that work? I'm just curious.

DR. CROSSON: When I first started doing fisheries, I was like, well, this is a nice variable CPUE, right, and why don't we just use that all the time, and it was like there's a reason, and it sounds beautiful, but it's a difficult thing sometimes to measure, and there is not one standard. It's not like, you know, dollars, where you can just sort of measure it in the standpoint of dollars, and it's different depending on how you're looking at it, and so I would leave that to the MSE experts to get into, but the encounter rates is something that -- Like it's how likely you are to hit X number of fish per hour or something like that, and there's ways of measuring that.

DR. CHEUVRONT: But we all know that a bad day fishing is better than a good day -- It's better than a good day at work, right, and so that's the psychological aspect of it, but we don't really have a good way of really measuring that.

DR. CRANDALL: To follow on that, are those kind of fishing-experience-related metrics what we're thinking of, like number of fish they can harvest, and bag limits and how those change over time, if that's one of the things that they're interested in?

DR. COLLIER: Can you say that again?

DR. CRANDALL: Following on the CPUE, are those things related to the fishing experience, like number of fish they can keep, the kind of metrics that you want to incorporate in here, that we're thinking are part of their satisfaction, or part of -- Which might then be part of their well-being and welfare?

DR. COLLIER: We really haven't started putting together anything to evaluate this, and they're developing the model to understand how the fish populations are responding and not necessarily how the rest of the environment is responding, and so we can definitely look into that, and I think we might be -- I feel like you could incorporate that in there some way, because you can define a catchability coefficient, and then, you know, if your population goes up and down, then you should be able to incorporate that in there, and so I can see it working, but we just haven't looked at the data, and, you know, private recreational data can be a little challenging, especially for a fish like red snapper, where it's been closed essentially for ten years, with the exception of some of the short openings that are allowed during the summertime.

DR. CRANDALL: I should have said that I don't do MSEs, and so feel free to say no.

DR. COLLIER: I can say that I haven't done an MSE, and so I don't know when to say no. All right, and now I think the more enjoyable part about this is what data should we collect in the future that could be used for future MSEs, in order to -- When I come to you guys next time, and you guys say we have all this data now, and what should we be collecting, so we can throw it into our research recommendations and monitoring plan?

DR. CRANDALL: Do we need to start with that brainstorm of what all the different things that are -- I think we need a sticky-dot-wall exercise, to brainstorm, and I don't know, and I feel like we could probably spend hours just outlining those categories of things that could be part of well-being, and maybe I'm wrong, and maybe we would be faster than that, but I'm just guessing that would be a big conversation.

DR. COLLIER: We do have a sticky wall that we can bring to our next meeting. It's been a while, and so it might not be that sticky.

DR. HUNT: I am pretty good friends with our librarian at Mississippi State, who spends his time just searching databases, and I can have him run well-being and welfare and see what comes up and then whittle it down to maybe natural-resources based, just to provide that breadth, because I think there's probably a lot out there, and we wouldn't tap it all in sticky notes, but I can do that, and probably get it done relatively quickly, and maybe that will give you some ideas of what needs to be collected.

DR. COLLIER: So, just thinking this through for a little bit, we have our research and recommendation plan that we're going to present to the council in June, and so it's not really giving you guys enough time, given that this is a much bigger idea than I thought it was going to be, and so what we can do, with the approval of the other two up here, John and Christina, is maybe bring this back to you guys next year, next April, or, if you have a fall meeting, bring it at the fall meeting, and really have a thought process on how to do it, and then we can get it into the future research and recommendations, which we update every two years.

DR. SWEENEY-TOOKES: I was going to jump in and say too that I have worked with health and well-being a million times over, but it's always in commercial and charter, where there's an economic reliance on fisheries management for livelihoods, and so I'm stumbling a bit with the recreational angler side of this, and I'm struggling to make connections between a hobby, or whatever it is, right, a recreational activity, down to well-being, unless we wanted to go down the road of mental health benefits, which we could.

DR. CROSSON: How about, and you can shoot this down, but the length of the season, or the number of days per year, that the species is available to be fished?

DR. ROPICKI: So like a contingent value study looking at the value? I think access, you know, retention of fish, and access could have a couple of different measures, you know, of season length versus -- Well, no, I guess it was just really --

DR. CROSSON: I mean, I have all kinds of questions, and opinions, about season length versus retained catch, because there may be tradeoffs between those two, and so that's one of the things the MSE should be able to get at. It's one of the things that I will discuss tomorrow when I go over some of the stuff we've been working on at the Center concurrently.

DR. WHITEHEAD: Just a couple of things, and Scott and Chip are on this MSE technical group.

DR. CROSSON: I am going to see it more than --

DR. WHITEHEAD: Instead of saying "contingent valuation", let's say "stated preference", and that will go in our notes, our writeup? Stated preference is a broader class of valuation methods.

DR. CROSSON: Go ahead, Brian.

DR. CHEUVRONT: One of things -- I am trying to group together some of the things that I'm hearing here, like about length of the fishing season and all this other stuff, and something that Jennifer was saying about the psychological mental health aspect of this, and one of the things about what makes a hobby more satisfying, bringing in something I presented earlier, is what makes it more enjoyable isn't just the action of participating in it sometimes, but it's also the lack of obstacles to participate in the hobby.

When you start the shortened seasons, the lower bag limits, the population issues, you know, and if you're in a rebuilding plan, and so now you've got restrictions on size limits, and all these sorts of things make it difficult for an angler to have an enjoyable experience, and it creates obstacles for the angler to be able to -- If the goal is to retain a fish, which it is for a lot of -- I am just thinking in terms of red snapper.

I don't know how to, quote, quantify this, other than listing a list of what these potential obstacles could be, and that maybe takes some brainstorming to do that, but you could conceivably simply count what those obstacles are, but then certainly some of those obstacles you could add weighting to, and then that gets a lot more difficult, because the -- Having a shortened season, a two-day red snapper season, is going to be a lot more painful for a very desired fish than say, you know, when you have a four-month closed season for certain groupers or something like that, and you know that the red snapper season is going to be a lot more painful, and so just having a closure is not -- You know, it's going to be different for different species.

I am not sure how to weight things at this point, and counting certainly is going to be inadequate, but somehow there's an obstacle issue there, and I don't know if that -- That could be somehow at least identified, and I'm not sure, and I haven't thought it all through, and it just came into my head as we were talking about all these different things that people have been saying, but maybe there's something there, at least at a rudimentary level, and at least it could be mentioned, and that could provide something for the future, that somehow somebody could expand upon and figure out how to weigh these things and how they weigh upon whether it's welfare or well-being or satisfaction, whatever we want to call it, in terms of what an angler gets out of a trip.

DR. CRANDALL: Just to kind of follow and connect back to that, that's where I went first too, and we should ask the anglers, because I don't know that much about how their well-being is connected to this fishery, and I know I hear rec anglers use words like culture and identity and heritage, when we talk about these sorts of things, and so that may all be tied up into their feelings of well-being, when it comes to this fishery too, and I like the idea of seeing if there's things that explore this, and I don't know, in the rec literature, but that would be neat, and so it would be cool to come back and see what we find, as far as the different metrics that could be there.

DR. HUNT: Just searching around, kind of looking at that, there's a whole bunch of -- You know, the -- One of the things that I came across was the difference between wellness and well-being, and well-being is health-related, but wellness is looking like much more what you all are interested in, and it's more than just physical health, and it's the emotional and spiritual and everything else,

and so do you want to continue calling it well-being? You know, that's something that -- Yes, you could ask somebody what's their well-being, and I'm not always thinking of health, but I think those are the kinds of things that you really have to define, you know, going into this.

I don't know if -- Because somebody may come up and say, well, well-being is health, and well-being is health, and so what's the correct term? Is it wellness, or something else, that goes beyond just health? Like you said, it's much more than an afternoon, I think, to kind of get at that.

DR. COLLIER: Thank you, guys, very much. I think this was a great discussion, and it provided some definite ways forward for us, and also some -- I think we're going to continue this discussion, and, you know, hopefully we're going to have much better information, the next time we develop an MSE, to incorporate some of these concepts of welfare, well-being, or wellness.

DR. CROSSON: Okay. Thank you. This is a good time to stop, since we -- I will give you guys four minutes back, and we're not supposed to end until 5:00, but I will let you out early today, but we're going to resume tomorrow, I guess, at 8:30, according to the webinar, the council's website, and so I guess we'll finish for the day, and, if we're going out to dinner, somebody knows something about that, and I don't know, and John I guess. We have a council member who would like to -- I don't know who.

MR. HADLEY: Laurilee Thompson.

DR. CROSSON: Okay. Laurilee is on. I'm sorry. Please.

MS. THOMPSON: Thanks for that. I think one of the things that the council had talked about, with the angler welfare and the angler well-being, was the fact that, you know, especially with our management of red snapper, was that we were literally putting anglers' lives in danger when we have a one-day season, or a two-day season, and the weather is horrible, and they're going to go out in their boats and go fishing anyway, and so that was one of the things that the council had pointed out with the -- Trying not to put peoples' lives in danger with our management of some of the fisheries, and so derby fishing was one of the things that they were concerned about.

DR. CROSSON: Thank you. Yes, that's a really good point, and I'm used to hearing that in commercial fisheries, but it's important when we talk about the mini-seasons for recreational as well.

MS. THOMPSON: Exactly, yes, and, of course, you definitely have derby fishing going on with the commercial, the ones that have the quotas, and so thank you for the opportunity to comment.

DR. CROSSON: Is there anybody else online? Okay. Thank you. I guess, with that, we're going to finish up for the day.

(Whereupon, the meeting recessed on April 17, 2023.)

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APRIL 18, 2023

TUESDAY MORNING SESSION

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The Socioeconomic Panel of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Town and Country Inn in Charleston, South Carolina on April 18, 2023, and was called to order by Dr. Scott Crosson.

DR. CROSSON: Good morning. We're going to start day two of the South Atlantic Council's Socioeconomic Panel meeting, and the first thing we have up is a portfolio analysis that's being done with I guess -- I know Steve Cadrin and Jason Link are two of the PIs, and who is doing the presenting this morning?

MS. WIEGAND: Lauran is going to be doing the presenting this morning, and, Lauren, I have just given you control, and you should be able to share your screen and the presentation now.

DR. CROSSON: Okay. I'm going to hand it over to those folks then.

DR. LINK: Can you all hear me?

MS. WIEGAND: We've got you loud and clear, Jason.

USING PORTFOLIO THEORY TO IMPROVE THE MANAGEMENT OF LIVING MARINE RESOURCES: A DEMONSTRATION FOR SOUTH ATLANTIC FISHERIES

DR. LINK: Great. Thank you. Good morning, everyone, and thank you all for allowing us to come and present to you today. I just wanted to tell you that we've been working on this portfolio project for about a year and change now, and we're excited to share this with you. By no means do we have definitive answers, and we just want to present a tool to you today, a way of looking at information that may be helpful and give you a demonstration of that.

Steve can mention it at the end, but, if we can go to the next slide, we're going to take team, and I'm going to just give you a real, real quick introduction to this topic, and Fiona is going to walk you through the data and some of the portfolio selection processes, and Lauran will tell you about the results, and Steve will give you, you know, the background and kind of lead the wrap-up. We've been working with several of the folks in your region, and so we're trying to be familiar and in-tune with a lot of the issues you have, but we, again, welcome any feedback, any input that you can give, and so let's just jump in.

The context of this is most of the management of fisheries in the U.S. focuses on single species, or populations, and relatively limited consideration of the full fisheries system, and we don't want to throw the baby out with the bathwater, proverbially speaking, and this approach has been very positive, and there's been a lot of good results from that, but it can be risky, and these risks extend into the economic, social, and even governance considerations, and you see our blue infographic that we tend to show in these things.

If you go to the next slide, what we're really looking for is to move into this ecosystem-based fisheries management, and, really, the reason we're doing that is the fishery managers are tasked with making so many decisions, including harvest rates and biomass targets and species distribution in different places in the ocean, and we think really, to meet all these legal mandates for marine fisheries, an ecosystem approach is not only allowable, but it's advisable, and, even just within the fisheries sector, there are so many challenges and tradeoffs, and so we want to look at it as a system, and one of the difficulties with that is how do we do that and boil it down into digestible chunks, and what are some tools to do that, and what we'll mention today is one example of that.

We want to mention this concept of multispecies portfolio management, and it's very similar to stock markets and, in fact, it's based on a lot of that theory. The studies that we've seen, as applied to fisheries, is that, when you have this portfolio frontier, this efficiency frontier, those curved lines there on the figure, an aggregate set of landings, the more aggregate it is, the more risk is occurring, and the less economic yield is attained when you're further away from that, and so Point B on this graph is maybe a realized example, and the risk is measured in variance, or standard deviation, and the return here is always less than that, and the more aggregated estimates of the efficiency frontier outperform the single-species frontier, and so the solid line versus what we're calling kind of the aggregated, or multispecies, or EBFM frontier, and those are different as well.

That is a theoretical result, and we begin to see that when we apply this, in many instances, and so what we're looking at is that dot there at Point B and how that is related to the efficiency frontiers when one calculates all the variance matrices and so forth based on landings.

Just with a financial stock portfolio, the emergent properties of a diverse portfolio tend to be more stable, and the theoretical studies demonstrate that, the further away you are from this efficiency frontier, again, the more risk you have and the less economic yield is obtained, and so that red point there may be -- That's where we are, but maybe we're okay with the risk, but we would like more value, and so what could we do with that, and then maybe we like the value, the return, we're getting, but it's too risky, and maybe there's a way we could do that, or maybe there's kind of this midpoint, moving towards the curve, and we just want to explore that and give you all a sense of how we might look at this, even as a diagnostic tool, post hoc of management decisions, and what that might do.

Again, the risk we're talking here is beyond the typical P* stuff and ACL or OFL setting, but it's really the variance of the value, and so, with that, let me pass it to Fiona and walk you through some of the data, before we actually get into the results.

MS. EDWARDS: Hello, everyone, and I'm sorry about earlier. I was having a few audio issues. Our first step was to determine a data download protocol for this dataset, and so we were using publicly-available commercial data, which we obtained from the NOAA Fisheries landings database.

For our download parameters, we selected the dataset to be commercial, for all years that were available, and we selected the region types to be NMFS regions for the South Atlantic, and we selected that we wanted all information for all available species, and we selected the report format as totals by year, state, and species. The reason that we selected the report format like that was

that we were unable to select both region and states, and so downloading it in this way allows for the state level to be examined, if desired.

With these parameters, we downloaded the raw dataset. The raw data file is very large, and it encompasses over 24,000 rows, and it has landings for 490 unique NMFS names, and this dataset comprises seventy-one years of data, from 1950 up to present, with 2021.

As the dataset we were working with was very large, we were going through methods to determine ways to reduce the size of the dataset for use in the frontier analysis as a top priority, and one of the points that I wanted to bring up is that we do not have any recreational revenue or landings, and we're only working with commercial data in this one, and, while both public and confidential landings exist in the dataset, as these confidential landings -- They don't provide any landing revenue or weight value, and they were removed, and, prior to a frontier analysis, we examined the dataset in R, to determine species-specific NMFS names for some of the species, as they differ within the dataset, one example being that graysby grouper has the NMFS name "graysby".

As we were examining this dataset, we noticed that, for some species, there were many data gaps, and we also found the presence of historical aggregates, which was noted by a double asterisk, which appeared as being phased out in favor of more species-specific reporting. We also came across this NMFS name of "withheld for confidentiality", which encompasses the aggregate pound or dollar amounts for these confidential landings.

We explored this dataset further, and this plot right here shows the top ranking landings and revenue for the dataset, and we can see, with the top thirty, with a category of "other", noting all other species, for landings in this case, by dollars, which we standardize all dollars for the dataset to their 2021 value, and we can see that we're getting some historical aggregates that are appearing in the top thirty, such as kingfishes, as well as mackerel, which is king and cero, and we're also getting some more species-specific NMFS names, such as snapper vermilion and mullet striped.

This is the top thirty by landings weight for the entire length of the time series, and, again, we are getting some historical aggregates, in this case, with king fishes, flat fishes, and we also are getting a mix of some more species-specific NMFS names, such as herring Atlantic thread, and these plots are oriented so that the right column, at the very bottom, is the most heaviest-weighted species for this plot, being that, in this case, the menhaden's historic aggregation is providing the greatest landings overall for the time series for the top thirty, out of these thirty species.

What are we looking at here for the frontier analysis, and so we examined the Snapper Grouper FMP for our candidate portfolio, and it comprises fifty-five species, and we looked at the FMP by breaking it up into groups, being amberjack, spadefish, hogfish, jack, bass, rudderfish, porgies, grunts, groupers, snappers, and, finally, triggerfish, and tilefish.

This shows the landings in metric weight for just the species managed under the Snapper Grouper Fishery Management Plan, and so we can see that, out of just these FMP species, that, for landings metrics tons, that really the heavy contributors for these are these species-specific designations of black sea bass, vermilion snapper, and gag grouper. Then this is the plot of revenue in dollars, standardized to a 2021 value, for just these FMP species, and we can see, again, that gag grouper, vermilion snapper, and bass black sea are really heavy contributors to the plot of the revenue for just these FMP species, and I will pass it over to Lauran.

MS. BREWSTER: Thank you, Fiona. Okay, and so Fiona has just introduced that we decided to pick a portfolio composition that was focused on the Snapper Grouper FMP species, and so probably one of the first things to point out is that portfolio analysis requires consecutive years of data, and so there was a fair amount of data decisions that we needed to make, and data preparation, to be able to actually run the portfolio analysis, and so one of the first steps that we did was to standardize all the revenue to the terminal year in the time series, and so 2021, and we also focused on landings in metric tons, because there were some zero values in the landing weight records.

This is just showing from the beginning of the time series, and so from 1950 all the way through 2021 for the species that we were looking at, and you can see here that there are a lot of gaps through various different points throughout the time series for the different NMFS name designations, and so we needed to try and work out how we wanted to deal with these gaps to produce, as I said, consecutive years of data for each of the species in the portfolio, or aggregations in the portfolio.

We decided that there were five potential courses of action that we could take, and we could potentially aggregate species together, particularly where there was a historical aggregation. Just to reiterate, as that is indicated by the double asterisk at the end of the name, and so this was particularly helpful, and we used this if -- For example, if you look at the triggerfish, in pink, towards the end of this graph, on the right, you can see that there was more species-specific reporting for gray, ocean, and queen triggerfish, but only towards the end of the time series, and so aggregating them with the historical aggregation was probably the best option for us there.

We could also truncate the time series, and so we did decide to truncate, I think to 1991 for this, and we could remove a species, or an aggregation, from the dataset, and we could potentially interpolate values, which we didn't need to do for this particular dataset, or we could add a zero, if there was a gap in the dataset that we knew that there was no landings or revenue for that year, but this is what we were dealing with to start with, and this is what the data ended up looking like that we used in the portfolio composition.

Where possible, we kept species-specific reporting, and we did need to drop some species, such as bass and tilefish, and we ended up fully aggregating the grunts, the spadefish, and then the amberjacks, the jacks, and the rudderfish, which I think are listed here as "AJR", and so that's the acronym there. We partially aggregated some of the species, such as groupers, snappers, and porgies, but we kept species, individual species, out, where we were able to, and we truncated the time series to 1991.

Here, I'm just showing you a correlation matrix of revenue for the species that were included in the portfolio composition, and so a key concept in the management of risk is diversification of assets that are in the portfolio, to take full advantage of negative correlations and returns, and so you can see that there's a lot of positive correlation, particularly between the snapper and the grouper, but, by including the amberjacks, jacks, and rudderfish, spadefish, the triggerfish, the tilefish, and the silk snapper, we were introduce some additional negative correlation, or negative covariates.

I'm going to show you two different styles of frontier analysis in the results, and this is -- This particular one is based on the methods from a paper published by Gin et al. in 2016, and, just to

orientate you to the figure, the vertical axis is depicting the expected revenue, again standardized to 2021 dollars, the terminal year, and the horizontal axis is depicting risk, which is measured as the standard deviation of the revenue.

You are seeing each single square is each year in the time series that we looked at, and the black dot is the Point B that Jason referred to earlier in the study, early in the presentation, and so it's the realized revenue within each individual year, and the blue line is the single species management approach, the efficiency frontier, basically, and the red line is representing the portfolio theory approach, or EBFM approach.

A couple of things to note here is, as I mentioned, this is showing you each year within the time series, and it's taking data from the beginning of the time series up until each year that you're seeing, and so, for example, 2006, here in the middle, is using data from the beginning of the time series through to 2006, and so we're adding data with each year, and the main difference between this and the version that I am going to show you later is it's showing you the development through the years, but it's also including a decay factor, and so it's downweighting more historical data. In this particular example, we used a decay factor of 0.741, and so there's about 5 percent of the data left after a ten-year period, and so we've got a full suite of data ten years into this time series.

This is one of three risk gap plots that I'm going to show you, and, basically, this is showing you the difference between that Point B, that realized revenue, the black dot on the previous plot, and the corresponding point on the frontier curve on the vertical axis, and so you can see that the risk gap peaked in 2008, with almost $1.4 million of revenue, and this is the difference in risk between the realized revenue and the equivalent point, and so I'm just going to flip back and show you, really quickly, and so it's this dot versus the equivalent point here on the EBFM frontier, on the red frontier, and it's the difference in risk there.

The risk gap peaked in 2008, at almost $1.4 million, and this appears to be as a result of fishing above the optimal weights, particularly for red grouper and red snapper, and you can see that, at the end of the time series, in 2021, there's almost half-a-million dollars' worth of risk that was taken than was necessary if the portfolio approach had been used. This is another way of looking at that risk gap, but it's showing the risk in -- The risk gap per dollar, and so you can see here, just giving you an example, in 2002, that there was an extra five-cents of -- An extra five-cents was risked, per dollar, than was necessary if the portfolio approach had been used.

This risk gap plot is showing the difference in risk per dollar, and so you see it's achieving the realized revenue within each year, between using the single species, that blue line, and the portfolio approach, and so, for example, in 2005, there was an approximately an additional five-cents per dollar risked to achieve the realized revenues in the single-species management approach, versus if the portfolio approach had been used.

Then, finally, this is just another way of looking at the frontier analysis, and so this is from an earlier paper, and it's just showing you each year, from, again, the same period of time, 1991 through 2021, but it's using -- It's just showing each year at the same time, on the same plot, just to make it a little bit more digestible. The thing to note here is that there is no decay, and the maximum landings are for the entire time series. With that, I will hand it over to Steve.

DR. CADRIN: Thanks, Lauran. To take a step back and get the bigger picture that Lauran just walked us through from these frontier analyses, the main point is that the risk of foregone yield was greater than the optimal multispecies yield, and you can see the result plot to the right, and, for any target revenue, that means that the risk of not achieving that revenue was greater with the single-species optimum than the multispecies optimum, and it also means that, with more coordinated management, and, by that, we mean flexibility for fishermen to access different species, we could reduce that risk of foregone yield, or we could achieve greater yield, a greater target yield, at the same risk.

The risk gaps that Lauran just showed generally increased over time, and there are different dynamics, both market dynamics and productivity dynamics, within each stock that cause the year-to-year variability, and we expect this to increase. With climate affecting species differently, the covariance that drives these optima we expect to increase, and so the need for flexible and coordinated management among species increases.

Because the portfolio optima relies on these covariants, we can look at the snapper grouper complex, and we see that, for most of them, there's a very strong positive covariance, and this could be because of common environmental trends, and stock trends, among those species, and it could also be because of management regimes that have affected multiple stocks, and it could be because of markets that have similar trends with these, but there are -- Fortunately, for the multispecies portfolio frontier, there were also negative covariances for jacks, triggerfish, blueline, red grouper, silk snapper, and spadefish. They had different trends in revenue than the others, and that really drive the risk gap.

The frontier analysis of this snapper grouper complex indicated that we could have achieved the same revenue with less risk of foregone yield, and they demonstrate that management systems -- There are benefits to allowing flexibility to harvest the species in the portfolio, that fishermen have access to them, and, alternatively, minimizing the constraints posed by any single species management action that might constrain the flexibility would reduce that covariance.

There are alternative portfolios that could be done, and we worked with the steering committee to identify that this was the most reasonable starting portfolio, but, really, what we're looking for are any groups of species that have interactions, and several different forms of interactions. Are they caught by the same gear and the same fishing effort? Do they have ecological predator-prey or competition interactions? Are they marketed together, or maybe there are product replacements, and then, finally, management, for example a rebuilding plan for one that may impose a bycatch constraint on another?

The council could explore alternative multispecies portfolios. We could go broader and include other species that South Atlantic fishermen could have access to, maybe that are beyond even the South Atlantic Council, blue crab and other things, or we could go narrower and focus on portfolios within the snapper grouper, shallow, deepwater groupers and snappers. Primarily, the next steps should probably include recreational fisheries, so that we include that catch and the value of that catch. However, whether we go broader with the portfolio, or narrower with the portfolio, or include recreational fisheries, we do expect similar patterns and covariates, and that should produce similar frontier results.

This was the big challenge that we had in the South Atlantic frontier analyses, is the large volume of recreational fisheries, and so the publicly-available data that's plotted here, up until 1980, was entirely commercial. After 1981, we have the for-hire recreational, and these publicly-available data do not include other modes of recreational catch, and so our entire initiative here was to use publicly-available data to demonstrate this approach in multiple regions without getting inside the firewall of confidential data, or disaggregated data, but it does have limitations.

What we would like to do is include all of the catch, all of the productivity for this portfolio, whether commercial or recreational, and that wasn't possible in this iteration, and so what we chose to do, for demonstration, was to analyze the commercial landings only, with a pretty large caveat that it's excluding a lot of productivity.

As we start interpreting the portfolio results, the frontier analyses results, it really applies on many levels. It applies to the commercial fishermen in the South Atlantic that has access to different stocks, but, within the permit, may not have access to commercial, or vice versa, and it also applies at the higher level, at the council, in the coordination, in which case, at that higher level, we really should be including recreational catch, and so, you know, we would want to include private and shore modes, and probably use the South Atlantic recreational data, have some attempt to evaluate the recreational value, the willingness to buy, you know, certain approaches to complement the ex-vessel sales value from commercial, and that would take more of you, with local expertise, and economic expertise for the recreational fishery, and so this team -- That's a bit beyond the scope of this team, or this budget, but I think these demonstration analyses could certainly lead some of the taxonomic decisions, for example, and they could certainly be adopted in a broader frontier analysis with recreational catch.

We have several data challenges with these publicly-available data, and Fiona described how there were inconsistent taxa labels, and we had some confidentiality, some years with data gaps, and so the solutions that we had were to truncate the time series to 1991, and that avoided a lot of the gaps in the taxa inconsistencies, and I think 1991 gives us enough historical context of data, while still characterizing the current fishery.

We did have to do some reaggregated taxa that Fiona described, and, again, if we had the raw data, we might be able to disaggregate some of those and increase the covariances that these analyses are relying on. For a few, we did add true zeroes, and this was with the local expertise of the steering committee, and we excluded some taxa that had very little catch and couldn't be aggregated, and, finally, we interpolated a few confidential data gaps. Again, this is a demonstration, and the data that are available to you, and to council staff, and state and federal scientists, could probably do a better job with retaining a lot of the disaggregation for the full diversity of a portfolio analysis.

Really, as we start to wrap these up, and apply these more broadly, we really welcome your expertise, both with the local South Atlantic fisheries as well as the economic frontier analyses. The frontier analyses itself is somewhat constrained. We have decay factors, as Lauran described, so that the most recent years have the most influence on the optimization, and maximum annual catch per species, and we've been imposing some sustainability constraints, and so we're really in the process of evaluating the sensitivity of the analyses to those decisions.

For Fiona's graduate research, she is evaluating the sensitivity of the risk gap on some of these decisions, and so we would really welcome your suggestions to optimize the analyses on the data end, the modeling end, and the interpretation, and so, with that, I will thank our funding from Lenfest, and we have an excellent steering committee that Jason put together, with expertise throughout your region, and other regions, and these analyses -- Howard Townsend and Garet DePiper really helped with the analysis, and Jeff, Chip, Chris, and Scott really helped, with their expertise in your fisheries, to help make some of these data decisions and modeling portfolio decisions, and so, with that, I will thank you and entertain any questions. I will serve as the traffic cop, and, if I can answer questions, I will, but, more likely, I will pass that off to other people on the team, and so thank you, Chair.

DR. CROSSON: Thanks, Steve. I guess we have some room for initial comments from the committee. Andrew, please.

DR. ROPICKI: So, just to be clear, the return measure was just revenue, right?

DR. CADRIN: That's correct, and so the covariance was in revenue, and we had both landings in biomass and revenue in dollars.

DR. ROPICKI: Okay. Well, I kind of have a problem with that, because, you know, if you do portfolio theory, a Markowitz portfolio, with stocks, you know, you're missing a cost associated with that, and you're just measuring an outcome. When you do portfolio theory with stocks, you have an annualized return. You have that revenue, whatever the value of the stock is at the end of the year, plus whatever dividends you made, less the cost of investing, and this analysis doesn't have any costs associated with the fishing. There's no -- You're not measuring, you know, revenue per unit effort, or even the cost of harvesting the fish, and so it seems problematic. It's not in the sense of a financial portfolio.

DR. CADRIN: Thanks for that comment, and so you're absolutely right that we only have revenue in here, without any costs, and so, you know, according to what you're saying, the profit might be something to consider, and we're really replicating the analysis that were done by Edwards and Ginn and others, and so that aspect of the analogy to financial portfolios may need consideration, and so I appreciate the comment. Again, what we were doing was replicating the methods by Ginn et al. and others, but I think that that's an important caveat to consider. Jason, do you have any comment on that?

DR. LINK: Andy, I take your point, but I slightly disagree, in the sense that the realized end values in the stock market don't -- The way they calculate that, at least some of the initial equations, really didn't accommodate that, and, as Steve said, we're just following what Steve Edwards and a bunch of us did twenty years ago and then, you know, what Sanchirico and Doug Lipton, and then, more recently, Dajan and others have done.

I think the bigger point is, you know, whether or not we use profit, or we use revenue, and we could try to do all of the above, but the bigger thing is looking at those frontiers and being able to calculate them. Whether the unit that we're using is appropriate, or there is another one, is the approach of looking at the frontier useful? That's kind of how I'm coming at this and thinking about that, if that gives you maybe perhaps a little different perspective. Thanks.

DR. ROPICKI: Well, I mean, that's just one of a few problems that I see with the application of portfolio theory here. Another one is, I mean, you talked about ecosystem-based management, but, with the data you have, I just -- I don't think you've done an efficient frontier, because, if you think about in terms of the way this is supposed to work, you have -- You have basically made it single-stock management applications to the max, because the assumption is that, each time a fisher goes fishing, they catch one species, the one species they were targeting, and that's it, because that's the way it would work with a stock.

I mean, we're using Markowitz portfolio theory, and we should use it the way they use it, and, if I go to my broker and tell him that I want to buy Stock A, I get Stock A, but, if I go on a fishing trip, going after red snapper, I'm going to get some red snapper and some, you know, other stuff. I'm going to catch a few porgy and other fish in there. I think your measure needs to be like at the trip level, and you need to separate out trips based on what they were targeting.

Now, you might be able to do that with whatever -- Some assumption about whatever the most caught species is on a trip, and that's what you were targeting, but there's a problem there, because you can't actively separate these species completely. I mean, when you fishing for A, you're going to catch B and C as well, but, with an investment, you're going to buy A, and all you're going to get is A.

DR. LINK: Steve, can I jump in on that?

DR. CADRIN: Yes, go ahead, and then I would like to follow-up.

DR. LINK: I think you have proven our point for us, and we totally agree with you. We understand, when you go out and are fishing, you're not just catching one species. Conversely, in the stock market, you could, but what we're saying is let's realize that reality and try to manage more in a complex, or a mutual fund, and I think what we're seeing in the stock market is those aggregated financial products, such as mutual funds or ETFs or whatever, and those are more stable and have other properties that minimize a lot of the risk that investors have in individual stocks, and we're simply saying that we understand how that occurs in the water for fish stocks, and let's maybe think about managing them that way, instead of managing them species-by-species and ignoring the fact that you do have, in the example you mentioned, technical interactions. I think we're actually in agreement, and we're just approaching it from different starting points, and so, Steve, go ahead.

DR. CADRIN: Yes, and it's similar. I think, first of all, disaggregating at the trip level would have some advantages as well, but, when it comes to the technical interactions, I've been thinking about this, particularly for snapper grouper, which is already quite coordinated. I mean, it's a single fishery management plan, and a lot of the permits and endorsements are for these multiple species, and so, just as you said, for a given fishing trip, there are multiple species caught, either the target species and some non-target species, but, under the snapper grouper plan, most of the commercial fishermen can retain, land, and sell those, which is exactly the flexibility that is towards the multispecies optimum.

Now, what would make it the extreme single species, and so the single species optimum is exactly as you said. You're going out for a target species, and the fisherman is not allowed to retain, land, or sell any of the non-target species, and so -- I think what Lauran showed for the realized risk and

revenue -- We see that they're falling, some of those, in between those frontiers, and so, from my perspective of the snapper grouper management approach, there is already some coordination, and there is already some flexibility that allows for fishermen to land and sell multiple species, and so I completely agree with you, and I think that's where our interpretation needs to come in. I think what this suggests is that the council should try to maximize that flexibility, to allow this, and should think twice before adding constraints to that flexibility. Thanks.

DR. CROSSON: Further questions from the committee? Andrew again, please.

DR. ROPICKI: One last thing, and, when you do your variance-covariance matrix on this, you know, you're looking at past returns, and how they covary is an indicator of future performance, and how do you account for how regulations impact the returns, because, you know, if you had -- You're using past data, and so, if you had limitations on how much red snapper could be caught in a year, that's going to impact the revenues, and, I mean, is there any consideration for that in the analysis, or --

DR. CADRIN: Yes, that's an excellent point, and we talked about this quite a bit in our steering committee. Jason, I will let you follow-up, if you would like, but what we would like -- You're right that what we're trying to do is predict the future conditions, and the best emulation of that are the current conditions, and so this is where the time decay comes in, is that we're really trying to have the most recent years inform that covariance the most.

We do want to get historical productivity and patterns in there, and some of the covariance comes from historical non-linear trends, or different trends among species, but we want to capture the current management regime, and, in fact, there were some discussions, in our steering committee, about limiting these analyses to the current regime, and we tried this with a few since the annual catch limit mandate came in.

Unfortunately, and Lauran can correct me if I'm wrong, some of those shorter time series, that are just the current management regime, and the broad management regime, don't converge, and there's not enough information there to get an optimum, and so we do need to have some historical productivity, but we tried to time decay that so that the current conditions are having more influence. Jason or Lauran on that?

DR. LINK: I will defer to Lauran.

MS. BREWSTER: Yes, and you've got that correct, Steve, and so, as I mentioned, we had two different methods that we followed, and so, with the Ginn et al. style, it's using that time decay to try and reflect more current conditions, and then, with the Sanchirico et al., we tried to break them down, based on different management regime shifts, but it really depends on how much data is available for each of those, each of those time periods.

DR. CROSSON: Kevin Hunt.

DR. HUNT: I have a more conceptual question. If you guys would go to Slide 4, and this may be for Fiona, because she's working on her dissertation on this, but, if you all had everything that you needed to perfectly execute portfolio theory, would that also allow you to check the box for

fisheries in the EBM, and, if not, what more would we need to do to check the box of fisheries in EBM?

DR. CADRIN: I am going to take a first swing, and then I'll see if Fiona wants to follow up, or Jason as well, and, with EBM, for this approach, we would really have to broaden it, because you would need to now consider the productivity in each of the human industries, and so not only would we have commercial sales, or profit, but we would have recreational fisheries values, and we would have offshore energy values, and we would have the value of protected species, and we would have, you know, the shipping, and those values -- To broaden the analogy to that level, it would be the interactions among those industries, and so fisheries would be nested within a much larger set of utilities. Jason and Fiona on that?

DR. LINK: Go ahead, Fiona.

MS. EDWARDS: I feel like you covered everything that I would have added, and so I guess nothing additional to add from me. Jason, do you have anything?

DR. LINK: Kevin, the other thing is we're still in the fisheries sector, as Steve said, and I'm looking at this, again, imperfectly, and all the caveats associated with that, and you often will have mutual funds that are in a sector, and we have all that information, and we're simply trying to improve fisheries management, or give tools to maybe take more things into account and deal with the risk there. If we were to get into the full EBM, the full multiple ocean use elements, with all the different sectors -- First of all, I'm not sure all that data exists, and, if it does exist, I'm not sure that it's all in one place, and I think, pulling that together, we would have to take a real hard look at what the units would be that we're looking at, and that would be the challenge.

I also am not sure where the governance aspects of that would be in any particular place, and just, if we look at what windfarms and fisheries are doing in some regions around the country, that alone is posing a lot of challenges, let alone all these other things, and so that is ideal, and we would love to explore that, and I think we have enough challenges just within the fisheries sector that I think that constraint is worth thinking about, but I am happy to theoretically explore, or conceptually explore this, with you further, because it is something we try to think about a fair bit.

DR. HUNT: Yes, and what I was just saying is your realm is fisheries, and we would just check that off, and other agencies would have to do that, the other nine boxes you've got in here, and then you work with them to incorporate it all together, but you wouldn't -- Would you be having -- If you checked the box for fisheries, would you be doing the energy stuff, or would that be another agency that you would have to work with to develop a regional ocean plan? Are the other things your responsibility? They wouldn't be your responsibility, correct?

DR. LINK: Mostly you're right. I mean, within NOAA, we probably have parts of aquaculture, some of sanctuaries, and there's some elements of conservation, protected species, but certainly the energy and the coastal development and marine transport -- This is just meant to be exemplary, but oil and gas, and the tourism thing, and that's a multi, multi whole of government, really, element, and there are significant challenges with that, beyond what we're talking about here today.

DR. HUNT: Yes, and that's what I was thinking, is is this ever achievable, or we're talking a hundred years before we could be successful in that?

DR. LINK: Yes, and so the point of this, these blue infographics, is to kind of start with any given sector and work our way up. There are other approaches being considered for the hundred-year plan, as you said, and we understand there are challenges. I'm not sure the analytical engine that we just described today would be appropriate, largely because we might not have the data, but there are other things that we could do and are exploring in an entirely different context, and I'm not sure if the Chair wants to go through that, or get into that, since we're focusing on the portfolio for fisheries.

DR. HUNT: I'm good. We can have that discussion elsewhere.

DR. LINK: Save me a beer, and I'll be happy to do it.

DR. HUNT: Yes. Will do.

DR. CROSSON: Dr. John Whitehead.

DR. WHITEHEAD: One of our discussion questions is does the treatment of the data seem appropriate for the analysis, and I appreciate that you described the data in your presentation, and let us know that there were data gaps and five courses of action were considered for each species, and so I'm wondering, and I apologize if I missed this during the presentation, of these five courses of action, if you tried the analysis with one course of action, or two or three, and made comparisons to this and conducted a sensitivity analysis of your results.

DR. CADRIN: Thanks, John. I'll take a first swing, and so I think that's a great protocol, are the data appropriate for the analyses, and I think, very early on, we identified some of the, I would say, minor problems, the species aggregations and gaps, and then a major problem, and that was the recreational modes that were not included in the publicly-available data or any value for the recreational fishery, and so I would say that, for ultimate portfolio analyses, that the council could rely on the risk gap estimates, but what we've decided at the steering committee was that we would use the commercial data as a demonstration.

From our view, the data are appropriate for a demonstration of how you would do these, what types of data decisions you would make with the available data, and so, even with the disaggregated data, you would have to confront some of these issues, and then, at the frontier analysis end, there are some decisions that you would need to make, and so, I think, as a demonstration, the data meet our needs.

For a final estimate of the risk gaps that the council could use for policy decisions, I would have to say no, and we did have one base frontier -- To your second question of was there one approach or multiple, and we have one base approach, but we've had several alternatives within this snapper grouper complex that we were using as alternative models, and so we think the data are appropriate for the demonstration, and we presented one approach among several that we attempted. Jason or others on that?

DR. LINK: I will defer to Fiona and Lauran. Thanks.

MS. BREWSTER: I can just add a little bit more detail, particularly pertaining to the five potential courses of action, and so we did have a look to see the sensitivity of the frontiers in response to, for example, the length of the time series, and it was sensitive to that, and I think really just that needs to be dictated by reasoning, basically, and we didn't need to interpolate anything here, and we did need to do that, for example, for the New England region, for some species, and I think, really, the sensitivity, in terms of aggregating or dropping species, is really dependent on those individual species, and the duration of the time series seems to be the most important, and we have to be a little bit cautious, in terms of including zeroes into the time series, because it can cause convergence issues down the road.

DR. CROSSON: John has a follow-up question.

DR. WHITEHEAD: Thanks for that, and I think, if this would be feasible, in terms of time and effort, I think it would be useful to conduct the analysis with the species that don't have data problems, as a counterfactual, to just say here's a pretend portfolio of target species, and we have full data, and these are the results, and compare that to what you have. Thanks.

DR. CADRIN: Thanks, John, and we're at the stage of that's the kind of recommendation that we're looking for, is what are the next steps for our analyses within this project. My expectation is that, if we trim this down to the species with no data problems, that we're going to lose some of that negative covariance, and the risk gaps will be smaller, and so we were always trying to, you know, meet that tradeoff between making some data decisions that allowed us to keep most of the portfolio in the analysis, and I think that's always what we're going to try to do, is to try to disaggregate things as much as possible, that the data will allow, but, of course, as you said, that's a balance, and what you suggested would kind of be a sensitivity analysis. If we went to just the safe data, would we get the same results, perhaps not trying to make that tradeoff decision so final, if you fall back to safer data, and I think that's a great suggestion. Thanks.

DR. CROSSON: Are there further questions from the committee? Steve, do you want us to go through the -- We have some discussion questions that are listed on our agenda, and do you want us to go through those, systematically, for you all? Would that be helpful?

DR. CADRIN: I will defer to you, Chair, on how you want to do it, and we will be standing by, and if you could just, at this stage, ask us -- You know, if you have any questions for us, just ask us to unmute. Thanks.

DR. CROSSON: All right. Well, maybe Christina is going to be able to pull up those discussion questions, and did the staff here come up with those, or those are the ones from Steve and company? I don't even know. Okay, and these are questions from Chip.

DR. COLLIER: (Dr. Collier's comment is not audible on the recording.)

DR. CROSSON: We will take a look at them, and, if the research team wants us to avoid a question, or they're not really sure, then we can address that, too. The first question is does the treatment of the data seem appropriate for the analysis, and I think we've kind of gone over that one already, and we've talked about the concerns with revenue versus profits, and I will bring up that I had mentioned to the research team some of the estimates of profitability and quasi-rents that

we've generated in the South Atlantic, but our stuff is -- You know, we're doing annual data at the Center, and it's just -- It's only a few years' worth, and so they needed historical data, and so that's one of the reasons that that's not included here, the stuff that Chris Liese has generated.

Are the methods to treat the frontier gap appropriate? I think -- Did we go through some of that? Yes. Okay. How about the third one, describing the revenue and risk change? Did we go over some of that or not? Is there any comment that we have on that? John.

DR. WHITEHEAD: I just typed up the basic results that they presented.

DR. CROSSON: Yes. We've been very critical, and do we have any recommendations for improving things? Okay. How about this last question, and do you think the council could use this information in management? That one we definitely have not discussed. Andrew.

DR. ROPICKI: You know, I don't want to seem like I'm picking on it, because, I mean, they noted, you know, some really good economists have published on this, like Jim Sanchirico, and, I mean, I'm not lumping myself in with good economists, but I'm a co-author on a paper that used portfolio theory in fisheries, and, since then, I've -- I mean, I have strong reservations about using this. I don't think it's a good fit, and I think there's other stuff out there to look at kind of the benefits of diversification, and there's one, and it didn't use portfolio theory, but Ray Hilborn, and I'm sorry that I don't remember who the lead author was, and I just remember that Ray Hilborn was on it, but looking at salmon fisheries in Alaska, and he did some really interesting stuff on the benefits of diversification without trying to, you know, take this square peg in a round hole approach with portfolio theory. I have reservations about it, is what I would say, in using it in management decisions.

DR. CROSSON: They also have -- In Alaska, I think they do a lot of much more frequent updates for the stock status, compared to the way we go through our SEDARs, and nothing is in sync in the Southeast, and so that's another issue that we come up with in looking at this in our region. Anyone else on the committee want to comment on this? If that's it, I think thank you for the presentation, for everyone that was on.

DR. CADRIN: Thank you, Scott and the committee, and we'll look forward to seeing most of you on Thursday.

DR. CROSSON: Okay. I didn't realize it was on the SSC agenda as well. Okay. I guess, if I have more comments, I will give them to you on Thursday then, Steve. All right. Thanks. I guess, at this point, we were talking about what to move on to next, and you think maybe I should do my presentation? All right. Do we need to -- Let's take a five-minute break, to stretch, and, at 9:40, we'll start back up again here.

(Whereupon, a recess was taken.)

SEFSC RESEARCH ON RECREATIONAL DISCARDS OF RED SNAPPER AND OTHER SNAPPER GROUPER SPECIES

DR. CROSSON: Okay, and we're going to resume. I'm actually next up on the agenda, and so this is more of an informational presentation, but I just wanted to keep everybody alert, because this thing really got rolling after our last meeting a year ago. I am presenting this, but there are a lot of other people that are involved with this.

I am the PI for a project that's being funded internally through NOAA that is trying to address the discards issue in the South Atlantic region, which we all know is problematic, and so one of the things that, after years of going to council meetings, going to SSC meetings, and listening to everybody being increasingly frustrated about the number of fish that are being dumped back overboard, and also working closely with the people from Beaufort that do the stock assessments, I thought there was a need to try and sync-up a lot of this stuff and try and address the issue systematically.

This is a bit different from some of the other presentations, and I am not addressing this necessarily at an ecosystem level, but I'm just trying to get it so that a lot of the information, the way we're calculating discards, is more in in-sync with what's actually happening out there on the water, and so there's a couple of aspects of this project.

One is that we want to -- For the data needs, we need to improve the discard estimates we have for reef fish in the snapper grouper fishery. We have -- From the recreational side, obviously, we have MRIP data, and all the revisions that have happened with that, and, on the commercial side, a subset of the commercial fishermen have been required to fill out a discards logbook, for quite a long time. However, the compliance with that has been falling over time, and a lot of fishermen are either not turning in their discard estimates, or they're turning in zero as the discards, which we know cannot be the case, because the regulations have been increasing dramatically over the past fifteen years.

We have hired a recent graduate, up in Maryland, and she's working for us as a contractor, going back through those discard estimates and trying to fix that, and so that's one of the things that we're doing, and the other is that we're trying -- We are building a model that will try to show the biological and economic effects of lots of different regulatory systems that you could use in the South Atlantic for the snapper grouper fishery, and the goal of all of these is to try and increase retained catch, all right, so that people are not dumping so many fish overboard, and they're not dumping 90 percent of their catch back overboard and dealing with all the bycatch mortality or something like that, and so it's trying to analyze what are the tradeoffs that are going to go through that.

The people that are working on it with me, and this is the technical members of the workgroup, and we actually have kind of pulled in more people than this, but Rick DeVictor is the chair, or the Branch Chief, for the South Atlantic Region at SERO, and so SERO has been working on this, and so we pulled in Rick as our link over to the Regional Office. Erik and Kyle, you all should know, from the Beaufort Lab, and they're both stock assessment scientists, and Erik is the head of the group up there. Genny Nesslage, of course, from the SSC, and Chris Dumas from the SSC, a stock assessment and economist, and, of course, myself, and I'm the PI, and I'm a Science Center economist, and I'm also on the SSC, and so I've got a lot of different oars in the water on this project.

What happened was, last year, we met in Beaufort. Those people that I just listed, we met in Beaufort, along with -- We had members of the whole stock assessment group from the Beaufort Lab that kind of were wandering in and out for different portions of this, and we met for a week straight, and we had basically brainstorming, and we talked about post-it notes, the way people were utilizing them, and we had a virtual board up with post-it notes, that we were kind of moving around and talking about different ways that we could manage this fishery, all right, and so what are some of the different ways we could look at it, and so that was a week long.

Then we managed to get a contractor hired, and she's been working and going through and trying to develop statistical, defensible methods for changing the commercial discards information to probably better reflect reality, and so that might be looking back at the historical data and seeing when compliance rates probably dropped off, and trying to calculate how you might change that, how you might weight things differently, and we're looking at other regions, you know, that are near us, or something along those lines, and so that's -- She's working on that concurrently, and then Kyle Shertzer and I have been working closely on doing a biological model that will incorporate a lot of these different aspects.

What do I mean by this model? What this model does is we're starting off with -- Red snapper, of course, just kind of a hit of peak, really quick, and became the focus on this, but we want to have a model that will show -- Right now, the way that we regulate the fishery, for the snapper grouper fishery, is we have a different -- You know, we have a different catch level that's set for maybe black sea bass or red snapper or what have you, and then, you know, we estimate that there's a certain percentage of those that are being discarded back overboard, and then the management system is not really incorporating the fact that people are catching those species concurrently, and so we want to try and sync-up a lot of those estimates of discards at the same time, and then we want to see what would happen if you were to do some sort of alternative management system.

Red snapper is very important right now, because, for the members of the committee that are not aware, the red snapper is overfished, okay, and overfishing is still occurring, and the overfishing that is occurring -- Even if you were to cut the allowable retained catch back down to zero right now, the estimates from the model, the stock assessment model, are showing that overfishing will still occur, okay, even if you set retained catch to zero, because red snapper are encountered in lots of other snapper grouper trips, and so there has to be some way to address that issue.

We have a model that's basically -- We have divided up the South Atlantic coast into different regions, both shallow and deep, okay, and going from the Carolinas all the way down to south Florida, and we've incorporated information about the species distribution across that region, and then we have a model that basically shows you what would happen if say you closed this area for retained catch, what would happen if you closed this area for any allowed fishing on the bottom, okay, which definitely change the way the discards -- It would hopefully, you know, minimize the discards, to an extent, and what happens if we throw a lack of compliance into that model and sort of put that in as noise, and how would the different stocks respond to this?

Time and area closures is easy to -- It's relatively easy to model, but it's politically not very palatable to a lot of people, okay, and, especially with red snapper, it might require pretty large areas to be shut down, to get out of the overfishing situation, and, of course, economically, it's not something that would be optimal probably either, and so -- But it's something that the model can do.

What we also can do with the model is show what happens if you decrease the amount of fishing activity, either commercial or recreational, right, and, to do that, to get some sort of effort reduction, it would require changing the way that management works, and we've heard fish tags being knocked around in the South Atlantic region, and, many times over the years, this committee has looked at them, and it might be something akin to days-at-sea, where anglers -- You say that anglers get a certain number of days-at-sea that they're allowed to go out and fish for snapper grouper, and, if you're not using one of those up, you're not allowed to go out there and fish on the bottom, because, again, we're trying to -- The goal of this is to minimize discards.

We have a model that is basically going to show that, if you were to say reduce the amount of effort from some sort of individually-oriented management, using some sort of individually-oriented management system, and we're focusing primarily on recreational, because that's the bigger component right now, because the recreational -- The amount of recreational fishing activity has increased so dramatically in the South Atlantic, and that seems to be the big pressure point.

If you were to do that, how would the stocks respond, and how would they rebound, and how would that increase the amount of potential catch that people could retain when they are actively fishing, and how does that tradeoff work, and so that's what we're kind of getting into the nitty-gritty on right now, and, again, the goal is to sort of just figure out how that system might work and to present a whole suite of different options to the council to consider how they want to manage this fishery in the future, because, again, the goal of this is to turn discarded catch into retained catch, because too much of the way that I think the system has been approaching this, for quite a while, has been all -- I guess basically all stick and no carrot, and we're trying to show that there are tradeoffs that can be made if you want to increase retained catch, but you have to recognize those tradeoffs.

It's not a -- Again, economics says there's no free lunch, and there's no free lunch here, but we also did notice that, you know, there's things that are, from an administrative point, relatively easy to do, because of the way the legal system is set up, okay, and time and area closures can be done, under Magnuson, without too much change. Unfortunately, it's very punitive on people that live in those regions, and it's not particularly economically efficient. That regulatory ease has a tradeoff against what people actually would like to be able to go out and do on the water.

What we called angler freedom, which is the freedom to go out there and fish, and, when you do fish, keep the fish that you are catching, and that's more difficult to implement, okay, but probably it would be much more economically advantageous and profitable for the people that are involved, both recreational and commercial.

Eventually, this is going to have to be a multispecies output, because so many of the major species that are undergoing overfishing right now are caught concurrently, and we are starting with red snapper because red snapper is the hottest topic right now and because the situation with red snapper requires something to be done to reduce discarding beyond just forbidding people from retaining red snapper, but the first species that we threw into the model is red snapper, and we're kind of playing with that right now.

We tried to limit it to some of the major ones that are -- A lot of these species, will you notice, are undergoing overfishing right now, or are overfished, and black sea bass, the stock assessment that

the SSC is going to look at this week, is just not good, all right, but red snapper, black sea bass, red grouper, and gag has got an overfishing situation, and red porgy does as well, and those are the major ones that we wanted to throw into the first group, because they tend to be caught concurrently, and they're all assessed species, and they all have had high landings, or have had relatively high landings, and also relatively high discard levels, and so those are mostly more of the shallow-water species.

Then, later, we want to add a deepwater component, to look at like snowy and the tilefish. As long as the first one is relatively well received, we're going to dive into that, and the species in the deepwater -- The barotrauma that especially those species undergo, when they're brought up to the surface, is usually lethal, almost always lethal, and so they're going to -- They would have to be managed somewhat differently than the ones, you know, in the shallow-water complex, where, if you're fishing below a hundred feet of water, in something more shallow than a hundred feet of water, so that there's certainly much more of a possibility that fish will survive being brought up from the depths.

Again, this is very informational, but, right now, the council is aware of this, and FWC is aware of this, and I'm trying to spread the word on this, but there's going to be an opportunity for research to be done along the lines of what we need to help fill out our model, okay, and so there's two things that we need to help make the model more complete.

One is that we need -- We don't have a really great idea of what the recreational catch composition would be for anglers across the coast if they didn't have all of the different regulations that they have right now, and so, in order to model this out properly, from the biological side, you need to know what people would encounter and bring home, and so we want to have some research that's going to basically allow people to go out and do some bottom fishing, through a research plan, that would require some sort of retained catch, or some documentation of exactly what's coming up out of the water.

The second, and this is probably going to be very exciting for a number of you, is that we want to have an actual experimentation with fishing tags, and those tags would basically -- Or it could be something else, but probably tags would be the easiest one, and it would basically allow people to out fishing, including for red snapper, and they would have to tag it when they catch it, and the only way they would be allowed to -- I mean, it would be a requirement for being part of this program, part of this exempted fishing permit, would be that you would be only allowed to do that sort of bottom fishing if you were using the tags.

When you run out of tags, you're done with your bottom fishing, and so you're now trading discards for retained catch, and so we would like to get into how the economics of that might work, or how the social aspects as well, and we know that recreational anglers have heterogenous preferences, and some people like to fish a lot, and they get a lot of enjoyment, but, with bottom fishing, there is certainly a lot of people that like to keep what they bring up, and I think that's probably -- You know, compared to some of the pelagics, probably the focus of bringing up flesh and keeping it, from the reef fish.

Some sort of system where you would be able to distribute those tags and see how people respond is what we want to try and implement, and so I think there's -- There's a lot of acronyms that I am throwing around right here, but one is that there's going to be a request for proposals, which is

something that is going to come out of the Regional Office later this spring, all right, and that's going to be open to -- Later this spring, there's going to be something coming out from the Regional Office that's going to be a request for proposals, and that's the RFP, and so people that -- It can be a combination, you know, of -- I mean, this is the way the legal requirements are for RFPs, but it can be some combination of, you know, state agencies, or higher education, people from the state universities, or the private universities in the region, or the non-profits, but it's basically come up with a system to experiment with this.

If you get funded through the RFP, that will have an EFP, an exempted fishing permit, that would go along with that that you could use for the people that are actually participating in your research program, and so that's something to keep on the horizon. It's still -- We're still developing it, all right, and there's going to be a group of people, including myself, that are going to be looking at all these different proposals, and you're going to be welcome to email with us ahead of time, or call with us ahead of time, before you send something in, because we want to make sure that this meets both the biological needs, from the Beaufort team for the assessment model that they're developing, and also for economics and for management, you know, the side that we're talking about, which is changing different types of ways that people approach their fishing.

I have on there the way that they're scored, because I was asked about this, and this is the way that RFPs are usually set up, is that there's a technical scientific merit, and looking at the priorities list, and so that's the kind of stuff that we'll be judging it against, okay, but it's got to meet -- I'm trying to make it not too complex, but it's got to be -- It's got to be basically addressing both aspects of that we need, the biological side and the economic side, or the management side, whatever you want to call it.

This is an example of a -- This is not -- I am not telling you to go out and do this, okay, but this is an example of the methodology that we would come up with for looking at this. It's like we're doing to do a study, and we're going to allow 500 participants, recreational fishermen, and we're also looking for the commercial side, for the commercial component, to be fair, but this is concentrating on the angling side right now.

If you had 500 participants in a study, and you wanted to do a one-year study, maybe in 2024, a group of them, you know, 250 of them, might get a bunch of red snapper tags for the year, and, every time that they go fishing, if they encounter red snapper, then they have to tag it, and then, when they run out of tags, they are done their bottom fishing for the year, and they're only allowed to -- You can put this in the requirements, that they're only allowed to go bottom fishing, and one of the things that you would probably have to address is compliance issues, but, you know, they're only allowed to do bottom fishing under the auspices of the program, okay, but they're allowed to keep what they catch, and they also have to some sort of mandatory retention, or at least some sort of documentation of what's being brought up out of the water.

Then another group of them, you know, would be your control, and they would have sort of like a mini-season, the way that things have been running frequently in the South Atlantic region for red snapper, and then you would be collecting a set of data, both the biological and economic, or social science, looking at how these programs run. That's the sort of thing that we would be looking for, but that's not the only way to do this, but that's kind of an example of the things that we have.

I think the next slide is the last slide, and so questions that you guys might have, because I think this is very exciting, because this committee has looked at this issue so many times over the years, but there's an opportunity for this, and the Regional Office and the Science Center are very much behind this right now, and so, Jennifer, you look like you wanted to say something. No? Okay. Kevin.

DR. HUNT: Since I'm just walking into this, and you guys have been spending on your time on this, and, you know, like Objective 2 just begs for like a choice of experiment, and has that been done, like where you present anglers that here's Trip A, under a permit-based, and here's Trip B, and so like what is the expectation, going in, for the tags?

DR. CROSSON: We can do these things, and, I mean, there's people in this room that have done choice experiments, and we frequently do these, as, you know, basically stated preference models, where people fill out surveys, and here's Trip A, and here's Trip B, and which would you prefer to do, and here's what you would spend, and here's what you would catch, and this is looking to -- We have that under -- These are theoretical questions, and stated preference models have a great history, and they've been compared to revealed preference stuff, and they are very accurate, but this is stepping it up one more level. This is actually going out there and experimenting and seeing what comes out of it.

DR. HUNT: But we have no idea what they think about it, going in.

DR. CROSSON: No, I don't know, and, when I've spoken to FWC -- When I spoke to staff from FWC, one of the first questions that I asked was would people actually want to do this, and are there people that would actually want to go fishing like this, and I don't know. I think so though, because, again, I also believe that there's quite a variety of anglers, and they all have different fishing activities and preferences, and so I believe that some of them would like to do this, especially after listening for years about how many people really want to go out and keep red snapper and not have to do it on a two-day mini-season.

DR. WHITEHEAD: That's a great recommendation, and I don't know of any stated preference choice experiment study that has looked at management regimes. They're usually all focused on valuation and catch per trip as the attribute.

DR. HUNT: My old mentor and one of his grad students looked at it with no economics, and it was just the management tradeoffs, and that -- But you have like management tradeoffs here, and there is experience, and, you know, this is going to change the experience, and so any trip scenario would say how is this fundamentally going to differ from what you're used to, and that, you know, could be involved in a choice -- I just think that would be real interesting, but that like would not be part of our RFP? Would you have internally NOAA do that?

DR. CROSSON: I'm an economist, and so I tended to focus on a lot of the economic aspects, and looking at also behavioral changes, okay, real changes, the way people fish, but there is a huge social side to this that I haven't brought up, which is how do people feel about fishing like this, because this is different. This is a very different thing to do, and, you know, it's more akin to like the tags that they use for big game and a lot of other stuff. I mean, it's not quite the same, but there's a lot of similarity there, and so I'm very curious as to how people would react to this and

how participants in this would react and how that might socially sort of work its way through the population afterwards. Jennifer and then Brian.

DR. SWEENEY-TOOKES: So, as someone who has sat next to you, hearing all these years about how much people would like to keep some snapper grouper, I think this is a great idea to explore, and I did want to just echo, and emphasize, that there is a huge social component to this, and so, as those proposals roll in, I hope that will be something that's really acknowledged, and emphasized, in the choices.

DR. CROSSON: Brian.

DR. CHEUVRONT: Following up with some of that social component of it, I think, with doing a study of the tags, people -- The pessimist in me says that people are going to say, sure, I'll stop fishing when I fish up my tags, and how many times have I been fishing, and how many times have I been stopped by an officer or something when I've been fishing, and it's a big old goose-egg, and I could tell you right now the temptation to continue on a fishing trip, if you don't have any tags with you or whatever, and how are they going to know whether you're in this program or not, and you're going out on another fishing trip, and they don't know whether you're whoever, and you don't have any red snapper onboard or whatever, because you've thrown them all back, and you've just got some black sea bass or beeliners onboard, and, I mean, the temptation is going to be really great to continue fishing, and so I think the compliance component of any kind of proposal for this is going to be really, really huge.

This is where I think you really do diverge from big game. If you've got an elk tag, or something like that, you're going to go after an elk, and you're not going to stop and shoot a turkey, you know, just because you can't have an elk, and it's a lot different, and so I think that's going to be a huge hurdle, if you go with tags, and I've always liked the idea of tags, or some kind of a snapper grouper, a separate snapper grouper, type of permit, and I think those are things that the council probably really ought to consider, with some input from the SSC and SEP, for the future.

I don't think that that's been fully fleshed out yet, at least in my experience, but there's some big hurdles that are going to have to be overcome, and so I really hope this RFP brings in some information to help you all get through that, but it's a really high hurdle.

DR. CROSSON: I have two comments to this, and I agree that this is a really high hurdle. One is I spoke to FWC about this, and the FWC staff, and they were really intrigued about this, and one of the things that I brought up for them is that, in Florida, if we were, for example, implementing this, through FWC, maybe in conjunction with academics, they would -- They have a certain amount of control with the fishing licenses, because you have to have the add-on for the snapper grouper. I think, if you're fishing in the snapper grouper fishery, you have to utilize that add-on to their recreational fishing license, and I'm not sure if I'm correct on this ,but -- It's self-selected, because, right now, it's done for data collection purposes, that they have a group to sample.

That might be something that you could tie into that, and the second one is, and Fred Serchuk is in the room, and so he might remember this, but Scott Steinbeck, who is an economist up at Woods Hole, a number of years ago, did a -- It wasn't a contingent valuation, but it was revealed preference, but he basically paid people not to go fishing for a year, right, and they had to surrender

their fishing license, and I understand that this was slightly controversial when it happened, but they generated some really interesting data out of this.

I'm sure that Scott has some issues, perhaps with compliance, but people, you know, had to deal with their fishing licenses for this, and so it was something that was -- Of course, he offered people a variety of different price points to consider surrendering their fishing license, so that he could build, you know, a frontier. Go ahead and then Chelsey.

DR. CHEUVRONT: Just to follow-up with that, the other thing, in the discussion you were talking about, is the logistical aspect of that is who is going to pay for dealing with these tags, and, you know, the states are going to balk at it, or at least some of them will, because they're going to look at this as a federal issue, and the states are going to say we don't have the money to pay for this, and then the federal side is going to say, you know, what are we going to -- You know, how are we going to be able to pay for this, and we've got limited funds as well, and so, if you want us to do this, that means we have to take money from something else, or something else like that, and so it's going to be a difficult -- A heavy lift, one way or the other, even to get it funded, if we can come up with a solution.

DR. CROSSON: One is the Regional Office does have a lot of money that they're -- A fairly good chunk of money that they've applied to get from Headquarters for this, and so I would have a lot of support coming from the Regional Office, and then -- Actually, I will just pause it at that point, because Chelsey has a question.

DR. CRANDALL: Two things. One, in reply to the compliance conversation, it seems like that could also be built into the study as a question, on whether people do stop fishing, especially if there are no repercussions, and like that would be interesting. Did you stop fishing, or did you keep going, or why, but I was actually thinking about that study that you just mentioned, and is there a plan on how to communicate why only a few people get to do this, when it comes out, because I would imagine there's going to be folks that say, hey, why do they get to go fish with these tags, and how did they get picked, and why don't I get to, and -- Or is that kind of on the researchers?

DR. CROSSON: That's why I want to hand it to a researcher. No, but it's an important question. I mean, it's -- Any time that there's EFPs, there is going to be controversy about who is allowed to go out and utilize them. In the Gulf, they did one for the charter vessels, at one point, I think, for red snapper season, and I know there was some controversy over that, and so, yes, that's an issue that's going to come up.

I mean, the point of this, originally, is to generate data, okay, and we need a lot of that data, and so it's got to be done in a way -- It should be also that you don't want to just do a program -- There's a couple of things. You don't want to do a program where you're just sort of getting the people that are most hopped-up to go out fishing, because, like Scott Steinbeck's project, and he wanted to get sort of a better distribution of anglers, and so it probably should be some sort of randomized components, the way you're distributing these things, because some people are going to -- Some people probably will take -- You know, they might get whatever, ten tags, and they usually only take two or three trips a year, and so that's perfect for them.

Some people would run out of them really quickly, and so you would want to have some idea of how that distribution occurs, and so it is definitely something that people would be curious about, because I imagine -- Again, I'm always asked, you know, do they think they really want to fish this way, and my answer is like, yes, I think there's a bunch of people that really want to fish this way, and so we want to see how many of them there are. Andrew.

DR. ROPICKI: Can you go to the second-to-last slide, real quick? I know it's just an example, but I had a couple of thoughts on it. The first thing is these tags, and I would -- When we put out an RFP, I would tell everyone who is applying to be as aggressive as they can in data collection, because there is value to this, and, I mean, these people should have an app, to tell you when they're going out, and it should track where they're going, because you're giving away something super valuable here, and you want as much data as possible, so they do that.

The other thing I would do is the -- For the 250 in the treatment that are going to get these tags, and think about separating them into two different ways, because, the way you have it right here, you have they're just red snapper tags, but they have to keep anything else they catch. Well, if red snapper, to me, is the gold standard, and I know I'm going to catch them as bycatch, 125 of them I would send out under these rules, because they're going to actively try and avoid red snapper, knowing that they will catch them, but they are going to get to keep whatever else they catch as well. Another 125, I would give them harvest tags for any bottom-dwelling fish, and when they -- You know, they had to keep whatever they pulled up among these reef fish and see how -- Because they are actively -- That group is going to target red snapper, whereas the other group is going to try and avoid them, I think.

DR. CROSSON: Yes, and I think that's a fantastic idea, and the idea of a multispecies tag for -- Again, you have this many -- You get to keep this many snapper grouper species per year, and I think that's a fantastic idea, and, yes, the incentive system for just the -- We've kind of gone back and forth about whether you would prefer to have a multispecies tag or just a red snapper tag, and, like you said, they have very different incentives that they put in for anglers, and it would be a problem if people were just like, well, I'm not going to go fishing anywhere there's red snapper, and I'm just going to keep everything I catch, and that's a problem also, and so that's something to bring up, but, yes, I am in sync with the way you're thinking though on this. I knew that I wasn't going to get out of here without council staff asking me something.

MR. CARMICHAEL: Apologies if you answered this, but so, the 500 people in the study -- What about the other hundreds of thousands? I mean, does it mean that these are the only people that can catch red snapper, and, if you don't participate, you don't catch red snapper, but you can still bottom fish, or is this the universe of people bottom fishing during the study?

DR. CROSSON: Well, this depends on what happens for the fishing season in 2024, all right, and that's actually one of the questions about this, because, if there's a general mini-season in 2024 for red snapper, then that's your control, and then you have a select group that's not using that, and they're instead using the tag system, but, yes, that's still kind of up in the air, I agree, and, again, I'm throwing out -- I threw out 500 participants, and the big question about this is how many people you would want to utilize this program, because, if too many of them are distributed -- The big question is the N, okay, the number of participants that you have and the number of tags that you're going to distribute for them, and so that's a big unknown.

Again, I knew, as soon as I put an example up there, that people were going to start ripping it apart, which is fine, and that's why you put it up there, okay, and I'm not saying it's 500 participants, and maybe it's, you know, 5,000, and I don't know, right, and there is obviously some sort of tradeoff between the amount of tags that you would distribute and the number of people that are allowed to participate in the program, and so that's to be determined, but, yes, go ahead.

MR. CARMICHAEL: When you say "participants", you're saying snapper grouper fishery participants and not red snapper participants?

DR. CROSSON: That depends on -- Well, yes. More comments? Brian.

DR. CHEUVRONT: But I think the bottom line is here though, Scott, is you're going to be able to -- By doing this, you're going to be able to get a lot more information that is currently not out there, and so you're hearing our nature, by the people sitting here, is to think through this thing and be critical, but I think, no matter how this is done, you're going to get a lot of information that is not already available, and so I'm thinking that this is going to be a positive outcome, no matter how it works out and how you do this, and it's going to move this forward, and you're not going to get all the answers to all the questions, in spite of all the things that we're all raising and stuff here, but I think this is going to, in the long run, provide the council with some really good stuff, and I really hope there's going to be some nice things.

I mean, I know, from my experience fifteen years ago, the council was talking about time and area closures, based on red snapper, between 100 and 240 foot depths, all along the South Atlantic, and it was very unpalatable then, and I'm sure it would be now, and the council completely walked away from it, because it was so difficult to deal with. They're facing it potentially again, and you're being creative, in looking at new ways to try to deal with the issues, and I think this is a great step.

I think, in the long run, this is really going to help give more tools to deal with the issues, and so I commend you all for doing this, and I can't wait to see what the results are going to be, and hopefully, a year from now, you will have studies that are ready to go, and I can't wait to hear about it, and so thanks for doing it.

DR. CROSSON: I mean, the council has been presented with information, in their briefing books at any rate, about different potential time-area closures, because they're trying to deal with the red snapper issue, and they're extremely palatable, okay, to the council, like extremely, and so, you know, something is going to have to be done in addressing this issue, and so red snapper is right now -- But there's the black sea bass assessment that we're going to be looking at later this week at the SSC that is just not good either, and so I was surprised at how bad it was, when I looked at it, and so we'll see what the SSC does with black sea bass, but so many of these species are in trouble right now, and so I'm hopeful, but we'll see.

DR. WHITEHEAD: I just wanted to emphasize that Brian's comment was well said, and I hope that, in our report, we can emphasize that the SEP is behind this study, and it should be taken seriously by the -- The SEP is behind it, and it should be taken seriously by the SSC and the council.

DR. CROSSON: Can you go down to the last slide again for a second? Okay. I think that's all I had for this one, because it's still -- I'm not part of the Regional Office, and so I don't know too much beyond that, and I've been giving a lot of input into this, but the legal process for RFPs, and EFPs, is way beyond my expertise, and I get surprised in new and interesting ways regularly. Okay. Thanks, all.

What do we have left on the agenda? Chip is going to go over the research recommendations, and then John and I want to have a discussion with you all about recreational fisheries and economic analysis, because we are going to be in -- It's in Tampa, I guess, but John and I are going to be part of a meeting next week in Tampa about recreational fisheries and economics and the way that the different regions utilize it, and so we want feedback from you all, because they want to know what we think, which means they want to know what you all think.

MR. HADLEY: John will be there, too.

DR. CROSSON: John is going to be there as well? Oh, excellent. That's right. Okay. Good. Chip.

FEEDBACK ON SAFMC RESEARCH RECOMMENDATIONS

DR. COLLIER: Thank you. What we have presented here, it's Attachment 6, and we're calling this the draft research and monitoring plans, and what we've done is pulled towards some of the socioeconomic priorities from the main plan, which is after the blue text, or after the yellow text, and so you'll see it on page 2, this yellow, and that's going to be the full research and monitoring, but we're really looking for your comments on the first part.

Why we're looking at this is the MSE requires the councils to develop a research and monitoring plan, that is developed in conjunction with their SSC, to identify fisheries, fishery interactions, habitats, and other areas that are necessary for management purposes, and so the research priorities shall be established for five-year periods, and that's why you're seeing that five-year time period. It's updated as necessary. The way that we've interpreted that, in the South Atlantic region, is doing it every two years, and so, even though it's developed for a five-year time plan, we come back to the SSC every two years, to make sure that our research and monitoring plan is current, and then we submit this to the Secretary and to the regional Science Center.

What our approach is now, we're taking a bit broader approach for this, and we're trying to get input from all the APs, and not just the SSC, but we're trying to get input from the Snapper Grouper AP, the Mackerel AP, all the APs that we have out there, Habitat, to make sure we're getting all the necessary information. Steve and Jason's presentation today gave an indication on the need for information for ecosystem-based fisheries management, and I think the SEP is ideal for providing some of those concepts. Some of those social and economic priorities could definitely address some of the ecosystem-based fishery management issues that we're having, and then, going forward, some of this information can be pulled forward into maybe management plans, to better describe what's going to happen in the future and how management might impact that.

Once again, in Attachment 6, we've identified issues, moving forward, that have been put together, and our goal is just to make sure that these issues that were seen as priorities right now are really

the priorities for the fishery, as you guys see them, and think about it three to five years down the line. As we're looking into it, are these going to be -- Are these going to help us in managing these stocks, and so just think in a broader context and not getting like detailed individual research questions, but broad topics that can be put forward for regional management. With that, John or Christina, if you have any comments, before we get into the actual ones.

MR. HADLEY: No, and I think that summarizes on the econ side, and it sounds like social as well.

MS. WIEGAND: Roll on, Chip.

DR. COLLIER: All right, and so we have a list of eight priorities here. The main bullets, the non-filled-in circles, the first one is to evaluate the cumulative economic and social implications of existing regulations on the multispecies snapper grouper fishery, provide updated estimates of recreational economic values for council-managed species, and there is four sub-bullets in there. Develop estimates, or models, for the responsive angler behavior to regulation changes.

Develop an economic impact model for the South Atlantic headboat component of the for-hire sector. Conduct economic analysis on the capacity of the commercial snapper grouper fishery and develop net revenue estimates generated from the sale of council-managed species. Develop a study to quantify current and baseline access to fishing infrastructure throughout the South Atlantic region, and then develop a socioeconomic profile of commercial and recreational participants in the council-managed fisheries. That is the list we have. If there's any additions, any concerns with some of those, and I'm not the expert on this, and John and Christina can respond.

DR. CROSSON: I'm going to bring it up, because I've brought this up many times, and the first one, and compared to what? I mean, what's your starting point, and what's your -- You say evaluate the cumulative effect of all these different regulations, and how far back are you going? Are you comparing to what the fishery looked like in 2005, or are you comparing to some sort of idealized version of what the system might look like? I mean, there are so many different regulations that have been put onto the snapper grouper fishery that disentangling them --

You know, we used to have what we called the Jim Waters model, right, that was built out of SAS code, and, every time that there would be a change in regulation, Jim would update it, and then it would try and show you how the changes in behavior would react, but, eventually, the code got too unstable, because there were so many different regulations that were going in that it just became -- Then Jim retired, and so then it was definitely not feasible anymore, but, every time, I look at this, I'm just not sure what the standard is that you're looking at, because there's this question about the cumulative implications.

I think Chris Liese has presented to this SEP, and to the SSC, and I think to the council as well, what the situation is with the economics of the commercial fishery, which is that there is -- Once you account for opportunity costs, there is really no economic profitability left, because of the situation with just overcapacity and trip limits, and especially trip limits are causing just an overuse of fuel, and probably a little bit of extra labor, but mostly just people are being managed to the point of indifference, in an effort to control overfishing, or keep things within the ACL, and so that's -- My answer to the first one is that you would look at the lack of economic rents, and you would look at the lack of economic profits, and that's the cumulative effect of all of the different

regulations that are on the commercial side of the snapper grouper fishery, with the exception of wreckfish, which is managed differently, which actually does have very good profits, but the rest of them -- That presentation that has been given several times is in the second round of review at a journal right now, and so hopefully that will be out in publication pretty soon.

DR. WHITEHEAD: I thought you said the journal name, and I didn't catch it.

DR. CROSSON: No, and I didn't say the journal name. I will wait until it gets accepted before I tell you what the journal name is.

DR. COLLIER: So, Scott, are you indicating that we should remove this?

DR. CROSSON: I mean, I would say it's been answered, and so I don't know another way to answer it. The only way I can answer this -- I mean, from the economic side. The social side, I don't know, but, from the economic side -- If you're talking about for the commercial fishery, it's been answered. For the recreational fishery, I guess it's not answered, but, commercially, you know what the implications are of the existing regulations. It's been -- I don't know how much more clearly it could be shown than what Chris Liese has done with his project, because a lot of that is just census-level data, and he's showing that there's not any economic profits from the commercial fishery overall.

There is a lack of rents, and he compares it -- He also has compared it to the ITQ system in the Gulf, which is a very different management system, where they do have very healthy profits, and so I think that's the cumulative effect on the commercial side. The recreational side, again, I don't know what standard you're comparing it to, because that's always been the unanswered question for this, looking at that. Any time I look at that, I don't know how to answer it, because I don't know what I'm being asked to compare it to. John.

MR. HADLEY: I think I agree with those comments, and maybe it needs to be calibrated a little bit more, and so maybe point out the recreational side, if that would help it, and then maybe try to put some sort of timeframe on there, ten years or twenty years, something like that, so there is a -- You know, here's the ideal baseline scenario, and, you know, here's how the fishery has changed over that timeline.

I think this first bullet -- It is a holdover from previous recommendations, but it's something that we hear a lot from fishermen, since we tend to analyze the different fishery management actions on a species level, or maybe a few species at one time, whereas we hear from fishermen that, well, you need to look at the bigger picture, and so I think that was a little bit of a context for that, but it can definitely be sharpened up and kind of, you know, a little bit more pointed on what's being asked.

DR. COLLIER: As I refine this, it would be, you know, evaluate the cumulative recreational, economic, and then social is for both commercial and recreational, correct? Then just define a time period? Okay. Any other issues? We've got eight others there.

DR. CROSSON: On the second one, I don't know -- I haven't seen it in a while, but I believe the Regional Office was trying to generate a list of all of the different economic values that have been used for recreationally-caught fisheries and track that, you know, both the ones that have been

done by NOAA or the ones that are in economic journals that have been done by academics or by NOAA staff as well, and I know that the regional office utilizes a list, sort of that they have to have, because they're dealing with all the different amendments, and so I'm sure that John has seen it before, but, yes, you just -- The first step is just what's going on right now, which is just trying to track all the different stuff that's being utilized and how recent it is and all of that different stuff.

DR. HUNT: I think you -- This is a question, and the fourth bullet in that second thing, the updating, and that was a question for, I guess, your discussion later, and I think it is necessary that we update them, because that is what I think your further question was, on the next thing, and I just did a study, twenty years apart, at a particular reservoir, Lake Fork, which is a trophy lake, bass fishing lake, and we did the first study kind of in the lake's heyday, where you would expect willingness to pay to be highest.

Well, twenty years later, when the productivity of the reservoir is down, the willingness to pay was through the roof, and so it's like the -- We were trying to explain that, it seems like the anglers self-select to stay in the fishery as the productivity declines and the clientele wants that, enjoys that, and it may be not as much to do with the catch as well as camaraderie, a developed sense of place with this place, and so I don't know if you see that same kind of thing, with people maybe dropping out of the snapper fishery, and the ones who are remaining should have a higher economic value than the ones who have dropped out, and so I don't -- It's a great question, you know, and I didn't look at that, but I've been struggling to try to explain why it was so much greater when the biological productivity was down.

In a nutshell, I think that fourth bullet is very important. My study was looking to update angler expenditures over time, using CPI and PPI, and you can, but how do you update that economic value without doing a study? That, to me, is interesting, because I think we can update expenditures, and our study said, look, we can update expenditures easily, but updating that value -- How would you collect that over time? Thank you.

DR. CROSSON: Go ahead, Chelsey.

DR. CRANDALL: This is kind of a newbie question, and so is one of the questions here do we see anything that's missing, or is it how do we feel about the ones that are here?

DR. COLLIER: Yes.

DR. CRANDALL: Both? Okay. Then, again, first time, and do we want anything here that speaks to some of the things that we talked about yesterday, as far as what's important to different groups in these fisheries, what's important to them to have retained into the future, what are the aspects of it that get into that wellness, wellbeing, et cetera, you know, what other priorities, and some of that may exist already, and we get into the parts of a fishing trip that are important for these different fisheries, but is that something that we might want to include here?

MS. WIEGAND: I would say, yes, absolutely, and we can work on language, based on the discussion yesterday, but I think there's clearly a need to have a bit more discussion on research on angler welfare and well-being and the wide variety of different things that can mean.

DR. CROSSON: Any other comments from the committee on any of these items? Jennifer, that next-to-last-one, you guys were looking at that, weren't you? You were looking at Georgia and South Carolina or just Georgia?

DR. SWEENEY-TOOKES: We are in the process of starting the second-to-last one for Georgia, yes, including not just infrastructure, but also current baseline needs for vessels, for existing functional vessels, what types of repairs would be needed to bring vessels up to like minimum function, versus good function, and the same for the docks as well. We are literally starting this like next month, and so, if anyone does know of any other existing resources on how best to measure these things, we welcome them. I can give you my email, and I would love your feedback, but that's only Georgia, funded by Georgia DNR, and so a best-case scenario is it could become a pilot example of how to do it across the region.

DR. CROSSON: North Carolina -- At one point, North Carolina Sea Grant was doing this, right, and Barbara Garrity-Blake was working with -- I forget who, but there were several people, and they kept tracking it, all the different infrastructure there. Brian.

DR. CHEUVRONT: Right. I think, at some point in North Carolina, they did both of the last two things, and they were doing the -- Basically, it was the community profiles and looking at, you know -- Doing it maybe not necessarily by individual participants, but by looking at sort of the economic profiles, mostly of commercial fisheries, more so than recreational fisheries, but there are some data out there, and I just don't know whether anybody is keeping this up, and so maybe the way to start is to look to see what is still out there, how old it is, and does it still need to be updated, and, I mean, is somebody else already doing this, and so, before you decide whether you really need to keep this in, you might be able to refine this by looking -- Just doing a quick -- You know, maybe a couple of phone calls to contacts, to find are these data currently available, are they up-to-date, and I'm guessing it's not throughout the region, and it's not going to be, and so you might be able to refine this a little bit by just doing a couple of quick phone calls.

DR. SWEENEY-TOOKES: Yes, and there's been some really good work, really, really good work, in North Carolina and South Carolina. Some of it has been kept up, and some of it hasn't been revisited in a few years, and those are our first steps, as we've already been in conversation with North Carolina Sea Grant, and with South Carolina Sea Grant, and looking at what's already there, but there is -- Even in what has been done, there are some inconsistencies in how it was approached, and so maybe that sort of unified model is really what the council needs, and hopefully then we can all contribute to creating that, going forward. I didn't mean to not say that there was some great stuff already out there, and there absolutely is.

DR. CROSSON: John.

DR. WHITEHEAD: So, thinking about the highlighted item up there, in the other ones, that has been a research need for the council, and the SSC, for a long time, and so are there ways -- I mean, we've developed these lists for a long time as well, and so are there ways to push that forward, or are these just -- Is this just a wish list?

DR. CROSSON: Brian.

DR. CHEUVRONT: Related to that, John, I was thinking along the same way, just as you were saying that, is that maybe, for a future SEP meeting, that -- This is just a suggestion, but that staff might be able to, on some of these things, as they get a little better refined, could bring us some of the information that already exists, in the summarized format, if possible, and we could look at it, and then we could say, oh, well, here are some gaps that we can identify, and this is what the next step maybe ought to be, and we could be a little more specific, instead of these generalized things.

I mean, I agree with John that a lot of these things have -- I mean, we've had these on the list for quite a while, and it might be more helpful not just for us to make recommendations, but I believe that this list goes to you guys, doesn't it, Scott, but it might also help the NOAA scientists, to help them prioritize and see what they can do to help the council and the SSC and SEP, for the future, if we can make more concrete recommendations, instead of less generalized ones. I don't know, and it's an idea.

DR. CROSSON: I am going to mention something that's not listed here, that probably should be, is wind energy, and there's nothing up here about wind energy, and that's really going to be a hot topic in the next few years, to the point at which my group is going to be hiring a new FTE that is going to be doing a lot of this stuff, and so, if there's something that the council wants regarding wind energy in the region, it would probably belong on this list somewhere.

DR. WHITEHEAD: Back to my question, and so I appreciate Brian's comment, but is it a wish list, or is there ways to move it forward?

DR. COLLIER: It's a wish list, and we try to encourage these items to be included in RFPs for grants that are federally-funded, but, as you brought that up, it made me think, you know, are there certain items in here that the SEP thinks that is most important, and maybe we could highlight those and put those at the first of the list, and just say, you know, these are the ones that were identified in this near-term to be addressed.

Then the full list can still be in there, and not saying that they're not as relevant, but these are the most important ones that the SEP has identified, because there's other ones that are in there, that are in the full research plan, that include stock assessments, and so a stock assessment might be coming up in 2025, and so we need to get the data for that species before 2025, and that's, obviously, going to be a high priority, but some of these other pieces -- You know, we can figure out ways to put emphasis on them, if there are certain items that you think are most important.

MR. STEMLE: I just have a quick question, and is there a specific reason why, on the Bullet Point 4, the headboats, why you're looking for an impact model?

MR. HADLEY: It's just that is something that is usually left out of the economic impact information that's in our FMPs, and so that's why that was added on there, because, I mean, you obviously are very familiar with the model, but, just to explain to the group, that tends to focus on -- Well, one of the main inputs is MRIP data, and so effort data from MRIP, and then the headboat data is separate in the South Atlantic, and so that tends to be left out of the economic impact information in the various FMP amendments, and so that was the reason to put that up there.

MR. STEMLE: If I can make a slight suggestion, and I don't doubt the usefulness of that information, but, for me personally, I'm not as interested in getting an impact model on headboats

as I am in getting updated trip-level economic information, such as gross annual revenue and things like that, and I think the most recent studies that we're using in amendment docs right now are from 2017, and so we're coming up on five years of -- A five-year-old study, basically, and so a priority, for me, would be more focusing on trip-level economics and things like gross annual revenue for headboats, and getting updated figures for that, and that's something that we could put into our producer-surplus estimates, rather than focusing on impact models, and so that's just kind of a priority thing for me, and I would rather see that go first and then develop the impact model after.

MR. HADLEY: I think maybe add a bullet in there that has to revise, or update, trip-level economics on the headboat fishery, and then, lower down, something on economic impacts.

MR. STEMLE: Perfect.

MR. HADLEY: Cool. Sounds good.

DR. HUNT: That said, does that bullet statement refer to the business of it or the users of the headboats, because I read that as economic impact of the headboat component would be how much do people who use headboats spend, from an economic impact, and the economic impact of those dollars to a community, and I don't know if I'm just reading that wrong, but, when I see "economic impact", that's how I'm looking at it, and he's looking at it from the charter, and I'm looking at the rec, and does that include both? Was it intended to include both?

MR. HADLEY: Well, the economic impact component would be for the business activity generated by the headboat fishing activity, and so that's the greater, larger view, if you will, and I think -- Adam, correct me if I'm wrong, please, but the trip level is looking at specifically for the vessel, and so vessel-level economic -- Basically economic metrics on the trip level for headboats and an update of that.

DR. COLLIER: Going back to what John said, are there three -- Instead of giving all eight, are there three that we could emphasize that you guys believe are the most important? I'm just trying to narrow it down, so that we don't highlight all eight.

DR. WHITEHEAD: I think updating the value estimates is a big one, and especially since it is -- It might be low-hanging fruit relative to some of the others, and it's possible to do that with the existing data and a limited amount of effort and generate estimates within six to eight months. This reminded me that, about ten years ago, I did this, and the paper was never published, but it was referenced in some South Atlantic Council documents, and it didn't take long to do it, and I don't want to do it again, but someone else could.

DR. SWEENEY-TOOKES: I think the second-to-last one is pretty important. Without infrastructure, we don't need to worry about pretty much anything else on this list.

DR. COLLIER: Not on this list is Chelsey had mentioned including angler welfare and well-being, and is that something that should be a high priority? I know it's not on this list, but --

DR. SWEENEY-TOOKES: Could that be incorporated into the last point, because this is developing a socioeconomic profile of commercial and recreational participants, but, if we were to incorporate that into that profile, that might be more useful.

DR. COLLIER: Christina is nodding yes.

DR. CHEUVRONT: I would agree with that, because I was trying -- As Jennifer was saying that, I was kind of formulating ideas, and I was thinking heavily on that last one, was a pretty important one, and we need to get more of that social aspect in there.

DR. COLLIER: Right, and so what we'll do, as we draft this and present it to the council, is we'll move the last two up, and bold them, and also move the bullet that John had mentioned up. As opposed to being a sub-bullet, we'll make that its own main bullet, and highlight that as well, and say those are the three main that the SEP recommended.

DR. CROSSON: Okay. Anything else? We're good. Okay. We have a little over an hour, and so we should be able to get this done, and John is going to -- We're going to discuss about the meeting that we have next week, that several of us are going to be at, and, also, when we finish this item, don't go anywhere, because it's picture day. The committee -- It's going to be for the SSC as well, and so there is no -- Whatever picture is on the council's website is very old, and so we're going to take a group picture for this committee after we're done here today. I guess I probably should have warned you of that yesterday, but I just found out. I will give everybody a five-minute break, and you can go into the bathroom and slick your hair down or whatever.

DISCUSSION ON THE STATUS OF AND POTENTIAL IMPROVEMENTS TO ECONOMIC ANALYSIS OF RECREATIONAL FISHERIES

MR. HADLEY: All right. I am just going to introduce this topic, and the idea is just to sort of have an informal discussion here, and Scott teed it up, and I'm going to kind of provide a little bit of context and hand it back over to Scott, but, in general, there's this upcoming recreational economics constituents workshop, and, you know, one of the panels, or panel discussions, is going to include a perspective from an SSC member, and so Scott was the one that was willing to do that and provide a perspective from an SSC member, and, you know, obviously wearing many hats, the SSC, the SEP, as well as various others.

Generally speaking, the idea is to try to come up with a general discussion on the status of and potential improvements to economic analyses of recreational fisheries, and so that's kind of the lens here, is focusing on recreational fisheries, and I just wanted to provide a little bit of context, the general summary of the quantitative recreational economic analyses that are typically readily available on the council side, or readily available and implemented in management, looking at changes to consumer surplus for anglers, and so changes in realized -- Available or realized harvest, and so sector allocations, changes in annual catch limits and retention limits, as well as changes in potential harvest, and so if there's a change in bag limit, and so sort of the change -- How anglers value the change in the opportunity to harvest.

Changing gears over to the for-hire side, we can look at the change in producer surplus and then also change in economic impacts resulting from adjustments in recreational fishing activity, and

so, provided that the inputs are available for that, those are the very high-level -- That's a very high-level look on what is sort of readily available.

Then a general summary of some of the challenges, and this is not the list of all challenges, but just a few to throw out there, and modeling changes in angling behavior, in response to management, and, you know, that's a key part of being able to perform some of those analyses that I just mentioned, and then, also, we discussed this, and it is an SEP priority, but the timeliness of recreational data, or potential quality of recreational data, the timeliness aspect, has been, I believe, a challenge that we've all seen.

Looking at the -- One of the questions that are often asked is are the economic value estimates still valid and appropriate for use, and many of those are ten years plus out, and so whether or not they're still reflective and relevant of the recreational sector, and then, obviously, uncertainty in catch and effort data, and there are certain species that sort of come up over and over again, where the catch and effort estimates are very imprecise, and so how to improve the primary inputs that go into the recreational analyses and then generating the economic value for fish left in the water.

I know, on the recreational side, and it's come up during this group's discussion a few times over the past couple of days, but we hear from recreational constituents that it's very important to have those interactions with fish. For a particular species, there's a lot of value of fish being left in the water and how to tackle putting an actual dollar figure on that, and quantifying it can be quite a challenge, and so, with that, we have a few discussion questions up here, to just sort of get the ball rolling on the discussion. You know, no exact direction that it needs to go, but, with that, I will turn it over to Scott, and hopefully that provides some context for this discussion.

DR. CROSSON: All right, and so you all have seen a lot of these things in council documents over the years, or in NOAA reports, but, in terms of the economic analysis for recreational fisheries, what do you think that the council, and the agency, are doing particularly well? What's stuff that you guys think of, and then what are areas that we -- Let's just tackle that first, and then what are the areas that we need to improve on? I will give everybody a few moments to pause and think. Andrew.

DR. ROPICKI: It is specifically related to how it's used in council business or just what we think?

DR. CROSSON: I mean, that's been the focus of a lot of this, right, in management, but, I mean, there's other values, I'm sure, for this stuff that's being used, but go ahead.

DR. WHITEHEAD: That's tough to answer, because we don't see the fishery management plans, and we don't see the stuff the SSC sees. We see very different things.

DR. CROSSON: John, please.

MR. HADLEY: Well, so let's take it -- Let's broaden the horizon a little bit, and, just generally speaking, you know, do you think that there are some areas of improvement, or what's particularly strong, or what could the committee use some additional work, to go outside of the management realm though, certainly?

DR. ROPICKI: I don't know, and I think there's a lot of value in some of the baseline studies that NOAA does generally that -- I don't know -- I mean, they don't fall within what's on this, you know, our discussion paper here, but, you know, but that big marine recreational angler expenditure study is wonderful, and they do it every five years, and it's just -- It's great, you know, and there's stuff out there that -- When there is the baseline economic data on fisheries, and I think the last one we have for the South Atlantic snapper grouper and the Gulf reef fish is 2016. You know, getting those more frequently, those reports, would be valuable, but that's more me personally, what I would like to see, and I don't know if it's really matching what we're looking for here.

DR. WHITEHEAD: I would go back to my comment on the previous agenda item, and Andrew reminds me that there's a huge effort that NMFS pursues to estimate expenditures, and the data is there for a similar thing with valuation, but it's just that task is just not pursued.

DR. HUNT: So, in that expenditure study that you were talking about, Andrew, they don't collect willingness to pay along with that?

DR. ROPICKI: No.

DR. HUNT: It's just expenditures?

DR. CROSSON: Yes, and so that would be one of the recommendations from the committee, would be to sort of -- Right now, the expenditure survey is done on a regular -- I mean, COVID interrupted it a little bit, but on a regular basis, and it's scheduled, and if the committee thinks there probably should be something like that for stated preference values, or something along those lines.

DR. WHITEHEAD: Revealed preference.

DR. CROSSON: I'm sorry. Well, revealed preference -- Revealed preference from expenditure surveys? I don't follow.

DR. WHITEHEAD: From MRIP and the -- The only other variable you need is income, and that is -- I understand that's collected every two years, or maybe it's every five years, with the expenditures data, and you can do it without income. You can do it with county level estimates of income, to get an estimate of the opportunity cost of time. The data is just sitting there.

I attended this thing in 2014, I believe, and I had a chance to stand up on the end, on a panel with Stephen Holland, maybe, and someone else, and I said the exact same thing, that this is a need, and the data is there, and there should be some resources devoted to it, and it is low-hanging fruit. I am going to be quiet now about this.

DR. CROSSON: Well, the additional FTE that we're supposed to hire at our Center is supposed to be partly doing rec stuff, and so maybe this is something that we're going to task that person with early on, and I don't know.

DR. WHITEHEAD: Okay.

DR. CROSSON: What are some upcoming things that excite you? What are some of the things that are coming down the pike that people are looking forward to? Let me take a look at this question here. Obviously, beyond the project that I'm running. I mean, I took that for granted, that everybody is looking forward to that with rapt anticipation.

DR. WHITEHEAD: The bioeconomic models that come out of the Northeast that I've seen, with the recreational -- With the stated preference choice experiments is really cutting-edge, and I don't know how many of those have been done.

MR. STEMLE: I was about the say the BLAST model. I'm excited for that.

DR. WHITEHEAD: Yes, and, at one point, NMFS was looking to fund one for the Southeast, and the survey instrument was being developed, and then the funding -- There was no funding to implement it the following year, and so something like that for the Southeast would be great.

DR. HUNT: I am just thinking back to the portfolio analysis, and you mentioned that, you know, expenditures get updated every five years, and you can't use this data in that, because it's not continual data, correct, and so is there -- You know, similarly speaking, is there some way to guesstimate, estimate, the intervening years between studies that could give you a time series analysis that would kind of help those people if, for example, that continued, and that is just -- I don't know, and that's why I'm thinking like they do a big expenditure, and I don't know the thing, and so that's the kind of study that I was looking at, and can the PPI and CPI predict that, and, if it can, do you need to do the study every five years, and can you just -- You know, I think you need to update that basket of goods every five years, to make sure you're on target, but is that data good in years-six, seven, eight, nine, and ten, and that's what everybody uses for five years, that that kind of stuff can be updated, I think, to an annual basis, and that was a point of our survey.

Like then you could do economic impact analysis every year in the intervening years, and so, I mean, it would excite me to get a time series that, rather than every five years, we're collecting this every year like biological data, and then you could maybe combine all those things together, because you have annual data, everything, and so I don't know if that's -- You know, that's just thoughts, but how do you move from every five years to every year and treat social and economic data with the same level of rigor that you treat the biology data, and how can we move towards that?

DR. ROPICKI: One thing I would say is that -- Well, first off, that's the recreational angler expenditure, and so, I mean, I know they were trying to -- The portfolio theory was trying to look at the rec side too, but that's even harder than the commercial side that I have issues with, but I feel like it's pretty good, you know, five years, because doing that survey -- I mean, that is just a crazy effort, if you go through there and look at their survey protocols and what they do, and it's amazing.

I mean, you get state-level data, and, in the State of Florida, they actually break it down to east coast and west coast, and it's great, but I just -- You know, everything on this list is great, but a lot of it, to me -- If one of the things that comes out of that meeting is a way to make information more available to researchers outside of NOAA, in a way so that it's still deidentified, you know, and you're not worrying about stuff -- I mean, there are lots of grad students out there who can

write a thesis, or a dissertation, on consumer surplus for anglers, or things like that, and, I mean, it's just access to the data.

I mean, to get to do that stuff now, you have to have a contract, because you need access to the data, but, if there were a way to make that data more available, you know, a lot of these things might self-populate, but, once again, that might be pie-in-the-sky, and so I don't know that we're going to get access to more data.

OTHER BUSINESS

DR. CROSSON: You know, speaking as a Science Center economist, it's definitely -- The University of Miami is attempting to build some kind of program, but it's not at the level that the Northwest or Alaska Science Center have right there, or the Southwest Center with USCD I guess is there too, and so we don't have that close -- I mean, the University of Florida would be the natural fit, but we're geographically separate, and so it would be certainly one of those things that would facilitate probably a lot of this work.

Okay. I think -- John, do we need anything else? This is good. Well, actually, like half of you are going to be there next week, and so you'll be able to chip in there as well. All right, and so we'll finish up this. I'm looking over the agenda, and have we covered everything on the agenda, John? All right.

Just one quick thing that I'm going to mention under Other Business, because I don't know that I've told this to anybody else in the room, but I spoke with members of the New England SSC, about a week-and-a-half ago, including the chair and then all of the people that do social science or economics on that SSC, and they were trying to figure out how to better utilize, you know, those folks in the SSC process in New England, because they were -- So they were curious about how the SEP runs.

I explained to Anna Birkenbach and Hiro, and I forget who else was on there, and there was like five or six folks, and also the chair of the SSC, Lisa Kerr, I think, and so it's not the first time that I've done that, and so this committee is really valuable that I think that we have in the South Atlantic. People from the North Pacific Council, Alaska basically, those folks approached me at one point, a number of years ago, and I spoke with them about how this committee runs, and so it's good, and I really value this committee, and I think it's very helpful, and so I just wanted to let you guys know that I had spoken to people up there about it as well.

We don't have any other business, other than the picture that will be taken after we conclude this meeting, and I guess we have an opportunity for public comment at this point, and so, if there's anybody out there, either here or in the virtual world, that wants to speak.

MR. HADLEY: All right. Well, I don't believe there is anyone in the room that wants to make public comment. If you are on the webinar, and if you could raise your hand, and we can unmute you to provide public comment. We'll give it a few seconds there, but I'm not seeing any hands go up. All right. I don't think there's any public comment.

DR. CROSSON: All right. In terms of the report, I will give the SSC a summary of sort of the things that we discussed here, because they're starting to meet this afternoon, and so, at some point this week, I'll be giving that overview, but I have to also write-up the SEP report, and so please -- I tasked people with kind of drafting sections, and you can go look on the council website if you don't remember, but they're usually just a few paragraphs, trying to get through the questions that we had and what the committee thought or did not comment on.

Then try and get those to me maybe a week from Friday, okay, and so the end of next Friday, and please try and get those to me. The earlier the better, usually, if you're trying to recall this stuff, but that would be -- At the absolute minimum, I would like to have it by the end of next week, and I will draft together the report and send it out to the committee for approval and then send it to the SSC for its approval, and, at that point, it's incorporated into the SSC report. The next SEP meeting I guess will be next year, here again?

MR. HADLEY: Yes. As far as we know, and we're not expecting a fall meeting. If it were to happen, it would probably be a -- It might be a short webinar, but nothing known at this point, and so probably similar time, the same place next year, and so --

DR. CROSSON: All right. With that, I'm going to conclude the meeting, and then we're going to go out and have our picture taken by Kim. Thanks, everybody.

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

- - -

Certified By _____ Date _____

Transcribed By
Amanda Thomas
June 26, 2023

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Attendee Report: April 2023 Socio-Economic Panel Meeting

Report Generated:

04/23/2023 07:36 PM EDT

Webinar ID	Actual Start Date/Time	Duration
288-873-019	04/17/2023 12:25 PM EDT	4 hours 33 minutes

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Yes	Franke	Emilie
Yes	Grimes	Shepherd
Yes	Griner	00 Tim
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Yes	Hallett	Fletcher
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Yes	Thompson	Laurilee
Yes	Travis	Michael
Yes	Tyler	Grant
Yes	Walsh	Jason
Yes	Ward	John
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Report Generated:

04/23/2023 07:22 PM EDT

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288-873-019	04/18/2023 07:52 AM EDT	3 hours 19 minutes

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