SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SOCIO-ECONOMIC PANEL OF THE SCIENTIFIC AND STATISTICAL COMMITTEE

Crowne Plaza Hotel
North Charleston, SC

February 6-7, 2018

SUMMARY MINUTES

Socio-Economic Panel Members

Dr. Scott Crosson-Chair
Dr. Jason Murray
Dr. Jennifer Sweeney-Tookes
Dr. John Whitehead
Dr. Christopher Dumas
Kurt Schnier
Dr. Jim Waters
Dr. Tracey Yandle

Council Members

Mark Brown
Ben Hartig
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Gregg Waugh
Kimberly Cole
Kelsey Dick
Kathleen Howington
Cameron Rhodes
Christina Wiegand
Dr. Brian Cheuvront
Dr. Chip Collier
John Hadley
Kim Iverson
Amber Von Harten

Observers & Participants

Dr. Kari MacLauchlin
Dr. Michael Travis
Ray Rhodes
Rusty Hudson
Dr. Marcel Reichert
Dr. Mike Jepson
Dr. Jessica Stephen
Dr. Nick Farmer

Other Observers & Participants attached.

The Socio-Economic Panel of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at the Crowne Plaza Hotel, North Charleston, South Carolina, February 6, 2018, and was called to order by Chairman Scott Crosson.

DR. CROSSON: We are going to get this show on the road now. I have several items on the agenda, and I have adjustments here. When I get to that, I will do that, but the first thing that I need to do for this committee is we have to do Approval of the Agenda, which we do a roll call first, but we will go through -- Let's do the roll call first.

We're going to go around the room here, I guess counterclockwise, and then we'll go through the online folks. When people, especially if you're online and having difficulty hearing anything, let council staff, or let us know, so we can make sure that everybody is part of the discussion, because I am going to assign rapporteurs for different parts of this discussion, and I want to make sure that everybody is aware of what they need to do and keep track of. We will go around the room, starting with Dr. Whitehead.

DR. WHITEHEAD: John Whitehead, Appalachian State University.

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

DR. CROSSON: Scott Crosson.

MS. WIEGAND: Christina Wiegand, South Atlantic Council staff.

MR. HADLEY: John Hadley, South Atlantic Council staff.

DR. DUMAS: Chris Dumas, UNC Wilmington.

DR. CROSSON: All right. The first thing we have on our agenda is to -- I'm sorry. Let's do the online. Who do we have checked in here online? Tracy, do you want to start it off?

DR. YANDLE: Tracy Yandle, Emory University.

DR. CROSSON: I guess we're going to come back to Jason. He's trying to call in, and he is communicating with staff right now. The first thing after that is, again, we'll get back to that, but I want to go through, real quickly, that we have, in our briefing books, the minutes from our last meeting, which was last April. I'm sure everybody has had a chance to go through them page-by-page, and does anybody have any amendments or anything to the minutes from the last meeting? Hopefully not, because I have already signed the form saying that they look good. All right. Good.

After that, I wanted to -- I am hopefully that Jim Waters is going to walk through the door any minute, but I wanted to go through -- We have a little bit more time than we usually have to put together our report from this meeting, and so what I wanted to do was assign rapporteurs for kind the meatier sections of this agenda, and so what I wanted to do was, the folks that are here in the room -- It's always a little easier to follow the discussion when you're in the room. Sometimes it's a little bit more challenging if you're online, and so, the folks that are here in person, I have

assigned to two different items. Then, for the people that are online, I have assigned them to one, but every item will have at least two people on there.

For the wreckfish discussion, and I've tried to assign people that seem to have some background or expertise in the issue, and so what I wanted to do is, for the wreckfish discussion, I wanted to assign Jim Waters and Tracy Yandle as the rapporteurs. For the earlier stuff, I'm not going to worry as much about, the Developing Council Actions and the Citizen Science. I mean, we'll have some commentary, but these are not things that I'm worried about making sure that we follow the discussion, but, starting with wreckfish, I want to assign Jim and Tracy to put together that section of our report.

For the trip metrics used for economic impacts of recreational fishing, John Whitehead and Jason Murray. For the next two items, is Ben calling in, or is he not going to be here at all? Okay. For the Items 6 and 7, which are closely related, the results from the socioeconomic profile of the commercial snapper grouper fishery and then the socioeconomic profile of fisheries by species, I wanted to assign Jen and Ben, but, if Ben is not going to be attending any of the meeting, I guess I will assign Tracy, as punishment for not being here.

DR. YANDLE: Thanks so much.

DR. CROSSON: That will be 6 and 7, but, again, those are very closely related, and so I don't think 6 has as much in it as 7 does. For Number 8, the analysis of the methodology used in Snapper Grouper Amendment 27, I wanted to assign that to Chris Dumas and to Kurt Schnier, and I know Kurt will be online tomorrow, and that item is going to be on the agenda tomorrow, and so we should be good there.

Then, for the last item, the red snapper management and recreational reporting, Chris Dumas and John Whitehead. Does anybody have any objections to those assignments, other than they're objecting to maybe getting assignments at all? Jason, can you try and speak again here online and see if we're working?

DR. MURRAY: Can you hear me?

DR. CROSSON: Yes, absolutely. Good.

DR. MURRAY: Sorry. I had audio problems with the computer earlier, but I'm calling in by phone now, and I can hear you, and you can hear me.

DR. CROSSON: Yes, I can. Good. Did you hear what I was saying a minute ago? Are you good with keeping track and working with John Whitehead for being a rapporteur for the trip metrics?

DR. MURRAY: Item Number 4?

DR. CROSSON: Yes.

DR. MURRAY: That sounds good.

DR. CROSSON: Okay. Good, and then let me finish editing my notes here, so that I keep track of who is responsible for what. All right. At this point, then the next thing that's on here is opportunities for public comment. John, did you say there was an online comment, or is there somebody coming in person?

MR. HADLEY: No, there is an online comment form, and there is no one, I believe, from the public in the room.

DR. CROSSON: All right. That's fine. Marcel Reichert is here, and he's the Chair of the SSC, and he's coming up to speak.

DR. REICHERT: Thank you, Scott. I just wanted to welcome the SEP to Charleston, and I want to thank you for your efforts and your advice and your recommendations to the full SSC. They are always appreciated, and so thank you, and I hope you have a very productive meeting here in Charleston.

DR. CROSSON: Okay. Good. Jim Waters is still coming, right, presumably. Given that he's not here yet, would council staff be comfortable with swapping the item right after it and moving it up, the one that's the economic impacts of recreational fishing? Can we move to that one first, and then we'll come back to wreckfish, if Jim Waters is here?

MR. HADLEY: Yes.

DR. CROSSON: All right. Let's do that then. I'm sorry. There is items before that, and let's get going on this. I'm sorry, but it's been a little while since we've had this committee. The next one we have up here is recent and developing -- Dr. Waters is here. Good. The next item we have, before we get to any of these items, is recent and developing council actions. I am missing something. Citizen Science is the next one on the agenda, and so Amber is going to come up and brief us about Citizen Science approach.

MS. VON HARTEN: Good afternoon, everybody. I know that I've come and talked to the SSC, and I think to you guys last year, kind of about what the council has been pursuing with developing our Citizen Science Program, and so I kind of wanted to just give you an update on what we've been tackling for the last six months or so.

Back in June, the council developed an Advisory Panel Pool, Citizen Science Advisory Panel Pool, to help develop some of the actual program recommendations moving forward of how the program should operate and some of our policies. Within that Advisory Panel Pool, they developed five topical area action teams, and those teams are Data Management; Volunteers; Projects and Topics Management; Communication, Outreach, and Education; and then Finance and Infrastructure.

These teams have been meeting since August, on a monthly basis, and kind of doing some work in between meetings to kind of dive into the different elements under each of these action team topical areas that need to be addressed to develop program recommendations, and so this document was something that I presented to the council in December of this past year to kind of just give them an update on progress to date and how these teams have kind of been functioning.

I am just going to walk you through this real quickly. Each of the action teams work has been kind of guided by some terms of reference, and that's something that is used in the SEDAR world, and so we kind of adopted that terminology, but, essentially, these terms of reference are just tasks that the council felt needed to be accomplished or addressed to help these teams develop these program recommendations.

One of the first things that we did with the action teams was get them to kind of prioritize these terms of reference, and that's what these tables are in this document. You will see these tables under each of the action teams, and so let's talk about the Data Management Action Team and kind of what they've been working on. Again, this team is really trying to help the council understand what resources need to be available and put in place for the program to manage not just project data, but also data on the potential volunteers that the program will engage.

One of the first things this team did was work on an inventory of existing data management resources in the region, both looking at existing resources and possibly other resources that might need to be developed for our program specifically, and, to do that, they developed a pretty comprehensive survey, or a form, that was sent out to I believe about fifty different agencies, as well as organizers of other citizen science projects, to kind of just get a better idea of what kind of resources were out there, what components existed under each of those data management resources, and I believe we got about thirty-two responses. We still get a couple that trickle in every month or so from folks that are following up. You can look at the form that was sent out as well as a summary that we developed of what we found out from those responses.

The idea is that this inventory of data management resources will help the program understand different agencies or entities where we might partner with them on data management. Obviously, the council has limited resources to develop those kinds of resources, and so we're really looking to develop partnerships with folks like ACCSP and other federal agencies to help us manage and house the data that's coming in for the program.

That has been a great resource, and then the next thing that the team has been working on is looking at data standards and policies and trying to understand, perhaps, what kind of standards need to be developed for projects that come under the program, recognizing that there is going to be different types of projects that engage different types of volunteers and have different data objectives, and so what kind of standards need to be in place to make sure that those projects, and the results of those projects, can actually be used in management as well as stock assessments. That's something that they are kind of compiling, data standards from different agencies and different projects, and they're going to summarize those and come up with some key things to consider for developing our data standards.

Also, we did a follow-up to the original inventory survey to specifically look at data management costs, so we had a better idea of what the council might be looking at in terms of developing or partnering with other agencies for data management, and so we have some responses about that, and the key finding from that, interestingly, was that the major cost for most agencies and organizations was the QA/QC component of data management, and that was the highest cost feature of those systems. Any questions about that before I move on?

The Volunteers Team has really been trying to tackle how the council's program will engage volunteers and work with volunteers and what motivates them and what incentives might need to

be developed for getting volunteers to participate, what kind of training needs, and what are the appropriate approaches for doing all of those different things, and so they spent some time kind of talking about these terms of reference and prioritizing them.

They first did an inventory of example citizen science projects and looked at the different approaches that those projects used to collect data on volunteers as well as collect the actual project data, and then they developed a few case studies focusing on some fisheries-related citizen science projects, like REEF, the Virginia Gamefish Tagging Program, iAngler, and the California Collaborative Fisheries Research Program, to kind of use as examples to look at the cost and approach and evaluation of volunteer training.

Then we had some pretty lengthy discussions early on about, moving forward, it would be really helpful to know more about the potential volunteers and their capacity to do different types of citizen science projects, what are their interests and what kind of skillsets do they have already existing, and where might there be a need for training on new skillsets. Do we want to have a project where we actually train fishermen to go out and collect otoliths or something like that?

They have been working on, along with one of the A-Teams, the Projects and Topics Management A-Team, on developing what we're calling a volunteer interest form, and so this will be the first point of contact that a potential volunteer would contact the program and give us a little bit of information about themselves. Like I said, where are they from and how do they participate in our fisheries and what kind of interests do they have in participating in different types of projects and their skillsets, so that we can kind of get a better understanding of who our potential volunteers are.

This was one of the flowcharts that we developed to help the Volunteers A-Team kind of walk through understanding what we need to know about volunteers, both from a data standpoint as well as from a project standpoint, and these are the kinds of questions that we need to be asking.

More and more, as we move forward, a lot of the A-Teams, some of their work is kind of overlapping, and there is room for collaboration on some of these specific tasks, which is really neat to see happen, because it kind of validates what we're doing in one A-Team complements the other A-Team, and they are working together to come up with different products and recommendations for the program.

We expanded the volunteer interest form by working with the Projects and Topics Team to not just focus on understanding our potential volunteers in the fisheries realm, in terms of actual fishermen, but also making sure that we're engaging scientists and researchers, to understand how they might want to interact with the program and also participate in projects as well.

Then, also, we do have a pilot project that we're going to hopefully be launching this month for the program, our first citizen science project, and a lot of the groups are going to be using that project to develop sample plans. For instance, in this case, the volunteers group is going to develop the volunteer training plan for that project, to kind of help the group walk through this is the project and let's develop what the training needs are going to be and how that might be carried out for the project, and so they're going to be working on that in the weeks ahead.

For Projects and Topics, this team was really trying to focus on how to make sure that the program is developing appropriate and relevant research and citizen science needs and also prioritizing those needs and how to then take a project idea and then bring it to fruition, recognizing that the council right now doesn't have money to support projects, and so how can we still support projects without funding and come up with ways to do that, and so this team spent some time trying to identify a process for doing this, of how to establish these citizen science research needs, and they kind of have focused on looking at -- The council has a research and monitoring plan that gets updated every couple of years, and using that plan, but kind of fleshing it out more for citizen-science-appropriate types of project ideas.

Also, looking at a way to bring in further, broader public engagement about developing research needs as well and a mechanism to do that, whether it's a call for project ideas or some kind of survey or something like that, but it's some way to expand how we develop project ideas for the program beyond the research and monitoring plan.

Again, this was another graphic that we put together kind of just to lay it all out of what kind of existing input we have that could be used to develop these research needs and then where there is some gaps and some other needed input that we might need to develop those and some of the questions that we should be asking for developing program priorities.

As I mentioned, they have been working with the Volunteers Team to develop this volunteer interest form, and now they are going to be working, again using this pilot project that we're going to be starting, to develop kind of steps for pulling together a project design and planning team, and so a plan for how a project should actually be developed and planned and designed and what kind of information and team players you need to make that happen.

Then the Communication, Outreach, and Education Team spent most of their time also doing inventories of existing citizen science projects and learning from them what types of communication approaches were used to about communicating about the project as well as recruiting volunteers and promoting the project and other types of outreach platforms that were used to do that.

They developed a pretty extensive database, I would call it, inventory, of examples as well as approaches, and then they very quickly were able to start developing some of their initial recommendations on appropriate communication and outreach approaches, and there is a Google Doc link in here that you can look at that as well. They also started tackling how project results should be shared with volunteers, as well as the public, and then how to promote projects, so that you're trying to recruit volunteers, but also talk about how the project data will be used, ultimately.

They also helped out the Finance and Infrastructure A-Team on reviewing a promotional flyer that they were developing, the Finance Team was developing, to target potential partners for the program, and so they put their communications spin on that, to make sure that we were using the right messaging and keeping it clear and concise.

Then the last, but probably the most important, A-Team, is the Finance and Infrastructure A-Team, and the same thing. They started out looking at trying to understand what type of financial needs the program might have and kind of are suggesting a two-tiered approach, where we have an operational budget and then a programmatic budget, the operational being the day-to-day

operations of the program manager, the council side of the house, and then a budget for actual projects, to support projects, and that could eventually incorporate additional staff that would be more project oriented.

They worked on the flyer that I mentioned, and now they're kind of starting to address looking at -- I think I mentioned this before in other presentations to you guys, but the biggest obstacle for the council is that we are unable to apply for and receive outside external funding, grant monies and things like that. The only funding that we can really apply for are internal NMFS opportunities, and so a lot of the existing grant programs that are out there, like cooperative research and MARFIN, we could partner with somebody on those types of projects, but we couldn't directly receive those funds.

This team has been looking at different funding models that might need to be developed and figuring out what the council can and can't do, and so they're looking at public/private partnerships, which is kind of how this pilot project is coming together, and that project is going to be a project that's being supported by Pew as well as the Citizen Science Association, and it's going to be run through those folks and some of our colleagues with the Cornell Lab of Ornithology and their citizen science program.

It's also looking at the possibility of developing a foundation. For example, the National Marine Sanctuaries have a foundation program to help support the work that individual sanctuaries have, and so we're going to be learning more about that. I am trying to think what else. Just different types of partnerships that could help bring in support or funding for projects as well as the program, and we're also looking at crowd funding and can the council do a Go Fund Me type of effort, even if it was just to raise funds for specific equipment that was needed for a project. We're looking at those different types of funding models.

That is what has been happening, and here's our new little graphic. It's kind of been modified since this time, but the idea is these are our scientists, and more data equals better science. These are our fishermen, and more data equals better fishing. Then these are our managers sitting around the table looking at this information, and more data equals better management.

Another thing we're trying to do with the Finance and Infrastructure A-Team is recruit additional members. We really could use some representation on that A-Team with some people that have experience with non-profits, and so, if you guys have any thoughts or suggestions for good people that might fit in that role, please let us know.

What is happening now with the A-Teams is we had what we called our all-hands A-Team meeting last week, on the 31st, which brought together all the A-Teams, for the first time, to kind of talk about what they've been working on and have an opportunity to talk about some of the challenges that they've been facing with some of their tasks at hand.

Then it was also to provide them an opportunity to identify different areas where they would like to work together on some of the tasks, and we had it scheduled for three hours, and we probably could have used six. It was a really productive meeting, and I will be talking about -- All the A-Teams have at least one formal recommendation that they will be presenting to the council in March, and so that's what I'm working on this week, is developing that draft document, and the

council will be reviewing those program recommendations and discussing them and hopefully adopting them at the March council meeting.

Those will kind of be our policies, moving forward, of how we need to approach each of these five different components of the program, and so hopefully, by the end of this year, we'll have most of this work complete and we will have our operating policies in place, and we'll continue to use that to support projects as they come up, and so that's what is going on. Any questions?

DR. CROSSON: Are there any questions from members of the committee, online or here?

DR. DUMAS: Two quick questions. One, does your Citizen Science Program accept interns, undergrad or graduate interns? Do you have any ability to accept interns? That's the first question. The second is, looking forward, could we use sort of the volunteer base, once it's established and organized, could we use it to help us with surveys along the coast, various surveys related to fisheries or coastal issues in general? A lot of times, we need surveyors in certain places at certain times, and, if we had a lot of people identified who would be like the volunteer to do surveying, that could be a very useful thing.

MS. VON HARTEN: The answer to your first question is we can use all the help we can get, and so we may not be able to pay interns, but that's definitely something that has come up amongst the A-Teams as well, is the use of students as well as interns to possibly do some of this work and get some of the legwork done and also participate in projects as well.

That was the other actual funding model that the Finance Team is working on, is looking at how to approach and partner with academic institutions, obviously recognizing that you're going to have a lot of resources to bring to the table in terms of both manpower and equipment and expertise.

Then the second question is, yes, I would definitely think that, if the right project came along and you had a group of fishermen that were willing to be surveyors and help you do some surveys, that that would be a project that could be developed. That was kind of the idea of developing this volunteer interest form, recognizing that this was going to be kind of our first database that we were going to have to deal with, which was going to be about volunteers, but we always have this crazy idea of one day being able to use this database as kind of a matchmaking service between fishermen and researchers and scientists to help develop projects, so we can definitely have the information of who has the interest and skills, and then a researcher that has a research question they want to answer that could be relevant to management and assessments and help them meet up and connect.

DR. CROSSON: Are there further questions or comments? Thank you, Amber. The next item on the agenda is looking at some of the recent developing council actions that are relevant to this panel, and John Hadley is going to run us through those.

MR. HADLEY: Thank you. There are a few items that were pulled out of the attachment that was included in the briefing book, and a couple of them are just more of a notice to the SEP that these are some of the actions that the council is considering. Then the other three, really, are kind of primers for topics that we'll be discussing further down the agenda. Without further ado, one of the --

DR. CROSSON: I'm sorry, John, but can I ask you a quick question? For going through these different amendments, do you want the -- After we explain each one, do you think it would be fruitful for the committee to stop and have any comments on that one, one at a time, since there's six or seven of them here?

MR. HADLEY: Sure. I will stop after each one, and we can kind of have a Q&A. The first one is Snapper Grouper Amendment 47, and this amendment has been considered for quite a few meetings by the council, and it would implement a moratorium on for-hire permits for the snapper grouper fishery, and so just the snapper grouper fishery and not dolphin wahoo or CMP.

This has been a topic that certainly has -- People have very differing opinions on it, and, some of those that are in favor of it, there is sort of an economic driver behind it, and so limiting entry and kind of some business planning aspects and that sort of thing, and so the reason I brought this up is this is something that, assuming that, if the council does move forward, this is a topic that we'll probably be discussing very much in-depth at your meeting next year.

DR. CROSSON: Does the committee have any comments or questions right now, knowing that this will be coming down in the future? I know that this is a hot topic at the council right now, this discussion, and so it sounds good that we'll be able to see it next year as well.

MR. HADLEY: Moving on, the council is taking on two vision blueprint amendments, and so one for the recreational sector and one for the commercial sector, and so the idea is this is the whole visioning process, where there were different port meetings up and down the coast, where, essentially, participants came and weighed in and relayed ideas on what the snapper grouper fishery should look like, ideally. This is sort of the end product of that, as far as potential management changes.

On the recreational side, there is kind of four major topics that the council is considering. One would modify the species composition of recreational aggregates, and so you have all of these varying aggregates and possibly changing those around, where you have a deepwater species aggregate, potentially just a snapper grouper aggregate, and so changing that composition.

Looking at recreational management measures for deepwater species in general, and so some of these include recreational minimum size limits for -- Rather removing recreational size limits for deepwater species, and so the idea is that there is fairly high release mortality for these species as they're being pulled up from such a depth, due to barotrauma, that maybe having a size limit on these three specific snapper species -- That size limit could be removed. Then looking at the aggregate bag limit for deepwater species and then specifying gear requirements for deepwater species, and so this is looking at you can only have a single-hook rig when you're deep-dropping for species such as golden tilefish and blueline tilefish and that sort of thing.

Next is specifying management measures for the shallow-water grouper aggregate, and the idea here is looking at changing the bag limit for shallow-water groupers and then also changing the seasonal prohibition for red grouper and specifically looking at that off of South Carolina and North Carolina, because we have fishermen that -- We have the seasonal prohibition for all shallow-water groupers from January through April, and people are seeing those groupers, red

grouper, in spawning condition into May, and so maybe changing that seasonal prohibition to protect those spawning fish in the Carolinas.

The fourth major kind of topic is specifying management measures for the other shallow-water species aggregate, and so this is kind of looking at the larger picture for snapper grouper species. One of them is looking at -- Well, it's specifically looking at changing the size limit for gray triggerfish off of east Florida. In Florida, it's fourteen inches, and in federal waters it's twelve, and so making those federal and state -- It is a federal regulation that it is fourteen inches off of Florida, but making those align throughout the region.

Then the other one is looking at an aggregate bag limit for other shallow-water species, and this also ties into the fifth one, and so an aggregate bag limit for snapper grouper species, and so changing around -- One of the ideas is to look at a bag limit and say you can have twenty snapper grouper species and that's your limit for the complex, and the idea is to try to figure out a way to make things a little bit more simple, simplify regulations, for recreational anglers. That's the recreational vision blueprint, and I will stop there for a moment.

DR. CROSSON: Did you say for gray triggerfish on that Item 4? The recreational size is smaller in federal waters than it is in state waters?

MR. HADLEY: It varies basically where you're fishing off of. Off of Florida, it is fourteen inches in the EEZ. Otherwise in the South Atlantic, it's twelve, and so, in South Carolina, it's twelve. In Florida, it's fourteen, and so the idea is to make those compatible throughout the region.

DR. CROSSON: Any questions from the committee?

MR. HADLEY: These next ones are kind of the primers for what we'll be discussing later on during the meeting, and the first one is Snapper Grouper Vision Blueprint Amendment 27, and so these are the commercial measures, and so the commercial version of essentially what I just discussed.

There are several different measures to be looked at, and I'll go over those very briefly. It's establishing essentially split seasons for several different species, and so establishing a commercial split season and modifying the commercial trip limit for blueline tilefish, a split season for snowy grouper, a split season and modifying the commercial trip limit for greater amberjack, and the same thing for red porgy, modifying the commercial trip limit for vermilion snapper, implementing a minimum size limit for almaco jack for the commercial sector, implementing a commercial trip limit for the other jacks complex, and so this is a complex that has been facing an in-season closure fairly early, and so looking at ways to kind of extend the time in which those fish are available for harvest.

Number 8 is modifying the seasonal prohibition of commercial harvest and possession of red grouper, and so, here again, looking at ways to provide a little bit more protection for some of those spawning condition fish, for red grouper, off the Carolinas. Then, there again, these last two sort of mirror what we just discussed during the recreational amendment, and so removing the minimum size limits for deepwater snapper species and then changing the minimum size limit for gray triggerfish, and so this is kind of to mirror those regulations that were just proposed in the recreational amendment as well.

What we'll be discussing tomorrow, specifically in regard to this, are some of the analyses that have been done so far for these ten different actions, and there is two different models that were used by SERO. The Southeast Regional Office did these analyses, and there is a SARIMA model, which we'll get into more details tomorrow, but it essentially has a longer timeline, and then the other sort of method -- The SARIMA model uses a longer timeline, so to speak, and it weights it differently, and then there is another one just basically using the last three years of fishing activity to model or project forward.

With that, I will take any questions. As I said, we'll be discussing this tomorrow morning, and the analyst that did these different analyses, Nick Farmer, will be on the phone, and we'll be looking at this first thing in the morning, around 8:30, and so we kind of have a thirty-minute chunk of time where Nick made himself available. He's in another meeting, but he was able to pull himself away for approximately thirty minutes, and so we'll kind of have the ability to do a Q&A session after that. If you have any questions for Nick, if you want to think about them overnight or what have you, he will be available in the morning to discuss that. I will pause there.

DR. CROSSON: Any members of the committee, here or online, have any questions for John on any of these topics, any of these amendments? As noted, we're going to be looking at some of these more in-depth later on during this meeting. Now that we have the committee here and the folks that I had asked about being rapporteurs -- Go ahead, John.

MR. HADLEY: Very briefly, we have two other amendments that I will just briefly introduce. We have Snapper Grouper Amendment 46, which is red snapper and recreational reporting, and so this amendment addresses recreational permitting and reporting for the private recreational sector and then implementing best fishing practices, and so we'll go over this in more detail tomorrow and have a presentation on the app that has been developed that kind of pursues some of these, or potentially pursues some of these, potential reporting requirements for the recreational sector, or opportunities for reporting, at least, to supplement some of the data that we currently get.

Then, finally, the South Atlantic For-Hire Electronic Reporting Amendment, this is a generic amendment that covers all for-hire permits, and it essentially implements weekly electronic reporting for charter vessels, similar to those currently in place for headboats, and we'll see if we can get to this, based on how much time we have. It would pop up under Other Business after recreational reporting, but we've had some feedback from fishermen, during very recent training sessions, some of which occurred last week, and there is a very short, three-question, section to this that has some economic questions, and I would just hopefully get a little bit of feedback from the SEP on if these could be changed a little bit in response to some of the feedback that we're getting. That's it.

DR. CROSSON: Okay. I guess, at this point, do we have any questions? I don't see any, and so we are going to move on to the wreckfish ITQ, and so, in assigning rapporteurs for this, I assigned Jim Waters, and I assigned Tracy, because the two of them are fairly familiar with this fishery, as am I, and I'm also on the IPT that's working on this review, with council staff, of course, and so Brian is going to go through this, and this is probably the biggest agenda item that we're meeting here, or one of the biggest ones, or it could be, and so hopefully this committee will have a lot of questions and comments for this. I will let Brian take over and discuss this.

DR. CHEUVRONT: Thank you. If you don't know me, I'm Brian Cheuvront, and I'm the Deputy Executive Director for Management for the South Atlantic Council. This, just as a preamble to all of this, the wreckfish ITQ program is currently undergoing review. It's a subsequent review from what had been done in the past, and so the SSC has discussed this at their October meeting, but what they really wanted to get the SEP to do is to comment on many of the topics that are being covered in this review, because clearly they fall under the purview of the socioeconomics.

What I am going to do here with this presentation is give you a quick background that got us to this point, where we are now, and then I will go over some of the issues and where we stand on things with the actual review document at this point. One of the things that I do want to point out, and it's not actually in the presentation, but understand that this review is different than many of the amendments to fishery management plans that the council normally does.

This is simply a review of the plan. It doesn't make any changes to the plan itself. It can recommend changes, but it doesn't actually change the plan, and so what this document is going to be doing is telling the council this is what everybody thinks is the current status of where we are with this plan, and, as we get into it, you will see that there probably are some things that probably ought to be considered for being updated later on, but, really, what I would like for you to think about in this process is what do we need to have in this review that accurately reflects a socioeconomic analysis of the different topics that are here now.

You've got a copy, in your briefing book, of the document as it stands now, and it's clearly not complete. We put in all the sections that have been written, up to the point of the briefing book. The council is going to be looking at it again a couple more times, but this may be the one and only time that the SEP gets a chance to look at this document and weigh-in on its development, and so I look forward to all of your comments.

Just a quick bit of wreckfish history. It was discovered on the Blake Plateau in the late 1980s, and it's a transatlantic stock. These fish are found off of Europe and the Azores, and in other places as well, and the fishery experienced an extremely quick expansion. It went from two vessels landing 300,000 pounds in 1987 to about twenty-five vessels landing two-million pounds just two years later, and so it just really exploded.

The council recognized that this was a serious issue, what was happening, and they realized that they needed to get things under control, and so they started this individual fishing quota program in 1992, and it's actually the oldest finfish ITQ program in the United States. The only one that I believe is older is the ocean quahog fishery off the Mid-Atlantic.

Being as old as it is, it was put into place prior to NMFS coming up with the guidelines for how these programs need to be run. The program is exempted from some of the requirements that are now in place for ITQ programs, but not all, and one of the most important ones that it is not exempted from is having these periodic reviews to make sure that the program is running efficiently, and so that's what we're doing. I just wanted to give you a little bit of history of what's going on.

The participants in the fishery -- Now, as an ITQ fishery, or an IFQ fishery, it has shareholders, and the document goes into the details on how people got to be shareholders in the fishery, and I

will spare you those details, because that is past history, and there's nothing that we can really do about that at this point, but, also, you will notice that a lot of the data that I'm showing to you starts in the 2009/2010 fishing year.

The fishing year starts in mid-April and ends in mid-January of each year, and so it doesn't fall on a calendar year, and there is a closed period between mid-January and mid-April. The reason that we're starting with 2009 is because the years prior to that were included in the initial review of the ITQ, and you have that document in there as well, in your briefing book. That was the one that had been done by Kate Quigley, who was the council economist at the time, as well as NMFS staff.

DR. CROSSON: I was just going to say that Jim Waters name is on that document.

DR. CHEUVRONT: Yes, and so Jim was involved in it as well, but that period of time when we do these reviews, we don't have to go back to the very beginning. The guidelines on how we do this is very clear about that, but we need to include this 2009/2010 fishing year, and what the interdisciplinary planning team has decided was that, the first three years in this time series, they're going to act like a baseline. Then, the years following that, they're going to act as the comparison years.

Our data that we have available to us go through mid-January of 2017, and so that's how we kind of got to these years, but, getting to the participants themselves, if you look at it, we can see that we have, starting in 2009, we had twenty-seven shareholders. It went up briefly through that baseline period, but then it immediately dropped down to a high of eleven, and, as you can see, the number of shareholders consolidated fairly quickly over two years, and now we have roughly half the number of shareholders that we had in that 2012/2013 season, and I will explain what happened that caused that.

You can see the number of dealers that we've had. While the number of shareholders has changed, the number of dealers in the period really has remained fairly constant, as well as the number of vessels in any given year has not changed all that often, but the important thing to note here is that in no year did any of these numbers drop below three, and, if you're familiar with the confidentiality rules that we use, three is sort of the magic number. If we drop below three, then we start running into some serious issues.

However, and I will get into some of our confidentiality issues here shortly, here is some participation in the wreckfish fishery by year and looking at the different vessels that have been in and out of the fishery. It's not that many vessels, but one of the things that you can see is that there's a couple of vessels that have participated pretty consistently almost every year in this time series, and then there is a few that come and go for one year in and out, and some actually only participated for one year and then just dropped out altogether and we never saw them again.

If you look at this, looking at it from -- This is, I believe, a graphic that I got from Scott at one point, and it's looking at pounds landed, and I wanted to show you kind of where things are graphically. Starting in 1991, you can see that there was about 1,750,000 pounds landed, and then it has dropped down considerably, to where we have the ACL that we do now, and they are consistently landing the entire ACL each year.

There is a big black block in there because, for those years, it was -- The landings were confidential, but you can see the landings were very high in the early years, and we got the ITQ going in, and they dropped pretty steadily down through about 1997, and there has been a little bit of variability in between, but you can see that's where we are.

The status of the stock is, right now, according to the 2017 update from the third quarter, it's that the stock is neither overfished nor undergoing overfishing. The most recent stock assessment that was done was done in 2014, and it was accepted by the SSC and based on recommendations from the workshop that they had in 2013.

The fishermen themselves hired folks to do a stock assessment. This was a fairly low priority fishery, in terms of how it got onto the SEDAR schedule, and the fishermen were unhappy with the ACL that they were given at the time that the council did its Comprehensive ACL Amendment, and so what happened was they hired somebody to do a stock assessment, and it went to the SSC for review. There were recommendations of things that needed to be looked at in the stock assessment, and they were done, and they came back to the SSC, and they later approved it.

Anyway, if you looked at those landings, you can see that we had a rather precipitous drop-off there, and two of our SEP members, Tracy Yandle and Scott Crosson, have done some research in recent years about what has been happening in this fishery, and so, in looking at the council records, they found out that other fisheries were more lucrative at the time, and so they were also developing catch histories in other fisheries, and, for some folks, they were holding onto their shares and waiting for the price of the shares to go up before they were going to sell them.

DR. CROSSON: Let me just pause here for a second. This is based off of me going through the council archives, because the council, in the 1990s, was aware that the fishermen were not fishing the quota, and this periodically came up, every year or every other year, and so these are based off of the notes from the council when fishermen were going up and explaining to the council why they weren't fishing the quota.

DR. CHEUVRONT: Yes, and I can add to that. I met with the shareholders in this fishery last summer, and they basically corroborated all the things that are here, and so they were saying exactly the same thing, that they were, for these reasons, not particularly fishing that fishery.

In a survey that was done in 2013 with former shareholders, they were citing that there were better alternatives, and there were health and safety concerns. I do know that, during some of that time, there were -- A couple of the high-liners actually passed away, and they felt they didn't have enough allocation to make it worth it to go out and do this fishery. This is not an easy fishery to fish. It's pretty deep water out there.

Just to give you a quick rundown on the timeline, in 1990, the council introduced a total allowable catch of two-million pounds, as a way to hopefully keep the fishery from expanding. They banned bottom longlines, and they started permits for the fishery in 1991. In 1992, there were some price declines, and the council had begun work on its ITQ plan. In 1993, the ITQ started with forty-nine shareholders and a two-million-pound quota, and the document tells you about how people got into the fishery.

In 2011, when they had the revised Magnuson Act and the council had to start setting -- The SSC set the ABCs, and the council started setting ACLs and other management measures, and the council set the ABC to 235,000 pounds, and that was based on landings at the time, because they had no stock assessment, and I believe this precipitous drop probably prompted Scott and Tracy to do a lot of the work that they were doing to look into this fishery, to find out what in the heck happened, because that information was not readily available.

The other thing that the council did when it established its ABC is they also established a sector allocation of 95 percent commercial and 5 percent recreational. Now, there are some issues with this sector allocation. MRIP is basically the way that we would capture this, but this is such a low-frequency-caught fish, in terms of recreational catch -- In the history of MRFSS or MRIP, I believe there has only been one documented catch of wreckfish.

We know that they're happening, because you can just go onto Facebook and search for wreckfish, and you can find people happily showing off their recently-caught wreckfish, but the problem is that we have no idea how many of these fish are being caught on the recreational side, and so that creates a bit of an issue.

The council, when the ABC was set to 235,000 pounds, they realized that that is about 12 or 13 percent of the original quota that had been set aside for the fishery, and people suddenly panicked. It was like kind of the precipitous stock market drop that we're experiencing right now, only it was worse, because suddenly the shares lost about 90 percent of their value overnight, because people now had shares that were worth very little money, because of the number of shares that were out there relative to the pounds available.

What the council did in response to that was, in 2012, they came up with criteria for determining what would be inactive shares and they revoked them. That's the council's prerogative to do that, and so the people who had not been fishing their shares, had not done anything with them, they just lost their shares altogether, and they also put in a 49 percent share ownership cap. Prior to that, there was no cap on it, and there didn't really seem to be an issue with it, because the quota was so high, but now, with the ABC being so low, relatively, they were pretty certain that there would be times when the fishermen, the shareholders, that remained would actually be catching the entire ACL, and so they wanted to put a share cap on it, because of consolidation.

Anyway, between 2012 and 2014, we had that independent stock assessment that was done, and, based on that, after the SSC review, they set the ABC to 433,000 pounds, which was nearly double what they had been given just a couple of years earlier.

One of the things that I wanted to show you is where we stand now relative to the ABC and ACL. Now, in this fishery, the council has set the ACL equal to ABC, and so there's not a whole lot of wiggle room here. They feel pretty confident that there's not a whole lot of management error that would require them to reduce the ACL from the ABC, because this is IFQ and they have to report everything that they're doing, and so they felt fairly confident in their ACL being set equal to the ABC.

Then you can see what the sector allocations are for the 95 percent commercial and the 5 percent recreational, and, again, we have absolutely, really, no real idea what the recreational sector is catching, but you can see now that the ABC/ACL is stepping down every year between now and

2020, and that level in 2020 is going to remain set until the council changes it through some other actions in the future.

Now, the program administration is -- I think this is going to come out as a recommendation from this review, is that there are going to be some recommended modifications to how the program is managed. Remember, this was started back before people were really doing much with computers and things, and you're going to look at this and say, oh my god, they're still doing it this way, and, yes, they are, because, until the council changes the procedure at some point, they have to remain with the current process, but the data are also not really readily accessible from a single source, and we've had some trouble with the data, and we can talk about this, and, Scott and John, if you guys want to jump in on some of the data issues, I would welcome that.

As it's set up now, the Southeast Regional Office manages the permits and the shareholdings for each of the participants in the fishery. To participate in the fishery, you have to have the wreckfish permit as well as the snapper grouper permit, and then they also figure out, based on what the ACL is for a given year and how much shares somebody owns, they determine how many pounds each shareholder gets allocated.

Then they create and distribute the coupons. Yes, pieces of paper is how we keep track of this, and I will show you examples of the coupons here in a moment, but also, like most IFQ programs, ITQ programs, they allow transfers of shares, and so SERO manages that. There is a logbook that is associated with this, and the Science Center in Miami manages the logbook and the dealer reporting, and they're the ones who receive the coupons, because the coupons are sent in with the logbooks. Then the Office of Law Enforcement is in charge of enforcing some of the rules in the program.

Part of the issue that we have with wreckfish data is that there are four separate data collection programs that provide data for this, and no one of them is a complete source of data, and so the wreckfish vessel logbook -- They have a separate logbook, and that gets sent in every month, and it includes landings, and it's supposed to include non-wreckfish species caught on the trip, and there is really not much bycatch in the fishery. However, it's not always clear if people are always reporting those non-wreckfish landings from those trips, but they record effort and participation and coupon purchases and transactions and things.

Then there is a wreckfish dealer report that gets done monthly, and they have verification, partial verification, of the logbooks. Plus, they include price and revenue from the transactions, and they have the two-part coupon system, which I will show you how that works here in a second, and then there is additional verification of things that they have that aid in enforcement and management and quota transfers and all sorts of fun things that are happening, and so that's all included on those reports.

Part of the difficulty has been in creating a single dataset that could be used for analysis, and I will get into that in a moment. Now, the wreckfish logbooks, the ones that go to the Science Center, there is monthly submission, and the coupons that they have to fill out go with those logbooks, and so the primary data that are captured here are the total landings, supposedly of all species, the number of wreckfish, coupon purchases, trip information, like departure and return dates, how long the trip lasted, and then vessel identifier and a dealer identifier, so we can hopefully track the landings back to vessel and dealer.

There is some secondary data, but they're not always there, of whether there is any kind of incidental catch, the gears that were used, the fishing time. Now, understand that basically the gear that's used to catch wreckfish is a vertical line, and there is not much variability from that over time, and so then how much time they were actually fishing, as opposed to how long was the trip, and the location and the depth of where they were doing their fishing, and those aren't always there.

Now, these are the dealer reports that are submitted monthly, and the coupons must be submitted with this report, and it's pretty straightforward, but, again, you can see this, and this is a copy of a piece of paper, and so it tells you what the dealer bought and the vessel permit and how much they paid per pound, et cetera, the typical things that we normally get. Here is all the information specifically that is on that form and all the typical information that we get from a lot of federal landings.

Now, the coupons are really kind of interesting. They are issued by the Southeast Regional Office, and they come in 100 and 500-pound increments, and, in talking to some of the guys who actually do this, they find it to be a bit annoying, because, if you have a 10,000-pound trip, which can happen, that's a lot of coupons you've got to fill out, and, as one of them said, invariably it happens when you've used up all your 500-pound coupons, and so they're filling out all of these things by hand every single time they to get to this, and you will notice that they're in 100 and 500-pound increments.

Well, trips don't always land in rounded numbers, and so there is a way that they can get credit for it, but it has to all be done manually, and so they're actually landing the exact number of pounds that they're allowed, but the coupons are a bit cumbersome, and so there is two portions of it. One part of the coupon is submitted by the vessel with the logbook, and the other half is sent in with the dealer report.

They are at least barcoded for the shareholder and the permit holder, and so they know, when that coupon comes in, who it belonged to, and the dealer permit number is on there and other additional information, like when they were landed and the date that the coupon was received and recorded, and so I wanted to show you -- This is what the coupons actually look like.

This is a 500-pound coupon, and there are quick instructions on how they are to be used, and here is the part that the coupon gets split in half, and so you can see on the left is the fisherman side. Now, if you're going to transfer that coupon, because we do have some shareholders who don't fish all of their shares right now, and so there are other people who do fish who don't have enough shares for what they would like, and so they just sort of, on the side, work out this trade. If they transfer some of their poundage, they have to fill out the transfer record, and so the buyer and the seller both have to sign this. Then whoever actually catches the fish, that uses that coupon, has to send it in, but it will have the number on there showing who bought it and who sold it.

Then the right-hand side is the fish house side of the coupon, and they also put the vessel number on it, and those two sides both have vessel numbers, and that's how they corroborate the landings between what the fisherman says and what the fish house says. That goes in, and, because it's in a specified denomination, we already know how many pounds they've landed, and you can see this is a bit old-school here.

Now that is kind of the status of how the fishery operates now, and there is more details in there, and, if you want to get into some of the document stuff, that gives a little more detail on how the fishery works, but, as I have mentioned, the council and NMFS staff conducted an initial ITQ review in 2009, and, since that time, NOAA has issued a policy on guidance to assist councils and the Regional Administrator on how to review the ITQs.

This ITQ is exempt, because it predates the reauthorized Magnuson Act, but it is not exempt from the program review, and it's got to be done at least every seven years now, and so this is considered to be the first subsequent review, and I have mentioned that our baseline years are that 2009/2010 fishing year through 2011/2012, and the other years are going to be from the 2012/2013 to the 2016/2017 years. As I mentioned earlier, the fishery runs mid-April to mid-January.

Some issues that we have encountered so far in trying to do this, and the first being confidentiality. Now, I've got really a late-breaking update on this that will help us figure out really where we stand at this point. There is some concern that data from fishers and dealers for some years might be confidential, especially at the state or the community level, because you realize we've got so few participants in there, and so what we had to do was to go out and try to get folks to sign waivers, both the people who had participated in the fishery from that 2009/2010 year up through the last fishing year as well as the dealers who did, because, although the numbers have stayed relatively the same, it hasn't been always been the same exact dealers each year.

The waivers went out a couple of weeks ago, and, as of yesterday, I found out that we've already gotten two no responses. One fisherman and one dealer said, no, I'm not going to allow you to report it, and so there goes our ability to do any kind of state-level analysis, and the only thing we can do is in the total aggregate.

We can't really, at this point, break it down by any other level of specificity, which is too bad, because this fishery is primarily prosecuted in three locations. It's South Carolina and two locations in Florida, and we're not going to be able to look at any kind of differences. Well, we could look at them, but we just can't tell anybody about the differences between locations and how things are working for this fishery, but it is what it is, and there we go.

When we talked about the SSC in October about this, we knew we were going to be sending out these waivers, but we just didn't know how things were going to go, and all it takes is just one person to say no, and that blows the whole thing out of the water, and that's indeed what has happened on both the fishermen and the dealer levels.

The SSC has made recommendations that we could try using standard scores, and so we get away from looking at actual pounds landed, and translate those into like Z scores and do the analysis based on Z scores, and we talked about using rolling averages from one year to the next and perhaps combining three years in a single number and swap out a year as we go or whatever, somehow looking at rolling averages, and the other thing that we need to still look at is that assessment that was done, that was accepted by the SSC, and somehow they had to deal with confidential data, and I'm not sure how they released that information, but that's one of our steps that we need to follow.

The SSC also looked at some of our data issues that we had. Remember that we have four different sources of data, and, theoretically, all of our trips need to have at least some of this information, but, in getting into the data, we found that it's not entirely clear that -- We have some things where it looks like we have pieces of data that are hanging out there that we can't match them, maybe to a specific vessel or something, and that sort of thing has happened, and so one of the things that we're going to be reporting back is how much of that unclaimed or unusable data from all the different sources actually exists, because they want to get a clearer idea of what is the quality of the data that are going into this review and what can we say definitively and what's just not clear, based on the data that we have.

DR. WATERS: Excuse me a moment, but I just wanted to ask -- Those concerns sound like they are pretty important, but, if all of the data are confidential, does it really make a difference? Do we need to fix anything if you can't report the data?

DR. CHEUVRONT: Well, we can report the data. We can do it in aggregate, but we just can't do it at the level of specificity that we wanted to use. Like, for now, we can't even do state-level analysis, and so there was a slide early on that I showed that showed that all of the different years, by shareholders as well as vessels that participated, and there were at least three of each in every year that are being used in the analysis, and so we can aggregate things together, and so we can use the data.

What the SSC was interested in knowing is, of the data that were -- I believe the term that they used was "cleared data", but what parts all go together that define an individual trip or by vessels or by dealers, and are there parts that are hanging out there that are not clear, and what is the percentage, what is the ratio, of what we can truly assign to a specific trip, vessel, or dealer versus what we can't, and so they wanted to get a feeling for how good is the dataset that we're working with, and so that's kind of where we stand with that right now. Actually, what we need to do is -- We would like your input on all of this.

DR. WATERS: My question was, if you fixed all those -- I suspect what you're talking about is you have different datasets, and you're trying to merge them together, but, even if you merge them together, it wouldn't change the industry totals.

DR. CHEUVRONT: Part of the thing is that we have some things that were in datasets that collect similar data, but they don't always line up, for example numbers of pounds landed and things like that. We don't always find total agreement, and so that's the kind of issue that needs to be resolved, and we're trying to find out how far off are we, and is it something that we even need to worry about, and that may or may not be an issue, but the SSC asked us to report back on that.

One of the things that they did say is that, if it turns out that there are data issues that make it hard to merge all the datasets, they just said, well, the thing that we probably ought to do is then analyze the datasets individually and try not to combine them together.

Where we are, standing in the timeline right now, is you all are meeting to discuss this review, and we're going to get a draft review document to the council for their March meeting, and hopefully we'll have a few more sections than what appear in the document now, and the SSC, the Snapper Grouper Advisory Panel, and the Wreckfish ITQ participants will be reviewing this, probably, this spring, between the council's March and June meetings.

The council will review the document again in June, and they will finalize the review in September of this year. Now, of course, there is always the possibility, depending on what comes up, that the council can revise the guidelines or the timing of this, and we'll just follow whatever they tell us. There may be some issues that they may want to discuss, but, now that we have this waivers issue kind of resolved, we're limited on the level of analysis that we can do, and so it may not be terribly difficult to meet this deadline, but we'll just have to see what other issues we come up with.

Other things that we can maybe get the SEP to help us with is do we have additional data and confidentiality issues or input that you have for us beyond what the SSC has given us, and, now that we know that SERO can't get waivers for everybody, do you have any suggestions for how to deal with the data that will help us to get as much -- Mine it for as much as we can get without violating any of the confidentiality issues that we have.

Then, lastly, there are specific parts in this review, the report, that you will see. The last half of the report has all of these sections in it, and these came from the NMFS guidelines on how to do a review, and, as you can see, a lot of these things, like eligibility and participation, safety at sea, price analysis, a lot of these things are very much socioeconomic-oriented topics, and so this is part of the reason why the SSC definitely wanted the SEP to discuss this.

What would be great for us is if we can deal with data confidentiality issues and then if we could deal with some of these issues specifically, one-by-one, to see if you all have things that you want to talk about that can help inform this review, and then we can take it from there. Scott, that ends my presentation.

DR. CROSSON: Do we want to go through and address the -- You had these questions in the discussion document, and so we should probably start with the first one about data and confidentiality issues, and I'm going to be careful about participating too much in this, because I know this fishery probably too well at this point, and I have put my input in at the IPT level and at the SSC level, and so I want to definitely hear from other members of the SEP here.

DR. CHEUVRONT: Sure. If we want to start then with --

DR. CROSSON: Let's start with this first -- This is our first question. Does the SEP have input on data and confidentiality issues beyond what the SSC has recommended? I am going to say something, even though I just told you that I wouldn't, but the issue, going back a few slides, about making a model to fill in the missing data, I think I spoke to this at the SSC level and said that you have such limited participants in this fishery that the idea of trying to build a regression or something and come up with something meaningful would just be ridiculous. I don't think you're going to have a reliable model, based off of just both the weird history of this fishery and the extremely small number of participants that exist.

DR. DUMAS: With respect to the confidentiality, what are the issues that the council thinks are most affected by that? Why does it matter? Are you trying to get better -- If confidentiality were not an issue, then what would you be able to make better estimates of that you need estimates of?

DR. CHEUVRONT: That's a good question, Chris. I think, mostly, what it's about is the social.

DR. WATERS: I would like to jump ahead, in terms of data that would be really useful, and, if we could get simply the -- If we couldn't get anything else, but if we could get all the price data and the time series of price data, the ex-vessel price, the share price, and coupon price, and, if we could get those three price series, I think we could do a lot, in terms of identifying the status of the fishery and the objectives of the plan.

DR. DUMAS: So, one question would be then how to best estimate those prices, given the constraint of confidentiality, or confidentiality constraints, that you're under?

DR. WATERS: Right. If landings are confidential, would the prices still be confidential for the shares and the coupons and the ex-vessel?

MR. HADLEY: If I could jump in here. The kind of full dataset would, obviously, be confidential, but, as far as the analysis, no. In the report right now, just the way it's broken up, I believe it's the share price data. The share price data, just the way we broke it up, there are very many observations early in the dataset, and, basically, there is very few in the latter part, and so we could change that timeline around a little bit to be more inclusive of -- Basically remove the confidentiality issues that are currently in the document for share prices. Everything else, we shouldn't have confidentiality issues, at least looking at it as a whole.

DR. CHEUVRONT: John would know, because he has written that section in the document. If you look at Section 6, that deals with the price analysis, and it has what John has done so far, and so maybe, Jim, some of the answer you're searching for is in that section.

DR. WATERS: I bring the question up about prices because, if you know share prices, that gives you some information about the fishery's expectations of profitability for the future. If you look at trends over time in the share prices, that tells you something, and the same for the coupon price. That gives you an idea of the net operating revenue now of harvesting, and so, if you have information over time, you get an idea of the economic status of the fishery. I think it's also useful to do ratios of those prices relative to the ex-vessel price, to see how that changes over time, also.

MR. HADLEY: While we're on share price data, if I could bring it up, Scott and I sort of briefly discussed this the other day, but, when you're calculating share price data, you had that big drop between the 2011/2012 and 2012/2013 fishing seasons. You have a percentage of the allowable quota, and so you take that percentage and you apply it to the TAC, basically, and so you transfer it into pounds and then transfer it into a price per pound.

What we were discussing is that fishermen kind of saw, likely saw, the writing on the wall that the quota was going to drop, and so you have several transactions that occurred before that quota changed, but they were anticipating -- Basically, those transactions occurred anticipating the drop, but, when you're calculating the price data, you kind of have to use the quota at the time, and so, if you look at what the -- Basically, the quota at the time versus what fishermen knew, you kind of get two different prices, and the key point there is what is your baseline as far as the total quota for wreckfish.

DR. WATERS: I should specify, when I talk about share price, I mean share price per pound and not a total transaction cost for that transaction.

DR. CROSSON: Of permanent quota and not leased? Are you talking permanent? Mike Travis from the Regional Office is going to comment here.

DR. TRAVIS: I wanted to clarify something that I believe John was talking about with regard to the decline in the share prices. Recall that the ACL was reduced under the Comprehensive ACL Amendment, and that actually came before 20A. The reduction in share prices was actually driven more by 20A and the very credible threat of the council and the agency revoking their shares if they did not sell their latent shares, and so that's when a lot of the trading occurred, was because the latent shareholders knew that it was better to get something than to get nothing, because, if they didn't sell them, they were going to get revoked and they would get nothing, and that's what drove the prices down.

DR. CROSSON: Just adding to this, I believe, looking at the records from this fishery, and maybe, Mike, you've looked at these recently as well, but I believe it was less than 5 percent of the quota was forcibly reassigned.

DR. TRAVIS: I think it actually got down to 1 percent at the end, and then there were people who intended to stay in the fishery who were furiously trying to get as much as they could, because they were afraid of losing it to other people or it just being -- It was just going to be distributed equally anyway among those who remained.

DR. CROSSON: Are there more comments here?

DR. WATERS: Just to conclude the discussion of Question Number 1, if data are confidential, I still think that you can say some meaningful things in a qualitative sense.

DR. YANDLE: That's what I was about to say.

DR. CHEUVRONT: That's kind of what we have thought at this point, and we're just looking to see if there is any more insight or something that we haven't thought of yet that you can all come up with, but I think we realize that we certainly can say something qualitative.

DR. CROSSON: Again, I'm not sure if this is going to be helpful for a lot of the social stuff, but I know one other thing is that, when Tracy and I were doing the history of the wreckfish fishery and there were all those years with the big black block on there that you saw earlier, we were allowed to report CPUE numbers for those years, even though there were fewer than three participants, and so that did sneak past, because it was determined that you couldn't pull anything out of CPUE, even if you only had two people active in any particular year.

DR. DUMAS: I guess my question is what are the most important management questions that you would want to answer from these data if they were available, or what are the most important management questions that you're not able to answer because of the confidentiality? There are lots of different things that we might want to answer, biological questions or economic questions, and then, within those, lots of different management questions, but which ones are most important that the confidentiality is causing problems about?

DR. CHEUVRONT: I think probably the biggest one that we've talked about is the fact that we can only discuss the fishery in total aggregate, as opposed to we can't look at now how the fishery

may be prosecuted geographically, because we know there are very distinct areas where this fishery occurs. There is basically three areas, and we cannot look at anything at this point that is going to tell us what are the differences between those areas and how people participate in this fishery and things like that.

DR. YANDLE: But you can still say that it appears that these three different fisheries, or three different localized areas of fishing, perhaps with different participants, exists and that it's something that we need to be aware of, can't you?

DR. CHEUVRONT: I would think we could, because we're not divulging any numbers at this point. We can't do that, and so, yes, there would be an acknowledgement, and, when I said the three areas, I'm talking about where the fishery currently is occurring. Somebody needs to look at how it has been in the past and whether those areas have changed. I know a couple of the hot-spots have been pretty much throughout this IFQ history and have been in the same places, but have the others changed? I'm not sure.

DR. YANDLE: It seems, to me, that you don't necessarily need the data to be able to state that. You can still report that important upshot that we do have localized fisheries going on here, and this is something we need to be aware of in creating future policy. You don't necessarily need to have a whole raft of data to support that. You can make the observation on the basis without breaking confidentiality.

DR. CHEUVRONT: Thanks, Tracy.

DR. WATERS: This is a review of the plan itself and not necessarily the fishery, and so the plan and the fishery are highly related, and so the questions to be addressed would be the objectives in the plan. Is the management of this fishery meeting the objectives as stated in the plan?

DR. CHEUVRONT: That's an important reminder, and remember that the plan can make recommendations about changing how the IFQ works, but, certainly if the council chooses in the future, they would have to do another amendment process to the Snapper Grouper Fishery Management Plan to actually implement any changes that they would like to do, and they will not be bound by this document, but they can use it as a reference to help them make those decisions.

Really, what we need here is something that gives as adequate a description of the fishery and its performance at this point, and there are some things that we were hoping that we would be able to get a greater level of detail than it turns out that we're going to be able to use, but certainly that doesn't mean that we have to completely walk away from the data that we do have access to, and I appreciate the comments that you all have been making, because that's what we're hoping to get, is how can we exploit what we have to its maximum potential, and I know we've gotten some ideas already on that, and we appreciate that.

DR. CROSSON: Owner percentages and stuff like that, you can break that down as well, in terms of owning shares, because that is not covered under confidentiality. You can look at the documents right now on SERO's website and see exactly who owns what percentage of the shares. That doesn't mean those people were actively fishing it, and it doesn't mean that they're not leasing it to somebody else, but those numbers are available over time.

DR. DUMAS: If you had the better geographic information, then what would that allow you to estimate better? Would it be biological parameters or economic parameters, or are there specific things you're after that, if you had better data, that would allow you to estimate those things better? Are there specific management parameters that are of special concern right now?

DR. CHEUVRONT: I don't think there's anything of special concern at this point. I think it's more of how in-depth of a description could we give of how the fishery is actually being prosecuted now, and so it's not like management is going to lose out because we can't get to a greater depth in our analysis at this point, but it's wanting just to make sure that we can, like I said, fully exploit what we do have and what we can get access to, and one of the things that we are concerned about is I know folks who do some of the social analysis have raised concerns about wanting to be able to look at geographic differences in the fishery, which we really can't get into too much detail on right now, other than to say that we know this occurs in these areas.

DR. CROSSON: Any other further questions or commentary? All right. Question Number 2 that we have on here is -- I am looking at the overview, but I thought that Brian had those questions up on one of the slides. Was that --

DR. CHEUVRONT: No, the only ones that I have are the ones that you see here, plus the top ones.

DR. CROSSON: Okay. They are the same though?

DR. CHEUVRONT: Yes, they are the same.

DR. CROSSON: All right, and so Question 2 is -- Well, SERO is unable to obtain waivers. Because SERO is unable to obtain waivers, do we have any suggestions for providing any additional detail, other than annual aggregates? I guess we answered some of those already, right?

DR. CHEUVRONT: Yes, I believe you have addressed Question Number 2 pretty well.

DR. CROSSON: All right, and so do we have anything further that we need to add to Item 2, the amended version of Item 2?

DR. JEPSON: I just sent in a comment earlier, when they were asking what kind of confidential data, and, during the stakeholders meeting, some of the fishermen commented that they wanted the council to get a better picture of their landings history, so they could understand how they were affected by previous alternatives in the amendment, in the fishery management plan, and that was one of the reasons that we were trying to seek to get more confidential information, to kind of address that.

DR. TRAVIS: Taking on to what Mike said, and Jessica asked me to bring this issue up as well, back when we worked on Amendment 20A, and this has come up in actual meetings with the shareholders, and so thinking back from the questions the SEP members asked about why do we care about this confidentiality issue.

There is a very clear geographic distribution of interests in this particular program, not that that's unusual in a variety of programs, but, in this case, there is clearly a South Carolina-based

contingent and there is a Florida-based contingent, and that's kind of the way the fishery is set up, and there are -- I will just keep it general and say there are distributional issues between those two contingents, and, as a result, they often do not agree on how things should be done within the program, and so that's why we want to look at these distributional effects within the program, but the confidentiality issue is likely going to preclude us from looking at that, which is unfortunate.

DR. DUMAS: If you're thinking about trying to -- If you have data on aggregates and averages for landings, and you're trying to estimate the distribution within that aggregate or average, I still don't know if you would have enough data, but you might. You might want to look at maximum entropy methods. That's a way of estimating missing -- If you think of the problem as it's a matrix, and you've got the row totals and the column totals, and you've got some of the cell elements within the matrix, and you're trying to estimate missing elements, and those would be the confidential data, then maximum entropy methods are kind of set up to do that. I don't know if you would have enough data, and it would depend on exactly what you're trying to do, but that might help.

DR. YANDLE: Chris, do you think you could just send me a quick one or two-sentence email on that to include in the minutes?

DR. DUMAS: Sure.

DR. CROSSON: Any other questions from the group or from any of the economists at the Regional Office or anthropologists at the Regional Office?

DR. WATERS: Brian, are all of these sub-categories in Question 3, are they the mandated topics from the national guidelines?

DR. CHEUVRONT: Yes, these are the topics that were given to us that need to be included in the review, and some of them are more relevant to this program than others, but, the way the document is set up now, it does cover all of these topics in there, and so we're going to do our best to address these issues.

DR. WATERS: Okay, and so do you see each discussion being sort of a history of that particular topic with respect to this fishery, or do you see it more directed toward a discussion of how do each of these items either meet the objectives of the plan or not meet the objectives of the plan?

DR. CHEUVRONT: I think, the way the document is written now, we're doing both of those things. We have talked some about the history, like initial eligibility into the program, but then one of the things is that, by having the folks with the eligibility requirements that are currently in place, which are the ones that have been there since the very beginning, and do we need to look at that?

Now, some of this kind of rolls into, for example, that eligibility versus new entrants into the fishery. The council is going to need to look at, okay, we've got six participants, six shareholders, in the fishery now, and are they okay with that, and part of the things that the council can do in the future is they certainly have the ability, like they have done before, to revoke shares or redistribute shares, however they want to do it.

At some point, if the ACL is changed, either up or down, things like how does the council want to deal with those things, and do they want to -- If they look at eligibility, could they change the eligibility requirements so that former participants who were shareholders -- Could they get back into the fishery because of changed eligibility requirements, that sort of thing as well, and so part of things that we're looking at to see if we're meeting the objectives of the plan could include has consolidation of the fishery, now to basically six participants, is that meeting the goal of the plan as it was originally stated?

DR. TRAVIS: I completely agree with what Brian was saying in terms of what we're trying to do here, but I did have one specific issue that I wanted to raise not just for the economists, but particularly for the economists, to comment on. That is 3b, sector allocations. For those who have been following the drama in the Gulf regarding sector allocation for red snapper, and then as well as the literature that has been published on this topic in the last two years or so, I think you will understand why this is a thorny topic.

It's also a thorny topic in this particular program, because of what Brian mentioned before, which is the recreational sector was given an allocation a few years back, and the commercial ITQ folks have never been happy with that, and they made this displeasure apparent again at a recent meeting with the shareholders, but, anyway, my point being that sector allocations are a thorny topic, analytically speaking and politically speaking, and just about any other perspective that you can look at them from, and so recommendations on how to address this issue, particularly from an economic analysis perspective, would be very welcome. If anyone needs me to get into the history of this issue, I can do that more.

DR. CHEUVRONT: I was actually on the council at the time that this came up and that allocation was made, and I'm kind of hoping that what we will do is have a discussion about each one of these a through j and just gather comments that we have as we go through it. Some of them, we may have comments on, and some you all may not, and that's okay. It's just however we want to do it, and I agree with Mike that the sector allocation is a thorny issue, because the data are lousy, and the commercial guys are wondering why do the recreational even have an allocation in the first place.

DR. CROSSON: Let's start then, and Mike's issue is --

DR. WHITEHEAD: Is this a terrible time to take a break?

DR. CROSSON: No, it's not a terrible time to take a break, and so let's take a ten-minute break, and we'll start again at 3:10. Thank you for your suggestion, John.

(Whereupon, a recess was taken.)

DR. CROSSON: We're going to get things moving here again, if everybody can get back to their seats. We're going to get started again here. Ray Rhodes from the College of Charleston is online, and, Ray, do you have a comment on this particular issue?

MR. RHODES: I just wanted to, on what we're calling the economic contribution analysis on the council-managed fisheries, I just wanted to ask a background question. What is the expected, I guess, or intended use of the results of that study?

DR. CROSSON: Ray, we're on the wreckfish fishery right now. Is this what you're talking about?

MR. RHODES: I'm sorry.

DR. CROSSON: That's all right.

MR. RHODES: As John knows, I'm running around trying to do some other things, and so I kind of missed that, as usual. Thank you.

DR. CROSSON: Thanks, Ray.

MR. RHODES: Sure.

DR. CROSSON: Let's go through this a through j, one at a time. For the first issue on this, in terms of the review document that we have, and I guess any other issues that you think might be coming up related to it, do we have any comments on eligibility and participation? I do have one to ask the rest of the SEP, if nobody else has one, but I would like to hear anybody else comment on this.

All right, and so this is my question, and I don't know if this fits under a or if it fits under c, but I was speaking with Marcel over lunch, and one thing I noticed about this fishery that I think is unique, though I could be corrected, in terms of American ITQs, U.S. ITQs, is that, to lease quota in this fishery, you need to own quota in this fishery, which is that true? I think that's a really unique thing, and I've been trying to wrap my head around why that was originally put in place.

I think it was put in place to try and reduce armchair fishing or sea lords or anything else, and then I was trying to think about what's the impact, what does that mean, in terms of running the fishery, and I guess it means that shareholders have to at least sell some quota to somebody new in the fishery, so that the person can lease more if they want to work their way in.

DR. CHEUVRONT: That falls under h, for new entrants. However, you are bringing up some of the issues and things and concerns, like we have the wreckfish permit. You have to have a permit, and you have to own shares, and you have to have a snapper grouper permit, and that's all before you can ever land any fish. What might be helpful is if we can have even some description, because initial eligibility has been done, and that's passed. That's gone, but you have to have those three things to be able to participate now. It would be interesting if you all had any comments on those criteria.

DR. CROSSON: Again, somebody can correct me, but I'm almost positive on this. The wreckfish permit itself is not limited access. Anybody can get a wreckfish permit from the Regional Office, because it's of no value to you unless you actually own or lease quota.

DR. CHEUVRONT: Is that correct, Mike?

DR. TRAVIS: That is somewhat correct and somewhat not. Brian, I thought you said this before, but you cannot -- Not anyone can just get a commercial wreckfish permit. You have to be a wreckfish shareholder, or an agent of the shareholder, and the shareholder has various terms, but,

no, it's not -- It is and it isn't. It's a strange permit, quite frankly, and, if I had my way, we would do away with it, but that's another topic.

DR. STEPHEN: The other thing to get the wreckfish permit is you need to have the SG1 permit as well first, in order to -- As well as being a certificate holder or an agent or employee thereof. It's not a clean process.

DR. TRAVIS: So, you think in terms of like barriers to entry, and not only do you have to buy the wreckfish shares, but you've got to buy that Snapper Grouper 1 permit, and I think Kari is going to get into this later, but those are not cheap permits. In fact, I think they're one of the most expensive permits we have.

DR. STEPHEN: They're also under a two-for-one, and so, if you're a new SG1 permit holder, you need to buy two of them for your one.

DR. CHEUVRONT: Unless you're a corporation.

DR. TRAVIS: And the corporation gets bought.

DR. CHEUVRONT: Correct.

DR. TRAVIS: Scott, I think you're right. There may be one other U.S. program where it works that way. I want to say one of the Alaska programs, but don't hold me to that, but it is -- Certainly, unlike the Gulf programs, where you don't have to be a shareholder to lease -- In fact, I would say probably the majority of our lessors are not shareholders, and so it may be unique, in that sense.

DR. CROSSON: I guess we could hold off on -- Well, several of these are wrapped together, and so we might as well continue this discussion. Do other members of the SEP see this as a restriction in the fishery worth noting? Does this have any negative effects, the fact that you can't just lease quota out to somebody who has a snapper grouper permit, but they also need to own some quota? I mean, I guess you could theoretically just sell a pound to somebody, but, at that point, now you have given that person a foothold in the fishery, and so is this anything of note?

DR. YANDLE: I would just say that the effect of layering all these things would absolutely be creating barriers to entry, and so it then becomes the policy question of what's your objective. I think we hit on this earlier. Is this something where we're happy with six people in the fishery, or would the council to see it be a larger fishery? If they would like to see it as a larger fishery, they may want -- One way to achieve that objective would be to rethink some of these permitting requirements.

DR. CROSSON: Such as removing the snapper grouper permit requirement?

DR. YANDLE: Such as that or such as removing the requirement of having to own to lease or both of them.

DR. DUMAS: You've already got the 49 percent share cap, right? So, to some extent, that is preventing some level of over-consolidation in the fishery. You could just adjust that share cap downward, if you wanted to, to address over-consolidation, but then, if you have that cap on there,

if you're got someone who is a very efficient fisher, and he's up against the cap and you prevent him from having more share, then that could potentially reduce the efficiency of the fishery, and so you could have some tradeoff there. We could look into that.

DR. TRAVIS: We already know that there is someone up either at or very near the cap, and so, if that were to be changed, the council and NMFS would effectively be forced to force that shareholder to divest, and that is not politically palatable.

DR. CROSSON: Again, just help me out, members of the IPT or staff. The 49 percent maximum, that's something that is required by the revised Magnuson, right, the reauthorized Magnuson?

DR. TRAVIS: Yes, we had to do that in Amendment 20A, because the attorneys said we were out of compliance. 49 percent is what the council decided to go with.

DR. DUMAS: You could make it smaller, but you just can't make it any larger?

DR. TRAVIS: They can change it however they want. Now, there are reasons not to. I mean, I distinctly remember, and, Brian, I'm sure you do too, the council discussions on that cap was the council was not, in my opinion -- They were never going to vote for something higher, because then it would allow some entity to have majority control in the fishery, similar to someone having majority control in a corporation, and they just said, no, we're not going to allow that. That was true, actually, in the tilefish IFQ in the Mid-Atlantic. They did the same thing. That's another small member case. I think they've only got nine or ten participants.

DR. WATERS: Aside from the problems of majority control, is there any evidence at all that owning a really large fraction of the fishery is a problem? Is there any type of market power associated with that?

DR. TRAVIS: I mean, we haven't done a formal market power analysis. I did a qualitative analysis associated with 20A, and I laid out a number of reasons as to why I could not foresee that happening, in terms of the landed product. John, I think I'm going to defer to you on the coupon and share prices and what you may have seen there, because you have looked at it more closely and more recently than I have.

MR. HADLEY: I'm sorry, but can you repeat the question? I was taking notes.

DR. WATERS: Is there any evidence of any kind of market power associated with owning a very large fraction of the shares?

MR. HADLEY: I would really have to go back and look at the analysis. I guess one part that I found a little bit odd in the data was looking at -- I believe it was the coupon prices, and so they stayed pretty consistent through time, with the changing quota, and so there may be a possibility there. I would have to go back and see how those coupons changed hands, whether it's one person kind of lending or trading coupons to several other people, but there are several other, I guess potential, items there that could have -- If there is some kind of other trading that's not being captured by that coupon price, but that stayed pretty much the same throughout, and so, if it were to show up somewhere, I imagine that's where we could kind of examine it.

DR. WATERS: I think it might also be worthwhile looking at the ex-vessel price, and I think you talked about ex-vessel price in your draft document a little bit over time, but, if you had a plot of price versus pounds in the fishery, to try to determine if the demand curve is downward sloping at all, or not downward sloping, that might give you some evidence of market power, or lack of market power.

MR. HADLEY: I think that's a great suggestion that we can look into, certainly. The dataset is there, but we just need to kind of analyze it appropriately in that manner.

DR. TRAVIS: John, did you notice an uptick in the coupon prices on a per-pound basis over the last say two years, because that issue did come up in the meeting with the shareholders, and there was some -- Again, there was a little bit of testiness about who was selling coupons and how much they wanted for them and claims of exorbitant prices being charged, and they weren't going to pay them, et cetera, et cetera.

MR. HADLEY: Right, and I think those weren't very common, but there were some kind of outlier, I guess you could say, observations in that coupon price data. I think I mentioned here, out of all, there were five observations in the entire dataset that were more than a dollar per pound gutted weight, but sometimes those observations were fairly high, and so I imagine those transactions were probably where those comments were coming from.

DR. TRAVIS: It's also problematic, because, of course, if the buyer isn't willing to pay the asking price, then the transaction never occurs and we don't actually see the transaction.

DR. CHEUVRONT: The other thing is the timing of when that transaction occurs. It could be that somebody actually had already caught the fish and didn't have enough coupons to cover it, and so they had to buy the coupons to be able to land the fish, and so the seller could raise the rate significantly just so that the buyer could get some kind of profit out of it and not lose the fish entirely.

DR. DUMAS: Just for clarification, we're talking about coupon prices. We're talking about the price that one fisherman charges another fisherman to transfer the coupon or to lease the coupon?

DR. TRAVIS: Yes.

DR. DUMAS: Okay, and so, when a coupon is leased -- I have a problem with the word "lease". I don't know if I'm talking about the buyer or the seller. We've got a coupon changing hands, and so, when the coupon changes hands, do both the buyer and the seller of the coupon have to own quota share? Is it both the buyer and the seller or just the seller?

DR. CROSSON: Both have to own. You cannot lease quota to somebody who does not already own some quota.

DR. DUMAS: Okay, and so, when you're talking about coupon, you're talking about -- The definition of "coupon" is temporary allocation of some of your quota share?

DR. CROSSON: Right, and so, at the beginning of the year, they take the quota, the overall quota, which is four-hundred-and-some-thousand pounds, and divide it up to the different shareholders

as a result of their percentage of ownership of the fishery, and that's good for the eight months of the year that the fishery is open. If you choose to lease some of your quota, you're basically giving those coupons over to this other fisherman, who is also in the fishery, and you can't, obviously, use it at that point. Then, next year, you're going to get back your regular allocation again.

DR. DUMAS: If I wanted to lease or sell some of my coupons, I could only do it to the other people who currently have -- The other six people who are currently in the fishery?

DR. CROSSON: Yes, and, Mike, I have a question for you, because I haven't looked at the new landings data. I have not dived into it, but is it true right now that the fishermen are not catching all of the quota that is out there and there is some unused quota? Is that true or not, because I know what they said during the meeting, but I thought that we looked and saw that some of this stuff is not being used.

DR. TRAVIS: Just a little bit of history, because I can't remember if Brian went through it. For years, the TAC, or the quota, was at two-million pounds, and then we had that huge reduction by like 88 percent, and it went down to 235,000. Now, Brian, we're up to what? Is it --

DR. CHEUVRONT: I think it's just under 400,000.

DR. TRAVIS: Okay, and so that gave them some relief, but the general feeling is that they still don't have enough in the aggregate, but there is the primary shareholder, who is also the primary harvester, did not use all of his coupons, or did not harvest his annual allocation, and I believe in the last two years, and I want to say he offered up, at the meeting, that maybe there was about 25,000 pounds or so that he didn't harvest, and so it went unharvested, but I think that was solely because of that one, who was also the primary shareholder, and I still think the other shareholders would say they don't have enough quota to get by and they're hoping for quota increases in the future. Did that answer your question?

DR. CROSSON: This is my question then. So there is unused quota by one shareholder, and that shareholder offers to lease it to another active shareholder who does not feel that he has enough quota, because the price that's being asked for leasing is too high for him to make a profit, and so you have a market where there is a limited number of buyers, and the sellers can't come to an agreement, and so quota is not being used, which gets to this question about whether the restrictions that Tracy mentioned on participation are too high to allow new entrants in. You have a market that's not working, because buyers and sellers can't agree, because the pool is too small, and it is very small here, and so is that a problem for the operation of the fishery from the council's perspective with managing the ITQ?

DR. TRAVIS: Right, and that would be a theme that you would have to kind of cross -- It would cut across multiple sections that are laid out under Number 3, because that would hit 3a, and it would hit 3e, and it would hit 3f, and so we need to pull all of that together to get at the issue you're identifying and see if it is.

DR. STEPHEN: I have a question for John. How much of the coupon data didn't have a price at all?

MR. HADLEY: If I recall correctly, and I actually have the information here, but there were several observations that didn't have any price data associated with them, and so it's not full price coverage. As far as in general, we had pretty good ex-vessel price coverage, but the coupon was not so great.

DR. TRAVIS: That is a common problem across all of our catch share programs in the U.S., because those prices -- I think this may get back to something that Jim brought up earlier, but we do not require -- I don't believe it is required in any program now that they actually report their prices when they transfer shares or when they transfer whether you're calling it coupons or annual allocation. It's not required that they report it.

DR. STEPHEN: Mike, we do require the share transfer for the IFQ, but the problem is that you can put it down to a penny.

DR. TRAVIS: Right, which is nonsense, but --

DR. CHEUVRONT: Also, with this whole share thing, while historically the unused shares were revoked, about six years ago or so, we do currently have shareholders who are not fishing their shares at all, and so it's not just the one high-liner who is not catching all of his shares, or catching all of his allotment. We do have other people who are doing this as well who are simply not fishing and selling them, and so that kind of gets into the mix, in terms of price that they're willing to sell their shares for. With the confidentiality issue, I just don't know we can disentangle all of that.

DR. WATERS: Well, in the spirit of trying to get things on the record, I think that there is no use-it-or-lose-it provision, and is that correct, but the council has in the past revoked shares because people did not use their shares, and I think, in general, if there is a potential, or a likelihood, a nontrivial likelihood, of having your shares revoked if you don't use them, that's potentially bad for the biological portion of the fishery, because, if people get to feel that they have to fish, even if it's not profitable for them to do so, that's going to drive -- Let's say the biological stock is in a declining mode and people want to shift to a different fishery, but they can't afford to shift, because they might lose their shares, then you're exacerbating the decline in the fishery, which is not a good thing.

DR. TRAVIS: You would need to be very clear, Jim, about what you mean by "use", because I can guarantee you that you will get shareholders in this program, and a lot of other programs, that, when they lease the associated coupons or annual allocation associated with those shares, they would contend that they are using them and they are participants in the fishery, even if they're not the ones who are actually fishing the quota.

DR. WATERS: I agree with that, but, historically, we had a lot of people who owned shares, and there were no transactions at all, in terms of coupons, and most of the quota out there was actually not used at all, and, because of that, people had their shares revoked.

DR. TRAVIS: Right, but I think 20A alleviated that particular problem. Now it's just a matter of you've got some shareholders that fish their shares, their annual allocation, and you've got some that don't, and then you've got maybe one who doesn't fish all of it or use all of it in some way.

DR. STEPHEN: This also leads into the idea of the allocation cap, which would be kind of a two-pronged cap, so to speak. The share cap stops them from owning it, but it doesn't mean that they can't receive coupons from someone else to de facto get above the share cap when it comes to landings.

DR. TRAVIS: That is an issue that we've actually noticed more in other programs, where the share caps may not be functioning quite as intended, because of that issue.

DR. DUMAS: Has anyone done a back-of-the-envelope sort of optimal yield for this fishery? Could it be from the point of view of maximizing the value of the fishery, and could it be that we want people not to use their share, to allow the stock to grow? Is not using a share necessarily a bad thing, from the point of the nation's perspective of maximizing the value of the fishery?

DR. CROSSON: I am not a biologist, but, just based off the discussions of the SSC and the whole process with coming up with an ABC recommendation a few years ago and everything that's been published on wreckfish, this is not a local stock. The recruitment is coming in from outside. This is a transatlantic stock, a long-lived transatlantic stock, and only a small portion of its habitat is off the coast here, and so these fish are coming in from outside and then moving on. These guys are catching large adult wreckfish. In other parts of the world, they are caught up near the surface, near wrecks, before they go deep.

I am not sure that that's an issue here, that if the guys don't catch the quota -- For one thing, the CPUE numbers have really changed very little over the lifespan of this fishery, and it was something ridiculous like they're always pulling in like thirty-three-pound fish, and I think the standard deviation over the whole lifespan of the fishery is like two pounds, and so it's like these very specific fish that come in and keep moving on.

DR. DUMAS: What about the recreational portion of the quota, that 5 percent? Can the commercial guys buy from the recreational guys, or can the recreational guys buy from -- Are those two sort of separated?

DR. CHEUVRONT: They are very separated right now, and one of the things in an email that Jessica sent to me, and we can sort of talk about this, but clearly the commercial guys would like to get access to those fish, but the other issue is we can't really count those fish very well, and what about the idea of thinking about the recreational fishery as being *de minimis* or something like that? I mean, how do we -- Are there ways that we can deal with that recreational ACL, where we really don't have any idea?

Clearly, the recreational landings are happening, and we know that, because, like I said, you can go out onto Facebook and you can look, and people will have pictures of wreckfish that they have caught, but we just don't seem to have any method to capture those fish, and so is there a way that we can deal with the allocation? Clearly the commercial guys would like to just either reduce it down to as low as possible, because we can't count it, so that they can catch more fish, or is there a way that we can just consider them *de minimis* and not worry about it?

DR. YANDLE: I actually had a question about that. You had mentioned sort of the anecdotal what we're seeing on Facebook angle of this. Is there any evidence that there is any kind of uptick in recreational catch, because, since this fishery originally opened, there has probably been some

changes in the recreational industry that may lead them to be able to catch more, and I have no -- I don't know anything about this end of the fishery at all.

DR. CROSSON: John, do you know some things about this?

DR. WHITEHEAD: I read this part of the report, and we're using MRIP to measure recreational landings, and there have been no encounters of wreckfish in MRIP, one, and so, in practice, it seems like the recreational allocation could be 1 percent or 50 percent and nothing would change.

DR. CHEUVRONT: I think you're right, and so is it -- *De minimis* generally is catching less than 1 percent of the overall catch, and is it okay just to declare that recreational fishery *de minimis*? If you want to allocate 1 percent, because you have no idea anyway, does that make any kind of sense to do something like that?

DR. WATERS: Well, 5 percent of the TAC would be about 600 fish for the recreational fishery, and so we know they're catching some, but do we have any idea? Is the total approaching anywhere near 600 fish?

DR. CHEUVRONT: No idea.

DR. CROSSON: If I caught one, I would put it on social media.

DR. WHITEHEAD: There is approaches in social science that are using social media to measure all this stuff, and so if someone would just write that down, so it would go into our report, then that might be progress.

MR. BROWN: I am Mark Brown with the South Atlantic Council, and I also have a fishing boat that I carry people offshore. My experience with this over the past few years has been that there's been an uptick in people in that depth of water where you would find the wreckfish more targeting swordfish. The swordfish fishery has kind of gotten to be a big thing, and people are fishing that same depth, and that's what they're targeting, but, as far as wreckfish go, I have not talked to anybody or seen anybody catch a wreckfish, and so I'm thinking it's extremely *de minimis*.

DR. CROSSON: You would have to -- They're not allowed a mechanized rod-and-reel for the recreational sector, right, including the charter sector?

MR. BROWN: For wreckfish?

DR. CROSSON: For any kind of deepwater fish. Are you allowed to use a mechanized reel to pull it up?

MR. BROWN: I think so, yes, but my understanding too, even using the mechanized reel, it's a long -- It takes a long time to get to the bottom. People were telling me like forty-five minutes just to get to the bottom, and most of these guys that I know that are fishing in the depth of water are not utilizing that time to just fish for a wreckfish. They're really geared towards trying to get something bigger, but all of it is a pretty small fishery.

MR. HADLEY: In relation to John's comment on using social media, Cameron Rhodes just looked up #wreckfish on Instagram, and I think there is 1,783 posts, and so, how many years that's over, who knows, but that might lead to another form of analysis, as far as quantifying the recreational harvest.

DR. CROSSON: I have done some social media analysis before, and, with Instagram, whatever the Instagram version of retweeting something, and I don't know if these are all showing up as individual, unique records, because that was a big problem with us looking at Twitter, was that people would retweet things constantly, and you were trying to piece it back to the original poster, and it's kind of a mess.

We're kind of dancing around a lot of these different topics, and we talked about sector allocation, and so I guess we -- I don't know if we're supposed to be asking for just feedback to the IPT or the review team, or are we just supposed to give our opinions on this? I think we're supposed to be giving feedback to the IPT, but it seems like there doesn't seem to be a lot of evidence, maybe, that the quota is being caught by the recreational sector, and so it's something that the IPT, I guess, or the council should consider, in the long run. We've talked a little bit about share caps, and we've talked a little bit about price analysis. Catch and sustainability, what is that? Is that biological?

DR. CHEUVRONT: Let me pull that section up here, because I'm not sure what we have on that.

DR. TRAVIS: It partly gets to whether you are harvesting the sector ACLs and quotas.

DR. CHEUVRONT: I am just going to read what we have from the MSA that is related to that. It says that FMPs must establish mechanisms for specifying annual catch limits at a level such that overfishing does not occur in the fishery, including measures to ensure accountability. This section will review whether the wreckfish IFQ has helped to keep harvest and landings within the applicable limits, if the program is encouraging full utilization of the quota, and describe and analyze changes in the status of stocks within the wreckfish IFQ. The section will also review if there are changes in bycatch and discard mortality consistent with National Standard 9.

DR. WATERS: One of the potential benefits of an ITQ program is that people are supposed to have an incentive to consider themselves conservationists with respect to their fishing practices, and so, when the ITQ program was first put together, they had nearly a two-million-pound TAC, and now we're down to one-fifth of that, and so one would say, if we had to reduce the TAC by 80 percent, maybe the ITQ program failed in its objective of promoting biological sustainability, but I would argue that that is not the case and that, when the program was first put together, we really didn't know whether it was a flash fishery or a potential big fishery, and the original TAC was just a guess, and we guessed wrong, and so I would not cite that type of evidence as a reason for failure of the ITQ program to achieve this particular goal.

DR. CHEUVRONT: I believe the reason why that original TAC was set was because that was -- At the time that number was chosen, that was the maximum annual landings that had occurred, and so I think there was a year later that it was even higher than that, but, when it went into place, it was set at that two-million pounds, and so nobody knew what the stock could withstand at that time.

DR. TRAVIS: To that point, Scott, and I'm not trying to put you on the spot at all, but I know, at the meeting with the wreckfish shareholders, that there is still -- Let's just say they have not gotten over the issue regarding the last stock assessment and the fact that they had to pay for it to be done. Is wreckfish on the Center's radar with respect to doing an updated assessment?

DR. CROSSON: I don't believe there is any intention of -- Is it on the SEDAR schedule anywhere? I don't think so.

DR. TRAVIS: Okay.

DR. REICHERT: I don't believe so either.

DR. CROSSON: If it was, it usually gets knocked off for a higher-impact fishery. There is so many other ones that they keep moving up the ladder that wreckfish always got bounced down, which is one of the reasons that they eventually had to do this. The question of catch and sustainability, the question about the quota, and I listened to the shareholders' meeting, and I know they had questions about what the total ABC is, and that is something that maybe the fuller SSC would comment on. I have strong opinions on that that I have expressed at SSC meetings.

DR. WATERS: John and Brian, you're looking for ideas as to what type of data to include in your report, and I think it would be useful to include some measure of productivity, either catch per trip, number of days fished, and trying to cite or demonstrate how that has changed over time. If productivity is going down over time, maybe that has something to say about the biological condition of the stock.

DR. CROSSON: Yes, and that was something that Tracy and I put into the academic article, because we were able to report CPUE numbers up through the time that the article was published, and so I think this definitely would be of value to continue that, because you really don't see much of a trend, keeping in mind that you have some years that you have an extremely low number of participants, and that's going to skew the numbers. The single biggest factor for me, like I had stated, biologically, is the fact that the fish size has just not changed at all, which is, to me, a very clear indication that this is part of a larger stock.

DR. DUMAS: On the general issue of allocation, share allocation within commercial or also commercial versus recreational, there are some relatively new results that have come out of the public choice literature on the issue of fair allocation and fair division, and I have been -- So far, and I did a literature search on this, and I couldn't find any applications in the fisheries literature, and so this is something that I'm working on.

I did a presentation at the American Fisheries Society meeting in Tampa this past summer on taking some of these models where you've got a resource and you're trying to decide how to efficiently allocate it among some users, but you're also trying to do that in a fair way, fair in the sense of defined in a certain way, and non-envy, is the way that they define it. There are these algorithms that can be used to allocate a resource in way that's both efficient and fair, and the cool thing about these algorithms is that you can include in the algorithm any number of different types of restrictions.

You've got these different -- You're talking about these different levels of restrictions that you've got in this fishery, and the algorithm can take different types of restrictions into account, and it goes through and sort of calculates the allocation that would be both efficient, in terms of the users of the resource, and also fair from the user perspective, in the sense that no user would want to trade their allocation and their permit price or whatever with any other user.

Each user prefers his own situation to that of any other user, fair in that sense, and it's called non-envy, and it's also efficient, and so some of these methods might be useful in some of these fishery allocation situations, including this one. The only condition on the restrictions is they have to be anonymous, and what that means is they have to apply to everyone equally, and so, for example, you could have a restriction that no one can have more than 49 percent of the share, and that could be a restriction that could be included in the algorithm, because that would apply equally to everyone. No one can have more than 49 percent.

You could not say that a particular fishing person could not have 49 percent and that restriction would not apply to anyone else, and so, whatever restrictions you have, they have to apply equally to everyone, but, in most of these fisheries, that seems to be the case. Whenever you've got a rule, it applies equally to everyone, and so I just offer that up. These might provide some methods that could be used in situations for fisheries like this, when you have a lot of restrictions and you're trying to find allocations that are both efficiently use the resource, or efficiently use the TAC, but that also would be perceived as fair from the perspective of the participants in the fishery.

DR. TRAVIS: Chris, I, obviously, remember your presentation, and several of us were there for that. Do you have a working paper or something that you have developed to this point that would be shareable, or are you still in the middle of working on that?

DR. DUMAS: I think the presentation itself is on the American Fisheries Society website, and I think they posted those presentations.

DR. TRAVIS: They did, but I don't think you can access them anymore. I ran into that a couple of months ago.

DR. DUMAS: As far as my paper goes, I'm working on it, but, if you were very interested, I could work on it faster.

DR. TRAVIS: Is that a rhetorical question?

DR. DUMAS: No, it's a time allocation question.

DR. TRAVIS: An allocation question about allocation. By all means. I mean, I find this really fascinating, and I have not -- As you have already said, I haven't seen this kind of work being explored in fisheries. I am not even sure that I've seen it in natural resources, and so, if you would be willing to share the presentation again and some draft of a working paper, that would be great.

DR. DUMAS: Sure, that would be great, and, actually, something that I've been looking for is an example resource to work out a concrete example, and, rather than just working with sort of a generalized resource and theory, taking a particular fishery or two, or several, and working out an actual algorithm to apply to a fishery with the particular restrictions that exist is something that

I've been looking for, and so maybe this would be a good candidate fishery, or maybe some other fishery would work better, but we could talk sometime, maybe later, about that, but I would be glad to do that.

DR. CHEUVRONT: The South Atlantic Council has lots of fisheries that they would like to consider, because we're actually looking at reallocation, and I'm not sure, just to get to this fishery specifically, because we don't have a very good handle on the recreational, and nobody is bound or constrained by that recreational 5 percent, because we don't know what to do with it, and this one may not be such a good one, but, boy, we've got several that would be great things to look at this.

I know that the South Atlantic Council, along with probably most of the other councils that have big sector allocation issues, would probably love to have another tool to consider to look at this to help when you're looking at maximum utilization and fairness, because those are the two things that we struggle with at balancing out.

DR. CROSSON: Do you need some kind of contingent evaluation for the recreational sector, some kind of numbers to assign for this? You have lost me.

DR. DUMAS: No, not necessarily. This is how do you come up with an allocation of the resource that -- The users bid. In an allocation mechanism, the users bid, and so the recreational fishermen and the commercial fishermen would be bidding for quota, or would be bidding for allocation, and that generates a pool of funds, but then some of the bidders get some of those funds back, get refunded some of the funds, in the allocation mechanism, so that it makes it fair.

Each individual ends up with a share of a quota and a share of the refund such that they would not want to trade with any other individual who is participating in the fishery. Then there are different ways to structure the algorithm, depending on the unique characteristics of the fishery, and so that's why I'm interested in doing some concrete examples of some concrete fisheries, and we could talk later about this one or others that might be better candidates.

DR. CROSSON: Your college is located in our region, and so it's going to be us that you're going to be doing this with. All right, and so we've commented a bit on new entrants into the fishery. Safety at sea, I know there's a section that Christina is working on, and you're still working on talking to the Coast Guard?

MS. WIEGAND: As it stands right now, it's just sort of a general discussion of this is how we expect IFQs to improve safety at sea and this is how it has improved safety at sea in other catch-share style fisheries. There were no safety issues brought up at the shareholders meeting, but I did recently get access to some Coast Guard data, and I haven't had a chance to sort of sift through it, to see if there is anything in there with vessels that might be associated with wreckfish, but analysis of some sort of Coast Guard data is a possibility.

DR. CROSSON: We've talked about new entrants, and a lot of that information would probably be rather old, with the original fishery, because I know it was pretty Wild West when they started out there in the early 1990s.

DR. WATERS: Back with safety at sea, I would like just to add to the minutes here that one of the objectives of an ITQ program is to promote safety at sea, because fishermen, in theory, should be able to choose when they go. They don't have to feel like they have to go, and I think, at least since the inception of the program, this has proven to be the case. When the program was being talked about, it was a mess. People were fishing like mad, and the quota was caught within a very short period of time, and, since the ITQ program has been in place, we have not had those problems at all. People have been landing throughout the year, and it seems to have -- I don't know if we've actually had any accidents at sea, but at least people have been able to choose when they want to fish.

DR. STEPHEN: Just to add that, the Science Center did a really good analysis that you might be able to borrow the model for. They did it for the grouper-tilefish ITQ, but it might be worth looking at for wreckfish as well.

DR. DUMAS: Can fishermen lease or buy and sell coupons across years?

DR. STEPHEN: No, it's just annual.

DR. DUMAS: Could they write contracts, or could they write swap contracts, which would be give me one of your fish this year and I promise to give you one of my fish next year?

DR. TRAVIS: We don't have any control over contracts that they write privately, and, in fact, we know that goes on in the Gulf ITQ programs, and I have not heard about that in wreckfish, but that doesn't mean that it's not happening.

DR. DUMAS: There's nothing in the regulations that would prevent that from happening?

DR. TRAVIS: Technically, no.

DR. STEPHEN: We issue the allocation, or the coupons, to the shareholder on record, and so the only way for NMFS to do that is by that shareholder certificate. If they're in agreement that that occurs afterwards, then hopefully we would see that with the coupon transfer, and that should be recorded, but it would just be a pattern we would see, and we wouldn't have any knowledge privy to the actual contract between them, nor could we require that.

DR. TRAVIS: I don't know, even in the Gulf -- I don't think that, with the analyses that have been done, I don't think any of us have actually intentionally went to look for those kinds of patterns. That's a great point.

DR. STEPHEN: We have transfer reasons in the Gulf that they need to submit, but there is not one that I think would be applicable to that situation.

DR. TRAVIS: No, I don't think so either.

DR. CHEUVRONT: Scott, can we go back to share caps for a second?

DR. CROSSON: Yes.

DR. CHEUVRONT: One of the things that is of concern is that we're not sure whether the ABC/ACL are going to remain where they are now. I mean, currently, they're going down a little bit, but a future assessment could show, potentially, that more fishing could be allowed. The fishermen certainly believe that heavier fishing pressure would be sustainable, even going back to the years where it did happen, and so, in a hypothetical situation, if the ACL were to go up, we're dealing with a share cap of 49 percent.

Theoretically, if the council did not take any increase and set that aside for something like new entrants, but kept it within the current shareholders that they have now, because those shareholders say that we don't have enough fish, and we could catch more fish than what we're catching now, and does that share cap of 49 percent, is that still good to have there? In essence, when you've got somebody who is fishing, hypothetically, at that 49 percent level, and let's say the ACL was to double, is that could to be more fish than one person would actually be able to fish, and is that okay?

They have a share of the overall that they could then trade to other people and continue to make money, even though it's not feasible for them to fish it themselves, and I guess that's kind of what I'm trying to get at here. Is that share cap at 49 percent, is that cool, regardless of what the ACL would be in the future, or do you have any comments on such a thing? Should that be something the council should be concerned about, potentially, for the future?

DR. CROSSON: I guess that relates back to what I was talking about earlier with the question of whether the market for quota has ever functioned well enough to make any efficient fishery, and I'm not convinced that it has. There's always been -- There was a period where there was no quota share being bought or sold for twelve or thirteen years, nothing, no leasing, no selling of quota, and there was just nothing happening.

Then, when 20A was coming down the pike, people that knew that they were going to lose their quota got out of the fishery, and so there was a bunch of market activity in that year, and then I guess there's been some activity since then that I've not looked at, and I guess Mike and John have, but, when I'm listening to this and hearing that there are prices that are being offered and they're not being met, and there is some quota that is not being used, and the folks that are unhappy with the price that's out there are not -- They're just hoping that there's going to be a larger quota overall and they're not willing to pay beyond a certain amount, but it just seems, to me, that this fishery lacks a sufficient number of participants to make sure that the market is actively functioning, and so that's something that I think that -- These are all wrapped together, to me, and I don't see a way of pulling them apart.

DR. WATERS: Brian, in your scenario, I don't see why the rationale for the 49 percent cap would be different, regardless of the level of the TAC. I think the issue would be if the council wanted to increase the allocation to the recreational sector or increase the volume of fish available to the recreational sector. The question is how would that increase be distributed among shareholders? Right now, we come up with some formula to distribute for free, but perhaps the council would like to consider a situation in which they actually sell the extra quota and people can bid for it, subject to remaining within that 49 percent cap.

DR. CHEUVRONT: Thanks, Jim.

DR. CROSSON: New topic. Jim.

DR. WATERS: Before we leave this, I believe that one of the original objectives of the management plan concerned capacity and excess capacity, and there's always been a lot of interest in getting rid of excess capacity in fisheries, and that often is defined as latent fishing effort. It's fishing effort that's not really being expended at the moment, but people have the ability to jump into the fishery at any time very quickly to harvest extra fish, and I think that the -- From an evaluation of the ITQ program, the recent reductions in the TAC, it certainly has removed a lot of excess capacity from this fishery, and so I think that is a major achievement of the plan. Maybe I shouldn't say "achievement". Major outcome of the plan that has reduced excess capacity.

DR. CROSSON: We've talked somewhat about privilege duration and subsequent distribution. Do we have anything else to --

DR. CHEUVRONT: If we could spend a little time talking about the last three items on there of new entrants, monitoring and enforcement, and privilege duration, because I think there is certain things that it would be good if we could get the SEP to clearly weigh-in on those three topics. For example, new entrants into the fishery, I mean, we're down to six shareholders at this point, and there has been some discussion of the barriers, because of all the permits and things that somebody is required to have to get into the fishery.

The other side of it is that does it really matter if an ACL goes up? Does it matter whether the increase in fish goes to the current shareholders, or does it make sense to hold some of that off for new entrants, or all of it for new entrants? If so, with the logic and all behind that -- I mean, if we have the problem of it's difficult to get into a fishery and you have an aging fishery, and we are starting to face some of those issues in this fishery.

There aren't twenty-something-year-old guys getting into this fishery like you see in a lot of other things, and so if you can help us make sure that we're covering all the issues that need to be covered, in terms of ways that we can look at getting new entrants into the fishery. In talking with the shareholders this past summer, they were all in favor of there being new entrants, as long as they got enough pounds for what they wanted to fish, and then, anything that's left over, then, sure, we can use that for new entrants, but is that really fair and equitable and is that the right way that this should be looked at for the future?

DR. WATERS: It seems to me that the program, as currently structured, already accounts for this. Anybody can buy any fraction of a share. If you want to jump into the fishery, you don't have to buy a substantial amount of shares. You can just get a tenth of a percent or something like that.

DR. CHEUVRONT: That's true. If you've got all the permits and everything, and if you buy some share from somebody, then, yes, you would be able to buy additional -- At least get transfers.

DR. WATERS: Right, and so the problem is the barriers to entry because of all the permits that are required and the cost of the permits. The problem is not in how the share system is structured and the availability of shares to new potential entrants.

DR. STEPHEN: I just wanted to add that, this year, we've had three share transfers, I think resulting in two more new entrants, and so, yes, entrants can get in, but the problem brought up of

how you do the quota is a problem that's being brought up in other catch share programs, because most of them traditionally give any quota increases equally out by the share percentage to the people who already have the shares, and there's been a lot of discussion about whether you can do something where you set aside a portion of the quota for new entrants, but then you might want to define what they are and what the mechanism is to get that. These are issues that are being brought up in other catch shares, and it would probably be worthwhile thinking of them in relation to the wreckfish fishery.

Also, I think all of these shareholders, the new entrants that we had, already had an SG1, and so it was just a matter of getting the wreckfish and getting the share transfer, and I believe, in the wreckfish, we got to four decimal places for the percentage, and so they could transfer 0.0001 percent to someone else as a minimum amount.

DR. CROSSON: That's interesting to hear, because I was thinking that -- I had heard several times, right before 20A, when some of the other deepwater fisheries were running into trouble, that people were worried, because there were so many snapper-grouper-permitted fishermen that could easily go out there and catch wreckfish and that suddenly the wreckfish numbers that would jump up, that the market would revive, but it never did, even up to 20A, but there was a lot of fear about it, and so it's interesting to hear that somebody actually is getting into the fishery now, a generally-permitted snapper grouper person.

DR. STEPHEN: That might be because they know this review is occurring and they are anticipating benefits and they want to buy-in when it's, quote, cheaper than it might be after we change the program.

DR. TRAVIS: There is a lot fewer of those SG1 permits out there now than there was six or seven years ago. I think, the last time I looked at it, there was about a 50 percent reduction. Kari will cover that more in her presentation. Can I raise one other issue?

DR. CROSSON: Sure.

DR. TRAVIS: Brian, I don't see this on our list, but one other section of the review will deal with cost recovery, which we do not currently have in the wreckfish program, but we do have cost recovery in most of our programs, and, Jessica, you may want to explain why we currently do not have it for wreckfish, but that doesn't mean that it might not have it down the line.

DR. STEPHEN: Sure, and so, with the wreckfish, we've written a waiver for not doing cost recovery every year. Generally, what we've done is we kind of look at what the cost is for us to administer the program with this whole paper-based system and weighed it against how much effort it would take to generate the mechanism to collect the cost recovery, and it we felt that it wasn't quite worth our effort.

Now, I don't know if we've looked at that in recent years as much as just gone forward with the same logic for it at that point in time. Granted, if we want to go out of the paper-based system and into the more electronic age, like we have for a lot of the other catch share programs throughout the nation, then we probably would want to consider some type of cost recovery fee and some kind of mechanism to figure out how much we think -- Cost recovery can be up to 3 percent of the ex-vessel price, but that doesn't mean that you have to be at 3 percent of the ex-vessel price. Many

of the fisheries that are more lucrative, it's a much lower percentage. In the Gulf, we happen to have it at 30 percent.

DR. TRAVIS: There is a cap on that fee, which is 3 percent, if you do have it, and we're currently at 3 percent in both of the Gulf ITQ programs, but there are other programs around the country where it's considerably less.

DR. STEPHEN: Assuming we would do anything electronic, if that was the way the council wished to go, we would probably build off of our existing structure, and so we wouldn't probably have, actually, a need for a full 3 percent for them, because we would be balancing cost recovery from three different programs to use for the people who would be administrating it.

DR. YANDLE: I may be about to regret saying this, but, given the relatively small value of this fishery and the number of people in it, is it possible that, even though the coupon system is fairly absurd, that it actually may be more cost effective and make more sense than going to a full electronic system and avoiding dealing with cost recovery and those kind of issues?

DR. STEPHEN: Speaking as someone who is looking over the data right now, I would love an electronic system. Just because we go electronic, it doesn't necessarily mean that we would institute a cost recovery. We would probably do an analysis to determine whether it would be warranted or not. We do have an electronic IFQ system with bluefin tuna, the IBQ program, and they do not collect the cost recovery fee, even though they are an online system, and they actually use a model from the Gulf.

DR. TRAVIS: I will simply mention that, when we did that assessment before, that was prior to the quota increase, and you're talking about almost a doubling of the quota, and John can correct me, but I think, over the last two to three years, there has been a bump-up in the ex-vessel prices as well, and so the revenue being generated by the fishery this past year I think is noticeably higher than it was three or four years ago. John, would you concur?

MR. HADLEY: Yes, you're absolutely right. The 2016/2017 season had the highest price per pound on record, and, at least as far as the time series that we analyzed, it increased pretty steadily through that time series. I am looking at $4.37 per pound for the 2016/2017 season.

DR. CROSSON: I think, when I looked at it in 2012 or something, it was three-something a pound, and it was about 50 percent higher than it had been twenty years before, when the ITQ had been instigated, and so it definitely had climbed over time. That is inflation-adjusted, of course. Have we gone through everything on here? Is there any other topics that the SEP recommends covering?

DR. CHEUVRONT: In terms of monitoring and enforcement, in the original establishment of the program, it was set up so that there were approved landings sites and approved hours in which people could land wreckfish, and, in those times, it was 49 participants. This is of concern largely to the commercial shareholders now because they say this is a real small fishery and there's not many people participating in it, and they don't have much law enforcement involvement, and they find it to be, frankly, a pain to have to abide by those guidelines specifically, because, if they don't get back in time, and I believe -- If somebody there at SERO could help me, but I think it's 6:00 p.m. is the latest that they're allowed to offload.

The shareholders certainly would like to see those provisions go away, since there doesn't seem to be much law enforcement involvement in this fishery, and that actually is probably causing these shareholders to be less efficient, because sometimes they can't tie up, and they've got fish sitting out there, and so, if you all have any comments that you would like to put in on that, that would be great.

DR. STEPHEN: Brian, is that landing time they're restricted to or offloading, and so they could tie up, but they can't remove the fish, if it was offloading.

DR. CHEUVRONT: You know, I may be confused, but I thought it was -- It might be offloading. I know definitely they cannot offload, but I was not sure about whether they can tie up, now that you mention it that way, because sometimes --

DR. STEPHEN: In the Gulf programs, you can tie up your boat, but you can't offload after 6:00 p.m., and I want to say wreckfish is a 5:00 p.m. instead of a 6:00 p.m. cutoff.

DR. CHEUVRONT: I knew it was either 5:00 p.m. or 6:00 p.m., and I thought it was 6:00 p.m., but, either way, it's still an inconvenience to the participants.

DR. WATERS: Does there have to be some type of NMFS Enforcement officer present when the ship is offloaded?

DR. CHEUVRONT: I don't think it's required that they're there, because I think -- Jessica and Mike, if you can help out here, but I think what they just have to do is notify them that they're going to do it, and OLE can be there or not.

DR. STEPHEN: The restriction is to allow OLE to be there if they so desire to, and I thought, at the shareholders meeting, they said that a lot of times that OLE is not there, and so it seemed like an additional burden to them when OLE isn't showing up.

DR. CROSSON: Any comments from the committee on this?

DR. DUMAS: Are there any restrictions on when OLE could show up? Do they work 8:00 to 5:00? Is that the reason for the restriction to 5:00 p.m.?

DR. STEPHEN: OLE can show up at any point in time. The restriction is to daylight hours, so that people aren't trying to sneak fish off when there is less enforcement around in the nighttime hours, or at least that was the theory used in the Gulf, and I'm assuming that it applied to wreckfish as well. OLE likes to have daylight hours for offload, because they have more staff on hand, and there is less chance of fish kind of walking away without being reported.

DR. DUMAS: That makes sense, but, with this fishery, with such a small number of participants, maybe the hours could be extended.

DR. STEPHEN: I think that's one of the things that we'll cover in the review, is discussion along those lines. That was also asked for in the Gulf one, to have the hours extended. Of course, that's a much larger fishery, with a lot of different problems and more landing locations. With the

wreckfish, I think someone could build an argument to extend that timeframe, especially in the summertime, when your daylight hours go a lot longer.

DR. DUMAS: It seems like, if OLE is not there, that it's just as easy to sneak a fish off a boat in the daylight as it is to sneak a fish off in the nighttime, if they're not there, and that's not a criticism of OLE, but, if they could show up, and they wouldn't even necessarily have to show up every time, but just, if they showed up a random number of times of nighttime hours, if it was sufficiently large enough, that would probably be a sufficient deterrent.

DR. TRAVIS: I did look it up, and it is offloading between 8:00 and 5:00, and then they have to provide notice twenty-four hours in advance to offload. I think this is kind of a sore point with the shareholders, because they're subject to this requirement, but I believe at least one of them said that they hadn't seen an enforcement officer at one of their offloadings in a decade, and so they were kind of like why are we being held to this timeframe when we never see enforcement and what's the point.

DR. WATERS: Back when the program was first put together, I think there were two issues here. One was the accessibility of enforcement people, but the other was an incentive for fishermen to cancel their coupons. The coupons for the fish that they catch are supposed to be canceled, and that is signed, before they hit the dock, and there had to be some sort of incentive to make sure that that happened, as opposed to just waiting to see if somebody showed up, and then you might not cancel those coupons and have them available for another trip.

DR. TRAVIS: When they use the coupons, I thought the coupons actually had to be attached to their logbook when they submit.

DR. YANDLE: Could it be then that issue is tied up with our previous one of electronic reporting? If you move to electronic reporting, then you have the mechanism in place to deal with the hours.

DR. CROSSON: There's lots of head-nodding going on here.

DR. CHEUVRONT: Yes, that's a very good point.

DR. WATERS: I mean, I will echo Tracy's comment about the cost of developing that electronic reporting system. You have to weigh that against the number of people involved in this fishery, relatively small amount of people and relatively small volume. You want to make sure that it doesn't cost a million dollars to develop the system for a very small fishery.

DR. TRAVIS: Which it shouldn't.

DR. STEPHEN: It would be the cost of maintaining things from there onward, which should be minimal.

DR. TRAVIS: Depending on how we define "incremental costs" in this case, because we're only allowed to assess, for cost recovery purposes, the incremental costs of the program.

DR. CHEUVRONT: The last thing is the discussion of privilege duration and subsequent distribution. This is IFQs that are under the more recent policies and guidelines set forth by NMFS,

and they have to set a privilege duration, which the fishermen are granted access to shares for a limited period of time, and I think the maximum period right now is ten years. Because this IFQ is older and predates that, that is not a requirement of this program, and clearly the current shareholders would like to see it stay that way.

However, something that the council can consider is setting a duration for the ownership of those shares and then setting up a way for how those shares could be redistributed, and I don't know if the SEP wants to weigh-in on particularly whether share duration is an issue that the council should consider for this program.

DR. TRAVIS: One quick comment on the duration issue is what Brian said is true, but the privileges continue forward unless the council explicitly revokes or suspends or basically does something with those privileges. If the council does nothing, they continue on for another ten years, in theory indefinitely, until the council -- Until a council does something, which then gets into the whole appearance of perpetuity, but the attorneys will tell you that we do not issue catch shares in perpetuity ever.

DR. WATERS: I am not necessarily speaking for the entire committee here, but, in my opinion, the viability of an IFQ program depends on the ability to generate share prices and coupon prices, or quota prices, and, any time you put a limit on the duration of the program, you are impacting the amount of money that somebody is willing to spend on a share, and, the closer you get to the deadline, the smaller the price per pound per share and the less likely you're going to have all of those potential benefits of an ITQ program, and so I would personally recommend that you not have any type of duration limits on an ITQ program.

DR. STEPHEN: If I can just chime in here, but one thing that is being considered in catch share programs is something we're calling an adaptive catch share or cyclic catch share program, and what that is, it kind of combines a use-it-or-lose-it and a privilege duration in concept together. The gist of it is that you take back, from every shareholder, a set small percentage every X amount of years, which is your cycle, and then what you do, or one that I think you could do, is what you took back gets redistributed to those people proportional to their landings, and so those who were more active in the fishery can gain back what was taken from them and they gain additional to that, if there were people who were inactive in the system.

That's probably one thing that we might highlight in this section, and I was kind of curious if there was any feedback from the SEP about an adaptive or cyclic approach to taking back shares and the share duration and what happens thereafter.

DR. CROSSON: Before we answer that, Mel Bell is a council member from South Carolina that has a question, and I would like to hear what Mel would ask the committee.

MR. BELL: I heard you discussing offloading of wreckfish and the need for NOAA OLE to be there, and we actually -- South Carolina DNR Enforcement monitors offloads under our JEA agreement, and so we actually do that, and I just wanted to verify that, and so I called the Region 4 Lieutenant, and he said that, yes, they get notified and they meet the boat and they monitor the offload, and so NOAA OLE doesn't have to be there. We cover that in the case of probably most of the offloads, I would imagine.

DR. TRAVIS: That would cover South Carolina, and so maybe the comments came from the Florida contingent. That's a total guess on my part.

MR. BELL: That could be, and, again, we do have -- We do have a pretty big interest in the wreckfish fishery here, and so that may be why.

DR. CROSSON: Thanks, Mel.

DR. TRAVIS: Of course, as someone just told me, we can't do state-by-state level analysis. Well, you could probably still do something in this respect, because it wouldn't require the disclosure of confidential data.

DR. CROSSON: To the point of the cyclical, I had a couple of comments, I guess. One is that, and this is in the article that Tracy and I wrote, but we were looking at the price. There was a lot of quota being sold in the time period when we were doing our analysis for the article in *MRE*, and you could see -- I also did net revenue estimates for the fishery that year, and you could see that price of the quota was fairly depressed. I think you would expect, I think in a normal fishery of that age, that the permanent share transfer would probably be worth five or six years' worth of profits, and I think it was down to 1.5 or 1.8.

It was a force distribution, and it gets to this question about privilege duration, and it was basically illustrating that the fishermen did not have a lot of trust in the system, at that time period, that this was not going to happen again, and so I think it gets directly to Jim's point about the depression of the price of shares, and so, if the council does go down that road, that's something to consider.

I guess the second point, which is getting back to what I was kind of thinking about a little bit earlier, which is that if we did do what Jessica is talking about and redistributed, I would wonder whether that would include -- You said you distributed by people who were actively fishing, and I wondered whether that would include leased quota or not, as a way for folks that have a pound or two that they own, and so they're allowed to lease some more, and would this be a way of helping them sort of build more of their quota over time, because they're showing an active engagement in the fishery through leasing? That's something that -- I don't know if there's anything in the literature to that.

DR. STEPHEN: I can speak to that a little bit. That question came up when we were considering this in the Gulf for one of their for-hire potential PFQs, which is a permit fishing quota, which is slightly different, and that's why we were thinking landings and not use of the allocation, because use of allocation could include leasing it to someone, and we want to exclude that, in favor of the people actually harvesting. So, yes, in the way it's being developed currently, it would probably be towards those that are harvesting, whether it's from leased allocation or shares, and that kind of also gets out of the idea of sea lords or whatever you want to call them, the guy who is owning shares, but not actually fishing them, which is generally considered a negative of catch share programs.

DR. WATERS: I will go on record here, not necessarily speaking for the full SEP, but for myself. I think anything like a use-it-or-lose-it provision, or any type of unilateral reallocation by the council, is probably going to be a bad thing for the markets, for shares and coupon prices, and I would not recommend doing it. I would let the markets work and just let it go at that.

DR. CROSSON: When this originally came before, when 20A was being considered by the SEP, I think we made a recommendation at that time that we not do that allocation, and, for what it's worth, when Tracy and I sent that article off to *MRE*, one of the anonymous reviewers expressed horror at what the council had done.

DR. YANDLE: I would also add in that, beyond the effect of the market, one of the whole ideas of ITQs that we touched on earlier is that they give people a long-term investment in the fishery and move people towards sustainability and sustainability thinking. Once you undermine their belief in that property right and their belief in the idea that, if they take a short-term hit that they will see the long-term gain from it, you're going to undermine any development of that sustainability thinking that you have.

DR. STEPHEN: I will just add that, when we were considering some of these cyclic things, all of those questions also came up, and it was -- One of the things being tossed around is that, in a more mature program, like the wreckfish ITQ, you would set it at a very low percentage, say 20 percent of everybody's shares, and so you take 20 percent times their share percentage would come back, and that cycle would be for a much longer cycle, and so more than five years, possibly up to ten years, in order to not have that disruption to their business practices and the value of their shares, although, at the end of every cycle, there would be a disruption to that market value for the shares.

DR. CROSSON: Are there any other topics? For 4 and 5, are there any other topics that we recommend covering in this ITQ? We brought up, I think, a few of them along the line.

DR. CHEUVRONT: You did mention the cost recovery issue, but is there anything that we haven't discussed that you think that should be considered as part of this ITQ?

DR. CROSSON: I am sure that it will be mentioned somewhere in the document, though I haven't seen it yet, but there are two estimates of net revenue that exist for this fishery, and one is in Tracy and my article and the other one is from the Richardson report in 1991 or 1992, or I guess 1992 or 1993, right in the beginning of the fishery, and those numbers are compared in that article, and so that's available. Do we have to answer Number 5? Are we supposed to say whether this is the best available information?

DR. CHEUVRONT: Well, I guess this is a recommendation that would probably end up going to the SSC, for you all to help inform the SSC on their judgment of this review. Basically, we have four sources of data, and I don't know that there are any others that are potentially out there.

DR. WATERS: To repeat some of the comments that I made earlier, in this case, information did not appear in the draft that I think is possible and would be useful, and that would be more information about prices, ex-vessel prices, versus quantity, for example, and share price per pound over time and coupon price per pound over time and the ratios of share price to ex-vessel price and coupon price to ex-vessel price. Then some time series data about catch per unit of effort I think would be useful.

DR. CROSSON: But you all think this looks pretty good? All right. Rusty Hudson has had his hand up forever, and, Rusty, if you're online still, and I don't know if this is general comment or

if there are specific questions that you would like to ask the committee that we've discussed, or is there something that you want to draw attention to?

MR. HUDSON: I am just making comments that John indicated could be used in your record and a little food-for-thought for folks that are paying attention to it. Otherwise, I am not -- I didn't even know my hand was raised.

DR. CROSSON: All right. I didn't mean to draw attention to you. Sorry.

DR. CHEUVRONT: I want to thank you all for your help and input here. I think it has helped clarify some of these analyses that will make this a better review as well as helping to inform the SSC overall in their review of this. I mean, they clearly saw that many of these topics and issues that were raised in this review were really much more pertinent to be discussed by this group, and I think you have given them a lot of information that will help them when they make their final recommendation to the council, and so I just wanted to personally thank you all very much for helping us clarify some things here. That's all I've got, Scott.

DR. CROSSON: At this point -- This took up a big chunk of the afternoon, and we have a number of other agenda items to try and get through before we finish up tomorrow. Is the committee willing to keep pushing through? We'll take a five-minute break, but are we able to kind of push through until 5:15 or 5:20 and see how we do? All right, because I want to make sure that we can cover these other items. Let's take a five-minute break and come back at quarter to.

(Whereupon, a recess was taken.)

DR. CROSSON: We are reconvening, and so everybody has got lots and lots of comments, and so this is good. We are now moving to Item 5, Trip Metrics Used in Estimating the Economic Impacts of Recreational Fishing. John, I guess you're going to be presenting this?

MR. HADLEY: Thank you. In the briefing book was the draft economic impact report that was put together for kind of the overarching view of what do these fisheries contribute to the economy that are managed by the South Atlantic Fishery Management Council, and I will kind of go over just kind of a broad overview of some of the information that went into the analysis and some of the, I guess, outputs, and then some discussion questions for the SEP.

Essentially, the question that was posed was what are the economic impacts of fisheries for the South Atlantic Fishery Management Council-managed species? That's a fairly large array, and so the report looks at both recreational and commercial fisheries, and so it's the entire fishery, but, the discussion for this, I wanted to focus on the recreational sector and the input that went into calculating some of those economic impacts.

What we're looking for here are jobs, income, value added, and business sales, that sort of information, and it's part of an effort to provide a more comprehensive overview of South Atlantic Fishery Management Council-managed fisheries, and so kind of the big picture. We tend to look at the economic impacts of these fisheries on an FMP-by-FMP basis, and so there's a lot of information out there for species-by-species, but there's not really a comprehensive document that kind of brings it all together. One important point is kind of the reasoning behind this question

being posed is more of a public-outreach-driven question than a policy-driven question, and so it's more of an economic contribution rather than looking at some sort of policy change analysis.

Some of the tools, very briefly, that we have at our disposal, or readily available, is that we can examine economic activity from recreational trips for all SAFMC finfish species, and so this is snapper grouper, fisheries occurring from the Florida Keys through North Carolina, coastal migratory pelagics from the Florida Keys to New York, and dolphin wahoo for essentially the entire east coast.

We have information on recreational activity for these species through the Marine Recreational Information Program, or MRIP, as it is commonly referred to, and so, in very brief terms, this trip information is input into an economic impact tool that was developed by the Southeast Regional Office, and they've been very nice to share that with us, and, again, as I mentioned, we use this for our FMPs, and I will get a little bit more into some of the details of this tool.

As I mentioned, there is the economic impact tool developed by the Southeast Regional Office, and it examines impacts of recreational trips for a species, or group of species, and really what you're looking at here are trip expenditures. It's not necessarily durable goods expenditures, the exception to this being for the for-hire sector, since, theoretically, the trip revenue should include durable goods, at least partially.

The multipliers in this tool are essentially trip-level impact coefficients derived from *Fisheries Economics of the United States* and supplemented with underlying data from the Southeast Fisheries Science Center. If you really get down to the bones of it, it's essentially an input/output model, and the underlying multipliers originate from IMPLAN, which is what is used for this annual fisheries economics of the U.S. report.

A quick aside on why durable goods tend to be excluded. Again, we're looking at this group of species, and so durable goods can be very difficult to attribute to one species, or even a group of species. They last for multiple years, and they are used in multiple fisheries, and they could be used in other activities. For example, a tow vehicle that you might tow your fishing boat with, you could use that for daily transportation, and that boat could be used for other activities, such as waterskiing, and so it gets pretty difficult to look at -- There are durable good estimates, but, when you're getting down to the species, or even this large group of species, it's really hard to attribute those to a group of species.

As an aside, I have a fishing reel over here, which I have had for -- This is a personal aside, but I'm had it for a while, and I was thinking about it, and I was thinking of all the fisheries that I've used it in, HMS and dolphin wahoo and snapper grouper and coastal migratory pelagics and inshore and state-managed fisheries and in fresh water. I've used it in four different states, and I bought it used in 2010, and so, if you asked me to attribute this to my snapper grouper fishing activity, that's going to be pretty difficult, and so that's just kind of a personal aside, and it demonstrates the reasoning of why durable goods are excluded.

The model results are your typical IO outputs, and so you have jobs, full-time and part-time jobs, and income, wages, salaries, and self-employed income. Then you have value added, and so contribution to regional GDP, and then sales, which are also output impacts, representing gross business sales.

If you look at the model inputs, essentially what is put into this tool, the main numbers that are put in by the analysts, you have angler trip estimates by mode, and so you have three primary modes. You have charter, private or rental, and shore, and these trip estimates originate from, as I mentioned earlier, MRIP, and so the Marine Recreational Information Program.

A caveat of this is there is no headboat effort data in MRIP, since this is tallied by the Southeast Fisheries Science Center, and there are not really any corresponding multipliers that have been developed for the headboat effort. Excluding headboat effort and durable goods likely leads -- Essentially, you're leading to a lower bound on the estimated economic activity.

Then the final point is this model is highly sensitive to the input of the number of angler trips, and so, as with any economic impact analysis really, there is a lot of discretion that goes to the analyst, and this is kind of the crux of bringing this whole presentation and research question to the SEP. Finally, the model is also highly sensitive to the mode under which the trips occur, and so multipliers are very sensitive to the mode that is put into the model, and so you tend to have much higher multipliers for for-hire trips than those occurring for private vessel trips or from shore.

A brief overview of the types of recreational trip estimates that MRIP provides. You have primary or secondary target, and so this is what is used typically when economic impact analysis is performed for our FMPs. This is what is examined, primary and secondary target, and so the species does not have to be caught. It's unobserved, and this is kind of unobserved catch, so to speak, and we'll get into that in a little bit more detail, but there are basically only two species that can be mentioned as targeted on a trip for the MRIP intercept form.

You can look, and MRIP provides harvest trips, and so trips on which a species is harvested, and this could be observed catch, and so which a port sampler or sampler examined those fish, or unobserved catch, where a fisherman essentially said that I caught a black sea bass today and I kept it, and that would count as a black sea bass trip, if you were examining it for that species. You also have release estimates, and so these are unobserved catches, or B2.

The way it's set up, you can really create any combination thereof, and so, in the report, both harvested trips, and so unobserved catch and observed catch, are included, as well as what are termed directed, and this is essentially a -- You had to name it. It's a made-up term, but directed, in this case, is defined as a trip where a species was a primary target, a secondary target, or harvested. It's not quite the highest number that you could go to. You could add released in there, and that would be an option. As I mentioned, the directed trips were what was used to produce the economic impacts for recreational fisheries.

A few more caveats, as far as going into using MRIP data, and so primary or secondary targets. As I mentioned, only two species may be listed, and that trip could very well have targeted more, but those first two are what get recorded on the intercept form, and there really is a large human factor.

Target species can change based on success or lack thereof for a trip, and there's also an option, when someone is asked what they were fishing for, of no particular species or anything. If this is chosen, that trip is not going to show up under any sort of query that we're doing looking at specific species. At times, in some situations, it can be a fairly common response. I remember, when I

worked with North Carolina Division of Marine Fisheries, that was quite a common response for many of our inshore species or inshore samples taken for inshore trips.

In general, overall, unobserved catch, and so harvested or released, can be influenced by issues such as recall bias or species misidentification. Effort estimates are just that. They're an estimate, and so there can be considerable uncertainty, especially for rare-event species, such as some of our deepwater species, and then the effort expansion factor that goes along with that.

As mentioned earlier, there is also no headboat data included under MRIP, since this is captured by the Southeast Regional Headboat Survey, and there is no information on effort for invertebrates, and so there is clearly a fairly large recreational fishery for lobster in south Florida and the Keys, but we just don't have the effort estimates and corresponding multipliers to go along with that.

Just to demonstrate some of the caveats of using MRIP data, and you really have to be careful when looking at different species, and so I have a table up here looking at king mackerel effort last year in the South Atlantic region, and, on the left there, you have the different trip types, and so targeted, harvested, released, targeted or harvested, and then targeted or caught, which is kind of that upper-end estimate.

Really, if you chose targeted or caught or targeted or harvested, and you ran this through the model, you're not going to really have that big of a difference, because you can see there's not a very big difference in trips. On the other side of the scale, I ran angler trip estimates in the South Atlantic for black sea bass, and, as you can see on the right there, in the middle, that release estimate is very, very high. If you were using directed trips as they were defined as targeted or harvested, you're looking at a much lower number of trips input into the model than if you used a different estimate, such as targeted or caught. You're looking at 94,000 trips versus 629,000 trips.

DR. WHITEHEAD: Sorry to interrupt, but can I ask my question now?

MR. HADLEY: Sure.

DR. WHITEHEAD: If you are using both Prim 1 and Prim 2, and so let's say Prim 1 is king mackerel and Prim 2 is black sea bass, are you counting that single trip twice?

MR. HADLEY: That's a very good question, and that is something that we looked into right at the beginning, and no. The way you can query the data, you can exclude double-counting of trips, and so you can do that between two species, or you can do that, for example -- If you're looking at Target A1 or B1, it's an "or" question, and so, if that trip counts for any one of those, then it counts once, and it gets excluded otherwise. If I targeted black sea bass and I harvested them and I also released them, that wouldn't be three trips. That would be one.

DR. WHITEHEAD: I can see how that would work when you're looking at harvest versus target, but, if it's just the target, primary or secondary, are you able to, through the way you're coding that, to make sure that you don't double-count?

MR. HADLEY: Yes, and I say that, but I'm not the one that pulled the data. That was our data analyst, but I have worked with several data analysts that are very confident that they can code the

data where they are not double-counting between -- They can look at a group of species and give one trip estimate for that group of species.

DR. WATERS: I would like to follow-up on John's question. You're going to do this analysis for each FMP, correct?

MR. HADLEY: No, and so it's -- Well, it's usually done in each FMP, but, yes, the idea here is to take a comprehensive look at all of our FMPs together, so that laundry list of species and the effort, and you're looking at different regions. For snapper grouper, you're just looking at it for the South Atlantic. When you tie in CMP, you have to look at the South Atlantic and the Mid-Atlantic. Then, for dolphin wahoo, it's essentially the entire east coast.

DR. WATERS: Okay, and so, if you were doing one analysis for the entire South Atlantic, I can see how you can avoid double-counting. If you were doing a separate analysis for snapper grouper, and black sea bass was one of the primary species, and then you did another analysis for coastal migratory, and then you would have king mackerel, and you would think that trip would show up twice.

MR. HADLEY: I don't believe it does if you query the data all at once. We are not querying king mackerel data and then querying sea bass data. We're kind of -- It's one large query for the -- You basically input the entire MRIP dataset and then you query it all at once, and so, theoretically, there should not be double-counting, looking at all those species.

DR. WATERS: But you're not doing a separate analysis for each FMP then, and you're just doing one analysis for all the species together.

MR. HADLEY: Yes, correct. That whole laundry list for the South Atlantic for finfish species. Any other questions? That's a great question. That's a very important consideration. Jumping, very briefly, into some of the results, and this is kind of an amended version of Table 5 in the report, and so looking at total directed trips for South Atlantic species. We had directed trips, and we had harvest-only trips, pounds harvested, and so this directed trips number is what -- This is what, in those top three, this is essentially what was input into the model, and there, again directed trips are being defined as primary or secondary or harvested. Primary or secondary target, rather, or harvested.

This was essentially the results, looking at the output of the model, looking at jobs and income and value added and sales for that, and one thing I wanted to point out is you can see that -- If you look up above, charter has the lowest number of trips, but it tends to have the highest impacts there, and, there again, I think a lot of that is coming from kind of that indirect capturing of some of the durable goods by using the -- You're using essentially the charter fee estimates and then backing into them, and so that's where that kind of considerably higher impact for a trip shows up.

Then, finally, this is a table comparing these results to what's found in *Fisheries Economics of the United States*, and those top two there -- This isn't exactly an apples-to-apples comparison. The South Atlantic trip impacts include more of -- They include regional expenditure data and national level multipliers to include interstate commerce. The *Fisheries Economics of the United States*, essentially what they did was they took a summation of the results table in that report, and so you're not really accounting for that regional expenditure data and interstate commerce.

If you do compare it, you're looking at the SAFMC report results up there at the very top, and they're about a quarter of the results for the entire South Atlantic region, and then, finally, there towards the bottom, you have durable goods impacts and total impacts. There again, one thing I wanted to point out is that, if you're looking at *Fisheries Economics of the United States*, in that model, durable goods really are the driver for the output of that, and that's one thing that -- It's certainly acknowledged, but I don't know if there is any other way to input that or to include that in this report, but that's something that is worth pointing out what's being left out of this analysis.

DR. WATERS: If we have information, tabulated information, like this from *Fisheries Economics of the United States*, what is the reason for trying to develop your own analysis and not just cite what was already in this report?

MR. HADLEY: One thing is *Fisheries Economics of the United States* is looking at regional, and so it's essentially looking at -- In this case, if you're boiling it down it's looking at recreational fishing in the Southeast, and so you're including inshore species and HMS species, and so what we're trying to do is drill down on that South Atlantic component, and so that's the reasoning there.

The other reason is, if you look at the -- In *Fisheries Economics of the United States*, the impacts are reported on a state-by-state basis, and so, there again, you're not necessarily capturing the interstate commerce, and so, when you're setting that IO kind of region, you're looking at here is east Florida and here is Georgia and here is South Carolina and here is North Carolina. This is more looking at it on a regional basis, and so that's the reasoning there.

DR. WHITEHEAD: Could you explain the first two lines again?

MR. HADLEY: The top one is the results specifically for the South Atlantic region that are in the draft report that was included in the briefing book, and so that's essentially what's reported as of now.

DR. WHITEHEAD: It's a three-year average?

MR. HADLEY: Yes, and, there again, that's something that I should have pointed out. When I was saying it's not necessarily a comparison of apples-to-apples, that certainly is a good point, but I should have mentioned that, but, yes, it's a three-year average versus a one year, but I guess, more accurately, in hindsight, I should have gone back, and I could have pulled at least 2014. 2016 is not available, but that would be another comparison for that.

I will say that the driver is essentially this economic impact tool is updated annually, as *Fisheries Economics of the United States* comes out, and so your trip inputs are going to be different, but, as far as your multipliers, they're going to be the same, because that's essentially -- When a new edition, so to speak, of *Fisheries Economics of the United States* comes out, and the model is also updated to incorporate that.

DR. WHITEHEAD: In terms of this comparison, my guess is you could do the South Atlantic 2015 fairly easily and just make that direct comparison.

MR. HADLEY: Yes, absolutely.

DR. WHITEHEAD: To answer one of the questions, if this is too high or too low, the regional impacts should not be greater than the national impacts. The sum of the regional impacts should not be greater than the national impacts.

MR. HADLEY: Correct.

DR. WHITEHEAD: To answer that question, you would have to do at least the Gulf and add it to the South Atlantic and see what that looks like, and is that true?

MR. HADLEY: Right, and so, if you look at the regional impacts, the Gulf has its own separate regional model, and so it's just looking at the South Atlantic region.

DR. WHITEHEAD: Are you not allowed to use that model?

MR. HADLEY: No, I am. You're saying tie in the Gulf and the South Atlantic and then see how that compares? Am I understanding that correctly?

DR. WHITEHEAD: For us to answer the question of is it too high or too low, all we can say is the South Atlantic should not be higher than the national number, and, without knowing what the other regional estimates might be using this method, we can't tell if it's too high. You might get the South Atlantic is $500,000 and the Gulf is $500,000 and the Northeast is $500,000, and also the sum of the regions is greater than the national.

MR. HADLEY: Got you, and I will have to go back into the tool itself, to pull that out, but, the way it's generally divided up, it is regionally, and I'm not positive that -- You could say that 1,000 charter trips occurred in the United States and what's the output of that, but I think we could back into that estimate. Any other questions before I go to the final kind of discussion slide?

DR. WHITEHEAD: This is related, and so I wanted to get it in here, but I was wondering why you included South Atlantic species on Northeast and Mid-Atlantic trips, including those trips in here? If you're adding up the regional estimates, that could lead to an overestimate compared to the national.

MR. HADLEY: Right, and so the way that that was broken down was we -- This might go back to Jim's point earlier, but we -- I say that we ran them all in one for the South Atlantic region, basically all the species that the South Atlantic Fishery Management Council covers, but, due to those extended range for CMP, it included the Mid-Atlantic, but just for CMP. Then that was input into the Mid-Atlantic version, so to speak, of the model. Then, for dolphin wahoo, you're running it for the Mid-Atlantic, and then you're also running it for New England, and so that was included -- Those trips were basically, if those trips occurred in the Mid-Atlantic region, they would be input into the Mid-Atlantic model. If they occurred in the New England region, they would be input into the New England part of the model.

DR. DUMAS: Trip expenditures were included and durable goods were not included, at least in the non-durable goods, but in the first two lines. For the trip expenditures, did you include things like restaurants and hotel expenditures associated with the trip?

MR. HADLEY: Those would be included in the NMFS model. Yes, they would be part of that.

DR. DUMAS: Which is the second row?

MR. HADLEY: Right. That would be part of the trips impact.

DR. DUMAS: Were they included in the first row?

MR. HADLEY: Yes, correct. They would be in that as well.

DR. DUMAS: So both?

MR. HADLEY: Yes.

DR. DUMAS: So how did you account for trips that the primary purpose of the trip was fishing trip or the primary purpose of the trip was not fishing trip, but fishing was just incidental to the trip?

MR. HADLEY: That is largely -- Essentially, that's unaccounted for. That's a function of the data, as far as what we can kind of get out of MRIP.

DR. DUMAS: The first row, the sales numbers seem low to me, just in doing a lot of these before, and so I'm wondering if -- We get a lot of economic impact from restaurants and hotels, and so you did include that?

MR. HADLEY: It is included in the NMFS model. I can go -- I would have to go back to the -- NMFS does have a report that has an angler expenditures report, and then they divide those into what are durable expenditures and what are trip expenditures. I know that restaurants and those sorts of expenditures would be included in that trip, in the trip expenses.

DR. DUMAS: The other question that I had was, when you focused, comparing again the first and the second rows, when the first row focuses on South Atlantic-managed species only, is that the primary difference between the numbers you get in the first and second row? The second row, those additional species would be migratory species and species in state-managed waters, like a lot of flounder?

MR. HADLEY: Correct. As John pointed out, you have the different baseline years there, but, as far as if you had -- You either use three years for the second row or you use the single year for the very top row, and that is what is being essentially excluded in this, and so the bottom row would account for the inshore effort, so to speak, for red drum, spotted sea trout, flounder, what have you, and that really is a large -- When you look at the overall MRIP numbers, that's where the majority of your effort is occurring inshore. Not only is it easier to access, but you also have that large shore component that really kicks in there.

DR. DUMAS: But a lot of the dollars are the charter trips.

MR. HADLEY: Correct.

DR. DUMAS: So a lot of those charter trips are excluded because they were going after highly migratory?

MR. HADLEY: Essentially, they're excluded if it doesn't -- Somehow if that list of South Atlantic species isn't caught in that query, then they're excluded. If they say that I'm going after yellowfin tuna and marlin, and they didn't catch any dolphin, they didn't target them, they didn't release them, any of those options, basically, then that trip would be excluded, and it's the same case inshore, and so, if they were going after seatrout and red drum, that's not going to be a South Atlantic trip, or a trip that would show up in that top line.

DR. WATERS: I would like to note that nobody ever comes along a year or two later and actually tries to verify these numbers. Like so many economic models, they're never actually -- I mean, they're hard to verify or test or refute. If a number looks too large or too small, it's only because of the numbers that we've been seeing in various reports coming out over time, and it's not that someone has gone out into the field and tested the predictions.

DR. DUMAS: When I inferred that that number looked small to me, I was comparing that number, which should represent a region, to some state-level numbers that I've seen before, but the state-level numbers included all the species, and so I think that's the major difference. Given that it's excluding the highly migratory charter trips and it's excluding the inshore trips, then it doesn't look small to me anymore.

DR. CROSSON: The proportion of inshore trips to offshore trips is pretty -- There is like three or four to one.

DR. WHITEHEAD: When Chris was talking, I read the footnotes, and so a lot of the stuff that I was saying was -- I would stand by my point that it wasn't correct comparing those two lines, but I think, in terms of answering the first and second questions, the way you're defining trips and then if it looks too high or too low, I think some sort of ground-truthing or some sort of adding-up test and some sensitivity analysis on the frontend, to get the definitions consistent with each other, from the national study to your regional study, would be a good thing to do.

MR. HADLEY: If I could, on that note, given some of the uncertainty, and this was one of the discussion questions, would there be a benefit, and this kind of gets to the sensitivity analysis or that sort of thing, as far as providing a range, because, essentially, what we're doing here is providing a point estimate, as far as what are the economic impacts of fisheries for SAFMC-managed species, and we're taking this point estimate. On the commercial side, you can have fairly good confidence in your data. On this side, as I mentioned, there is all the caveats of using these MRIP numbers, and is it good to provide this point estimate, or would there be some sort of more appropriate range?

DR. WHITEHEAD: I think, since this is the first time you're doing this, that, if you go back to that table that had all the different definitions of trips, to do the analysis for each of those, and I'm assuming that the analysis doesn't take a lot of time, since you're just punching numbers into the tool. At some point, in an appendix or somewhere, the comparison of those would be really useful.

DR. DUMAS: If you're going down that path, I think it would be also useful to include a sensitivity analysis to the proportion of the trips where fishing was the primary purpose of the trip to the coast, rather than the incidental purpose, because you may have been traveling to the coast to see Grandma, and, by the way, you took a fishing trip, but, if you had not been able to take a fishing trip, you still would have made that trip to see Grandma, and so then the incremental portion of the expense attributable to fishing itself could be smaller.

There are some estimates, and I know we've done some surveys where we've asked if fishing was the primary purpose of your trip and would you have made the trip anyway if you had not been able to fish, and so I know there is at least some surveys where those questions have been asked, and so you could do a sensitivity analysis row where you include that factor.

DR. WHITEHEAD: Is it on the survey form for MRIP? I think they're all assumed to be primary purpose.

DR. DUMAS: I don't remember if it's on the MRIP form, but I know we've done some other just fishing surveys in the past in North Carolina, and I think in Florida, and maybe other states too, where they have asked that.

DR. WHITEHEAD: But these are guys mostly that are holding fish. These are guys mostly who are holding fish, who have just finished fishing.

MR. HADLEY: As far as the sampling side of it, yes. When you're looking at the catch itself, or at least the observed and unobserved catch, that's -- I will specify that for the private recreational component, but, yes. Basically, you're intercepted at the boat ramp, and then that's applied to -- There is basically two parts to it. One is the catch, and the other is the effort estimate and kind of how that trip gets expanded.

DR. WHITEHEAD: I think your task is easier than -- I don't think you have to worry about that, because you're just taking the NMFS methods and applying them here, and so the decision has been made at NMFS about what data to use and what trips to input, and so your question is a little bit easier. It's like which of those trip estimates, and you have already figured out which ones are relevant.

DR. DUMAS: But if you're including the hotel and the restaurant expenditures, those are usually a very large portion of the trip cost, and, if those are expenditures that would be made anyway, even if you didn't fish, because you went to the coast just to visit relatives, and then you took a fishing trip, then, when you took a fishing trip, if you were intercepted by MRIP, it shows up in there, but the trip, the hotel and restaurant, expenditures were not because of fishing. If you had not been able to fish, you still would have made those expenditures, and so they were incremental impacts that were not caused by fishing, and so that's my point.

That's why I asked earlier the question about the restaurant and hotel expenditures and if they're included, because, if they are, then those aren't necessarily attributable to fishing if the primary purpose of the trip were not fishing and if it was something else, and that could be a significant portion of the overall.

DR. WHITEHEAD: I agree with Chris's point, except that, if those are included in this, I think that's NMFS's problem and not the council's.

DR. DUMAS: Fair enough.

MR. HADLEY: We can go to the end here. I have these questions, but I think we've hit them pretty well. I don't know if we want to spend more time on them, but this is basically an expanded version of what was in the overview document, with kind of a statement beforehand to qualify them, but the first one is involving the range between the two trip types, if that's better than providing a point estimate, based on what trip type. For example, you could include a range of -- You could look at harvest trips and you could look at one definition of directed, targeted or harvested, which is what was included in the report, or you could change that definition of directed and include kind of that higher number, and so targeted or harvested or released, and so, basically, if you interacted with this fish or intended to interact with this fish, then it is counted, and so those are just kind of some ideas on what could be included.

The second question is essentially you have the -- You are leaving out that durable goods expenditure, and I don't really know any other way to address that, other than just mention that this is a caveat of this method. You really can't apply it to species based on the available data that we had, but, if there is any other more comprehensive economic impact assessment, like jobs or income, that could be applied specifically to SAFMC-managed species.

The final was kind of that discussion that we had of are the numbers high or low. When you present these numbers, you have some people saying those are ridiculous and they're too high, and then you have other people saying those are ridiculous and they're too low and they're an underestimate, and so just kind of getting a -- This is really just a qualitative discussion, and I don't think there's any absolute correct answer, but you all did discuss this, as far as are these numbers at least appropriate.

DR. DUMAS: Two other things that you might want to consider, and one is taxes supported impacts, and so a lot of these models also have multipliers for sales taxes supported and property taxes supported, sort of in the coastal area, and other types of taxes and fees paid, and so you might want to include that, just as another type of economic impact. A lot of times, the coastal governments are very interested in that, and they would like to see that as important to them, local taxes that are supported by the fishing activity.

The other comment was that also a lot of times, in talking to regional economists who do economic impact stuff, sometimes the distinction is made between, on tourism trips or on fishing trips, the expenditures made by -- If you're trying to calculate economic impact for a given region, and that could be a state, or it could be a collection of states, or it could be a county, but distinctions made between expenditures that are made by people who are residents of that region and expenditures made by people who are nonresidents and who travel to the region and make those expenditures.

You might want to give that breakout also if you've got data on what percentages of the people are residents versus nonresidents. If you're doing state-by-state, then of each state, or, if you're doing it for the region as a whole, residents or nonresidents of the region. That information may be -- I don't know if that's available in the MRIP, where the fishing trip occurred and then what is the home state or zip code. If it is, you could do that. You could figure out who the residents or

nonresidents are by state or by region, to calculate things, if you want to show that. Some people like to see that when they read the economic impact.

DR. WHITEHEAD: That would be like a paragraph or a few paragraphs into the report, the limitations of this study, since you're using the -- You just want to use the economic impact tool and not dig into the primary data, but that would useful to include. Then I have a procedural question for Scott. Is it okay if Chris writes up a paragraph of what he just said for Number 2?

DR. CROSSON: Yes.

DR. WATERS: John, when you do you final report, I think it would be useful to have a section at the beginning in which you do a more thorough job of explaining what these different impacts mean. In the draft that we got, you mentioned the impacts, but you didn't really explain them, and you're going to get a lot of non-technical people reading the document, and I think it would be worthwhile to explain that.

DR. WHITEHEAD: John, could you send me those questions for the report?

MR. HADLEY: Yes, absolutely.

DR. WHITEHEAD: 1 and 3 are in what we have, but 2 is not.

DR. CROSSON: Any other comments from the committee? Jason, are you still there?

DR. MURRAY: Yes, I'm still here, but I need to head out in minutes.

DR. CROSSON: We're about to wrap up. Did you have any questions or comments?

DR. MURRAY: No, I think everybody has covered things pretty well.

DR. CROSSON: Good.

DR. MURRAY: I've got notes.

DR. CROSSON: Are we ready to call it a day here? Any other comments? John, do you feel like we're addressing this stuff?

MR. HADLEY: Yes, and I just want to say that I really appreciate that. That's a large sum of very useful feedback, and so thank you, all.

DR. WATERS: Before we adjourn for the afternoon, if any of you have been taking any notes or would like to supply notes about the wreckfish discussion, please send them to Tracy and myself, so we can incorporate them into our overall notes.

DR. CROSSON: I think council staff took a lot of notes on wreckfish, and probably some NMFS staff did as well. All right. Given that, what's a good time to start again tomorrow morning? I'm trying to see on the agenda. Let's start at 8:30. We'll get down here at 8:30, because we'll also

have to check out and stuff tomorrow, and so 8:30 tomorrow morning, and we'll start on the stuff that Nick is going to work with.

(Whereupon, the meeting recessed on February 6, 2018.)

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FEBRUARY 7, 2018

WEDNESDAY MORNING SESSION

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The Socio-Economic Panel of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council reconvened at the Crowne Plaza Hotel, North Charleston, South Carolina, February 7, 2017, and was called to order by Chairman Scott Crosson.

DR. CROSSON: This is Scott Crosson. Good morning. We're on the second morning of the Socioeconomic Panel meeting, and we have an analyst for a limited amount of time this morning able to answer the questions, and so we're going to go through this presentation. We are on Agenda Item Number 8, Analytical Methods for Snapper Grouper Amendment 27, and John Hadley is going to do the presentation, and then Nick is going to be available for answering questions while he drives to another meeting, and so we only have him on for briefly, and so, John, go ahead.

MR. HADLEY: Thank you. I will, very briefly, give some background and briefly go over the SEP discussion questions before jumping into the models themselves, but, as a little bit of background, this is Snapper Grouper Vision Amendment 27, and so these are the changes to the commercial snapper grouper fishery that I discussed yesterday, kind of the preview, looking at split seasons, changing size limits, and changing trip limits, and so this will essentially change fishing behavior.

One of the reasons that this is being brought to the SEP is that these analyses are being used for the biological effects, but they will also be used in the social effects and economic effects, because they're all based on the commercial logbook, and so, essentially, you're looking at changes in fishing behavior with this, and so, overall, as a little bit of background, there was a technical analyses that was conducted for the amendment previously, and there is two models, and so there is two methodologies, and I will get into them a little bit more, but one is essentially a Last 3 Model, and so this is examining fishing behavior over the last three years and using that to project forward on what these effects of these changes in regulations would be.

The other one is a SARIMA model, which essentially has, and Nick can explain this much better, but it essentially has a longer time series, and it weighs current and previous behavior a little differently. There is a lot more to that model, and, as background, the preliminary analyses were reviewed by the SSC in October, and the SSC recommendation was to use the Last 3. However, there is has been a very much updated version of these analyses provided. At that time, we didn't have Nick on the phone to answer some of the questions, and, some of the questions that were

asked by the SSC, we could not answer them, and so that's kind of the reasoning on why this will be discussed at the April meeting.

The point of discussing it now, as I mentioned, in that these will be used in the economic and social effects sections, and, also, to help inform and play into that subsequent SSC meeting, or discussion, rather, that we expect to have during the April meeting, and, in general, the two models do agree for some analyses, and, in this case, it's not that much of a concern, but they're very divergent results presented, in some circumstances, between the models, and I will get into this with our red porgy analysis, but these divergent results are sort of the crux of the request from the amendment's IPT for the SEP and SSC to provide guidance on the appropriate model results to use.

With that, I will just briefly go over, just to kind of keep these in mind, the discussion questions, and so there is three discussion questions that we would like to go over, essentially, and one is, is one methodology more appropriate for use in the analyses, more so than the other, or do either of these approaches provide clearer management advice to the council, and are there differences in relative risk or uncertainty between the two methods?

With that, I will jump into one of the attachments for this subject, and what was included was a little intro and then an overview of the methods and results for the Snapper Grouper Amendment 27 analysis, and, overall, as I mentioned, there are the two approaches, and so one is the Last 3 Model, which uses the last three years of data, 2014 through 2016, to project what some of the effects of these different management actions would be.

The other model is a Seasonal Autoregressive Integrated Moving Average, and so SARIMA, model. The Last 3 includes the mean of the standard deviation of the last three years of data to generate monthly mean and 95 percent confidence interval projection estimates for daily catch rates, and these are expanded into monthly landings and multiplied by the number of days each month.

The SARIMA model is more involved. As you can see here, here is kind of an overview of the model, and so there's the autoregressive component, which represents the lingering effects of previous observations, and the integrated component, which represents temporal trends, and the moving average component, which represents lingering effects from previous random shocks or error.

The single difference is the SARIMA model only considers the maximum of one differencing term in the annual and one differencing term in the seasonal component. Differencing terms considered were annual and monthly. All SARIMA models were fit using a conditional lease squares, and stationary tests were used to guide differencing selection. The final model guided the examination of autocorrelations, inverse autocorrelations, partial autocorrelations, and whatnot.

You have the SARIMA being a more complex model. The Last 3 approach is essentially a simple average, and it is highly sensitive to recent trends, and so you're using -- Basically, you're feeding the last three years of fishing behavior into this model, and that's what your output is going to be based on. The SARIMA model is more statistically robust, with the final model selected with the combination of seasonal interannual trends that best fit the data.

Down at the bottom, most of the species under consideration are indirectly harvested during trips targeting other stocks. For this reason, uncertainty in historic data is often high. Similarly, actions involving target species often require extrapolation of catch rates to periods that have been subject to recent closures or complex management history, further contributing to uncertainty, and so, as a step back, just to summarize the original SSC discussion, one of the, I guess, bullet points from that discussion was you have -- I believe it would be fair to say that the SARIMA model -- The SSC felt the SARIMA model may be overly complex, but, here again, we have updated -- That was one of the reasons that the Last 3 approach, which is a very much more simplistic approach, was used, given especially the management history of these fisheries.

There is several management changes, but, as I mentioned, there is an updated approach, and there has been discussion among the IPT about possibly using both, given there is different strengths to each approach, as well as weaknesses, and, to illustrate kind of the divergent results of these models, I chose a -- Basically, it's approximately an eighty-page document, and I didn't expect the SEP to read over everything, but I pulled out two parts from the document that kind of show where the IPT is ending up in the quandary here.

DR. CROSSON: Kurt, did you have a question for John or for Nick?

DR. SCHNIER: I did have a question. Is the Last 3 model a regression-based model, or is it more that it has imputation of means? Is the Last 3 some sort of regression based on the last three years, or did you just calculate the averages and then sort of say this is what I would expect through some sort of weighted average or something?

MR. HADLEY: Nick, correct me if I'm wrong, but I think it's a simple regressive model, and is that correct?

DR. FARMER: The Last 3 is as basic as it sounds. Basically, I'm just looking at daily catch rates on a monthly basis for the last three years of data and doing a simple average, and so December of 2014, December of 2015, and December of 2016, and the average of those three years' worth of December daily catch rates, and that's all it is. It's extremely simple compared to the SARIMA model.

DR. SCHNIER: I guess, if I'm understanding it, does that mean that the average of those three gives you the average for 2017? Is that what you are saying?

DR. FARMER: That's correct. Yes, that's how it's doing it, and so it's not a regression of the last three years, but it's just an average of the last three years, and so it's always going to be in the middle of what's been observed in the last three years, and so, if there is any kind of temporal trend up or down, it's going to miss that. If the variation in the last three years is simply due to variability, rather than a trend, then it's probably a reasonable approach, but, if it is a trend, it's going to miss that.

DR. SCHNIER: Also, that would mean that, when 2019 came around, from any year there on out, it's perfectly level. There is no variation, right?

DR. FARMER: Correct.

DR. SCHNIER: Thanks.

DR. DUMAS: So, you're taking the standard deviation of those three means and using that to build your confidence intervals?

DR. FARMER: That's correct, yes.

DR. DUMAS: Thanks.

MR. HADLEY: I will just go over, if there is no more questions at the moment, I will go very briefly over the kind of two examples that I pulled out of the document that Nick put together, kind of the full-blown analysis, but, like I said, they kind of show the quandary that the IPT is in, as far as which model results to use. Essentially, Action 1 would establish the commercial split season for blueline tilefish, and I won't go over the alternatives, but I will scroll down to the sort of results table, looking at the changes in length of the season, which is one of the effects that we will be examining.

You can see here, looking at the mean values between the output from the Last 3, and so this is the Last 3 model here in the middle, and then the SARIMA model over on the right. In general, there is a few days difference in the projections, as far as the length of the season, and so it's not going to make that big of a difference, as far as regarding which model you use. There will be a few days, but, overall, the models are generally in agreement.

Kind of on the flip side of this is a similar analysis for a commercial split season. For this case, it's red porgy, and, here again, I will scroll down to a similar table that shows the length of the seasons, and, in this case, in the middle here, you have the mean, and this is the results from the Last 3 model, and then the SARIMA model is over on the right. Looking at these mean values, under several circumstances, the Last 3 model is predicting a closure in the fishery, and part of this is essentially stating that the commercial sector will fully realize their ACL and it will be fully landed.

If you were using the SARIMA model, essentially this model is saying that this ACL will -- The commercial sector will not reach its ACL, and, therefore, there will be no closures of harvest, and so you kind of have two very divergent results, and, in this case, you're talking about -- We will take Alternative 3c here, and you're talking about approximately a three or three-and-a-half-month closure using the mean value for the Last 3. Moving over to the SARIMA, you are predicting no closure, and so there is a fairly large difference there, and that's where -- These situations especially are kind of where the IPT is coming from as far as trying to get a little bit more feedback as far as which avenue to go down. With that, I don't know if there are any further questions, as far as the models themselves or some of these results.

DR. WATERS: I have a question for Nick. On this red porgy analysis, it seems like the closure between January and April is possibly a major factor in the outcome of the analysis. When you did the Last 3 averaging, you went back to the pre-closure era and pulled out some data and made some adjustments and plugged that into your analysis, but, for the SARIMA model, you just left everything blank, and I'm not sure what leaving things blank is, but I'm just curious. If you had gone back and used the same averages from the Last 3 model and plugged them into your analysis

for the SARIMA model, would the results have changed a lot? Would they have been more -- Would the results of the two models have agreed more?

DR. FARMER: That's a good question, Jim. I think that basically what -- The way the SARIMA model works is, if you don't have data available, you leave it blank, and the model kind of freely estimates, based on the previous trends, what those values would be, and so it's a nice way to backfill data without having to do a bunch of artistic backfill. It allows for a more statistical approach towards backfilling the data, and so what it's reading in there is basically the seasonal trend in the past and using that to backfill the future.

Now, one thing that might drive that estimate high with that approach is if the fishery redistributes fishing pressure into the months that are open once that closure is put into place. Those catch rates in those new months would go up, and so then the model would interpret that probably as an increase in overall fishing pressure, and it might inflate the catch rates for the months that are closed as well when it's backfilling them.

What I did with the Last 3 model, I believe, is I looked at the seasonal trends and the percentage of catch coming from each month and then used that for the backfill, which may be slightly more conservative on those kind of backfilled catch rates for the January through April time period, but this is one of the big quandaries with any kind of projection analysis in Regulatory Amendment 27, is just that the -- A lot of the openings being proposed are the first time it's been open in that time period for a long, long time, and so there's just not a lot of recent data to inform the modeling approach, and so I think, when the models are diverging -- That's why I left two modeling approaches in there, is, really, there is a lot of uncertainty, and I'm not quite sure which way it's going to go.

DR. WATERS: How much extra work would it be for you to go back and re-estimate the SARIMA model, but, instead of leaving those January to April months blank, you filled in the averages that you had used from the Last 3 model?

DR. FARMER: I don't think that that would be terribly difficult, no. It's already coded in, and the input file is pretty simple. It's all connected, and so that would be fairly easy.

DR. WATERS: My guess is that -- I would just be curious to see how that worked out, and my guess is that the results of the two different methods would be a lot closer than they are now.

DR. FARMER: That may very well be the case. I think that a lot of the divergence you're seeing between the modeling approaches is how they're handling time periods with no data. That, and, any instance where you have a long-term trend, the Last 3 model is just completely missing.

DR. SCHNIER: It kind of relates to this, and I understand what you're saying about not having the data in there, but I'm looking through the other tables, and I was looking at like Figure 15, and I think it kind of helps explain a little bit what might be going on, which is that you have a really high confidence interval on the estimates for the SARIMA, and I can imagine that the Last 3 has a much tighter bound on it, which allows you to more precisely estimate when you think the closure is going to occur, but, if you look at the confidence intervals on the catch per day, there is intervals in which you would predict that there would be a closure, but it's just that it's not meeting statistically-significant bounds in order for it to say that it is a closure or not.

I think you could almost use the confidence intervals to sort of look at the fact that maybe 70 percent of the time it recommends that there is -- If you did a simulation of a thousand different seasons, maybe 70 percent of them would have a closure or something like that, with these high confidence intervals, and what is happening is there are point estimates, which don't predict it, but the confidence intervals encompass a fair amount of closures, and is that --

DR. FARMER: That's definitely true, and you will notice, just in general, that the confidence intervals for SARIMA tend to be much larger. That's a byproduct not only of the method used, but also, given that it's incorporating a much longer time series of different sources of error. You know it's encompassing long-term error, rather than just three years' worth of information.

DR. SCHNIER: I guess what I'm saying is that it makes perfect sense that you wouldn't have it nailed down with precision, because these models are complicated, and they're going to have the larger confidence intervals. I guess I'm not as troubled by the fact that it's not generating the same point estimate as the Last 3, because the Last 3 is much more of a stable model, but it's also overly simplified. I think that's the tradeoff we're making here.

DR. FARMER: That was something that we noted in our paper in *North American Journal*, was just that the SARIMA model, even compared to GLM and GAM approaches, tended to have much broader confidence intervals. It's just kind of one of the nuances to the modeling method itself, is it really gives you a much broader estimate of error.

DR. SCHNIER: That makes sense.

DR. DUMAS: The three-year model could have falsely narrow confidence intervals. It could be misleading in that way.

DR. SCHNIER: I think we would almost have to assume that it does.

DR. DUMAS: Yes.

DR. FARMER: Any time you're basing a confidence interval on just three years of information, I would say it's probably falsely narrow.

DR. DUMAS: Another point related to confidence intervals is that, instead of maybe setting policy by the mean, you could set it by one of the confidence interval limits, but pull in your confidence interval limits you're looking at. Instead of looking at 95 percent confidence interval limits, you could look at maybe 75 percent or something like that, or maybe even pull it even more, and then you could base your policy off of that, rather than off the mean.

If you looked at confidence interval limits that were pulled in, maybe then, for example, on this Table 11, you would have say upper 75 percent confidence limits for both models, and so, even though the SARIMA is not giving you a mean, maybe if you looked at a confidence interval limit, then you would have estimates from both models in this kind of situation. I don't know, but that might be an alternative. It could be a way to look at both models and to sort of pull in both model estimates, so they don't diverge as much.

DR. SCHNIER: Along those lines, I don't want to generate more work for the authors, because I think they've done a lot of work, and so they should get credit for that. Work that I have done similar to this is you could simulate like a thousand seasons, and, for each of those seasons, draw from this 95 percent confidence interval and then determine what percent of those seasons have closures, because what that does is it gives you some benchmark against it, which is a much more stable three, to see how far off you are, and it may only be 15 percent or something like that, which is pretty tight.

DR. FARMER: We do something similar with red snapper in the Gulf of Mexico, where we kind of look at what the risk is of overfishing with a thousand bootstrapped runs and that sort of thing, and that's not overly difficult to do, but I guess I would want to understand more clearly how the council would still use that information to integrate between the multiple modeling approaches when the outputs are divergent, because I think you're still going to run into a situation where they're going to tell you relatively different answers.

You will get a sense of what your risk is of overfishing under each of those assumptions, but, fundamentally, it comes down to your council risk tolerance and whether you want to go with the more conservative modeling approach, which varies, depending on, I think, which of the species you're looking at and which of the actions in the document. It really fundamentally ties into, like we were talking about, the long-term trend and whether it's incorporated or not and also how the closed months are being backfilled.

DR. DUMAS: Nick, I wanted to ask you a question about the SARIMA model. How far back was it allowed to look? Was it allowed to look as far back as the data extend and then it selected the lags that were significant and, if so, what was the maximum lag that was selected?

DR. FARMER: I looked back to 1997 for all the modeling approaches, because we feel that the species identification is fairly robust for all the species from 1997 forward. That was the start point. The lags that were considered were only a one-year -- It was an interannual lag and then a monthly lag, and so it was looking back twelve months and then looking back to the previous month is basically how it works, and so it's reading in recent trends, in terms of are we seeing like a big kick-up in the previous month, and we would expect that to continue, and also what is the seasonal trend underlying that on a twelve-month basis. It's not a multi-differencing model, where it's going to look at one, three, and twelve years back and that sort of thing. I have seen those --

DR. DUMAS: Thanks. One reason I asked that is, to me, one advantage in looking forward with the SARIMA model over the three-year model is that, if you have any cycles that are longer for three years, for example cycles related to the life cycle of the species that might be longer than three years, if a generation time is longer than three years, then, over time, as you gather more data, the SARIMA model might be able to incorporate some of those sort of life cycle cohort effects that extend over more than three years. That would, over time, I think allow the SARIMA model to make better estimates.

Also, there might be cycles in weather or ocean currents or food availability, prey species availability cycles, that might be longer than three years, but might be very significant in the long run in predicting the abundance of some of the target species, and, looking back three years, you wouldn't capture any of those ocean or prey species or generation time cycles that were longer than three years.

As we go forward in time and the data become better and better and better, and the data lagged ten years become better and better and better as we go forward, I would expect the SARIMA model to start doing better and better over time, compared to the three-year model, and so, even though the SARIMA model is I think less transparent to users, I think it would make better predictions over time.

Also, how often is -- If you were to use the SARIMA model to make projections going forward, how often would the SARIMA model be updated? Would it be updated monthly as new data come in, or annually, or less often? Do you guys have a feeling for that?

MR. HADLEY: I think, how often the SARIMA model would be updated going forward, essentially it would be -- Nick could correct me on this, but it would be updated as needed, and so, essentially, the next appropriate amendment that affects the commercial sector, we would kind of rev it again, so to speak, with updated data up to whatever the terminal year is that we're examining.

DR. DUMAS: But, in theory, the same model could be rerun once a year to update parameter estimates as new data come in every year?

MR. HADLEY: That's possible.

DR. FARMER: The commercial catch monitoring will be performed by the Southeast Fisheries Science Center, based on dealer reports as they come in, and so the projects, really, once this amendment is finalized, will be just basic ACL catch monitoring with a couple of different projection methods involved there, of which I don't think the SARIMA would be one of them.

The SARIMA is really being used to guide the policy decision for what the management regulation will be, and then, after that, the crux of the issue will become the catch limit and when it's going to be exceeded, and so we really wouldn't update the SARIMA model for any purpose other than, like John was saying, like if we had a new amendment involving that species, and so we might revisit this code and reevaluate, but, really, it's going to come down to monitoring the ACL, and so it's really just more meant to guide the council in the selection of the alternative that gets them a season that meets whatever needs that they have defined within their risk tolerance.

DR. DUMAS: I am just saying you could rerun the same SARIMA model year-after-year with an increasing long dataset, and so, each year, you would get one more observation, or, if it's a monthly model, you get twelve more observations each year, and so you could just rerun the same --

DR. FARMER: I don't know what -- Without a policy decision to be tied to that, I don't know what the management purpose of that would be, because, really, what we're going to be caring about after this amendment is finalized will just be the catch relative to the ACL, and we have a more rigorous method of doing that in-season, which just involves the incoming dealer reports, and so you wouldn't really so much need a SARIMA model at that point, although the Science Center does, when they do their dealer report forecasting, I believe we do incorporate some level of historical data from those dealers, but it's more at an entity level to determine what sort of information they expect to be coming in when they're projecting kind of a closure date for the

fishery, but that's a much more real-time approach, and it's much more refined than kind of the coarse monthly catch rate approach that we're looking at here.

Then, just to add on to the predictive stuff that you were mentioning earlier, it's that, in previous SARIMA modeling approaches, we have successfully incorporated covariates for assessed species, like spawning stock biomass or exploitable abundance, where we look at the numbers at age and the selectivity matrix and use that to create an index that can be used to predict those long-term trends in population. Unfortunately, for this particular approach, we didn't have that information readily available.

DR. DUMAS: Right, but, even without those covariates in the SARIMA model, you're also using patterns in the errors, and so, even if covariates were left out, some of that information would be in the errors that would -- The SARIMA model would be able to use that information in there to help improve the predictions over time.

DR. FARMER: Yes, and, when we did that analysis that we published on SARIMA models and GLM and GAM and previous year fits to recreational fisheries data, which actually has a lot of parallels to commercial data for these kind of indirect species, we did find that the SARIMA model, in general, delivered the best predictive fit, as compared to GLM, GAM, and previous year. The previous year is not quite the same as the Last 3, but it's the same general idea. It's a non-regression-based approach just informed by recent data.

MR. HADLEY: Are there any more questions? I'm just going to hop back over to the overview, and I think we covered these fairly well, but as far as the method to use or whether or not to maybe use both methods, is there kind of a consensus from the SEP on that?

DR. CROSSON: I found Chris to be very persuasive in convincing me of the merits of the SARIMA. I hadn't really thought of it that way before, but I am certainly leaning that way.

DR. SCHNIER: I like the SARIMA model, but one concern that I have is what is the timeframe over which this model would be used for advice on the council, and I came up with a revision, because I'm trying to think that the robustness of the model is based on how good the data is to capture the variation, and, if it isn't updated on a sort of regular basis to advise policy, you could have issues.

I mean, I still would say the SARIMA is probably the better for the arguments that have been made, but there is always uncertainty about how this model might come out, because of those confidence intervals, and so I would encourage the management council to think about continually sort of looking at where these outputs are, if it's going to be used to guide management.

DR. FARMER: I think one of the tricks with that, in terms of using this type of modeling approach to dynamically inform management, is that, in order to make a management change, you have to do a framework amendment, and so you're looking at a relatively long time lag between wanting to make the change and being able to make the change, and, at least the way that the regulations exist thus far, the ability to make those policy changes is not in the hands of the Regional Administrator. It's in the hands of the council, and it requires public comment and that sort of thing, and so it's hard to do dynamic, adaptive management to kind of optimize as you're seeing data coming in.

I would envision this more being a situation where you're going to get a year or two, or maybe three years, of data under this new management regime and then the council, after hearing from constituents, would potentially develop a new framework amendment with a modification to policy, and those tend to be confounded by changes going on with the stock and changes going on with stock assessments and other issues that are far outside what's currently in the projection modeling approaches. I don't see a good way to dynamically manage the stock with a projection model, unfortunately.

DR. SCHNIER: I think, even with that said though, it still sort of points to there is some benefits to the SARIMA model, because the uncertainty is actually encompassed in there, and so it sort of tells -- I mean, I think that the three-year thing almost falsely misrepresents what uncertainty exists, whereas the SARIMA model actually shows what uncertainty exists, and so I think that's important to show management as well.

DR. DUMAS: I agree, and I think, going forward, as you get more data, the SARIMA approach will be better. Looking at results from time series modeling and using it to forecast and predict, I think that's the way we want to go, and could the current framework specify the rule as you're rerunning the SARIMA model once a year using updated data? Then the rule doesn't change. If the rule is run the SARIMA model and the new data each year on the -- Add a row of data and rerun the same code, but on an additional year of data, so you get updated estimates every year. I might not be understanding the policy process correctly though. Nick, what do you think about that?

DR. FARMER: I guess I don't understand what you do from a policy standpoint on that. I mean, right now, we're evaluating the potential closure dates under a series of policy alternatives, and so the council is going to have to select one of those policy alternatives, whether it be a closed season or a portioning of an ACL or a trip limit, and we're not going to be able to dynamically change that in response to an updated forecast to a SARIMA model without an additional round of council framework amendment making, where they would have to go through that year-long to two-year process of getting public comment and developing a document and selecting preferred alternatives and implementing those and codifying them.

It's not really set up in a way where, for example -- Like, right not at least, in the document, it's not set up in a way where the council gives anyone the authority to dynamically change say a trip limit or a closed season in response to a forward-looking model projection. I could see a situation where they could write a totally different type of framework, where, if the model forecast suggests X, Y, or Z, then the trip limit gets reduced by X, Y, or Z, or the closed season gets extended or truncated, but that would put a lot of burden on the Regional Office and kind of wave public comment within that, and I don't know -- I mean, we've never done that before, and I think it would be a policy challenge, for sure.

DR. DUMAS: Even if you kept the policy constant from year to year, if you reran the model every year, it might allow you to update the relative risk or uncertainty of keeping the current policy, and so you may be keeping the policy current, but the risk of keeping that policy at its current level may change from year-to-year, and so what if some drastic change happens in the fishery? Then some emergency action or rule change or framework making thing would probably occur. Then

the policy wouldn't be correct, and the purpose of these models is to try to predict when those types of situations would occur, I would guess.

DR. FARMER: The model gives you kind of a forward-looking idea of when a quota closure might happen under the current policy, but, like I said, once the council selects preferred alternatives, that process sort of gets turned over to the Southeast Fisheries Science Center, and they look at the incoming dealer reports to do that sort of projection on an in-season basis. I am not sure if they use a SARIMA modeling approach. I don't think they do. I think it's more like they look at historical times series on the dealer level for the most recent few years under a few different approaches in order to determine the quota closure date.

The nice thing about that is they really don't have to be all that precise, because they wait until the quota has nearly been caught before kind of raising the red flag on us and having us prepare a closure package. Now, if there were a series of closures outside of like the council's desired window for a closure, and they realized that this amendment and what they selected was not accomplishing the objective that they set forward to accomplish, unfortunately I think the only way that they could make an adjustment there would be through a framework amendment, unless there was a stock assessment that gave a benchmark that then indicated that the catch levels somehow were resulting in overfishing.

If that were the case, then you could do like an emergency rule or an interim rule, which is a much faster process, but those are restricted to very particular situations that don't really occur all that often anymore, because we sort of define overfishing as exceeding the catch limit, and we try to prevent that from happening using this in-season catch monitoring, and so that's a long-winded answer of saying that just the way that the regulatory framework is set up right now, although these models inform the council's policy decision-making at the time that they vote on this particular amendment, I don't see a situation in which they could be used in between amendments to enact any sort of policy decision-making.

I think that the council would be less convinced by a forecasting model approach in the intermediate time period and more convinced by what they will actually receive, which is the observed catch levels relative to the ACL and the observed quota closure dates, and that's going to give them the information that they need to know whether the Regulatory Amendment 27 preferred alternatives have accomplished the goals that they intended them to accomplish. Then, for some of these species, they are going to have additional bites at the apple, like blueline tilefish, because they're going to get a stock assessment and have to respond to that.

DR. DUMAS: Thanks. That makes the process clearer, but, in light of that though, do we need either of these models?

DR. FARMER: Well, you need them to inform the council's decision-making. These models, right now, are intended to inform the council as to which of the alternatives in each action would be the one that accomplishes the goal that they personally have in mind for that particular fish, and so, if you wanted blueline tilefish to have the longest possible season, and that was the most important thing, then you would look at the suite of alternatives and look at both modeling approaches and figure out which one gets me the longest possible season.

If you wanted just to make sure that we get a season until July, and, other than that, I would rather have a higher trip limit, then you would look and see what is the highest trip limit that I can have where I can ensure that the fishery stays open until July, and my recommendation would be, given the uncertainty in the modeling approaches, is that they look at both of the models and try to figure out an alternative that accomplishes it under each model.

Based on the discussion here, if you can't find an alternative that would accomplish it under each model, then you probably would want to prioritize at least making sure you accomplish your objective under the SARIMA model, and, also, I've heard a lot of talk from the IPT and the council about ignoring the confidence limits, and I think that that's not necessarily a great idea.

Yes, there is differences between the two models, but there is also pretty wide confidence limits for each of the models, and it's important to try to consider all of that in the decision-making process, and so, when the models are extremely divergent, I think the council would be encouraged to be relatively conservative in their decision-making, based on whatever their objective in their individual minds is that they're going to vote on for selecting a preferred alternative, if that makes sense.

DR. DUMAS: That does. Thanks.

DR. CROSSON: Chris, I had assigned you and Kurt to do the write-up on this section. Do you feel like the questions -- It looks like we've covered a lot of them pretty clearly, and so you guys are confident that you have what you need?

DR. DUMAS: Yes, and thanks.

MR. HARTIG: Nick, it's good to hear you on here. Before I ask the question, I would just like to thank you and the rest of the SERO staff. This has been a great interaction between the SEP and SERO staff the last two days, and I really want to pass that along to your other staff members. It's been great, and today as well. The question I had, and I think you already answered it, and I think I got bits and pieces of it in your discussion, but have you gone back and done a performance evaluation of these models in the past and what they actually gave us for recommendations and how close they were?

DR. FARMER: We've done a few things like that. We've done a retrospective for red snapper in the Gulf of Mexico each year, and the forecasting approach is -- It's not a SARIMA approach that we're using there, but it's always been within about 5 to 10 percent accuracy, which is pretty darned tight for such a big-bang fishery.

For South Atlantic black sea bass, I think that we've had some underlying stock things going on along with some weather changes that may have made the predictions for that one not quite as great. I would have to look back at it. I haven't done a retrospective on it. Then, for the Gulf of Mexico, we just did something on our longline fishery, a retrospective on longlining effort, and it looks like our projections, with basically our most conservative projection, where we assumed increases in effort and that sort of thing, was the most accurate, and so yes and no.

It would be great to have the time to look at it for each amendment and do a performance retrospective. I think we've done it for Gulf greater amberjack as well, where it turned out to be

really robust, and so, in the instances where we have looked back, there has been at least a few of the model runs that have looked really good and have done a good job of predicting, but then one of the tricks is the regulatory changes that happen that you don't foresee, and so, in situations where the council has enacted multiple regulatory changes in a short timeframe, and black sea bass would be one example, with 18A and then 17 and 19 all coming online at the same time, or close to it, and then blueline tilefish with the implementation and then removal of the 240-foot closure, and so, things where you have these little blips in regulatory history, that makes a retrospective a little bit more challenging to put forward, but it's certainly something that we've been wanting to do for a long time, but it's just the train keeps on rolling, and so we're hanging on as best we can. Right now, it's just myself and Mike Larkin as analysts for all three regions.

MR. HARTIG: I appreciate that, and this train doesn't seem to be slowing down, and so thank you very much.

DR. FARMER: Yes, and I will pass on to the compliment to the other folks that have been involved with yesterday's SEP meeting. Thanks for that, Ben.

DR. CROSSON: I think we're done with this section, and the next presentation is going to be Kari, and so do we need a quick break to set things up for her?

DR. TRAVIS: Scott, can I jump into this?

DR. CROSSON: Yes, please.

DR. TRAVIS: I want to make sure that I'm understanding what I'm hearing from the SEP, and this may help certain folks write up their section of the summary report. Am I hearing that the consensus opinion is the council should be presented with both sets of modeling results and that they should be allowed to make the decision of which one to use on an action-by-action basis based on their determination of what is their risk tolerance?

DR. DUMAS: Yes, I think that's where we are, and, looking at different levels of risk tolerance with both models, we could present the council with the 95 percent confidence limits, and those might diverge significantly between the two models, but we could also present them with 75 percent confidence limits and other -- 65 and 50 percent confidence limits for both models, and they could look at those, comparing across models the different confidence limit estimates, and they could look at the different confidence limit estimates as different measures of risk and uncertainty and kind of decide -- The models would become more similar as the confidence limits got smaller, I would assume, and so that might be a way for the council to be presented with both model estimates and also different levels of risk or uncertainty with both model estimates and see how the model estimates become similar as you look at changes in the confidence limits, and that might be a way to present the information in a manageable, actionable way.

DR. TRAVIS: The reason I'm asking for clarification is because I also thought I heard some folks say that they thought the SARIMA model was the better model, and, of course, to date, the leaning has been towards the Last 3 as being the better model, and so I want to make sure that we're landing in the middle, as I described it before, and, Chris, as you just restated, as opposed to definitely one is always better than the other in all situations.

DR. CROSSON: Mike, if you're talking about the SSC's review of it, I don't think the SSC had a sufficient look at the difference between the two models at our last meeting, and so I think what this committee is making is a recommendation about which of the models better incorporates risk into it, and I think the answer to that is clear. Again, this is just advice for the council to look at when they're considering policy options, right, and so, if they want to use a model to better incorporate risk and uncertainty versus one that does not -- I mean, if they choose the wrong model to set up their policies and then it turns out that the season has to be abruptly cancelled or whatever, or shortened, then that is something that they have to consider.

DR. TRAVIS: Yes, and I understand and agree, but the reason I raise it is because, in the document, in the most recent version of the document, the decision was made to simply rely on the results of the Last 3 model, and I have not, let's just say, been thrilled with that decision, and now, after this discussion, I am even less thrilled with it, and so that's why I posed it in the way that I did.

DR. DUMAS: I think the SARIMA model does incorporate risk better, but, because it does that it will give an estimate of more risk, wider confidence limits, but that might be the truer picture of the risk in the situation. I also think that, over time, over years, if the SARIMA model is updated, even if it's only updated every three years or every five years, I think, over time, it will become better, compared to the three-year model. As more data become available, and the data become better, I think the SARIMA will do increasingly better, relative to the three-year model, over time, as more data become available, and so that's just something to keep in mind going forward.

DR. TRAVIS: Okay, and then the other question that I would like to pose to the SEP is, kind of setting aside the model choice issue for right now, the economists and other social scientists will have to use the results from Nick's models and apply that in their effects analysis, and, Ben, if you're still on, and you can correct me if I'm misstating this, but one of the primary goals of this amendment is to achieve a more equitable spatial distribution of the landings for these species, and that's all potentially a laudable goal, and I'm not questioning that as being an appropriate goal, but Nick's model does not get into that issue at all, and it's not clear to me how we use the result of either of Nick's models to directly attack that issue, in terms of what would the spatial distribution of landings be under either of the models under the various alternatives. If we can't answer that question, it seems to me that we're in a predicament to determining whether the various alternatives would address one of the council's primary goals for this amendment. Ben, have I accurately described that that is one of the primary goals?

MR. HADLEY: Ben is nodding yes, and that is one of the primary goals, but I don't know -- Based on the information that the SEP has been presented, I don't know how informed of a discussion we can have about that right now, but I will turn it back over to the SEP.

DR. DUMAS: I don't think either of these models was set up to try to estimate or predict spatial distribution. I don't think that was the goal of either one of these models, and, Nick, you can chime in here if you want. In order to do that, it would take a different type of model or a modification of these models, and is that correct, Nick? Am I understanding correctly?

DR. FARMER: I think the easiest way to do that would be to look at the monthly distribution of landings amongst the states and then apportion the monthly catch accordingly, under the

assumption that the model projected monthly catch rates are distributed amongst the states following some historical pattern.

That or you would have to develop kind of a separate SARIMA or Last 3 modeling approaches for each of the geographic regions that you were interested in and look at the combined landings through time for each of those model projections in order to do it, but you're right that the modeling approach was not initially set up in that way, and so there is kind of a simpler way of doing it, where you just apportion what the model is projecting, under the assumption that you've probably got a more robust catch estimate and that's more important than your state-by-state estimates, or you would have to do state-by-state models, which is something we do for red snapper in the Gulf of Mexico.

The problem you run into with those is you're really cutting down on the amount of data, and these species already have relatively limited data, as shown by the massive confidence limits coming out of a lot of the projections, and so, as you start stratifying it even further, I would be concerned that, at least for a few of the states, you would end up getting projections that would be not terribly meaningful, and so my recommendation, if you had to break it out, probably would be to take the projected monthly catches and then just apportion those based on the monthly distribution of landings, which I think we do show for some of the species in the amendment, but could be pretty easily calculated from the commercial data for the recent years, and you could probably use that moving forward, under the assumption that the recent geographic apportioning of catch is probably a reasonable representation of future geographic apportioning of catch.

DR. TRAVIS: But, Nick, I don't understand that, because you're going to hit the exact same issue that you ran into. In fact, probably more severely, where you're not going to have data for certain states in certain months, because they haven't had any landings during the closures, and, in fact, that's the problem that the council is trying to address, is getting some of these landings into the hands of other states and the entities that are in those states, because they haven't had access and they haven't had landings in recent years.

DR. FARMER: I think, in that situation, you would probably have to do what we had to do for the Last 3 modeling approach, which is that creative approach to backfilling, where you look at the seasonal distribution of landings during the last year where everything was open and make an assumption that, at least during those months, that is how the landings would be apportioned amongst the states and just heavily caveat that we're looking at data from 1999 to project what's going to happen in 2019, which may not be the best way of doing it, and it may not be super accurate, but I can't think of a really much better way of doing it, unfortunately. For a lot of these species, because they've been closed for so long during those time periods, you are forced to borrow fairly heavily from the distant past.

DR. SCHNIER: Can I interject here? Nick, I follow what you're saying, and I didn't want to -- I think the other thing that's an issue here is that, if you try to sort of slice that data up even farther, your confidence limits are only going to explode even more, because the confidence intervals you have are a construct of having the data you have, and so, if you start slicing it up even more, they're just going to get even larger, and so I'm kind of cautious about thinking about the methods you're doing, because I think the precision would be pretty low, and I imagine you might agree.

It kind of makes me think that, if the council is really looking for advice from this model, it seems as though the SARIMA model, with this bootstrapped idea of when some percentage times of closures that occur gives them some estimate of where these things are, relative to the three, because I am really cautious of this Last 3, but I wouldn't mind hearing your thoughts on the fact that I think you might be pushing the data a little too much and you would have really high confidence intervals if you tried slicing it up that way.

DR. FARMER: I am more picturing a situation where, for January, you would have -- Based on the most recent year where all the states were open in January, it was 25 percent off of each of the four states, and so you would break the catch out, the model-projected catch from both of the models, and assign 25 percent of it to each state, and then you move into February and maybe it's 20, 30, and then 25 and 25. You just would walk down that way, rather than trying to do an actual regression model for each state's data. I think that would probably not work out.

DR. CROSSON: Guys, we need to stop. I know this is really interesting, and I know we could keep going on, but I think we've answered the questions that we've been given as a committee, and we have a limited amount of time left today to get through this, and so I think we're going to stop for now for this discussion, and I think we're going to take a five-minute break and set things up so that Kari can come on for the next item. Thank you. This was a great discussion.

MR. HADLEY: Special thanks to Nick. I know you have a very busy work schedule today, and so thanks for fitting us in. It's certainly appreciated, and it added a great deal to the discussion.

DR. FARMER: Thanks for inviting me, guys. Have a great day, and enjoy the rest of your discussion.

(Whereupon, a recess was taken.)

DR. CROSSON: We're now going to pick up with a presentation by Kari, a former staff member of the council, and so let's go. For this one, I have a couple of comments before we start. This one, I have, as rapporteurs, assigned Jennifer and Tracy. The one after this, which is the socioeconomic profiles of fisheries by species, I am going to assign that one to Jennifer and to Jim, since Jim seems to have a working computer today. That way, I don't have to assign three things to Tracy.

The other thing I wanted to say is that, since we don't have time pressure, if you can get the stuff to me by the end of next week, assuming the government is open. This is the second trip I've had in a row where the government was getting ready to shut down at the end of the week, and so -- Anyway, hopefully by the end of close of business on Friday, please send this stuff to me, so I can incorporate it into the report. Then I will send that draft back out and get comments, and then we'll get the thing finalized. All right, Kari. You're ready to go.

DR. MACLAUCHLIN: Good morning, everybody. My name is Kari MacLauchlin, and I am former council staff, but I was contracted to work on the socioeconomic profile for the South Atlantic snapper grouper fishery, and so I'm going to give you kind of an overview. For the presentation, I will have a little bit of background and timeline, to refresh your memory. The main topics are the data and methods, key findings, and then the next steps.

The council and the Snapper Grouper Advisory Panel had requested an in-depth profile of the commercial fishery for a while, and, based on their input, we had put together kind of an outline of the main topics and then got additional input from the advisory panel, the council, and from you guys. You talked about it at your last meeting.

There was a lot of information that they had and kind of some basic questions about what's going on with the commercial fishery and how that's changed and permits and access, and so it was a lot of information, and so I conducted most of the analysis starting in October. I'm still finishing up a few things, and there is a draft of the document that is being reviewed by council staff, and then the draft document, after I do some revisions, based on that input from staff, will be provided to the council for their March meeting, and I'm going to present. Since it's still under review, what we decided to do is just kind of give you a briefing on what I did and the key findings. Next, you guys can review the draft document that goes to the council in March.

First of all, we had some project goals. The council wanted some community summaries, and they gave us some input based on how they thought that should be set up, and so I have nine areas that I used kind of throughout the report. North Carolina is split into three areas, north, central, and south. Then we have northern South Carolina and southern South Carolina and Georgia together, since those are similar and also to maintain confidentiality for some of that analysis. Then Florida is four areas, north, central, south, and the Florida Keys.

With some input from the AP and the council, there is a detailed analysis about the permits, the permit holders, the permitted vessels. There's lots of different things about how the permits have changed and the distribution of them and what other permits are on the vessels and how to get the permits and how many have been retired and then the permit holder history and then some vessel characteristics and then landings on the permits.

I also looked at participation, and so this was number of trips, number of vessels and days at sea by year and then actually by season, for each area. Then I looked at the catch portfolios and trip types, and then I also have information about the landings and revenue over time, total, and then by species or complex and then by gear.

A little about the data, and I obtained the permit records from the very, very helpful Permits Office at the Southeast Regional Office from 1998 through 2016, and these are all the permit records, because I wanted to be able to look at the permit portfolios. Then I also used logbook data from 1998 through 2016 and then some ALS data. Then John Hadley had also provided me with the landings and revenue information from the Science Center's query tool.

Mostly, this was just a number crunch and processing the data and then trying to answer all of the questions that the AP and the council had wanted to know more about, and so a lot of it is just descriptive and generating tables and summarizing the data over time. Then I also used two-mode network analysis and some network metrics for the permit and catch portfolios.

I am going to get into key findings, and I'm going to try not to get too much in the weeds here, because a lot of this is in the document. When it comes to permits and permit holders, I do want to remind everybody that the commercial permits are limited entry, and that was implemented in December of 1998, and that was kind of a two-tiered criteria, and so, if you met both tiers of

criteria, you received a snapper grouper unlimited, which, throughout this, you will see that I refer to it as the Snapper Grouper 1 permit.

This is transferable, but it does have a two-for-one requirement, where you have to get two of the snapper grouper unlimited permits to turn into the office and then you're assigned your new permit, and the exceptions are if a permit holder transfers it from one vessel to another, like a new vessel, or between immediate family members. Then another exception is the permits that are held by corporations, and I will talk about that a little more.

Then there is also, if somebody met just the initial criteria, they received a snapper grouper limited permit, and that is a 250-pound limit per trip, and these are non-transferable except to immediate family members, and so, overall, of course, there was a reduction in place with the two-for-one requirement, and so the number of permits has decreased by about 50 percent through that two-for-one, or sometimes just permits retiring.

The highest number of permits is in Florida, specifically the Florida Keys. I looked at the proportion of corporate versus non-corporate permits, and so a corporate permit is just the permit holder is an incorporated entity. For the most part, it's increasing over time, when you look at the proportion of permits held by corporations, but, still, the majority are still held by non-corporate, and so individuals or families.

The permit portfolios mostly include commercial dolphin wahoo and Spanish mackerel. Those are open access commercial permits, and so it's not surprising that the vessels also keep those on there, but then many of them also have the limited entry commercial king mackerel permits. About a third of vessels with a snapper grouper commercial permit also have at least one, but usually all three, of the federal charter permits for snapper grouper, dolphin wahoo, and CMP. Those are all open access.

Looking at the current cost, Mike Travis had provided me with some information from the Permits Office about the transfers, but the price data is voluntary. It's self-reported, and so it ranged. It was kind of all over the place, and then, in some cases, it included where somebody purchased a vessel and multiple permits along with it, and so it was kind of hard to parse out how much the permit cost, but it did kind of indicate that there has been an increase, and so that helped, but, mostly, what I did was look online, and I would do this kind of throughout the whole time, but look on Craigslist and then also forums, and there is a couple of sites that are specifically there to sell permits in the Southeast, and so I kept track of what I could find.

It looks like, based on the advertised prices, the current cost to get a Snapper Grouper 1 permit is about $60,000 to $80,000, and so sometimes you would see a non-corporate permit advertised for about $40,000, and sometimes you would see two non-corporate permits advertised and then a corporate permit. If it was a corporate permit that was advertised, it was usually a little less expensive than what you would pay for two non-corporate permits, but you also are actually purchasing the corporation and obtaining that snapper grouper permit as an asset of the corporation.

With the advertised prices, there were some old posts that I found on some of the sites, and so, based on the advertised prices, I would say that it has increased about 50 percent over the last several years, since about 2011, and these are -- I do note this in the document, but these are the

advertised prices, and so we don't know the negotiated prices, and they may be different, but, overall, the advertised prices and the way that they have increased, from what I could find, indicates that the cost to get that Snapper Grouper 1 permit is going up.

I also looked at the leasing, and so, technically, you don't lease a permit. The way the Permits Office handles this is that it's noted that the vessel is leased for that permit. However, they are definitely advertised as leasing, you know like looking to lease my snapper grouper unlimited permit, and most of them that I could find were between $6,000 and $8,000 for the year.

With the permits and permit holders, I kind of got into how many are still there and who has kept them, and about half of the snapper grouper unlimited permits are retired, and about two-thirds of the snapper grouper limited are retired, and I have set up a dataset to look at the permit holder history, and over half of those snapper grouper unlimited permits have the same permit holder for over ten years, and about a third of them are the original permit holders since the implementation of the limited entry.

I also looked at landings associated with the permits, and I used 2012 through 2016, and very few of either unlimited or limited permits have no snapper grouper landings, and so, as far as -- There are permits that have very low landings, but very few that have no snapper grouper landings through that time period, and then about half of the unlimited permits have landings every single year for that time period and about a third of the limited.

I also looked at the vessel characteristics. In general, the Florida vessels are a little smaller and a little older than the vessels in North Carolina, South Carolina, and Georgia. They all have kind of similar -- The most common horsepower range, and most are made from fiberglass and use ice for refrigeration.

I wanted to look at participation, which is number of vessels, number of trips, and number of days at sea, and so I have my nine areas that I used, similar for the community summaries, and I looked at logbook data from 2012 through 2016, and then I also looked at a longer time period, where I compared 2001, 2006, 2011, and 2016. Then I also split them up into three seasons, and so these are four-month seasons through the year, and the exception is, for the Florida Keys, I made Season 3 start in August, and that's because of the impact of the spiny lobster opening in August.

Overall, participation levels have been pretty consistent over the last five years. It has decreased since 2001, but that makes sense, because there are fewer permits available, but the exception is north Florida and central Florida. The number of vessels and number of trips has stayed about the same, and, in some cases, it has increased a little bit, and so it may not be the same people, but the level of participation is about the same for these areas.

When I looked and compared seasons, in the northern areas, participation is highest in the Season 2, and so that's the summer. That makes sense, because the weather probably is better for fishing. For the middle areas, around South Carolina, Georgia, and north Florida, the highest seasons are Seasons 1 and 2, and then participation kind of drops off in Season 3, and then, for the southern areas, it's consistent all year, south Florida and the Florida Keys.

Northern North Carolina and central North Carolina and all the Florida areas typically have one-day trips, with one to two crew, and then, in the middle, southern North Carolina, South Carolina, and Georgia, they typically have longer trips, three to five days, with a little more crew.

Looking at the catch portfolios, I actually combined North Carolina, South Carolina, and Georgia and then the Florida east coast and the Florida Keys for this one, because they were similar enough to put all together. This is the first steps in really looking at these catch portfolios and looking at trip types, and there are lots of ways to do this, you know what species are caught together and what trips are catching these species, and it's incredibly diverse, and there are so many species, and so I used a two-mode network analysis, using the trips and the species.

The two-mode network analysis is similar to maybe something that you've seen with social network analysis, where you have two modes and they have a tie that is defined. Maybe they are related or they've been in a transaction or something, but two-mode is kind of like cluster analysis or some other methods like that, but it allowed me to see what species were caught together, what trips were catching those species, and then what trips shared similar species catch combinations.

I wanted to use network analysis, because I could generate the network graph, so we have like a visual way to look at it, a birds-eye view. This is a good way for me, preliminarily, and then, also, I could use network metrics. I used a grouping called Factions and then a measure called Betweenness Centrality, and I will explain that a little more.

I only did this using logbook data from 2016, and so, for each season and each area, I identified the primary species, and so these were driving species for the trip, and then secondary species, which were just the other species caught during that season and that area, but maybe not as much of a driving species. I identified trip types, or at least my first draft of trip types, and I'm going to get some feedback, hopefully, from the council and AP about that, and then I developed annual portfolios.

For the document, I just have, in the main part of the document, the tables with the trip types that I identified, and, in the appendices, there will be a little more information, the network graphs and the tables with the network metrics, but that is a lot of visual information, and so, for the document, the main part of the document, it's just the tables. This is how I presented it. We have North Carolina, South Carolina, and Georgia, and I combined them.

For Season 1, we have black-sea-bass-driven trips and we have what I call core snapper grouper trips, which are kind of these general usually pretty dense area on the graph, multispecies trips, and then a deepwater trip. I'm not going to go through all of these, but we do have, in Season 2, the blueline-tilefish-driven, which is in northern North Carolina, primarily, and so let's look at the next one.

This is a network graph, and so what I would do, and this is North Carolina and South Carolina and Georgia, Season 1, and so what I would do is I would put the trips and the species into the software, and I would generate this graph, so I could look at it as a system a little more, and so, for this one every circle is a trip, and every square is a species. The trips, I have attributes that are assigned to those, so you can test something out, and so maybe location, gear, et cetera.

For kind of this dense area in the middle, that's more core snapper grouper trips, and I would also run the group metric, the grouping metrics, where the network analysis software tries to sort them into groups, and that is indicated by the colors, and then I also ran a metric of betweenness centrality for the species, which is indicated by the size of those squares. The bigger the square, the higher the betweenness centrality, and this metric incorporates the number of ties, but also the position within the network, and, when it comes to modes that have very high levels of betweenness centrality, if you remove them from the network, they would really alter the network.

I felt like this was a good indicator to be able to identify kind of these driving species, and so, in this one, you can see that I have them circled. The black-sea-bass-driven trips, you can see that has a really high betweenness centrality value. If you removed black sea bass from this network, maybe through a regulatory closure, it would really throw off the trips for this area and the season, and then you have kind of the core snapper grouper, and these are the multispecies. Vermilion probably is a driving, but it's not super distinct, and so it's probably vermilion and trigger, and then we have the deepwater group, and that's probably driven by snowy grouper.

I only have three of these, because it's a lot of visual information, but I just want to be able to point it out. This is Season 2, and this is summer. This is when this part of the region really kicks into gear, and so you have this really dense area, and this indicates that these trips are similar, in that they are all focusing on these very multispecies trips.

There is black sea bass, if you can see up in the corner there, that middle circle, and it does have a high betweenness value, and so it's probably a driver, but there is so many species, and what this suggests, to me, is that, in the summer, there are a lot of vessels taking these trips and they're targeting lots and lots of different things, and maybe black sea bass, gag, and greater amberjack are their main species, but they are catching lots of stuff in the summer. Then you can also see that blueline tile, up in the left-hand corner, is very distinct, and this is the northern North Carolina folks, and then a deepwater group over there on the left.

This is the Florida east coast, and the Florida east coast was super diverse and did not want to fit into most network groupings or metrics. I think it's pretty awesome, and it seems like a lot of the trips change a lot, and there are a lot of species.

You can see, in Season 1, a little bit of some compartmentalization here, but you do have, on that left-hand corner, the jacks and then other species. Those are just the other species that are in the commercial logbook, and so maybe the shellfish or a state species there, but you have this kind of jacks-driven. On the right-hand side, you have golden-driven, but a deepwater, and this is the longline fishery off the Cape. You do have a yellowtail up at the top, kind of a little component up there, and that's south Florida, and then you have your multispecies trips to the left of that.

There is nothing in particular that is kind of a driving species for that, and then, in the middle, you have king mackerel, which makes sense, because central Florida is a primo king mackerel area, and it's right in the middle probably because everything is kind of the secondary species caught on king mackerel trips.

The Florida Keys, I do have to say the Florida Keys are very yellowtail snapper focused, and you can see that in the next slide, with the graph, where you have a really distinct yellowtail snapper component there. It has a very high betweenness level, definitely. In the upper-left, you have a

deepwater group, and we do have an others group. This is Season 1, and so maybe this is shellfish or some other state-managed species, and then I do have, on the bottom-left there, very diverse trips, on the side there.

I next tried to work out some annual catch portfolios, and so I would take those trip types that I developed and I would compare them, assign them, to a vessel, so I could see if the vessels had patterns, and, in some cases, they did. I was able to kind of develop a couple of different types of portfolios, to show how they switch, and I did this for the North Carolina, South Carolina, and Georgia. Then also for the Florida Keys, and I can't wait to get feedback from the fishermen, to see if these do fit their annual business.

I could not do this for Florida east coast. I tried every way, and there was no pattern. The vessels fish for everything throughout the year. Maybe they are focusing on golden tilefish at the beginning of the year, and that was really the only one that kind of defined itself, but, as soon as the longline is closed, it drops off, and the Florida east coast is just super diverse.

Last, I looked at the landings and revenue, and this is total landings and revenue, and, while it has decreased a bit over time, in general, it's pretty consistent. In looking at the species-by-species, you can see the species where landings and revenue decreased, but then you can also see the ones that kind of came in to take its place, and then, in some cases, actually the landings didn't go up substantially, but the value did, and so it's been very interesting.

The next step is review and revisions and present it, and then maybe there is some more analysis and data collection possible. I do want to say that one thing that I have found, in digging into all of this, is diversity is the strength of this fleet and having access to so many species. It really helps them weather regulatory changes and also any environmental or biological changes, and it's really resilient overall, and maybe not every single business, but the fleet is very resilient, and so that's it.

DR. CROSSON: Do folks have questions? I see that Jennifer does.

DR. SWEENEY-TOOKES: First, I would like to say that this is really beautiful. You've done a really nice job, and this brings a lot of new data to the table that I'm very happy to see, Kari, and thank you. I had some preliminary questions, going all the way back to the beginning. You mentioned that you're focusing on these nine key areas, and you mentioned the number of permits, and I'm wondering if you can just give us a little background on why particularly you chose those. Are those the major fishing communities, or can you talk a little bit about changes you might have made there? Then also tell us how many permits we're talking about. What is our sample size?

DR. MACLAUCHLIN: For the community summaries, you're asking about the way that they were divided up into the nine areas, yes?

DR. SWEENEY-TOOKES: Yes, thank you.

DR. MACLAUCHLIN: Okay, and so we kind of threw out a draft of how we would break them up into sub-areas, I guess, within the states. Then we got feedback from the council and the AP about where they thought the different cutoffs should be, because they felt like the fishing was different, and so that was actually based on the input. They wanted Hatteras north to be separate,

and they wanted Southport, North Carolina and south to be separate, and so that's how North Carolina was split up.

Then also, with Florida, we had some information about where we thought the cutoff should be, but I did separate north Florida and central Florida on my own, because I feel like the fishing is really different in Volusia County than it is from the Cape, and so I wanted to separate those out, and so it was a little bit of my decision, but then also based on what the council wanted to see and the way they thought it should be split up and compared.

Then, with the number of permits, there are many, many tables with lots of information in the document, and that includes that information, and so we just -- Because it's still under review, and then also to save time, because it is actually a really long document, we wanted to just present you -- We wanted to not give you too much information and get in the weeds too much with the details, but, the last permit poll I did was January of 2018, and there were 540 snapper grouper unlimited and 110 snapper grouper limited. Over time, these have decreased, and so, at the beginning, there were a little over 900 permits that were allocated, and there have been 995 numbers.

MR. BROWN: Kari, I've got a question for you. When you were talking about the increase in the corporate permits, was that through a specific period of time that that happened, because I know that some people had individual permits and that -- I talked to Monica about this, and she told me that there was a period of time to where they were allowed to change those to corporate permits, but has that been ongoing, or, when you mentioned the increase in them, was there a specific time?

DR. MACLAUCHLIN: I looked at 1999 through 2016, the permit records, and then I also created a dataset with the permit holder history for every single permit, so I could figure out how long people held them and if it was families and stuff. The council did -- It was after the amendment that put the limited entry in place, and they did go back and they added in where, if you are a non-corporate entity and you want to -- If you start a corporation and you want to move that permit, as long as you or an immediate family member is an initial shareholder in that corporation, you can do that without the two-for-one, and so that's usually how they became corporate permits, is that an individual started a corporation and transferred the permit to the corporation.

MR. BROWN: Is that still going on right now?

DR. MACLAUCHLIN: Yes.

MR. BROWN: Okay. That is interesting to me, because my business was incorporated at the very beginning, in 1990, and then I built a new boat, and the boat is in the corporation's name, but everything was happening right around that time of 1998, and then I didn't follow-up on it. Then, in later years, I found out that people were transferring them over, but my understanding, from Monica, is that they ended that at some point.

DR. MACLAUCHLIN: Not that -- I mean, the proportion of permits held by corporate entities is increasing, and so, in looking at the permit history, I can't always tell if it was an individual who already had it and then they transferred it to their own corporation that they started, but, to me, it indicated that it's still going on, but we can ask Monica about that, and I will check-in with her.

MR. BROWN: Okay. I appreciate that, because that's valuable news to me, because it actually increases the value of my permit if I'm able to do that. Also, you were talking about a period of time where the cash flow for the fish, the economic part of it, where it looked like it dropped down, from like 2003, 2004, 2005, or 2006 or whatever, and I do know that there was a period of time where some fishermen, and I don't know how many, were diversifying, and you mentioned how diversified a lot of people are, and that they were going into other aspects of the industry, to where they were getting boats to either charter or headboats or something and then commercial fishing part-time, rather than doing it full-time.

There was quite a few people that did that, and, for me, that was one of the things that I was gearing towards, because of the pressure that we were putting on a lot of the area that we were fishing, and we were noticing a decline in the amount of fish we were catching on certain places, and so it made more sense to diversify into the for-hire industry.

DR. MACLAUCHLIN: Great. Thank you.

DR. SCHNIER: I really like what you've done with the species aggregations. That was really neat, and mainly because I've sort of done some work like this before and tried to think about this, and I'm curious to what degree you might be able to say that those aggregations are driven by biological factors versus policy and economic factors, because I am wondering -- I mean, is it because they're living in similar habitats and this is why they're catching these assemblages, or is it because there is some overlapping regulations and economic incentives that are sort of generating these portfolios? Have you thought at all about that?

DR. MACLAUCHLIN: I think, in some cases, it is -- You want to maximize the value of that trip, and so it would be preferable to go to one location and be able to catch a lot of different species and not back and forth, and so I imagine that there is, especially with those just really diverse multispecies trip types, that they are found in the same type of place, and I think that would be good to get some feedback from the advisory panel, about how those trips work and if they make sense to them.

Definitely for the shallow-water closure, that's a lot of really important species, the gag grouper, red grouper, black grouper, scamp, porgy, all of those, and, when that is closed from January through April, and then when it opens in May, it definitely shifts everything around for Season 2, and I think that's why, in Season 1, vermilion and gray triggerfish are so important, because a lot of other popular species are closed.

DR. SCHNIER: Thank you. I was curious about that.

DR. CROSSON: Other questions?

DR. DUMAS: I just wanted to applaud you on this work. In the past, when I've tried to understand, in descriptive way, what's going on with the snapper grouper, all different species, it's been really difficult, and I think these figures are the clearest presentation that I have ever seen about what exactly is happening and how to visualize those patterns, and so I think, as far as describing the current situation, I think it's fantastic work.

I think Kurt is asking questions of the next stages, of what's causing these patterns that we're seeing, regulations versus biological associations and things, and I think those are the next questions to ask, but, as far as an initial description, I think this is fantastic work. A comment related to Ben's comment or question about the catch patterns over time, and I noticed that catch was down in 2003 to 2006, I think, and those were boom years, if you recall, in the housing industry.

To the extent that some fishermen have alternative employment opportunities in construction or the construction industry, that's when, especially in Florida, but also just construction was booming, and so there may have been some folks who were taking some time off of fishing to do construction or to flip houses, and a lot of people were doing that, and that could have been going on.

Then, in 2007, the recession hit, and a lot of those alternative employment opportunities went away, and folks may have been coming back to fishing, and so I don't know to what extent that drives some of those patterns relative to biological abundance or consumer demand for fish driving the prices, but, those alternative employment opportunities, that could have been driving some of those changes in landings over that period of time.

My final comment is on the figures, the network analysis figures, that you presented. Not only are they beautiful and descriptive and very informative, and this might be revealing some of my psychology, but, to me, they look like fish, and I think that -- I give you extra kudos for making an informative, descriptive figure that also represents, at a meta-level, the topic of the discussion, and so just well done.

DR. MACLAUCHLIN: Thank you. That's really, really helpful to look at.

DR. SCHNIER: I wanted to second Chris's comments and just say that, Kari, this is by far the best graphical depiction of this type of analysis that I have ever seen. Having tried to do this stuff before and thought about it, what you've done is absolutely -- It's amazing, what you've been able to do, and I think it will really help a lot of people who are doing work in this area.

DR. MACLAUCHLIN: Great. Thank you.

DR. WATERS: Kari, have you detected any evidence of vessel migration over time, either among portfolios or between areas?

DR. MACLAUCHLIN: I did actually run an analysis of how they move, and so what I did was I took the vessel and attached any kind of landings report attached to that vessel in an area, and, mostly, if they venture out, they don't venture very far. I used the nine different areas, and so, if they are in central Florida, 95 percent of the vessels never go further than north Florida or south Florida, and a lot of the vessels stay exactly in the same area all year, and so I think that, in general, they stay pretty close to their home port, and I didn't put that in the document, because it has turned into a really long document, but I think that I will probably add that in, because it was something that was brought up at the council meeting, about how they move. There is definitely a contingent that moves around, but they don't move like king mackerel fishermen, for sure.

DR. CROSSON: Kari, did you, in any way, look at the impact, in terms of these clustering groups, on the endorsements that were created for golden tilefish and black sea bass? Did that seem to have any kind of noticeable impact on how people were being clustered and their trip changes?

DR. MACLAUCHLIN: I did do just 2016, for what I used in the document, and I ran some other years to see if there was any really obvious changes, and it doesn't seem like that. With the endorsements, first of all black sea bass pot endorsements, I feel like the hook-and-line component of that is still pretty solid, and so you don't really see anything affected, necessarily, by the black sea bass pots.

For golden tile, because longline is such a prominent component, and it's just for usually two or three months at the beginning of the year, you can definitely see that since the endorsements were put into place, because it's such a short-lived fishery now, usually, or a short-lived season for the longline golden tile, and so a little bit with the endorsements, but those are pretty specialized folks, I feel like, and so most of the people are fishing for everything.

DR. CROSSON: Any further comments or questions for Kari on this?

DR. TRAVIS: Scott, can I ask a question?

DR. CROSSON: Go ahead, Mike.

DR. TRAVIS: Kari, I think you and I talked a little bit about this before, but we didn't get into details, and Chris brought up a comment a little bit ago about other factors, and so Nick Farmer did a cluster analysis in support of the Comprehensive ACL Amendment a while back that attempted to group like species based on biological, environmental, and ecological factors. Now you have sort of done the other half, from my perspective, using social and economic factors. Do you think it would be possible, down the line, to combine those two and actually do an analysis that makes use of all those factors?

DR. MACLAUCHLIN: Sure, I do feel like that would answer the question of are these catch combinations associated with the biological and environmental factors more and be able to compare it, because I think actually Nick Farmer and I had -- We had talked about this, like years and years ago, at some point, and so it could be possible. It would be at least a good comparison to see how those factors line up with the trip types.

DR. DUMAS: I would like to make another comment about the snapper grouper lease prices and purchase prices and looking at comparing those. Based on what you were able to find, you had lease prices of between $6,000 and $8,000 a year and purchase prices between $60,000 and $80,000.

DR. MACLAUCHLIN: Those were advertised prices that I was able to find online.

DR. DUMAS: Right, and so they may not describe all of the sales that are happening, but, if we just look at that information that's available and compare the lease prices with the purchase prices, those are consistent. If you work out the perpetuity formula, that is consistent with a discount rate of about 10 percent a year, and it's consistent.

If you look at the $7,000 annual lease price, that is consistent with the $70,000 purchase price, at a 10 percent discount rate per year, and, if you look at smaller discount rates of 8 percent, 6 percent, 4 percent, then the value of the purchasing the permit, the purchase price, would be much larger compared to the lease, and so it looks like, if you can take this information as somewhat reliable, that the fishermen are discounting at about, per season, at about a 10 percent discount rate to discount the future lease value when they're trying to estimate how much they should pay to purchase the permit.

Another way of looking at that is, if you look at -- Suppose you were going to buy this permit and you're looking out -- Let's say you're looking out thirty years, thirty years and looking at what you would -- If you look at the value of having the permit is about $7,000 a year, which is the lease price, going out thirty years, and discount that at a 10 percent rate every year, you get right at a lease price of $7,400, if you look at paying $70,000 for it today and discounting it 10 percent. That's equivalent to a lease price of $7,400.

Lower discount rates would lead you to lower lease -- My point is I think that the purchase prices and the lease prices that you see here, that you managed to find, are self-consistent with each other for a reasonable discount rate, which is the implied discount rate is around 10 percent a year, and I think that's reasonable, given the nature of the permit as an asset and the certainties involved with it.

DR. MACLAUCHLIN: Interesting. Thank you. That's helpful.

DR. CROSSON: That also tells you something about the fishermen's expectations about stability and management in the fishery over time, because, as I stated yesterday when we looked at net revenue and compared that for the quota share prices for wreckfish, it was much higher discounts than that, because of, of course, the turnover with the Amendment 20A.

DR. WATERS: It's too bad that we don't have time series information on this. If we had time series data about these permit prices and lease prices, we could see changes over time in expectations of profitability.

DR. MACLAUCHLIN: The information that the Permits Office does have for the transfers ranged all over the place, and so I don't know how reliable that is. I felt like the advertised prices were kind of the best indicators, but I don't know how that would work with requiring them to report how much they sold the permit for, because I don't know if there is tax implications or what.

DR. DUMAS: My point was, if the lease prices -- If the data on the lease prices are more reliable, then I'm just saying, thinking about comparing the purchase price with the lease price, the purchase price for the permits are not far out of line with what you would expect them to be, given the lease prices, for reasonable discount rates.

DR. MACLAUCHLIN: Yes, and I don't know. There is no requirement to report the price and then also definitely like a lease arrangement, and I don't know if there is any information collected about how much that costs, but there are more advertisements for leasing of permits, definitely, online at least, and so if something would just check and see if it goes up and down. I think there's a way to do that, but I think you would just have to kind of check online all the time or have somebody keep an ear out for you. I'm sure that it was -- There are not that many advertisements

online, and so either there are not a lot of permits available, for sale or for lease, or they're doing it all by word-of-mouth. Anyway, that was a side note.

DR. CROSSON: Kari, I think you might remember that some of the economists from my group are using Amazon Turk to pay people to keep getting prices for charter trips online, so we can quickly update and compare across regions, and this would be a perfect sort of thing to pay people small amounts to keep looking online for these prices over time. That's something for me to bring back to Miami and to consider.

DR. MACLAUCHLIN: Yes, and that was an awesome idea. That's a good way to use Amazon Turk, for sure.

DR. CROSSON: Are we ready to move on to the next item? It's related to this, and so, thank you, Kari. That was a really wonderful presentation, and I really enjoy what you're doing here. I agree with other members of the SEP that that really kind of was eye-opening on how to group some of these behaviors and these fishermen. Thank you.

DR. MACLAUCHLIN: All right. Thanks so much.

DR. CROSSON: We will take a five-minute break and then restart.

(Whereupon, a recess was taken.)

DR. CROSSON: We're going to restart now. We're on to the next agenda item, and we're going to be doing more socioeconomic profiles, and so I will let council staff take over.

MS. WIEGAND: We are looking at doing some more socioeconomic profiles for all of the species managed by the council. The key difference to keep in mind, when we're talking about this versus what Kari just went over, is these are going to be a little bit broader, and our goal is to be able to update them annually, or maybe biannually, and so a lot of this will want to be sort of plug-and-chug and be able to go, as opposed to needing a significant amount of time to reanalyze every year.

We sort of started putting these together by looking at a variety of different things, looking at North Carolina DMF's reports that they do, based on county and species, as well as the NMFS community profiles and snapshots and some of the stuff that is already in our Fishery Ecosystem Plan.

The goal is to really provide a more comprehensive look at South Atlantic Council-managed species, and this will include looking at community characteristics, fishing trends, imports, infrastructure, safety concerns, and the hope is that it will be able to sort of enhance the socioeconomic section of the fishery ecosystem plan. Right now, all it contains is just the most recent amendment for each FMP and the economic and social sections that are included in that, and so we're hoping to be able to take those sections and expand on it a little bit to get a more comprehensive understanding of the human environment.

We've got it broken up into sort of different sections, chapters that we're going to look at by fishery management plan and then chapters that we're going to look at by region, and so, for the FMPs,

this will be by species or, in the case of snapper grouper, by complex, to make it a bit more manageable, since there are so many species in that FMP.

It will start with just a basic history of the fishing communities, and this isn't something that would need to be updated every year, but it will just be sort of a baseline background on these communities, and, a lot of this stuff, you guys went over last year, and so I'm just going to sort of breeze through it quickly, and, in our fishery management plans, in the social environment section, these key fishing communities are usually identified based on a regional quotient, and this, essentially, just looks at the proportional distribution of landings, and so it's relative importance, and it's just the landings of that species for that community versus the landings of that species for all communities in the area, and so here it is for king mackerel for the pounds and value.

Once those communities are identified, and, again, all of this is typically included in our fishery management plans, and we look at commercial engagement and recreational engagement as well as reliance, and engagement is just the absolute number of permits or landings or value, and then reliance is per capita, and so it's that same number divided by population, and this helps us identify those communities that are most involved in the particular fishery, and then here's just an example of that again for king mackerel.

Then, once we've sort of identified those major fishing communities for each species, we're hoping to look at some demographic characteristics of these communities, and so what's the population like, what's the median house income, what's the education breakdown, what are some of the major industries in the area, and all of this information can be gathered from the Census Bureau.

Additionally, sometimes our FMPs have these vulnerability indices included, and these are things like the poverty indices, population composition, personal disruption, and this includes Census Bureau type of stuff, like the number of households with young children, crime rates, separation rates, unemployment, to get a general idea how vulnerable these communities are, and there are also gentrification indices, and these aren't typically included in our fishery management plans, but NMFS social snapshots, community snapshots, do include these, and these will look at things like urban sprawl, natural amenities, housing disruption, and retiree migration, and this includes variables like population density, cost of living, median home values, things like that.

Then, in addition to some of that social stuff, we'll go into looking at effort, and again, this is stuff that's included in our fishery management plans now, and so the number of vessels landing a species, the number of trips, total landings, landings of species that are caught jointly with the target species that we're looking at, and things of that nature.

We can also look at landings over time, and we can break these down regionally, by state, also by gear, and look at sort of a seasonal distribution of landings. Additionally, one of the things that we've started to do recently is to put together these heat maps for species, and these are based on top area fished, as identified in the logbook, and so this is just a quick example of that for king mackerel. These are total king mackerel landings in the month of March for the 2015/2016 and then April through September, which is the second half of the first king mackerel season. Then this is October through February, and these are fairly simple to put together and chug out and sort of give a general idea of where these fish are being brought in from.

Additionally, like Kari showed in the snapper grouper profile, we can look at vessel characteristics, and so this is average age of the vessels, the size of the vessels participating in the fishery, hull type, things like that. We can also look at whatever permits are tied to that species, be they commercial permits or charter/for-hire permits, and look at trends over time, in terms of the number of permits, as well as where the permits are located.

Again, this is imports, and it's something that is typically included in our fishery management plan as well, and this is more of a qualitative discussion of where we're seeing imports and how those compare to domestic production, as best you can compare those two. We've got a couple of questions for discussion related to that section, and I will leave it up to you. We can briefly address those now, and then I will run into how we're going to break this down by region, or I can run through it all and we can circle back to the questions, if you have a preference.

DR. CROSSON: Does the committee have a preference? Do you want to stop right here and get into these discussion questions? What do you all think?

DR. WATERS: I've got a question. I was just wondering how much extra effort would it be to have more than five years of data, and I understand the concept of a snapshot at a given point in time, but sometimes it's only by looking at the trend over time that you can really make inferences. A number presented now is just a number, but a number within the context of the time series has some interpretation.

MS. WIEGAND: I don't want to speak too much for the economic portion of the analysis. In terms of the social stuff, I don't believe it would be that much extra work to extend that time period beyond five years. With the mapping work, it can get a little tricky, but I think, once we've sort of gone through the initial point of setting up some of these models and getting them set up to run, it won't be too challenging to extend that time period.

DR. WATERS: Maybe you wouldn't need to look at the full time series for every single aspect of your analysis, but I think that there are certain trends you can look for over time that might be meaningful to bring in data more than just five years.

DR. SWEENEY-TOOKES: I just wanted to echo that point, that a five-year snapshot might be interesting, but, to be able to see data over ten years, that lets us identify trends that we can then make stronger inferences about what we actually see happening.

MS. WIEGAND: Are there any particular sections that I just went over that you think would be key for extending that time series to ten years, as opposed to five years?

DR. WATERS: Certainly, you have started with landings, and value, number of permits, for example, and you can play it by ear as you go. Once you start questioning why something is doing something like this, you can start looking for trends, and that will stimulate your curiosity, and you will want to go back and learn a little bit more.

DR. SWEENEY-TOOKES: I would actually -- Going back to Slide 5, where you're describing the communities and you're looking at the education levels, and Slide 6, where you're looking at the social vulnerability indices, and those are all really important things to watch over a longer period of time.

DR. DUMAS: How often are you thinking about updating the snapshots?

MS. WIEGAND: Ideally, annually, or maybe biannually. I will go ahead and move on to the chapters by region, and there is quite a bit of overlap, and these will only be done for states in the South Atlantic region, even though some of our FMPs do extend beyond just those four states in the South Atlantic, like CMP and dolphin wahoo. For the regional analysis, we'll just be focusing on the North Carolina through the Keys area, and, again, this will include a description of the major communities, as was already identified in the FMP chapters, as well as fishing trends, the same as the FMP chapters, but summarized by state, or a different regional breakdown, whichever is most effective.

One of the big things we're struggling with is infrastructure. It's an important thing to get at, but data can be sparse, and we were hoping to be able to do some sort of mapping analysis of where these guys are docking their vessels versus where the dealers are located, but, at least based on the Regional Office's permit website, it looks like the dealer locations are actually mailing addresses and not locations, but, if there were datasets that you guys know of that might be able to get more specific location information on dealers and home port of vessels, there are some connectivity analyses and hotspot analyses that can be done, that are typically used for city planning, but could fit into these sorts of questions.

Additionally, we've been doing fisheries performance reports with our advisory panels, asking them to sort of have a qualitative discussion about changes in catch over time and area and any regulatory concerns, and this might be another place where we could bring up sort of a qualitative discussion about fishability of areas, and then we recently got access to quite a bit of Coast Guard data.

We were looking at it for the wreckfish fishery, but we were sent sort of four different datasets, sort of summary information for any Coast Guard investigations that occurred in the South Atlantic's region, as well as time series events data for any of those investigations. There was personnel and injury data for commercial fishing vessel and dive trips, as well as spill data and pollution data.

At least the personnel and injury database can be tied back to a vessel number, and so it could be tied to different permits, and there is some way that we could link these up with the fisheries we manage. We just got this data, and so I haven't been able to dig too far into it, and we would have to work with the Coast Guard, in terms of what analysis they would be comfortable with us doing and posting publicly, but, if there are any sort of questions that you guys think would be interesting to answer, in terms of safety-at-sea, that's a discussion that would be nice to have.

DR. SWEENEY-TOOKES: I have actually two quick suggestions right there, and it would be to look to see if you can link any of them to police reports as well.

MS. WIEGAND: All right, and so sort of the broad discussion that we're looking to have with you guys is if there is other readily-available information, in terms of looking at the distribution of fishing infrastructure, whether there is other information that should be included in this outline that would help us better characterize the social and economic environment for council-managed

species and whether, given the information that we do have, if there are any other analyses that we should consider conducting that might better speak to the environment.

DR. DUMAS: I have two suggestions. One is you could look at the county-level parcel data, real estate parcel data that is in GIS format. A lot of times, one of the fields will be the owner name, and when the owner name of a parcel is a company, then the owner name might have "fish house" in the name or "crab" or something like that, and so you could search those parcel databases for keywords, fish or crab or things like that. We did this with the parcel data in North Carolina for other purposes, but that's something, if you can get the data for the coastal counties of each state, that might help. That's one thing.

The other thing is to use Scott's idea about Amazon Turk and maybe pay Turk people to search on the web for fish houses or distributors or that type of thing and keep a list, and, whenever someone sends in a name of a fish house and a location, compare it to your existing list, and, if it's different, then that's a new hit. Then you can kind of build a list, and so pay people to search the web for you to find places, and I don't know Amazon Turk is set up with this, but you could pay them more if they discover a place that has not been discovered before, if there's a way to do that.

You could maybe post a list on Amazon, in the instructions to the Turk searchers, and somehow have a website that posts a list of known sites and so tell them that you'll pay them for a site that's not on the existing list or something like that, so that you're incentivizing them to discover new sites that are not on the existing list.

DR. CROSSON: I was kind of wondering, just thinking back to my days working for North Carolina, both the states, and there are also federal port agents, and they're always going around to all these different infrastructures, and so how do they have a list -- I don't know where this comes from. I never worked in the port agent area, but I know that, regularly, they are driving around and stopping at different sites, and so they must have a list that is separate from whatever is listed as a registered business address, right? They must have a physical location list to tie things to the trip tickets, and so I know it's going to vary between the four states, to a degree, and some states are known to be a little bit more reluctant to share information, but, to the degree that that can be done, that would certainly be useful.

DR. SWEENEY-TOOKES: To build on both of those, as Chris mentioned, paying someone through Amazon Turk, but I would also put word out through the local Sea Grant and Extension offices to promote that in the local communities, that you have an opportunity to do research and get paid, and I would also consult with the Department of Ag for some of those processor and dock facilities. The Department of Ag has inspectors, seafood safety officers, that they send out, and so they might have a better idea of where the docks and the houses are, too.

DR. DUMAS: Related to that, I know, for shellfish, shellfish sanitation offices, every shellfish processor has to get a permit, and there is a list of the processors, and so the shellfish safety office of each state would have those lists. Then also county chambers of commerce would have lists readily available that you could also search for key words, too.

DR. SWEENEY-TOOKES: That's a great idea, and, in fact, the county extension offices, even the agricultural extension offices in each county, generally know what seafood processing facilities there are as well.

MS. WIEGAND: Thank you. That's an incredibly helpful suite of suggestions to get more infrastructure data, and so, again, along those lines, can you think of any other readily available information that should be included in this that hasn't already been discussed?

DR. DUMAS: Maybe a list of not processors, but for marinas, and you could get a list of marinas from the state boating and recreational fishing agencies. They would have a list of -- Typically, they have little brochures that list all of the marinas for the private boaters, but that would be a set of marinas from which you could try to pick out the ones that have commercial boats tying up there.

DR. CROSSON: I got to use those very recently when our group was doing economic impacts for Hurricane Irma in Florida, and we got a big list from Florida Fish and Wildlife, and we were going through and looking, on the ground, to see what had happened to these different ones, and so that information -- At least Florida was very willing to share that with us. I think it's all online. I mean, we did find it was out-of-date, and sometimes the addresses were not -- They were business addresses or corporation addresses, but not the actual facility, and so there was always some of that in there.

DR. DUMAS: But the state boater guides would have -- Usually they're brochures, and they have a map with every marina sort of located on the map and then an address. For private boaters, if you're boating along a waterway and you want to buy gas at a marina, they have all the marinas, even the small ones, and so, from that, would be a set of marinas, out of which you could try to identify which ones had commercial activity, if you're trying to get infrastructure, and if you're considering marinas as part of the infrastructure, in addition to the processors.

DR. JEPSON: I just wanted to point out that Brent Stoffel has a project working with port agents identifying infrastructure and fishing communities, and so, Christina, you may want to talk with Brent and kind of see where that's at. It's a project where they go out and identify a fish house, and they get the location, and they take photographs. Then they go through the community and try to identify other businesses that are associated with fishing in that area, and so that might -- That's just another project that's going on to help us kind of build that better idea of -- Get better data with regard to the location of this infrastructure.

MS. WIEGAND: Excellent, and I will definitely reach out to him. Thanks, Mike.

DR. CROSSON: Getting back to Christina's question, for the second one, is there other information, readily-available information, that could describe the social and economic characteristics? Do we have any input on that?

DR. SWEENEY-TOOKES: It's not nearly as simple as going through databases, but there is a fair amount of academic and gray literature qualitatively working with many of the fishing communities in the Southeast.

DR. DUMAS: I would also like to make another comment about the GIS parcel data at the county level. The data also often have value of the parcel, and sometimes it also has the value of the structure on the parcel separated from the value of the land, and sometimes it's combined, but sometimes they separate that out, and so, if you identified, from other sources, where the

infrastructure companies were located, then you could go to the parcel databases and pull out the value of the land and the structure.

Then you could say that fishing activity supports this infrastructure, and this infrastructure is valued at this amount, and then you could figure out what the property taxes would be supported by that fishing infrastructure being located, and so that would be important to counties to know what portion of their property tax base is being supported by fishing, and you could also, if you had the database of where fishing permit holders lived, and so you knew their home addresses, and you could also tie that to the parcel data and pull out the property data of those parcels and say fishing supports these fishermen, and these fishermen own this property, and so fishing helps support the property taxes paid on these property locations.

Then the question becomes what portion of household income is fishing versus other activity, and that's always a question, but you could go through and at least you could identify what property value is at least partially supported by fishing. Then, if you had data on which fishermen got all of their income from fishing, you could say this portion of it is supported totally by fishing, and so, once you've got your database of fishermen's addresses, that would be easy to do, to merge with these GIS databases and then pull out the value and property taxes supported, and I think that would be another way of showing the value of fishing and fishermen to these counties and to the states.

DR. WATERS: Actually, it sounds to me like one of the first things you need to do is to define what you mean by infrastructure, because you can tell, by this discussion here, that it can get out of hand pretty quickly, and so you're going to have to limit your area of focus.

DR. DUMAS: My point of those comments is that, if you're not using the parcel data, those datasets, the GIS parcel data, provide some additional sources of information that could inform several different areas of these types of community descriptive studies, and those parcel data are only now sort of becoming readily available online with rich datasets included, and they're becoming sort of consistent, on a county-by-county basis, as state GIS programs sort of require the counties to submit parcel data in the same format across counties for a given state.

In the past, there was a lot of diversity, and it was hard to get --Each county produced their parcel data in a different format, but now that's becoming more consistent, and so it's becoming easier to access, and, in theory, it would be easier to update in a frequently-updated study like the one you're contemplating here.

MR. HARTIG: In south Florida, it's really been interesting to watch the transition. Between Jupiter and Miami River is about seventy miles, and there is nowhere to unload any fish on the water in that area. The infrastructure is totally gone. Where I am, in Port Salerno, which has 150 years of known fish house activity, there is no fish house in Salerno anymore either, and so what we have are platforms in Salerno that actually we have three different fish houses that pick up fish there on a daily basis.

Somehow in this, in trying to identify infrastructure and to identify how things are done, probably you're actually going to have to talk to someone from that area in south Florida to get what's actually happening, and I don't know how common that is going to the north, because certainly in

the megalopolis where we are, things change fairly rapidly, as far as infrastructure goes, for commercial fishing, but I just wanted to mention that.

MS. WIEGAND: Our advisory panels only have representatives from some communities on them, but I'm hoping that sort of details like that may be some stuff that comes to light during these fishery performance reports that we're looking at doing, or have been doing.

MR. BROWN: When Ben mentioned that, there was one thing that came to my mind about South Carolina, too. When the federal permits, the dealer permits, came out, there was a lot of fish houses in South Carolina that turned in their permit, and they didn't want to mess with the dealer permit, and they just started buying fish wholesale, I guess, from people that were continually holding the permits, but there was a lot of drop-out of fish houses that actually were dealers that we sold fish to, and they're no longer available, and so there is only just a -- There's not many. There is only a handful throughout the state.

DR. CROSSON: Are there other comments from the panel?

DR. SWEENEY-TOOKES: As you're looking at the stock information as well, it would be interesting to see what emerges about privately-owned versus if there are any publicly-available docks, because that starts to impact the finances going back to the boat.

MS. WIEGAND: All right, and then I guess sort of the last thing that I wanted to get input from you guys on is, given the dataset that we do have, if there are any other analyses that could be conducted with that data that you think would paint a more complete picture of the social and economic environment.

DR. WATERS: I am just looking at the material that was distributed to the committee here, and I think you had some totals on pounds and revenues and things like that, but, if you had looked at some time series data about productivity, like average value per trip or average value per boat, or average pounds per trip, or average pounds per boat, I think that can provide some useful information to you.

DR. CROSSON: That's it? Okay. All right. Thank you.

MS. WIEGAND: Thank you, guys.

DR. CROSSON: No meeting would be complete without a discussion of red snapper, and so who is presenting that? Is that Chip? We need just a minute to set things up here, and this one is of particular importance to me as well as to the SSC, because the SSC is looking at red snapper, the management and the biological ABC recommendation for red snapper, right now, and we'll be discussing this quite in-depth in our early May meeting of the full SSC, and so the question of tracking recreational landings is very important to that discussion, because bycatch has been a big issue with red snapper in the past, and so I'm hoping that quite a bit comes out of this discussion. For the discussion about red snapper, Chip Collier from the council staff will be leading us.

DR. COLLIER: Last year at the SEP, I came and talked to you about Amendment 43, which was focused on red snapper, and there were several management alternatives that were included in that amendment. Since then, there has been some dramatic changes. Amendment 43 has been

submitted to the National Marine Fisheries Service for review, as well as an emergency action to set an ACL for red snapper. That was also done, and so that was done after the SSC meeting. It was done from June to September, with the emergency action occurring -- The season opened in November, but the plan was for it to open in October, but it was delayed, due to the hurricane.

To give you more background on that, when we were talking about Amendment 43, it was looking at setting overfishing levels and several different things, including setting the ABC and the ACL, and there has been some discussion at the SSC level, as Scott had mentioned, about setting the ABC for red snapper, and the SSC had requested additional projections, and the Southeast Fisheries Science Center indicated that they were not able to provide those projections. Therefore, the SSC did not have an ABC to begin to develop some of the values. That has been in discussion by the SSC since then, and so now they have a sub-committee looking at the ABC for red snapper, and we should be getting a value for an ABC beginning -- I guess they are going to provide that at the May meeting.

While that was being developed, because there was an uncertain time schedule, the council went ahead and set an ACL for red snapper, and they did that in two different ways. The first way was through emergency action, and that allowed for the open season in 2017. What they did when they set the ACL was they looked at past catches from 2012 to 2014 and set the ACL equal to the highest catch level, which occurred in 2014.

Some additional information that they used for determining whether or not this constituted emergency action was looking at the relative change in the fishery-independent survey, which is a catch survey conducted by the National Marine Fisheries Service and the Southeast Department of Natural Resources, and they do a trap survey throughout the coast, looking at relative abundance for a variety of species.

Over the past few years, there has been a rapid increase in the number of red snapper that they have been observing in their survey, and so the council used that information to basically request emergency action for red snapper to allow for a season in 2017. As I had mentioned before, they set the value at 2014 -- To a value equal to what was reported in 2014, and the reason they did that was to prevent overfishing in the future.

They don't have an ABC, and they wanted to be somewhat conservative in setting their ACL value, and so they set that equal to the ACL, or equal to the catch level in 2014. Since 2014, the abundance level of red snapper has continued to increase, and, yes, we've had a closed season since then as well, but the abundance of red snapper appears to be increasing.

Amendment 43 did the almost exact same thing. They set the ACL for 2018 and future years based on the value that was observed in 2014, and so now we're to Amendment 46. This options paper, the one I supplied to you, I put together while I was enjoying Nyquil, and so there's probably some errors in it, and so I apologize for that, but what has happened in Amendment 46 is it started out looking identical to the same amendment that you guys were presented last year as Amendment 43.

Since then, they have removed several of the actions that were previously in there, and now we just have, I believe, four actions that are in this. There is one action to establish a permit, which it should be a permit program, or a permit for red snapper, and there is a variety of ways that they

can set this up. Where you look at Alternative 2, it would be just for red snapper, and Alternative 2a would just be red snapper, and Alternative 2b would be all species in the Snapper Grouper Fishery Management Unit, and Alternative 2c would be some deepwater complex species.

The reason that we have selected those is, one, red snapper has that very short mini-season for the recreational fishery. Two, for 2b, do we want all the species to be reported? When it comes down to it, many species in the South Atlantic region are actually rare-event species in MRIP, especially for the private recreational side, and so do we need it for all species? Then, during the visioning process, we heard that it's not just -- They are envisioning, we heard, that they wanted a deepwater complex permit, and so this is the option to address some of the information that was collected during visioning.

We also have Alternative 3 in there, which is a permit for a vessel or for an individual, and the council had requested that be added to figure out what is going to be the best way to actually have this information reported. Alternative 4, we don't really need to look at that, but that's conditions to renew or maintain a valid permit. This hasn't really been thought out in great detail, and it's more or less just a placeholder to think about it in the future.

When we go to -- Looking at the table, as I had mentioned, we can think of a lot of species in the snapper grouper complex as rare-event species, and what I have provided is essentially a heat map of samples by wave for several different species, and I have it for 2014, 2015, and 2016. These years were selected because MRIP had changed prior to this, and it was basically the change in the Angler Point Intercept Survey, and there's another acronym in there. I am missing one of them. Access.

In green, you can essentially look at these, and, if it's green, it's more than thirty samples. If it's yellow, it's eleven to thirty samples, and, if it's less than ten, or ten or less, it's in red. You can see, if we were to change management based on a season for greater amberjack, and let's just pick that for 2014, if we were to pick a season and we wanted to see the effect of closing Wave 1 or 2, we would have a total of three samples to actually base our judgment of how we're impacting management.

I only presented the top-ten species, or the species with greater than an average of thirty per year for the private recreational fishery, and I believe there were thirteen species in this list. Overall, in the complex, there are fifty-five species, and so, in general, most species are essentially rare-event species in the MRIP survey, and these are just the three different years separated out.

These are some questions that were developed by the IPT. As we begin to develop this amendment further, we're going to further dive into some of these issues, and you guys might want to address some of them, or you might not. They've been there since last time, and we're just trying to move forward on some of the issues.

The reporting requirements, this action has actually changed dramatically since I actually put it together. For Alternative 2, it is simply just a value that is going to be specified by the council as what percent to report, and then Alternative 3 is going to be an option, and you can ignore the rest of it, but that is just an option for encouraging voluntary reporting by private recreational anglers.

Alternative 4, 5, and 6 are no longer in the document, and, continuing on to these other actions, these are best fishing practices for the snapper grouper fishery and requiring that venting tools be onboard, either on recreational or commercial vessels, as well as descending devices on recreational and commercial vessels, a requirement to only use single-hook rigs. For some of these species, the requirement is that you're allowed one individual of either a complex or a species. Therefore, if you're putting two hooks down, you are increasing your likelihood that you are automatically going to exceed your actual bag limit for the day.

Then we also had modifications for the circle hook requirements. In this, the council has -- These are the exact same as you guys had seen last year, but the council had actually asked us to incorporate two more options. 4e is to remove the circle hook requirements for commercially-permitted vessels, and 4f removes requirements for circle hooks for recreational vessels.

Then, continuing on, we also have Action 4, which is the adjust powerhead prohibitions in the South Atlantic region, and this actually might go into a different amendment, but what this is looking at is the EEZ off of South Carolina is the only EEZ where you're not allowed to use powerheads, and so this is trying to make it more equitable in the South Atlantic region, where you would allow the use of powerheads in the EEZ off of South Carolina, or you would not allow powerheads in the rest of the EEZ, either way, but, right now, that is -- That might be moved when we're looking at any of our fishery management plans. There has been a mandate by the President to reduce regulations, and this might be one of those options to reduce regulations, and so that is under consideration by the council, and so this might not be in Amendment 46 anymore.

That is just a brief background on what is in Amendment 46, and all of that was essentially to introduce you into the topic of recreational reporting. As you guys remember last year, we talked about that quite a bit and the incentives to report and several different things, and so we had the option this year, or the ability, to encourage voluntary reporting through an app that we developed called MyFishCount, and Kelsey is going to present on MyFishCount and provide some of the findings that we found in the mini-season that we had in November and December of this year. Then, also, she's going to be talking about a survey that she is putting together with UNC, University of North Carolina, Chapel Hill, as well as the University of Florida, and so I will hand it over to Kelsey.

MS. DICK: Thanks, Chip. My name is Kelsey Dick, and I've been working on the recreational reporting project. Before I begin today, I just kind of want to give you a disclaimer. I am recently getting over the flu, and I don't even want to say that out loud, and so, if I'm not as clear or you can't understand me very well, just let me know, and I will clarify anything.

I am first going to give you an overview of the reporting project and where we are and what we've done so far. As Chip said, back in September, the council requested, and was granted, a red snapper mini-season, and, during that time in our project, we were in the process of developing and testing a web portal that recreational anglers could report their catch, and so we saw the mini-season as an opportunity to actually test out the web portal in a real-world setting, and so we modified the web portal specifically for red snapper, and we worked with the Snook & Gamefish Foundation to promote the web portal, as best we could, and this is what it looks like up here.

Recreational anglers had the opportunity to report information about their trips, and specifically about their red snapper catch, and so, from that project, we got 360 member profiles were created,

and 341 trips were reported. Anglers were also allowed the opportunity to report trips that were not completed, and so, if they had planned to go fishing, but were not able to, due to weather or other circumstances, they were able to report that information as well.

We also, as part of our project, we sent out reports to anglers after the weekends that they fished, and the reason that we did this was because a lot of the literature from citizen science or other projects like this suggests that maintaining contact and providing information to project participants is a great way to keep angler participants, and so, on the screen here, you will see -- This is one of the reports, and we sent out a total of four, and they included information about the number of people who were reporting, the type of information they were reporting. We also included some figures, and so we sent out reports like this one.

Then, once we found out that the red snapper season was going to be extended, we were also able to adapt the web portal, based on some initial feedback that we had received, and we showed them some of the new features of the app, and so these reports basically just encouraged anglers to continue reporting. From the Constant Contact email that we sent out, we did have pretty high click rates that people were opening these reports, and that would indicate to us that they were, hopefully, probably, interested in what we were sharing with them.

At this time, I would like to ask our first discussion question of if you thought that these reports were helpful to anglers or provided information that they were interested in or if there's anything that you think we should modify or change in these types of reports or this approach. Thank you.

DR. WATERS: I thought the report was interesting, but I wanted to know why did you not report the number of fish that were caught, and everything was in terms of percentages.

DR. COLLIER: I will take that. What we were trying to do is we are looking at developing an app to hopefully begin to develop an additional data stream for number of fish that could be reported. Right now, we're not looking to replace MRIP. MRIP are the official numbers until other systems are validated, and so what -- We didn't want people to get the idea that these are strict numbers and therefore that's what it is. We're developing a system that enables reporting, recognizing that MRIP is the true reporting mechanism right now.

DR. CROSSON: Wouldn't you want to compare the numbers that come out of this to the MRIP estimates, or is that for a later date, when the project is more stable?

DR. COLLIER: I think that's for a later date when the project is more stable, because we would definitely get numbers that come out of this, and it's going to be different than what's going to be estimated through MRIP, and it's going to be different than what is estimated through the FWC survey as well as other surveys that are done, and so we didn't want to give false hope that these values were going to be used in the management and setting the ACLs.

When we set the ACL based on 2014, one of them is using a survey that's done by FWC in looking at the number of vessels that go out of different inlets and then actually sampling at the individual docks, and so that's much different than MRIP, and the value that comes out of that would be very difficult to recreate through any other sampling program, and so we need to begin to develop our own estimates, and that's going to take some time before we can get any valid numbers.

DR. SWEENEY-TOOKES: From a social science angle, I really loved the email you sent saying that the data they provided was key to then extending the season. I mean, that makes a huge impact on people, to think that this is not just going off into the internet somewhere and it matters, and it matters for my life, and that was really good.

MS. DICK: Thanks. We also noticed, I think, one of the larger lessons learned, just from this kind of initial project, was that having this type of platform really served kind of as a way for anglers to reach out and be able to have a voice and be able to feel heard in management, and, if they sent us an email, Chip and I tried our best to respond as quickly as we could, but they were kind of like, oh, there's someone there, and so I think really making them feel like they're a part of the process is very key.

MR. BROWN: Did you guys get feedback from the people that were using it on their thoughts of how it worked? I entered my stuff from the first opening, and then we weren't able to get out, and I just never did go back on there, but did you get any feedback from the other people in other areas, comments or anything?

MS. DICK: We did get quite a few comments, and most of them were pretty positive, and some of the people who did have issues with the website, because this was put together fairly quickly, we were able to resolve them, and they stayed onboard with the project, and we've been able to take some of the feedback that it needs to be faster, or some of this doesn't make sense, and we have been able to take that feedback and edit and change the web portal to incorporate those changes, and so, so far, it's been pretty good, and so hopefully we'll keep it up.

DR. WATERS: Looking ahead, this was a pilot study, basically, a relatively small-scale. Looking ahead, do you think this could be used on a large-scale basis to record fishing trips and catches for the recreational fishery? Do you view something like this as a mechanism for people to report their recreational catches?

DR. COLLIER: We definitely see it an opportunity for recreational fishermen to report their catches, and one of our partners in this is actually ACCSP, and so what we're trying to do is develop an option for regional reporting and trying to avoid a system where we have multiple different entities creating their own estimates of recreational catch, whether it's a survey or mandatory reporting.

What we would like to do is at least have a background, and that's available for anyone to participate in and provide recreational catches. We have worked with VMRC, in regard to their cobia catches, and this could potentially be used by VMRC as an optional reporting mechanism for them. That is a requirement that they report cobia catches in Virginia now.

Also, the Mid-Atlantic has required catches of blueline tilefish and golden tilefish be reported, and this could potentially be used for something like that as well, and so we're going to be in discussions with those different groups, in order to make sure that it's something that could be useable, or at least the database that's developed would be able to incorporate everything that we want and they want.

DR. WATERS: But would this type of app represent the electronic reporting that you're proposing in one of the actions for this amendment?

DR. COLLIER: It could definitely be what we're proposing, yes.

DR. CROSSON: You said that the Mid-Atlantic requires recreational landings of blueline and golden tilefish to be reported, and do they require any kind of -- For people that catch and discard them, do they require anything along those lines for non-retained fish?

DR. COLLIER: I am not positive on all the requirements of that. That was part, and I can't remember the amendment number right now, but most of it was implemented, with the exception of the recreational reporting. They haven't implemented that part of the fishery management plan, because they are trying to develop a reporting system.

DR. WATERS: This is going to sound way off the wall, but people like our GPS navigation devices because we can turn them on and our device is communicating with every other device that's on the road, and we can see where the hot spots are for traffic and whatnot. Could this app be modified a little bit, if a person signs on to the MyFishCount app and, all of a sudden, he gets some information about where all the hot spots are for fishing, because everyone who is signed on at that time is providing information?

DR. COLLIER: We have been trying to avoid some of the locational information, because that becomes pretty controversial with fishermen. They don't want to give away their spot, and, just because a fisherman is in an area, does that mean they're catching fish? If they are catching let's say something like red snapper, where you're only allowed one fish per person right now, do we want them all going to that one spot? I mean, it could lead to some issues with species that have low ACLs, and it could lead to quicker closures.

DR. WATERS: I knew you were going to say that, but it seems to me there is some money to be made here, if you structure it right.

DR. CROSSON: As long as we answer the questions, or at least try to address the questions that we have listed on our --

DR. WATERS: Is it relevant to go back to the action items for the amendment that you presented earlier, or do we still want to talk more about MyFishCount?

DR. CROSSON: If we can finish up the questions that we have here that are on MyFishCount, then I'm willing to go back and look at the earlier stuff, but I do want to look at these questions. I think we've sort of answered the first one. The literature question, everybody can read that.

DR. COLLIER: A lot of these are probably going to be more involved with the survey that Kelsey is going to go over in just a little bit, but, prior to us getting into that survey, I think she wanted to actually go through the app with you guys, real quick. It gives you an idea of exactly what we're talking about with this app, and it can be nebulous until you actually see it in action.

MS. DICK: After the mini-season, we were able to take the web portal, and we have now turned it into an app. The app has the ability to work offshore as well, and so this is just kind of a little presentation, and I will walk you through it. I am going to through, and I set up this video logging kind of just a typical snapper grouper trip for a recreational angler.

This is the home page, and I'm going to start a trip. This is some of the information that an angler can provide. Some of this is required, whereas you can't move on to the next page until you enter certain information, but, because I have been using the app -- After you use the app once, it stores and remembers certain information, and so you can also choose the logging mode as individual or a vessel.

If you are logging just for yourself, you click "individual". If you are logging for everyone on your boat, you would click "vessel", and you also have the option to log for family members or people who wouldn't necessarily have a fishing license. You can also choose the target species, and so, right now, it's still set up for red snapper, and we're working on a new modified version, and so, on this page, I only have to choose the fishing method. I am going to choose bottom fishing.

Now that it has created a trip, we can go ahead and start logging our catch, and so this is a log catch page, and it shows the species as red snapper. I can add a photo of the fish from my photo library or take a picture of the fish, and then I can go ahead and log the length and the weight. On this page, I am providing a lot of information, but this is just what the angler wants to provide, and they don't have to provide all of this information.

This is a map, and so, because I recorded this at my house, it chose where I was, but, if I was on the water, it would zoom out to show where I was fishing, and I can also click to choose my location, and then the flags on this map show different MPAs or different areas where you cannot possess snapper grouper, and the intention of this is that, if an angler is on the water and they press "my catch location", if they're in one of those areas, we're hoping that it will incentivize them to move.

We are working to include all of those areas along the South Atlantic, and so it just zoomed out there to show you kind of the scale of this, and so I will choose my fishing location, and the depth fished, and you can also choose the hook type, and so there is a bunch of options there, and you can also choose information about how you released your fish and then also why you released the fish.

Then I will submit that, and so now I have one red snapper logged, and so I logged a lot of information about that, but let's say I caught a lot of red snapper and I just want to log them very quickly. There is a quick log function, where you can just slide the scale bar for released or caught fish, and that logs it very quickly.

We use the quick log again, and let's say that I caught a bunch of black sea bass. I can just slide the scale bar and quickly record those, and so I can go back and I can tap that fish, and I can edit it, to provide more information, but, if I'm on the water and I just quickly want to put this in, so that I remember it, that's kind of what this feature is for. There, you can see now that the catch log has been updated, and I think we'll add greater amberjack. We can add a picture, again, and then I'm not going to enter a lot of information about this one, and so I just want to do it quickly, and I will log this fish.

In addition to the quick log, you can also recreate your catch by actually swiping your catch to the left, and then you can go back and edit that, and then you can also use a duplicate catch button,

which is on the left-hand side, and it duplicates, and then you can go in and edit that fish. For this last one, I am just going to add vermilion snapper, using the quick log, and so now I am done logging all of my fish for this trip, and you can see that all of my fish are there.

Then you can go to the locations, and this will actually show you where you caught your fish as well, and that's only for the angler. It won't share that information, and so, now that I'm done, I click "go to end", and you can say if the trip was taken or completed, and you choose your hours fished, if your fish was sampled on return, and the amount of time that you had hooks in the water. Then you submit it, and you're done.

That kind of took a little bit longer, because I wanted to go through and talk about the different features of the app, but I have done that trip before, and I have been able to log it in about two-and-a-half minutes, and so you can do it pretty quickly once you're familiar with the app, and we wanted to make it as user friendly and adaptable to different types of users as well, because we've been finding, and also in other literature on recreational reporting, that people either provide a lot of information or they provide very little information, and so we wanted to make it adaptable for all the different types of users that there are. That is the app, and do you guys have any comments or questions about the app?

DR. DUMAS: If you're two-hundred-and-some trips, how many of those anglers input a lot of information versus a little?

MS. DICK: We haven't looked at it specifically. That's just kind of anecdotally looking over it. I have just found that people will provide so much information, and then they're provide more information in the comments, and they just want to tell you everything about what happened. Then, the people I've been talking to in Kai Lorenzen's lab, who have worked with the Snook & Gamefish Foundation on their recreational reporting apps, they are finding the same thing, and so it's definitely something that I want to look into. That's just kind of what I've been seeing as I've just kind of superficially been going through them.

DR. DUMAS: Have you collected any other angler information besides the email address, like their location, their residence location?

DR. COLLIER: In this initial one, we did not collect any information beyond email address. In a future one, if it becomes a permit, then we would request information such as their permanent residence location and different things like that, but, as a voluntary reporting option, we're going to keep it as basic as possible.

Some additional comments are our first weekend was really the only good weekend for fishing for red snapper, and we only had this providing information for red snapper, essentially. You could report that you caught other fish, but it didn't enable to report those different species that you caught, and so the first weekend, obviously, that was also when we had the fewest number of participants in it, and the number of participants grew over time, as more people learned about it and as different people used it.

Then, as people found out that information on abandoned trips could be used for consideration for future trips, more and more people joined up. On abandoned trips, all you get is that the trip was abandoned, and you might be able to get -- It has information on whether or not it was a charter or

a private recreational vessel, but that's the only thing that you're going to get, and so it's really basic. As people were learning about this, as we were developing it, we didn't have all the bells and whistles, and so we're not certain how well they're going to report in the future.

MS. DICK: I will go ahead and move into the survey, and so, as we've been doing this project and continuing moving forward, there is always the question of how are you going to continue to recruit people and engage them in this project, and then there's always the follow-up question of how are you going to retain them, once you have them, and so we've been looking at the literature, and we found that there is information on citizen science projects, but, specifically on recreational reporting, there is not a lot of information.

Most of the information that I could find, as I just mentioned before, was by Kai Lorenzen's lab, specifically by Chelsey Campbell, and they make the point that recreational reporting projects are different from citizen science projects, because anglers actually have the ability to influence the resource that they are extracting, and so they classify them a little bit differently.

In order to figure out and try to gain some more information on angler motivation and participation in recreational reporting, we're developing a survey, and we're also working with Erin Spencer at UNC, who is a graduate student there, and she's been helping on this survey as well. Chelsey Campbell, who I mentioned, she works a lot on understanding motivations as to why people would or do recreationally report, and so we've actually incorporated -- She has made some motivational scales that she is trying to apply to different projects to determine differences, and we've actually applied the scales that she has developed into this survey as well.

The survey that we have made right now is very long, and we want to eliminate some of these questions, because we know that, the longer a survey is, probably the less likely people are to answer it and stay engaged.

Also, I want you to keep in mind, if you read through the survey, in Part 3, it's a branching survey, and so, originally, we were only going to send this out to people who participated in MyFishCount, but then we realized that that's probably a pretty small sample size, and so we're going to send it out to a larger group of people to further understand people's perceptions of recreational reporting and then, if those people did use MyFishCount, then they will be sent to another part of the survey, and so there were some symbols in there to help kind of guide you through the different questions. I don't know if you guys have any feedback on the survey right now or questions you think that we might want to eliminate or are not necessary or redundant, and that would be very helpful.

DR. WHITEHEAD: I have comments on the survey. You presented the Amendment 46 and options there, and the survey draft describes that you're hoping to get information on fishing effort and avidity and using the theory of planned behavior, and it sounds like we're thinking about letting people fish for red snapper, right, for fun, and so it seems like there's an opportunity to connect these two things.

If you want to understand -- You might be able to get a handle on how many people are going to buy a red snapper tag with this, and, if they do buy a red snapper tag, how many times they would want to fish and target red snapper, and you can ask those prospective questions on this survey, and that would suggest, with those trip questions, that they be written to be continuous, so you get a point estimate of trips in the past, and you could ask the same thing for the future.

Right now, they are categorical, and, if you look at Part 1, Question 1 and 2, someone could answer one to five trips per year for all of their trips. Then, on Number 2, they could provide the same answer on snapper grouper trips, and so you don't know if all their trips are snapper grouper trips or if they took four trips and three of those were snapper grouper, and it's not hard to ask that continuous question. You say about how many, and then anglers are usually able to give you a pretty good answer.

Then Question 1 is -- I don't know if it's intended to be just private recreational fishing trips, and that could include freshwater trips, and I don't know if you wanted to get that or not, but, if you just say marine recreational fishing trips and then keep that language consistent through the survey. That would clear that up for people answering the question and people trying to interpret the answers.

DR. COLLIER: I do want to point out that the tag part is just going to be a permit. The council actually requested that that tag portion be removed, so it's just a permit for fishing.

DR. WHITEHEAD: Is that permit for -- Is it a red snapper permit?

DR. COLLIER: That's to be determined. It could be red snapper, all snapper grouper species, or deepwater complex, or deepwater and red snapper, or maybe some other combination.

DR. WHITEHEAD: But the red snapper is one of the options that is being --

DR. COLLIER: Yes.

DR. WHITEHEAD: The survey is a great chance to get information on those options about what people are thinking they would want to do.

DR. DUMAS: Can you send the survey to a sample of people? Do you have a recreational fishing license holder database that you could sample from and send the survey to a sample of those folks, some of whom may have used the app, and some may not have?

MS. DICK: We were thinking about -- We created an email list just for people who used MyFishCount, and then we have a Constant Contact list from the council that we send out newsletters and other information to, and so we were thinking about sending it to both of those lists, and hopefully that would give us a more comprehensive view and a larger sample size, but, if you have any other suggestions as to how to send the survey to more people, we would appreciate that, because we're kind of trying to figure out how we would -- Most of these surveys don't have very high response rates, and so I'm trying to figure out the best way that we could reach the most people, including our MyFishCount users.

DR. DUMAS: I am saying do survey the MyFishCount users. They are self-selected, because they chose to use it, and so if we could also survey a sample of folks from -- Are you doing North Carolina, the recreational fishing license database? Could you pull a sample of individuals from that to send it to?

MS. DICK: Probably. I think so. That's a good idea. Thank you.

DR. DUMAS: Just see whether the responses from the random sample from the recreational license database differ from who you know did MyFishCount who you targeted, so you can compare sample-selected with non-sample-selected. Also, on the app, one thing that you could ask for, at a minimum, would be the zip code of the information putting the information in, and that would be really useful to calculate a lot of distance measures for travel cost models and things. At least get the zip code. That would be something fast and easy for them to put in, and you could calculate the -- Then you would know which state they were from and whether they were fishing in a different state and lots of other things, and so home zip code, or zip code of permanent address, permanent home address, of the fisher.

DR. WHITEHEAD: I just want to emphasize that. All the data that you're getting on the app is great, but, if we just had the angler zip code, then an economist could do a whole bunch of stuff with that.

MS. DICK: We do -- On the app, there is additional features, and I just kind of wanted, in respect of time, to just show you quickly how to get through it, but there is a home page and a profile setup, where you can enter all that type of information, and so you can enter the amount of licenses and the types of licenses you hold, and you can enter information about your address, your phone number, and so the option is there for them, but we could look into asking them to specifically provide the zip code.

DR. DUMAS: Right, because you're asking anglers who might not want to provide you their address and things like that, and so you could give them the option of only providing their zip code, and that would still allow us to do a lot of economic analysis, but it would allow them to remain maybe confidential, if they don't have to put in their name and address. That way, it would maybe not discourage as many folks from using it, and it might encourage more people to use it who might not want to disclose their address, just because they don't want -- Even though you might not, they might think you might want to bug them later. That way, they could just give the zip code, but that would give us a lot of information, as far as being able to do economic analysis.

DR. COLLIER: As Kelsey had mentioned, there was a lot of questions in this, and we felt that it was too many questions. When we're looking at a survey like this, and essentially cold-calling some of the individuals, is there a limit on -- Do you guys know of like how many questions should we be asking? I've seen some that say it shouldn't be over twelve, and then others just say it's around fifty, and so, if there's any advice that you guys could give, it would be very beneficial.

DR. WHITEHEAD: You're using Qualtrics, and Survey Monkey has -- I am not suggesting Survey Monkey, but Survey Monkey has a feature where you type in your questions and it gives you an estimate of how long it takes, if it's too long for their panel, for them to provide it to their panel, and so Qualtrics might provide some feedback like that as well. You could just rely on that, but you can ask more than twelve questions.

DR. DUMAS: But put the zip code near the top.

DR. SWEENEY-TOOKES: You do also have a lot of matrices, which really slow people down, and so you might want to rethink the number of those you have in here and really prioritize, and

another vote for the zip code. I mean, if you get nothing else, no name and no email address or nothing, a zip code.

DR. CROSSON: We seem to be providing a lot of the answers to the questions that we have before us. There was one question that I haven't heard us address, or maybe I didn't hear it and recognize it, but are there -- The third question we have in our book is, are there other readily-achieved social and economic analyses that could be used to incentivize anglers to regularly use recreational reporting apps?

DR. WATERS: That was my suggestion.

DR. CROSSON: What?

DR. WATERS: People love social media, when they get instant feedback, and so that was my suggestion about the GPS units giving people information about locations of fishing and number of people fishing and that sort of thing.

DR. COLLIER: One thing that Kelsey actually didn't mention, or some of the carrots that are actually associated with this app, is you can actually put in your Twitter feeds and your Facebook and different things like that, and so you can share your pictures immediately, if you had a big fish, and it would go up onto Instagram or different things like that, if you wanted to submit them, and so you're able to put some of those things in there.

A lot of people love to put that information, and then we can actually extract some information from those pictures as well, as long as they provide maybe a scale bar or something like that, whether it's a -- It could be a soda can or different things like that, that we could actually get a measurement of the fish and potentially, if they're going to be releasing it, then we have a -- We could begin to develop a size distribution for released fish or different things.

DR. DUMAS: In your survey, especially the survey of the MyFishCount users, those you know who have used it, in addition to asking them questions about what you could do to make them more likely to use MyFishCount in the future, and I see you're asking that question, and I don't see it, but you should also ask them what they think would make their friends or associates or other recreational fishermen they know more likely to use MyFishCount, because, if you're surveying the MyFishCount users, you know they're using it, and so you might want to get their advice on what they think would get other people who are not currently using it and what would get them to use it or what's holding them back. Other people they know who don't use it, what's holding them back from using it?

MS. DICK: That's a really good point. Thanks. I appreciate that.

DR. DUMAS: Another thing is that, if your recreational anglers have to buy their recreational fishing license or permit or tag or whatever they have to buy, then, if they use the app, then they have a chance -- Every time they use the app, or maybe not every time, but, if they use the app in a given year, that gives them a chance of getting their fishing license free next year or getting something for free, and you can set that percentage at, I don't know, one in a hundred or one in fifty, and it depends on how much revenue you potentially want to commit to that, but that would be something that would give them an incentive to use it. They get a chance, and you could set

the chance low or high, depending on how much revenue you want to risk, but that could encourage participation. You're giving them a little something, and they get a chance of getting a free license next year, and that could help.

MS. DICK: That's a really good idea, and we can also -- In our discussions, where we've kind of had these off-the-wall kind of ideas, we can send notifications to specific people who have the app, and so say you opened it, and you could have a notification pop up saying, because you have been using the app during this amount of time, your fishing license is free this next year or something, and so you could possibly do something like that. That's a good idea. Thanks.

DR. SWEENEY-TOOKES: Or link it to the number of times they enter a new catch, but I also wanted to come back to the survey and say I'm not sure you have it in the order that is prioritizing what you really want to know, because their opinions of the app are the last questions on the survey, on the ten-page survey, and so you're going to lose a lot of people by the time they get down there.

DR. DUMAS: I would like to echo that. Put the most important things first on the survey, starting with zip code.

DR. SWEENEY-TOOKES: Put the easiest to answer things last. By the time they get to page 10, it will be easier for them to answer how many recreational trips they take a year than it will be the what do you think we should do differently about this app, and there is no brainpower left by page 10.

MS. DICK: That's a great suggestion. Thank you.

DR. DUMAS: On the topic of incentives, there also might be some way, in the future, that you could send rewards to people who use the app that come from something related to the fishing industry, and so that would also allow the fishing industry and suppliers to advertise to the people who use this app.

A fishing reel manufacturer might agree to, every thousandth person who uses this app, gets sent a free fishing reel or something, and so the notification pops up of, congratulations, you just got a free whatever, or it could be something as simple as a free seafood dinner at some restaurant that is their region or something like that or a free something, and so that would both allow -- That would allow advertisers a way to target recreational saltwater fishermen, which might be a key target group for them to advertise to, and so basically it's -- Or allow them to send coupons of some type, and it's not necessarily free stuff. It could just be a discount or some kind of coupons, and then that would also incentivize the fishermen to participate in this app.

You need to think about how you can design it in a way that does not encourage false reporting, in order just to get the incentive, but I think these are relatively general questions that come up in data analysis and advertising and using social platforms to advertise and target, and so I would be in the -- You might want to team with someone from a marketing department, a business school marketing department, who specializes a lot in social media and advertising, to get their ideas on how to incentivize your target group to report, but not incentivize false reporting, and how to use incentives to best do that. I know there's a lot of work going on in marketing departments right

now on exactly that, and so it would be sort of taking some results from marketing literature and trying to leverage those here for what you want to do.

DR. CROSSON: Okay. I think we have a -- John and Chris, do you think we have a sufficient handle on this? I want to kind of -- We only have a few minutes left, and we need to finish up at 12:30 sharp, and I have a plane to catch as well, and so we'll finish up this agenda item. I know that John Hadley had originally asked me about an additional item about the charter fleet and some questions, but I don't think we're going to get to that today, and so thank you for your presentation.

In Other Business, do we have anything else? I guess that would have been the only item. We are supposed to provide opportunity for public comment, and that's always required, and so if there's anybody here that wants to say anything from the public, you are welcome to.

Hearing none, in terms of the report, if I wasn't clear, get your drafts to me by -- It can be the end of next Friday, honestly. We don't have a super tight time pressure. Not this Friday, but the end of next Friday. Just don't -- The longer you take, the more you tend to forget things, or you write a note down and you have no idea what it meant, which happens to me frequently, and so I would encourage you to get down as many of your notes as quickly as possible and send them to me.

Then I will compile those the following week, and then I will send out the draft of the report for comment, and, again, we have a lot more time than we're used to, right, John? There is no need to get this in for the briefing book for anything other than the SSC briefing book, which is not going to be until early April, or mid-April, when we need to get that done?

MR. HADLEY: I believe the SSC is in May, the first week of May.

DR. CROSSON: We will get it done well ahead of time.

MR. HADLEY: The briefing book is two weeks before that, and so that's where this report will go, initially, and, if I could, on that note, if, in writing your reports, if you need any information from us, as far as you want the Word document instead of the PDF, or you want the PowerPoint slides instead of the PDF, just let one of us know. Also, if you really want to relive all of the moments of the discussion, we do have the recordings available, if you wanted to go back and rehash what was discussed, and so there is that option, and I'm just putting that out there, if you need any help from us as far as recalling the entire --

MR. COLLINS: We will have the transcripts also by next week.

MR. HADLEY: Mike just mentioned that we'll have the transcripts by next week as well.

DR. CROSSON: All right. Other than that, we don't have anything else, and I guess the next time we will be meeting will likely be either winter or spring of 2019, and what did you all think about having this meeting earlier and away from the SSC meeting? I know usually we have it the day before, and I like it personally, because it's nice that I don't have to try and write a report immediately, while I'm sitting in the SSC meeting, because I don't normally get a break, and so this is very useful for that, and I know some of you all that are in the academic community thought this was easier, compared to the exam schedule, and so this is something we can recommend to the council, that, if we can do the meetings earlier and separate it out from the SSC meeting,

whenever scheduling and economics of the council's budget allow, then we would prefer to do that, I think. Okay. Good.

DR. DUMAS: Yes, I would prefer that.

DR. CROSSON: Okay. Anything else that we need to cover?

MR. HADLEY: I just wanted to say a big thanks to everyone. I appreciate all the time you put in this week, and this brings a very fresh perspective, a different set of eyes on the work that we're doing, and I really appreciate your time and expertise. Also, a big thanks to staff and some of our presenters, as far as getting this information together. We, obviously, has some illnesses recently, and everyone really powered through to make it happen, and so we certainly appreciate that, as far as the folks that were involved in putting together the briefing book, and so thank you.

DR. CROSSON: All right. With that, we are done.

(Whereupon, the meeting was adjourned on February 7, 2018.)

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Certified By: _____ Date: _____

Transcribed By:
Amanda Thomas
February 23, 2018

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