SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SOCIO-ECONOMIC PANEL OF THE SCIENTIFIC AND STATISTICAL COMMITTEE

Town and Country Inn
Charleston, SC

April 24-25, 2017

SUMMARY MINUTES

Socio-Economic Panel Members:

Dr. Scott Crosson
Dr. Christopher Dumas
Kurt Schnier
Dr. Jim Waters
Dr. Tracy Yandle
Dr. Ben Blount
Dr. Jason Murray
Dr. Jennifer Sweeny Tookes
Dr. John C. Whitehead

Council Members:

Ben Hartig

Council Staff:

Gregg Waugh
Kimberly Cole
Dr. Mike Errigo
Dr. Kari MacLauchlin
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Dr. Chip Collier
John Hadley
Roger Pugliese
Amber Von Harten

Observers and Participants attached.

The Socio-Economic Panel of the Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened at the Town and Country Inn, Charleston, South Carolina, April 24, 2017, and was called to order by Chairman Scott Crosson.

DR. CROSSON: Good afternoon, everybody. I'm Scott Crosson, and I'm an economist for NOAA and Chair of this Socio-Economic panel. We have an agenda for today and for tomorrow morning. Before we do that, we usually go through and do the roll call for the different members. I think you've heard everybody that was online, and so we're just going to go through the people that are in the room. Just quickly, for voice identification purposes, give your name and title, I guess.

DR. BLOUNT: Ben Blount, and I'm a retired anthropologist.

DR. SWEENEY TOOKES: Jennifer Sweeney Tookes, and I'm an applied anthropologist at Georgia Southern University.

DR. YANDLE: Tracy Yandle, policy analyst, Emory University.

DR. CROSSON: Again, Scott Crosson.

DR. MACLAUCHLIN: Kari MacLauchlin, council staff.

MR. HADLEY: John Hadley, council staff.

DR. WATERS: Jim Waters, economist, retired.

DR. CROSSON: Before we move on to the actual items in the agenda, we have a couple other little small things here. Everyone has a copy of the agenda. I have not heard council staff tell me about anything moving around in order or getting dropped off, and so does anybody have any objections to the agenda as laid out? All right. Hearing none, the agenda is approved.

We also have to approve the minutes from our last meeting, which was in May of last year, which I have not had a chance to peruse myself, but I am hoping are fine. Does anybody have any objections to us approving the minutes from last May as stated? All right. Good. That motion is moved on.

I guess I did the introductions, and so I'm a little bit ahead of the game already. We'll make up that time later. The first item we have up on here is for Amber to come up and give us an update on the Citizen Science Program, and so we're going to move to that right now.

MS. VON HARTEN: Good afternoon, everyone. I think I know everybody at the table, but I'm Amber Von Harten, and I am the Citizen Science Program Manager for the council now. I was the Outreach Specialist, and I have moved into this position, and I don't believe the SEP has heard about the council's efforts to develop a program yet. It's something that we've been working on the last couple of years, and so I just wanted to kind of walk you guys through what the council has been working on and kind of some of the program development updates that we have going on for this year.

Why citizen science? As you all are very aware, we have lots of data needs and also some data gaps and limited resources with which to meet those needs and gaps with our existing data collection programs, and so the council is really looking at this program from that approach and that we're not trying to compete or anything like that with the existing programs, but complement them and help fill those gaps.

We also have a really high interest amongst fishing stakeholders to work with scientists to provide information and help with data collection procedures, and we also view this as an opportunity to increase the public's understanding about science and how that drives policy and management. Again, like I said, we really are hoping this will complement the existing programs and help us develop even some new relationships and partnerships with other agencies and organizations.

The council started talking about this actually back in 2015, thanks to our council member over there, Ben Hartig, who attended a citizen science workshop out in California, a conference, and came back from that pretty stoked about what he heard and saw out there, and he started with talking with staff and other partners about the possibility of how that might be able to work here in the South Atlantic and in fisheries.

We formed an organizing committee back in 2015 that was made up of council staff and council members and also folks from the Science Center, and someone from Pew, Leda Dunmire, who also was with Ben at this conference and had a real keen interest in seeing how they could help the council out with this effort, and we kind of quickly discovered that the first thing we needed to do was to try to figure out what a program might look like for the council.

We organized a citizen science program design workshop back in January of 2016 that brought together close to sixty, actually, participants from all fisheries sectors, and so we had commercial fishermen and recreational, for-hire captains from the throughout the region, fisheries scientists, researchers, agency staff, Sea Grant outreach and extension folks, to come together and kind of develop some recommendations for what a program might look like and how it might operate and what were some of the components that were going to need to be developed for the program.

We kind of focused on, the first day, providing them a good foundation of what is citizen science. We were really, really fortunate to get connected early on in this process with some of the leaders in citizen science internationally, and that's Dr. Jennifer Shirk and Rick Bonney from the Cornell Lab of Ornithology. Of course, all of their birding citizen science that's been going on for a long time has kind of been pioneering in that realm, and we were able to learn a lot from them, and so they helped us with the design of the workshop, and we brought together some of the work that's kind of been going on in the region, in the fisheries realm, related to citizen science, and we presented some projects about that.

Then we kind of got into what makes a project successful, hoping that those components of a project would also translate over into how a program can be successful to support projects, and then we did a bunch of breakout groups and plenary sessions with workshop participants, first to look at developing project ideas for the region, and then we actually had everybody walk through designing a project, based on what we had learned earlier in the workshop.

Then we had identified each of the workshop participants' kind of area of expertise and brought them together under these expert group working groups, and we spent several hours, over the course of the last day or so, working on making recommendations for each of those different areas, and those are those bullet points that you see there, and so we had fishermen kind of paired up in the participant groups, and so the users and the volunteers that would be participating in citizen science projects.

We had groups of researchers working on addressing how to work with fishermen and also addressing project design issues. We had communication, where all the educators and outreach folks that could talk about planning for training and outreach for the program, as well as projects. We had a science standards group to talk about developing data policies and a framework for how to manage data coming into the program, along with the data management group, and then governance was kind of the higher level. How does the program function, the infrastructure, and funding for the program.

We took all of the recommendations from the workshop, from each of these expert groups, and came up with what we call our citizen science program blueprint, which is our framework for how we can start to develop the program. We are still working on some workshop proceedings, but here is a quick snapshot of some of the items in the blueprint.

This is our vision statement. It's pretty clear and succinct. More collaboration plus more data plus more trust equals better management, because that was definitely something that came out of the workshop, was this wasn't just about data. It was also about rebuilding trust with stakeholders in our region and making them feel that they are a part of the process, part of the data collection, that is driving the science behind the management. Then our mission statement is to improve fisheries management through collaborative science, and so focusing on that collaboration amongst all parties that are involved in the program.

We developed some core program goals, trying to adopt a new approach to increase the amount of data available for the council to help make management decisions, and also making sure that the data that is brought into the program is appropriate and relevant and timely and actually can be used in assessments as well as to help guide the council on management actions. Also, to further develop partnerships with other groups that maybe the council has not historically had partnerships with, industry groups and things like that.

Of course, enhancing stewardship is a big goal for the program and making sure that we're actively engaging and communicating with all the project participants as well as partners on the process of how the program is developing and projects that are moving forward and the results of those projects and how they will impact all the different users.

We also took the input from the workshop and developed a tiered program structure approach that might be how the program could be structured, and this is what you see here. The part we're going to focus on right now is the advisory committee and the Program A-Teams, which I'm going to explain a little bit here in a second.

Just quickly, a recap of how we move forward from the workshop. We had the workshop, and we developed the blueprint. Then, in March, the council met and reviewed the program blueprint and then adopted it as this is how we want to move forward with the program, given the fact that, at

that time, we didn't have any resources really available to implement the program or projects. We did some work kind of trying to educate other folks about what we were trying to do over the course of the spring and summer. We were asked to participate in the NOAA Science and Technology QUEST Webinar Series, and we presented about program development and the workshop that we had.

We also went to the International Marine Conservation Congress up in Newfoundland last summer and presented our work, and that conference was really helpful, because the focus of that conference is bringing people that are working in marine conservation from around the world, and, at that particular conference, I think it was 60 percent of the presentations were all about citizen science, and so we were actually able to tap into some of the citizen science practitioners from around the world to get their feedback on some of our ideas for how to develop the program, and we presented at the conference, as part of a symposium, and we also did a focus group, with about thirty participants from around the world, to get their feedback on these action teams and the different program components that we were thinking about developing, and so that was really useful.

Then, in September, after we came back from the conference, there were more discussions by the council, and they decided that they needed to elevate it to the next step, which was to actually develop a Citizen Science Committee at the council level. We had been meeting under the Data Collection Committee, and we realized that it was getting to the point where we needed to have our own committee meetings to discuss all the things that we were working on.

Then, in November, we had an opportunity to apply for a grant that could have potentially supported a pilot project. We wanted to test out a pilot project to test our citizen science approach that was in the blueprint. Unfortunately, that didn't get funded, but we're still pursuing support for that, and we have some irons in the fire on that front.

Then it was really clear to the council at that point that, if we're going to keep this momentum going and keep stakeholder interest high, it was really important to have a dedicated staff person to help manage the program, and they decided to support that at their December council meeting, and then I transitioned into that position in January.

What are we working on in this first year? We're focusing on program development, and so kind of implementing some of those components that you saw outlined in the blueprint, and then also pursuing support for this pilot project, and so, the initial program infrastructure, what we're starting is we got advice at the last council meeting that we probably need to consider developing a Citizen Science Advisory Panel that also has topical action teams that can work on the specific program components that will go into building the program. Also, it's looking at partnership development and pursuing support for that pilot project.

What I wanted to talk to you guys about today, and also pitch to you, to hopefully apply, is our Citizen Science Advisory Panel Pool. As you all are very familiar with, hopefully, the SEDAR Pool is another advisory panel that the council has that operates a little bit differently than our other advisory panels. The SEDAR Pool is made up of a pool of individuals that then can be appointed to serve on specific SEDAR stock assessment teams.

That is how we envision the Citizen Science AP Pool to operate as well. People would be appointed to the pool. Then, as we move forward with developing specific program components, these action teams, they could be appointed to the action teams, as needed, and so we also wanted to make sure, just like in the SEDAR pool, that our existing AP members, as well as the workshop participants that came to the workshop last year, would be considered for the pool, but we still wanted to make sure that we understood which of those program areas people wanted to maybe work on and what their areas of expertise and interest were.

We developed an online application, which the deadline is this week, on the 26th. It's pretty straightforward. It's just your basic online application, and you get to pick your top three areas of interest that you might want to participate in and give us a little bit of rationale for what kind of experience you think you have and what you could contribute.

Then, like I said, the members of the pool would then be appointed, as needed, to these five different action teams, and that is volunteers, data management, project and topics management, funding, and then communication and outreach and education. Those five action teams will help develop the different policy recommendations that the council would consider for moving forward with the program development.

The next steps is the members of the AP would be appointed by the AP Selection Committee in June, and then the Citizen Science Committee, in June, would select members of all of these different A-Teams, and so we are anticipating that the work will start this summer, with the advisory panel and the A-Teams. The time commitment for working on an A-Team is two webinars per month, in between council meetings. There are no face-to-face meetings, and so there is no travel required. We want to make this as streamlined and as efficient as possible.

You will have terms of reference that each action team will be given, and that's kind of going to serve as your charge for what we need for you to work on and what policy recommendations we need for you to develop. Then you will meet in between council meetings. Then that very last meeting, webinar meeting, before the council meeting, the chairs of each of the A-Teams would then get together on this last call and talk about what they're going to be bringing forward to the council, and so kind of like a plenary of all the chairs of the five A-Teams. Then those would be presented to the Citizen Science Committee at each council meeting for discussion.

Quickly, let's just go through these five action teams. The first is volunteers, and so obviously we need program guidance on how to work with volunteers on projects, and so everything from recruiting and retaining volunteers and learning what their expectations are and what motivates them, incentives for participating in projects, and then what kind of role they might serve in identifying projects and different research needs.

The second one is data management, and so how do we effectively manage the data that's coming into the program and create data standards and policies for the program. That is really, really important to designing projects, because we want to make sure that the projects that are coming under the program can actually be used, as I said earlier, in science and management.

Projects and topics management is dealing with how do we select topics and prioritize them and identify them for the program, which research areas are appropriate for a citizen science approach, and then how to manage all those projects, and, again, some of these are kind of overlapping, and

so it would be training for participants, just in methods, data collection methods and citizen science methods and all these different things you see in this bullet list here.

Then the last two, the communication and outreach and education, again, it's looking at how to do all of those things for not just projects, but also the program, and also evaluation, making sure we have a feedback loop for participants in projects to give their input on how well the project is working, to be able to change course midstream, if needed, and working with media and communicating the results of projects and all those different things that go into outreach for the program as well as projects. Then, of course, the big one is funding, and so identifying resources and different creative partnerships for supporting not just the program, but also projects.

That is the gist of what we've been working on. We do have a page on our website that has all of this information. We also have the news release that has all the details about applying for the AP, and I can send you the link to the application if you would like, and John can share this presentation with you guys, so you have some of the details about what we talked about today, and so that's it.

MR. HADLEY: I should have mentioned this earlier, but, for those folks on the webinar, if you have any questions or would like to speak, you can either raise your hand, and we will be monitoring that, or you can write a comment that you would like to ask, just to help facilitate the discussion, since we have, obviously, folks here and many online as well, and so I just wanted to mention that. With that, I will turn it back over for any questions. Thank you.

DR. CROSSON: I have a question for Amber. What I am trying to understand here is where is the origin of the citizen science project idea? If a member of the public has a particular idea, then it gets run through these different committees, like the finance committee, to identify potential funding sources, and then the methodology or the data management committee, to consider how it would be incorporated, and I'm just trying to figure out how the whole process flows and what is the actual origin of the ideas.

MS. VON HARTEN: I think the idea is that each of these action teams will develop the policies of how projects can be presented to the program, and we'll have those in place, so that there is policies in place for potential projects to come to the council. Yes, then there will be like a review panel that would review projects. Again, that's something that the projects and topics management team will have to give us guidance on. Should there be a review panel and what does that look like and what kinds of standards and things are going to be in place for a project to be considered under our program?

The idea is that we hope -- The council hopes to pursue projects under the program on our own as well as people coming to us with, hey, I've got this project and we would like for it to be considered for use in your management and what do we need to do to make sure that it meets your data standards and policies to be used. Does that answer your question?

DR. BLOUNT: I think you just answered my question, but, if I'm following correctly, the projects and topics and so on really haven't been delineated yet, and that's work to be done?

MS. VON HARTEN: Yes, that's work to be done. Of course, the council always puts out their research and monitoring plan, which is being reviewed right now, and will be reviewed, I think, this week by the SSC. We did get the Citizen Science Committee to take a look at it at the last

meeting, and I think you will note, when you look at it -- Are they looking at that here, the research and monitoring plan? I can't remember if it's just the SSC.

DR. MACLAUCHLIN: No.

MS. VON HARTEN: Okay, but we actually went through that plan and delineated the different research needs that we thought could be met by a citizen science approach and have that included for the future.

DR. BLOUNT: Yes, and you answered the second part, which is how much of this will be coming from the council and perhaps the SSC, and, of course, as I'm sure you know, in SEDAR, if you have a full analysis, a benchmark analysis, there are three different committees, and each one of them ends up making recommendations for research, and so, at the end, you have this really impressive list of research recommendations, and so I assume that the same thing could kind of come out of this, modeled in similar sorts of ways.

DR. WATERS: Amber, does participation on one of these advisory committees generate a conflict of interest that would preclude funding under this program?

MS. VON HARTEN: I don't believe so, because this is more about program development and not making management decisions, because we've actually had some folks ask us about that, and so we want it to be inclusive. We need the whole spectrum of stakeholders involved, whether it's an industry group or an NGO or a fisherman or an agency staff person, but these are just developing policy recommendations and not -- I don't think it would serve as a conflict of interest for folks.

DR. CROSSON: Do we have any other questions for Amber?

DR. BLOUNT: Perhaps just an observation, and that is that -- I asked about directions for topics and the research agenda and so on coming from the council and from the SSC, but, of course for this to be successful, it really has to come from the fishermen too, and that involves a completely -- Well, not a completely, but a very different sort of set of research methods and objectives and so on, and it would be critically important to have that part of it fleshed out really very well too, and I'm sure you know this, but I've been thinking about this for a while, but I see now that my thoughts are really sort of simplistic, because it has moved much beyond what my original conceptualization of it all was.

That particular part of working with fishermen to find out how they see the problems and what the problems are and how they would like to see them resolved and how you might go about doing that and how you might have implementation and monitoring and management and those kinds of things, I think that would be central to all of this.

MS. VON HARTEN: Yes, and that's our hope. We want fishermen involved in these action teams, because we need their input on what is feasible and what's reasonable for us to be asking for them to go out on their boats and collect data, and we want them to be a part of that whole design process as well, and so that's going to be really critical for them to be a part of that, and that is, I think, a little bit how this varies from cooperative research, where historically, or typically, it's just a scientist designing a project and then either paying for days at sea or vessel time, and we

want the fishermen involved in the design and all the way through, even communicating the results of the project.

MR. HARTIG: I think the really interesting thing about the part that we're trying to do is -- When I went out there, I went looking for citizen science work that was done on people that were being managed in some context. The only -- I found one project where actually people working in timber were doing wildlife observations. That's the only one I found out there where people who were being impacted by what they were doing and their observations -- The question about whether those observations are good or whether there is something behind that. If you're being managed and you're making your living off of a resource, can you be trusted to give good information into the system?

I think that is what got some of the gurus of citizen science actually interested in our program, because it's outside the box of what most citizen science programs do, and so we've been very blessed to have some very high-level citizen scientists involved in our program and helping us develop it, and so I think the answer, in the long run, will be yes. I think we can do it, and I think it will really benefit the council. It's my last, best attempt to try and get some data to manage our fisheries.

DR. BLOUNT: If I could follow up on Ben's comments. I've been to a number of conferences in recent years on natural resource management, and the general sense that comes out of these is that forestry is ahead of fisheries in terms of these areas, and I don't know the extent to which you may have looked at forestry, like Ben was suggesting, in terms of the wildlife management, but I think there are probably a number of kinds of projects and things out there that actually might be relevant models, if those haven't been followed already.

Also, it occurred to me, in thinking of models of where to go for maybe looking at what other resource organizations and management are doing, it would be ornithology, and the Cornell University Ornithology Program has had a citizen science thing going for many, many years. It would be fairly different, because, there, much of the need is to educate the general public, the ones who want to stand in as scientists, as to what it is that they should be doing and what they should look for, and so there are all kinds of training things. For fisheries, the training, in some ways, would be in the other direction.

MS. VON HARTEN: Yes, and that's why it's been just an amazing experience to work with the folks at Cornell, and we are actually -- Next month, there is a very large citizen science conference, the Citizen Science Association Conference, and Jennifer Shirk and some others have put together a symposium just exactly on that. It's looking at the context of natural resource management or any kind of resource focused-type of citizen science, where the people collecting the data are actually going to be managed by the data that's being collected.

Then we're presenting a poster about what the council has been doing, because Jennifer said that what you guys are doing is very pioneering, from the sense that no one has really developed a program to support projects. It's always been projects just coming through, and so she said that you all have a lot to teach others in the world of citizen science about how to do that. I said, well, it's a work in progress, and we're learning as we go along, but it's been very exciting.

DR. CROSSON: Any other comments? Okay. Thank you, Amber.

MS. VON HARTEN: Thanks, guys, and please apply.

DR. CROSSON: I encourage you to do so. The next item I have on here is John Hadley, and possibly Kari, are going to talk to us about developing council actions.

MR. HADLEY: All right. Thank you, Amber, for that presentation, and we will continue on with some of the recent and developing council actions. Included was a document going over all the different actions that have occurred recently and are in the process of occurring, but there were a few specifically that I wanted to highlight. The first two will likely play into our later discussion on the Amendment 43, looking at fishing behavior and the red snapper fishery. I will start with those.

To begin with, looking at the South Atlantic For-Hire Electronic Reporting Amendment, during the March 2015 meeting, the South Atlantic Council approved actions and alternatives to require weekly electronic reporting by charter vessels that have a South Atlantic for-hire permit, and so either the dolphin wahoo, coastal migratory pelagics, or snapper grouper permit, to have a weekly electronic reporting logbook.

This is in the final processes of being implemented, and I briefly wanted to go over some of the items that will be included in that, and so we have a pilot project going on right now with the logbook, and this is just to show some of the core variables that will -- We'll just kind of briefly go over those, and there is an economic component to these as well, mostly looking at a few of the trip costs, but the point being there is going to be -- There is expected to be a great deal of information on the for-hire sector, both through effort and then also looking at landings and discards.

You're going to have information such as the start time and end time, and so you will have good information on the total effort that went into the fishing trip. There again, this is a for-hire fishing trip. You will have the start location and the end location, and so that's trying to get some information also on fishing time versus travel time information. This will all be tied to the vessel, the vessel ID, and then also the captain will have information on the number of paying anglers, and so you will have a pretty good angler count, a pretty good total effort count, at least from the for-hire sector.

We will look at information such as crew, and then also the methods used during the trip. That's looking at was trolling gear used or bottom-fishing gear or spearfishing, all the gears that were incorporated. There's information on depth ranges and general location. Then it's looking at species, and so specifically looking at species, and so the number kept, by species, information on the numbers released, and then the target species on that trip.

Finally, within this logbook, as of now, there are three economic-related questions that will help, hopefully, provide more information on the for-hire sector, and so it's looking at fuel used, price per gallon, and so getting a more accurate count on fuel costs, and then the cost of the charter trip, and so this being the charter fee and not necessarily what the operator is expending, but the total revenue for the trip, if you will. That is the -- Again, this is very much still in development, and it's expected to be implemented soon, but I wanted to make the SEP aware of that, and if you have any questions before I move on to the next recent developing actions.

DR. CROSSON: I just wanted to comment that the cost of the trip is just absolutely vital, because everything kind of flows from that pricing information, and so, to the degree to which we can actually get that incorporated into this electronic reporting would just be absolutely valuable, both for the council and for the agency.

MR. HADLEY: That is supposed to be for the cost of the trip, and that information is going to be on every trip, and is that correct?

DR. ERRIGO: Yes, these questions are for every trip, and so the fuel used and the cost of -- What you charged for the trip, and so charter is the cost for a single trip. For every trip, what did you charge, and fuel used, the price per gallon at that time, and the cost -- What you charged for the trip, and that's every trip. You need to log that. Those are questions to be asked.

DR. CROSSON: I've got several people that I see expressing an interest in questions on this.

DR. YANDLE: Just a suggestion of what I think would be a fairly low-cost ask that could give us a lot of good data, and that would be if we could get the zip code of the people who are paying for the trip, because that would let us calculate trip distance to go on the charter, and it would also mean that we could access all the census demographics aggregated for those zip codes and get some ideas of at least a very broad, generalized idea of the broad demographics of who is taking the trips. Number 1 is a lot better valid reason to do it than Number 2, but, from what I understand, in just chatting with some folks, is they have to get that zip code information anyway to run the credit cards, and so it's not a -- It shouldn't be that onerous of an ask for them.

DR. CROSSON: I think that's absolutely a good point, because NOAA collects that information, I believe, with the private vessel socioeconomic add-on that they do every few years, and we are starting to use some of that data in calculating some of the consumer surplus values.

DR. WATERS: I have a question. Could you clarify for me the stage of development of this? Are these data elements already carved in stone or are these elements still being developed and evolving?

DR. ERRIGO: Nothing is really carved in stone yet. The amendment hasn't been passed that requires federally-permitted vessels to report via logbook, and, even when that does pass, which will be fairly soon, there is still going to be a phase-in, like a lag period, before that happens, and so these are -- Most of the information is going to be fairly static.

The socioeconomic questions, I think, are still malleable, but a lot of the catch and discard information and stuff like that, we're trying to follow -- There are logbook programs in place right now, the headboat and South Carolina, and we're trying to align with those, because we don't want people to have to report more than once. As long as we match up all the variables, they only need to report one time, but I don't believe that South Carolina has socioeconomic questions, and I don't know about the headboat. I think they do have some of those types of questions on there.

DR. WATERS: Okay, and so the answer to the question is that it is relevant to make suggestions during this committee about additions or subtractions from this list?

MR. HADLEY: Absolutely, and especially in regards to some ways to easily get at this information, because one of the very major concerns of this is trying to not burden whoever is doing the reporting and keep the reporting burden to at least a minimum overall.

DR. SCHNIER: Thank you for the presentation. I had a quick question about whether or not you might be interested in getting information on the originating port for the boat. I know some might go from different locations at different times, and it might be information if you have that other spatial resolution.

DR. ERRIGO: That is actually being collected. That's one of the things that is being collected, the where are you leaving from.

DR. SCHNIER: I couldn't scroll through the screen there. Sorry.

DR. ERRIGO: That's fine. Where you left from and where you returned to, and I think it's mostly auto-populated, for the most part. Where you're returning to is usually the same as where you left from, but, if it's different, you can put in a different port.

MR. WAUGH: The amendment that is under review does have a list of the core data elements, and so, if the amendment is approved, those are the core data elements. There is a lot of discussion and going back and forth between the council and the agency and the public. The public is very concerned about the list growing and growing, and so what the council did was specify that, at least for now, these are the core data elements, and that is listed in the amendment, and we could provide that to you all. There may be some associated questions that could be added, but, to go beyond that list of core data elements, we would have to make a future change, which doesn't mean you shouldn't point out if there are some shortcomings.

DR. ERRIGO: I believe this is the list that was developed, and I don't know if this was the -- I think this is the final list that was developed for the amendment. This is how they developed it. It's the one all the way on the right. It's the proposed core elements.

MR. HADLEY: I will mention that this is, I believe, Attachment 2b in the SSC briefing book, if you're following along and wanted to bring it up.

DR. CROSSON: Again, I don't see any other comments for this. I guess we will move to the next item, the next amendment.

MR. HADLEY: Just before moving on, I just wanted to show that Chris Dumas did write that I second Tracy's request regarding the zip code of anglers, and Kurt did as well, and so he said that he would also add that Tracy's suggestion is a very good one. With that, we will move along.

DR. ERRIGO: There is one thing that I can add. When the anglers are -- There has to be a validation of the logbook data, and the way that they're looking at doing that right now, the way that MRIP is looking at doing that, is by angler intercepts, and so they intercept the anglers coming off the boat, so that they can keep the intercept system the same.

Instead of intercepting captains, they are looking at intercepting anglers, and they're running a pilot study in South Carolina right now. When they do that, they get the home information of all

of the anglers, and so zip codes and sometimes full addresses and telephone numbers and whole nine yards. The idea is that we can match those interviews up with the logbook so that we can then go back and see how well the counted catch matches up with the logbook entries. For a portion, or at least right now, for a portion of the logbooks, we will have that information for the anglers. We don't have, in the logbook now, for them to report all the zip codes for the person paying for the trip for every trip, but we will have it for those that are intercepted.

DR. CROSSON: Are you talking about for headboat or for the charter or both?

DR. ERRIGO: This would be for charter boats. It won't happen right away, but -- Well, actually, charter boats will still be intercepted by MRIP. They are going to be intercepted by MRIP, because not all the charter boats are going to logbook reporting. It's only the federally-permitted, but, even after they all switch over, if that happens, all charter boats switch over and we no longer use the MRIP survey, they still have to be intercepted for validation purposes. Right now, we're looking at ways to match, and, actually, we're having a very high success rate of matching angler interviews with charter trips.

MR. HADLEY: All right. If no one has any more questions on the for-hire logbook, we will move on to the --

DR. MACLAUCHLIN: Gregg just passed along the core data elements in the charter boat reporting amendment, and so I just forwarded them to you all just now, but John Hadley is going to pull them up on the screen.

MR. HADLEY: Just very quickly, there is -- I won't run through them all, but that's essentially the heart of what will be collected.

DR. WATERS: I know that the type of data that you collect depends on the type of analysis that you want to pursue, and what was the reasoning behind asking for trip-level economic information instead of annual information about passengers and revenues and costs, for example?

MR. HADLEY: For right now, I guess it goes back to the main focus of the reporting amendment. The main focus is more so on the catch and effort component. It's nice to be able to collect economic information where we can, but that's essentially why these core data elements were selected.

DR. WATERS: To monitor the ACL?

MR. HADLEY: Well, partially, and to help improve recreational data, and so it's looking at what's being harvested and what's being targeted and what's being discarded, the discard information to help essentially improve data collection for recreational fishing, where there are data gaps, and so the way that it's being done is a trip-level logbook, and so that's why that's not necessarily an annual component yet, or for the time being. Any other questions on the core variables? Then we will move along.

The other item that I just wanted to let the SEP know about and be aware of, because, here again, it will play into our discussion on fishing behavior in Amendment 43, looking at red snapper, is one of the items that the council is considering is looking at limited entry for for-hire permits in

the snapper grouper fishery, and so this isn't looking at the other fisheries, but just for snapper grouper.

It's fairly early in the process, in a white paper stage, and so it's not an amendment or anything along those lines, but it's been discussed at several recent council meetings. Currently, the for-hire snapper grouper permit is open access, with approximately 1,400 to 1,600 active permits. There was a white paper that was developed for the March 2017 council meeting. Time was limited during that meeting to really get into the nuts and bolts of it and whether to move forward with possibly implementing limited entry for the snapper grouper fishery, and this will be an ongoing discussion, but, here again, we will talk about this again later, but just to know where the limited entry proposal is coming from.

Finally, the next two amendments that I will discuss came out of snapper grouper visioning, and I will briefly go over them. They're very early in the process right now. They're in development. We didn't have any analysis to show you, but these are certainly being developed and will be discussed over the next several meetings with the council, and so one is recreational and one is commercial.

Amendment 26 is looking at recreational management measures in the snapper grouper fishery. There are seven major actions, and I will just run down the list. It's looking at establishing a recreational aggregate bag limit and recreational season for deepwater species, establishing a recreational aggregate bag limit for shallow-water grouper species, modify the ten-snapper and twenty-fish recreational aggregate bag limits, modify the seasonal prohibition on recreational harvest and possession of shallow-water groupers, remove the recreational minimum size limit for deepwater snapper species, reduce the recreational minimum size limit for black sea bass, and reduce the recreational minimum size limit for gray triggerfish in federal waters off of the east coast of Florida, and so, here again, this is essentially taking the input that was received during the visioning process and potentially implementing that via action.

The next amendment, some of these are similar. There are some differences that are specifically focused on the commercial fishery, but Amendment 27 looks at commercial management measures in the snapper grouper fishery. There are several items with this amendment as well. One is to establish the commercial split season for blueline tilefish, and another action is looking at a commercial split season for red porgy and also snowy grouper and greater amberjack.

The council is also considering modifying the commercial trip limit for vermilion snapper in the second part of the season and then also implementing a commercial trip limit for other jacks, the other jacks complex, and so that's an aggregate of several species. Modify the seasonal prohibition on commercial harvest and possession of shallow-water groupers, remove the commercial minimum size limits for deepwater snapper species, and to reduce the commercial minimum size limit for gray triggerfish in federal waters off the east coast of Florida.

One of the reasons that we specifically wanted to pull these out is, as I mentioned, we don't necessarily have an analysis ready for them, but the following discussion, looking at the FEP update and what kind of economic information is going into the amendments, I think that will help come back to some -- It will influence, essentially indirectly, some of the analysis that will be completed for these two amendments, looking at Visioning Amendment 26 and Visioning

Amendment 27. With that, I will ask if anyone has any questions on some of the recent developing actions.

DR. CROSSON: I don't see any additional questions. Chris Dumas has a question.

DR. DUMAS: This is just in response to Jim Waters' question about getting annual values for the for-hire fishery. Could we just aggregate it? If we're getting trip data on all trips, can we just aggregate it across all trips for a given vessel for a given year, to get the annual values, or would something prevent that?

DR. WATERS: I'm sure if you get a record for every trip that you could do some aggregations for some of the trip costs, but you would not have any data for your overhead costs, your fixed costs and your semi-variable costs.

DR. DUMAS: Right, and I knew that, but I just thought, for the information that's being collected on the form, at least we could get the annual values for those variables and that's all. Thanks.

MR. HADLEY: All right. Any more questions? I am not seeing any, and we will move on to our next item on the agenda.

DR. CROSSON: The next item on the agenda, are you presenting this, John, or is Roger? The next item on the agenda is Social and Economic Information for the Updated Fishery Ecosystem Plan.

MR. HADLEY: Roger will give us a brief overview of the FEP, the Fishery Ecosystem Plan, Update, and then, from there, we'll narrow it down into some of the social and economic components that are intended to be included in that update.

MR. PUGLIESE: Good afternoon. I'm Roger Pugliese, Senior Fishery Biologist with the South Atlantic Council. Welcome to those that I've worked with in the past, and welcome new members and additional members who have joined us today. What I would like to do is walk through an overview of the Fishery Ecosystem Plan and touch on a couple of other connected components on ecosystem modeling and on some policy development associated with the plan.

The Fishery Ecosystem Plan evolved from originally the council had a habitat plan, many years ago, and it provided the foundation for our essential fish habitat information. Moving toward and looking into the future toward ecosystem-based management, we had developed and set in motion to development of a more comprehensive view of not only habitat of all managed species in our region, fisheries and connectivity and really the first step of looking at the ecosystem within our region, which was the first generation of the fishery ecosystem plan back in 2009.

What has happened now is we have evolved over a number of years in developing and advancing both the essential fish habitat information and also the need to look toward ecosystem-based fisheries management, and we are in the process of developing the Fishery Ecosystem Plan II at this stage. This document is going to be more precise, more operationally focused, and links to a lot of tool capabilities and models.

In order to do this, we are updating the system, including new core sections, which are addressing climate variability in fisheries, food web and connectivity, as well as new, updated policy statements and habitat information supporting those, and one of the other aspects of this is this is going to be somewhat of a hybrid, because it's going to draw on a lot of linkages to other information. Instead of reinventing the wheel, in many cases, it's trying to draw on online information for other components of the ecosystem plan.

This involved multiple writing teams and a broad engagement of experts throughout the region and online tools for drafting, editing, and sharing of information, as well as creating integrated and linked documents. We had twenty teams, or actually probably more than that, and even greater number of participants and over about fifty-five organizations, everything from specific habitats to species to managed species to some very specific things, such as support for modeling, as well as support for development of the South Atlantic Climate Regional Action Plan.

Those groups have been providing input and being focused and coordinating through a partnership we have in a contractor with Group Solutions who has been providing a Basecamp online system as well as Google Doc development of virtually all the different subcomponents, including the polices that have been evolving over time.

What this does is it provides updated baseline information on habitat, species, fisheries information, and it addresses directives from the council, and I think some of this is actually going to evolve as the plan gets wrapped up and moves into an implementation development. I think that's going to be what we're going to see later this year, is development of an implementation plan that addressed the FEP specifically.

It involves our SSC, both present and past Chairs, in both ecosystem modeling components as well as into some of the development of the sub-sections, mainly the managed species components of the FEP. It highlights long-term research needs and the opportunity to connect, and, again, this is going to be connections to activities. We have a five-year SEAMAP plan, the Southeast Area Monitoring and Assessment Plan, which does a good job of highlighting all the fishery-independent activities in the region, what the present activities are, they how connect and integrate between SEAMAP, MARMAP, and SEFIS activities in the region and what long-term possibilities are, and, to some degree, to greatly support the bigger picture, such as ecosystem-based management.

Other things are connections to our standing managed areas system management plans for multiple things, from the marine protected areas to the special management zones. Again, it's linkages to a lot of these, so that you can be able to connect in and see what the longer-term visions are for these in aggregate.

Also, it's linkages to other regional partners. We have been building the groundwork, and that's some of the only reason that we have advanced, either bringing people in for this participation or advanced in terms of some of the bigger-picture things, modeling, et cetera, is our work with other regional partners, and this one specifically is the South Atlantic Landscape Conservation Cooperative. They are funding the ecosystem modeling work in our region, which we are hoping will provide information to connect directly into the SEDAR stock assessment process as well as to provide tools for our SSC.

The content and design to expand the conservation directive of EFH, again this partnership with other players in the region provides us the opportunity to expand the essential fish habitat mandates, especially the linkages from inshore to offshore, inshore habitats, et cetera. This really provides that capability, and one of the ways is the links to the Landscape Conservation Cooperative's conservation blueprint in the region, and so it's linking everything from the mountains to the end of the Exclusive Economic Zone, and we're the only region in the nation that is trying to take on that bigger picture.

Also, the opportunity, again, for north and south connectivity and east and west, really looking at the bigger picture here. It's support for mapping, enhancing all of our information for managed areas, everything from coral HAPCs, deepwater MPAs, and spawning special management zones.

The goal, again, is to link all the different online information, so we have access to spatial information on species, environmental information that could be available for stock assessment, habitat characteristics, connectivity of the different spawning food webs and links to the MPAs, and one of the avenues of doing this is a, and this has become a bigger player in the system, as we've been evolving the FEP, is this developing online ecospecies species information system.

Primarily, it was evolved in a partnership with Florida Wildlife Research Institute, and it was originally looking at core life history information based on a number of their probably ninety species at the state level, and this has evolved into expanding to integrate all council-managed species and a lot more different fields that give everything from life history information to ACLs to, ultimately, species distributions to connections to the individual fisheries and FMPs, the EFH designations, and so the idea is to really try to provide information that you can access and query online to get to species or fishery or habitat information and is a big supporting mechanism of the FEP.

Again, building on the partnerships with the Florida Wildlife Research Institute, we've been building online information systems, the habitat and ecosystem atlas and GIS services and our digital dashboard and ecospecies, that I noted, and this is to support the FEP and present all of our GIS information and also provide habitat, fishery-independent surveys, and supports -- What you're seeing is a snapshot of partitioned-out habitats by depth contour, so that we ultimately are going to provide online access to where priorities are for different habitats, and so what we'll do is we hope to be able to provide the information on what we know in the managed areas, what we need to know within those areas, and then priorities even outside the bounds in those depth contours.

In the best case scenarios, as we go through some of the modeling efforts, to have species information associated with these individual areas also, and so building that bigger picture for the whole system. The online tools also support how we look at all the overall species information, not only habitat information, but species and fishery operations information.

On the FEP development, it also includes our update for the essential fish habitat, the five-year review, and it provides more refined information by life stage and some of the directives under the original review, back a number of years, and so the timeline is we've been developing support information, such as refining all of our essential fish habitat policies and providing the core structure of a lot of the different sub-sections. The council has been reviewing those, reviewing

policy and approving policy statements specific to the core components of this effort, which I would say would be the climate variability in fisheries as well as the food web and connectivity.

I will touch on some of that at the end of this and walk through some of the ecosystem modeling activity, but the intent is to look at approval of the core components of the FEP and really transitioning into discussions on implementation and how do we advance beyond here, because I think one of the biggest things, in our region, as I touch on the policies and research needs, is a lot of the foundational types of capabilities, the analytical capabilities or information, still needs to be compiled for our region.

One of the efforts though to advance some of these different things is the opportunity to advance ecosystem modeling work in our region, and we have been investigating that for a number of years, going all the way back to when the Sea Around Us Project. When the UBC and the Lenfest Sea Around Us Project initiated, we were, opportunistically, at that stage to begin investigation of Ecopath and Ecosim models. We have advanced and collaborated with them into subsequent models, specifically on forage activities, and now, in this effort that is advancing, funded through the Landscape Conservation Cooperative, we are reengaging the group and really advancing even a bigger picture of Ecopath and Ecosim and then connected all the other different type of model capabilities that we can see, because that has evolved so far. We are investigating that as we speak, literally.

The objectives are to advance and integrate existing models. As I mentioned, there's a number of different things that we're going to be able to draw on to advance this. Other regions, such as the Gulf of Mexico, has done work on the gag grouper and modeling environmental components on that, and there are opportunities to draw on what we know there. The forage model that was done for the South Atlantic, we worked on previous model capabilities, and all the GIS advancements that I talked about on our habitat and ecosystem activities are, hopefully, with the newest Ecospace component of this, are going to be queryable and accessible and available into this system.

It's going to support that, but also, since it's being funded through our partners with the Landscape Conservation Cooperative, it's supposed to also bridge between their work on the broader conservation efforts plus the council's efforts in conservation, and we've been building that be integrating information as we've been evolving their conservation blueprints, and, again, this is to support our advancement towards ecosystem-based management.

The way we're advancing this is we created an interdisciplinary regional science team, which is essentially a South Atlantic workgroup, which are the individuals that are being funded, the principal investigators, plus core researchers and technical capabilities that are going to advance this entire process, and the idea is that, right from the get-go on this, is it was going to be a lot of management-focused discussions.

Instead of being a pie-in-the-sky effort, it was really going to ultimately link it very closely to council-managed species and to needs and tools that the SSC can use and the council can use to evaluate alternatives, and so coming in from the frontend and keeping that as the bigger view is this process, and that opportunity to advance this I think has been a driving force on how this is evolving.

As noted, we are trying to look at the connectivity between the systems, and, again, linkages with our partners, so that we're not only looking at the ocean connections, but the land-to-ocean connections, and this may be the only place where we're actually going to have resources enough to be able to provide some of that connected information, both in habitat and species and environmental variability, too.

Then, ultimately, to also look at some of the changes in the capabilities in our region and what that's going to mean, and so that's the -- The workgroup that we have is both our present Chair of the SSC as well as our Past Chair, Marcel Reichert and Luiz Barbieri. Tom Okey, who we worked with in the past, with two other iterations of the Ecopath model, or actually three, and this next generation is being focused through our collaboration with him. Jerry Ault worked on the ACES modeling for the bigger picture, and so he is bringing together probably one of the later efforts into this process and not the frontend. Dr. Ruoying He with North Carolina State really has all the modeling capability that they've done for all the oceanographic circulation models and capabilities, and so we have a real opportunity to figure out how to integrate those on the frontend of this effort.

Then Dr. Peter Sheng provides that connectivity on estuarine modeling. How do we build the connections between the oceanographic models. Dr. Halpin and his group out of Duke did essentially all the marine mammal modeling for our region, plus they've been involved in Ecopath and Atlantis and many other modeling capabilities and evaluation capabilities in the past.

Two of the newer participants are -- Dr. Simeon Yurek with the South Atlantic Landscape Conservation, and he has just come onboard, and part of his duty is to support and connect into and provide foundation work on how we advance this modeling effort, and his background is in ecosystem and species modeling. Dr. Townsend has just moved to the national headquarters, and so he is essentially their key ecosystem model representative for the nation, but his background is really doing all the ecosystem modeling for the Chesapeake Bay, and so we're going to have the opportunity to understand how some of that may be able to get integrated into the way we advance.

That is our team that we're advancing this effort with, the funding fully funded through the Landscape Conservation Cooperative, and the idea here is to take it to the next step, to look at linking the hydrodynamic oceanographic models and satellite data and provide more predictions of the spatial options that we can do and look at impacts of episodic events. I think that's one of the biggest things, and that's why, when we talk about climate, we talk about variability in our region.

One of the biggest things we're seeing is this episodic events variability, and I think that's going to be a big thing, and so the tiering of this is to look at development of Ecopath, Ecosim, Ecospace modeling, to integrate the data in that so that we can advance this to then look at how the estuarine connections are, as well as the environmental components of this, such as the oceanographic modeling capabilities, and then look at how those may be drawn into even bigger modeling capabilities.

These are kind of big core base of how we begin to link this, through Ecopath and Ecosim, with all the inputs from species to fishery information systems, and so what you have is a tiering of Ecopath, Ecosim, and Ecospace, from your trophic dynamic model to your simulations to Ecospace, and that one right there is the most exciting component that we have going right now,

because it is evolving, and it has evolved so much further, that a lot of these different spatial information inputs may be able to be drawn directly into the modeling capabilities, and so real habitat distribution and real species catch information, things in the other models, such as the oceanographic models and other temperature models.

We are actually working with the consortium in Spain, who have actually done this with some areas, and it's not even in the modeling capability at this time, to try to get that right on the frontend as we advance, so that we can do as much as we can, with the focus, again, on management, but the ability to understand that, if we structure it right, we can, in the long-term be able to actually pull these different types of components into the system.

One thing I did want to do is touch on quickly -- With everything said on the plan and on modeling, a couple of the core areas that I mentioned are the sections on food web and connectivity and climate variability in fisheries are ones that have been crafted, have been advanced, and the council has actually developed policy and research needs, essential fish habitat policy statements approved by the council, and I have touched on kind of the highlights of those, because what it does is a couple of things.

You can see the connection on what we need into the future for what we have and some of the social and economic information needs that are obvious that we may not have been advancing to this date, as well as just the bigger picture of how we're advancing this, and so the council's policy is advanced on climate variability in fisheries, and one of the biggest issues is on species shifts, and to begin to understand how that might influence or be influenced in adjusting what the council's activities may be in the region if we see these distributions.

Some of the ones in our region is everybody continually talks about northern expansions. In our region, a species like sea bass, I think we're actually seeing a southern movement, and it may be more to do with upwelling events, and that's actually been documented through some of the sampling regimes, and so it's some big environmental variability, but some of the same issues maybe as you see these fisheries move into different regions or operate -- They are going to have implications for the way they are addressed by the council and by the fishermen themselves.

The work with the state agencies and with the councils and with the commissions to work with the Landscape Conservation Cooperatives and all the different -- Both NOAA's Science Centers for environment, as well as the Climate Science Centers under USGS, to really advance these, and then, ultimately, also working with the fishing industry and fishing communities and stakeholders to move this forward.

Develop climate indicators, advancing some of these different things, annual summaries, or even more frequent, to understand what some of these trends may be and understanding that, and I think that is significant, because that may be integrating fishermen's observations a lot more into some of these processes, to be a check on what some of these model outputs may be.

Climate change requirements and understanding what tradeoffs are and advancing that information and trying to really provide capabilities to look at what those different tradeoffs may be and buffers that may be needed to address those. Given uncertainty, looking at what precautionary measures may be needed to address things such as climate change and then careful scientific management

evaluations, to be able to look, if there is new fisheries developing, what those may be and how you avoid impacts on essential fish habitat.

Some of the research, again, gets to our better understanding of the variability in the region and fish productivity and then how the entire life history, from habitat, reproductive, recruitment, et cetera, is affected by those. Climate data and the effects on climate variability integrated into the stock assessments, and there's been advances in trying to bring some of that environmental variability into more recent discussions on assessments, especially species like king mackerel or ones that may be very influenced by some of the changes that we see going on, and this is directing that to be advanced, and that doesn't necessarily have to have it addressed from a broader modeling capability. That may be something that, if we get that refined input, that actually may be something that could be used, and so that's advancing those efforts.

Three-dimensional models of the entire system, that's something that is very lacking in our region, to really understand what the implications are of the Gulf Stream and the way it moves within our system and how the fisheries react to those different variables in a three-dimensional space.

Management strategy evaluations are some things that are necessary to advance our understanding of how you respond to these, and I think we may have an opportunity, with the next generation of ecosystem models, to advance those actually as the outputs on the backend of those modeling efforts. Understanding of the socioeconomic impacts and response to these variabilities, whether they be, as I said, increased upwelling events or shifts in temperature regimes from nearshore to offshore and what that may have for implications for species, et cetera, and, ultimately, our characterization of habitats within our system.

On food web and connectivity, one of the big-ticket items under that has been the forage fisheries and understanding how forage information and species -- It's part of the bigger picture of our predator-prey, and the foundation of these modeling efforts really does get to that, and the good thing is that that last iteration had good foundational information on at least a wide variety of core forage species for our council. The one issue in developing that is it still is limited on some of the key species that are forage to our snapper grouper complex, because they're just not captured in almost any specific activity.

Food web connectivity, looking at the different food webs in our systems and looking at how that connections -- I think, as we advance some of the directives for research needs, really understanding that is going to be critical. I think one of the good aspects of collaborations with say our Landscape Conservation Cooperative efforts is that they are integrating, even within those conservation blueprints, the idea of corridors, and so then we are beginning to understand what the connections are from the estuarine systems to the offshore systems, and then you can understand, with the circulation patterns, how those may distribute within our region or, based on eddy formations, can vary over time.

Trophic pathways and understanding better -- It's really looking at the overall food web, and, again, this is going to be driven by some of the modeling efforts and really what your biomass is in different levels. The food web models, I've been talking about that continuously, and so it really just gets back to advancing those. Indicators, food web indicators, and advancing that, and I think, again, we're in that development stage of what we have to have to understand what the base of those models are, to even be able to get those indicators.

How invasive species are affecting these systems, everybody has been looking at what the implications are for lionfish and other species, and that may be not the end of it all, because, as things shift, we're going to still, again, see other species move, based on new currents and new temperatures and new challenges into the future. Then, ultimately, things such as contaminants, bioaccumulation, and other effects on the system.

The research really gets towards better understanding of the variability in our system and how the species are going to shift to that, and it goes both ways on this. I think something that people don't realize is that, if you see some of these changes, we may actually see species' ranges change and new fisheries develop within our region that are the more tropical species advancing into more northern areas, and so there is going to be -- It's not going to be all one-sided, the way this is looked at.

The characterization of our offshore habitats, and, again, that refining that information and monitoring and understanding, better understanding, the forage information. I mentioned before there is some very significant shortfalls. Basic data in the ecosystem-based fisheries management and fixing existing data gaps, we have shortfalls on our fishery-independent surveys, on our fishery-dependent, and just our information of how all these different species and habitats connect, going all the way to the foundational information of understanding species' use of habitat by life stage.

If we get all of that information, we would be then understanding how the fisheries operated relative to those, and then there is some very specific directives to NOAA, in cooperation with regional partners, to evaluate the suite of products that could be developed, looking at how those can provide our understanding, better understanding, of not only the species, but the fisheries and the dependent communities in our region and then develop vulnerability analyses in our region, but we do not have specific -- While we are going to begin to compile some of the species vulnerabilities in the ecospecies system, an overall analysis, such as has been done for the Mid-Atlantic and New England region, has not been done for our region.

One of the attachments that was provided was an analysis of the fishery community impacts, based on the analysis done in the Northeast region. Once they did the analysis of the vulnerability of the species, then they were linking the fisheries tied to those and beginning to go down that road, but we don't have the baselines. Then one of the other things is the management strategy evaluations and opportunities to provide that capability, and the idea is that, hopefully, as we advance the modeling efforts, and especially since we have our direct linkages back to the SSC of how some of these different management strategy evaluation capabilities can be developed.

Ecosystem-level reference points, getting NOAA to provide and develop those, so we can begin to look at what thresholds are relative to our region and then, ultimately, continue to support refinement of information, going back to that species use of -- The bottom line is that, if we really had all that information, we could advance a lot of these efforts into the future and how those relate in relation to that climate variability and change.

Overarching needs into the future, the completion of the FEP II and continued support for what we're doing and develop data and refine the information to fully support the baseline systems for fishery-independent surveys. The information collected on a lot of these surveys are the

foundational information for what we need for inputs into these ecosystem models and even new surveys.

When you look at SEAMAP long-term planning, it talks about things such as we need pelagic surveys and we need -- We do not have an ichthyoplankton survey in the region. There is some foundational types of core information that are still missing that could be connected, either directly through our fishery-independent or collaborations between our partners or what you were hearing before on citizen science and opportunities to work between these systems.

Modeling to continue to expand what we're working on. I think we're going down a good path. We had some resources initially developed in here, and we are advancing. Continued support for that, and I think, with NOAA wanting to at least get some direct involvement, maybe that is going to open doors for resources that can provide even more capabilities. Then long-term mapping and the capability to support some of those mapping needs and that information on understanding everything from habitat distribution to species distribution to how we really refine fishery operations and understand how that works on a spatial scale in our region.

That leads to kind of the overall structure of the FEP, and what you have here is just a snapshot that shows you an amalgam. This was presented to the council at the last meeting, both where there are sections as well as there are linkages, and so the core sections of the plan, such as the Fishery Ecosystem Plan, or the climate variability section, the food web connectivity sections, the managed species sections, but then you would have other things, such as our other managed species linkages back to our partners with ASMFC or Protected Resources. Instead of reinventing and trying to recapture all of those types of things, just begin to make it something that is interactive and getting the most recent information.

Within that, it shows the frame for the socioeconomic information for this first iteration. In the original Fishery Ecosystem Plan, we had those community representations by state that we updated in the last iteration, which were great and which got to that point, which essentially sat there, and so they were not something -- What we're doing is we are using, essentially, Chapter 3 as the focal point to give us the foundation of something that is operational for those fisheries, again linkages for those.

Those are going to be provided, and they can evolve as the information for that plan evolves, and that's where I think John is going to get into a little bit more of the structure after my brief presentation. Sorry, but I'm not known for doing too brief, but I was just trying to capture that bigger picture and how there is a number of different things moving forward.

I think one of the key messages is we haven't had nearly some of the support, at any level, from biological to economic or social to environmental that we need to advance some of these different directives that are now moving forward, but, with partners, we've been at least trying to keep into the queue and moving forward. We've got some real good partnerships that we've been building for a long time that are really coming to bear now. With that, I think that's it. Are there any specific questions?

DR. BLOUNT: That's a very appreciated set of developments. In fact, crossing model boundaries is something that's been needed for a long time, integration and linkage of them, of all the sorts that you laid out. I wanted to ask a couple of questions about one specific area, and that would

have to do with environmental variables, because, in some ways, that's a very logical extension or next step, along with the food web interconnectivity, and there are a number of them that would be logical extensions, but I wondered -- In terms of environmental variables, there were a couple of concerns.

I wanted to ask one question and then come back and have a second one, but I wanted to ask what's happening now -- Could you fill us in a little bit on what's happening with modeling in terms of harmful algal blooms? I know that area is growing and expanding, and questions come up again and again of how can we incorporate environmental variables, and part of the answer is that we don't have the models to include them, or, if we put those variables in the models that we have, then sometimes they don't work as well as we would like to see them work, but could you comment on that just briefly? I would appreciate it.

MR. PUGLIESE: I don't have the details of that, but one of the things I will say is that we do have the benefit of working directly with the individual that worked on it in the Gulf of Mexico. The gag model was driven to be able to adjust that, and so I think we're already working with the people that at least -- We had discussions at that level too, about that is one of the aspects of modeling that we need to figure out how to do.

We actually had the example with at least a companion council that has been involved in it, in the modeling, and so I think we're going to be able to learn from the last iteration of the gag model in the Gulf of Mexico and maybe at least how you structure it to advance that and integrate it into these multiple models.

DR. BLOUNT: If I could follow up with a second question, the second major category I was thinking about was sort of socioeconomic variables, but let me just sort of bring up one of them, and I was thinking about the need to include any environmental models that would cross the environmental and socioeconomic and pollution of ocean areas. Again, I'm sort of biased towards the Gulf, knowing more about the Gulf now than I do about the South Atlantic, but, for example, pollution runoff, watershed runoff, and there are some areas where the pollution, the Mediterranean, for example, and I'm not really up on what's going on in the South Atlantic, but are there major concerns about pollution and pollution areas and modeling in regard to those? I am just curious.

MR. PUGLIESE: Of course, I think all the discussion we had in Florida on a lot of the water flow issues, I think there is -- You can begin with that, as a foundation. One of things I think that's a real benefit is our partnership with the Landscape Conservation Cooperative, because, if we could get to some of those kinds of capabilities -- That is the group that's already beginning to look at what the water flows may be and who is doing work that may provide some connection of pollutants into the near-shore and offshore areas. If we're not working on it, there may be those avenues, and there's a lot of horsepower at that group, because it's national, and I'm sure there are a lot of people trying to figure out how you make that connection.

DR. BLOUNT: Thank you.

DR. CROSSON: I have a question. I noticed Ecosim popped up earlier in the discussion, but, by the last few slides, it seems to have disappeared off, and I have worked with Ecosim modeling with biologists in the past, and my big experience was that it was very hard to find a lot of the

valuations that you need to use to plug into that model, inshore fisheries and then non-consumptive valuations for things like wildlife and pelicans and things like that, and so is that one of the reasons that I didn't see it sort of towards the end, or are you still going to try and do some Ecosim modeling? If that's the case, then what are you trying to get valuations for? What's going to go into this?

MR. PUGLIESE: No, that definitely wasn't intended to do it. I think Ecopath is the foundational model and Ecosim will be the simulation models that you're going to be able to run based on how much we can actually shore up the way the structure of the model is developed in the future, and so some of that is literally being developed right now.

The species that are being used and the functional groups are being tailored so they align directly with council-managed species, the core groups, and then maybe even at life stage for a couple of key species, and then that's going to have a ripple effect into how we define fleet dynamics within those and then some of these discussions on valuations, I think, are going to begin to be discussed as we get that first generation, literally within a couple of months here. We have a meeting coming up within less than a month, and so I think we can begin to discuss how Ecosim evolves, and I think that's also going to be driven a lot by what you can do with that and what the limitations still are.

That's one of the -- Why we got involved in the first discussions on Ecopath was to use it as a tool to tell us what we didn't know, and then it goes beyond that, what we don't know, but also what types of things may still not be in a state or capability to be consumed or presented adequately in the project, and so I think it's evolving, and Ecosim is going to be a major part of it, because you won't have the ability to look at what-if scenarios without that.

I think one of the key ones that I am excited about is that generation on Ecospace, because this newest evolution, we may be able to do some -- One of the efforts that I have tasked our partners with is to take -- Where we've got the grid system for catch information, to be able to intersect those with species life history information, where we're trying to build some polygons on core species. For example, take something like golden tilefish distribution and habitat and align it with catch information and come up with at least a more realistic view of where you may actually be catching those information.

Now, if that model can begin to consume those type of polygonal representations, that's going to have a lot to do with our understanding of how maybe you can connect the different managed areas, the habitats, the species utilization patterns, let alone how the fisheries operate on those. It's far off of kind of where you went, but I think they're all being investigated, and some of the points you're making, I think, are some of the ones that really still are challenging in the Ecopath and Ecospace and Ecosim world.

However, when you get to something like Atlantis or whatever, I think we just do not have the level of types of information to get that type of a modeling effort in our region, and I think this is a good focus, and it has a lot of support by NOAA Fisheries and others to advance, and, how far we can go with this, I think we have to just investigate it and understand its limitations on what you can use it for.

DR. CROSSON: Any additional questions? We do have some specific questions that the committee has been asked, according to the overview document that we have, and so John is going to get into that. Roger, we have another question from Kurt.

DR. SCHNIER: I was questioning about what are sort of the predicted accuracies of the model, in thinking about sort of groundtruthing it or running old data and seeing how it looks forward, because it seems that's where the real power of it is, and has anybody tested that?

MR. PUGLIESE: Yes, and I think, as we get actually into the models and developments, that -- It's been done in other areas. Some of the work that was done in the Gulf of Mexico on the Florida Shelf model had some pretty strong predictive capabilities, in terms of what it was showing for actual landings relative to what the model outputs were, and so that is part of the process, and you can get a -- The way the models are run, you can get a fairly effective understanding of how the actual information is aligning directly with the reality. In certain cases, in some of the more recent model efforts I've seen, some of those line up pretty good, and it's, again, dependent on how powerful and how much information and how complete the inputs are into the system.

DR. SCHNIER: Thank you.

DR. CROSSON: Okay. John Hadley is going to lead us into discussion here for some questions that the committee has been asked to answer.

MR. HADLEY: Thank you, Scott, and while I'm bringing this up, I imagine you will -- I appreciate Roger going over the kind of general overview of what the FEP update is going to be, and so I will imagine that you will see parts of this as it progresses and as it develops, but the first item to look at is sort of the nuts-and-bolts components, and so getting at that goal of having a sort of one-stop data resource for a specific species and what to include, as far as the human component of that, and so what social and economic information do we have that can be readily updated to include -- If someone wants to find the most recent information on say any species, say dolphin, they can go and they can click on dolphin, and go to the social and economic components, and they can bring up at least the most recent information that we have put together on that specific species.

With that, what I did is I put together a summary of typical economic and social information, components, that we put into our human environment sections in fishery management plans, and I will briefly run through that and then have a couple of discussion questions towards the end.

We will start with the economic components. On the commercial sector, we typically start off with information on the number of commercial permits, and so looking at the permit type, the state or region, and so the distribution of those permits, and then also looking at seafood dealer permits, and so I pulled some examples here, and this is an example of snapper grouper permits. Typically, there is a five-year profile, looking at how many unlimited and 225-trip-limited permits there are. Then, looking at this Table 2, it's how those are distributed across states and then also looking at dealer permits. There again, how many licensed dealers there are that could potentially sell this species and how that distribution falls by state.

Typically, it also includes information on landings, and so looking at this by weight and also a regional or state breakdown, a seasonality of landings, and so how the fishery tends to operate,

and, again, this is looking at the commercial sector. Then, finally, information by gear, and so examples of this are just looking at -- This is an example for mutton snapper, looking at landings compared to the ACL and how that compares to percent of the ACL. Here is a figure on the landings by state, and, here again, you will find these are typically done in five-year -- It's basically whatever is the most recent finalized year of data and then go back, so we have five complete years of data available for a specific species. Here's an example of kind of the seasonality of landings and then landings by gear, and so, there again, it's just kind of illustrative of those points.

DR. CROSSON: Can I interrupt you for a second, John? What you were just showing, the landings of I think it was mutton snapper, and you had Florida and the South Atlantic in there, and what did it say? Harvested from the South Atlantic region and landed in Florida. Just, for the South Atlantic, it seems, for some of these species -- The intersection of which state it's landed in and also the variation by season is kind of important, just because there is such a difference as you go from the south to the north with a lot of things, and so that might be something to -- Depending on what the needs are for this, you might want to consider that.

DR. BLOUNT: I will have, I think some questions and issues to raise a little bit later in regard to that point, but the whole question of human population at the coast and the amount of fishing and the location of fishing and the fish landed is something that really would be very fruitful to look at, I think. I mean, ultimately, we want to know the landings and the fleet and sort of work from that, but I think you can get very, very different patterns. I was struck, looking through here, of how much of this is Floridian. It's Florida and kind of everything else, but, anyway, that's kind of seconding what Scott was saying as being important.

MR. HADLEY: I appreciate that, and one thing I will mention is these were just kind of examples that I was pulling out of different FMPs, but I absolutely think the -- As you mentioned, the population information, and we'll get into it. There is information on participants, but, when you go outside of the fishery, that's duly noted, absolutely. Any other questions before moving along? All right.

Looking at some of the logbook data, looking at participant vessels to show landings for specific species and how that species relates to commercial trips, and so looking at it by effort, weight, and ex-vessel value, and so kind of showing the economic importance on a vessel level, and so, as I mentioned, looking at the weight of landings of species being examined, weight of other jointly-caught species, and then weight of species caught on trips that did not land the species being examined.

It's specifically looking at the importance of whichever fish species is being looked at on a trip where it is caught and how that also plays into a vessel's landings throughout the year, and so that's the specifics of that. Then it's similar information for ex-vessel value, and so looking at three different ways. Here again, an example table looking at the number of vessels of trips with -- Here again, it's looking at mutton snapper, and so trips with mutton snapper, trips without mutton snapper, the total number of trips taken by vessels participating in this fishery, and how often those trips included the species being examined.

Moving down, it's similar information for weight, and then, finally, ex-vessel value, and so we have switched species here. This is slightly different. It's looking at hogfish, but, here again, the number of vessels participating in the fishery, the ex-vessel value of that species, how that

compares to trips where that species was caught jointly with other species, how that compares to trips where that species was not landed, but they were taken by that vessel, and then total dockside revenue and average dockside revenue per vessel. Here again, this comes from the logbooks, from the Science Center.

Moving on down for the commercial section, again, some information on imported seafood, where it's available, and so NMFS has a pretty good database that you can query as far as imports of specific seafood. If you're looking at -- I will go back to dolphin. They have a great deal of information on dolphin imports, as far as I have included an example here, but looking at the value of the imports and some seasonality components of imports and also the typical areas of entry into the United States and typical areas of origin as well, and so where those imports are coming from.

Finally, for the commercial section, also there is information on, where available, economic impacts of commercial fishing activity, and so this uses NMFS input-output model. The large driver of it is ex-vessel value of landings and estimated number of jobs, income impacts, value added and sales impacts from those landings, and it encompasses the harvester through the retail sector and the supply chain, and it includes it specific for the species being examined and then, there again, tying back to the logbook information, all of the revenue generated from all species on trips where that target species was landed.

An example here is using hogfish, and, here, we have the ex-vessel value for hogfish, and, based on that information, how many jobs it would have supported in the South Atlantic region, harvester jobs, output information, and income impacts. Then, also, like I mentioned, kind of expanding the focus there to all, based on the trip revenue, on the trip where species are landed, and so kind of the larger component of that.

DR. WATERS: I hope you don't mind the interruption here, but, before we go on to the recreational sector, let's talk about the commercial data items here. I am a little bit uncomfortable with this economic impact example that you have here, because so many trips catch more than one species. If you do a separate I-O analysis by species, you're going to have a lot of double counting, and, sooner or later, and it doesn't matter how many disclaimers you put in your report, someone is going to come along and add up all of the numbers for each of the species that you calculated. Then you're going to come up with a really big number that's much larger than real life, and so I would recommend that you just do the I-O model for the fishery as a whole, rather than species-by-species.

MR. HADLEY: You're talking about, for example, if we're using hogfish, you're thinking of the snapper grouper complex rather than all landings throughout the -- Basically beyond the snapper grouper, but whatever complex it's in? Am I understanding that suggestion?

DR. WATERS: Let's say a guy goes out and he gets three species on his trip. He spent all the same money for that one trip, but you're going to be calculating different impacts three different times, because he had three different species, and so I think you ought to just focus on the I-O modeling for the entire snapper grouper fishery as a whole, rather than on a species-by-species basis.

MR. HADLEY: That might be a good discussion to have in May as well with the Science Center review and for future discussion.

DR. WATERS: Did that make any sense though?

MR. HADLEY: I understand what you're saying. It's probably one of the single biggest dangers I think of with economic impact reporting, is double counting. I mean, you see it left and right, and so that, in confusing economic impact and economic value.

DR. WATERS: In that little example, the trip with three different species, and, in your example here, for hogfish, you have estimated three harvester jobs, and output and an income impact, but then you're going to repeat the same analysis for two different species, and you will end up with nine harvester jobs instead of three, if you were to try to add all of those impacts together.

MR. HADLEY: When you look at the drivers of these I-O -- If you have three species and you -- If we had three species landed on a hogfish trip, in this example, you would say, okay, what was the -- The driver is the ex-vessel value, and so you could parse out the ex-vessel value for hogfish and you would say, okay, this is the economic impact of hogfish for this trip, when that bottom line would be adding all three species together, and so you're not necessarily double counting.

However, the natural inclination, when you have two numbers how they're presented here, one on top of the other, is to add it up and that's the bottom line, and so I think the way the model is set up, my understanding of it anyway, is that, as long as you are parsing it out correctly, then it should at least minimize some of the double-counting if you're looking at these species together. However, the inclination is, as I mentioned, to add that up, and so I certainly see what you're saying, and also trying to focus it -- For example, if you're looking at hogfish, it's in the snapper grouper complex, and maybe you have more information focused on that complex, if that makes sense.

DR. DUMAS: Jim makes a great point. I-O models are a very useful tool, but they can be misused if not used carefully and correctly, but a good I-O analysis would take those kinds of multispecies fishery issues -- It would recognize those and take those into account, and they should be taken into account. If the I-O analysis does not take them into account, you will have problems, but a good analysis using an I-O model should take that into account, and, with respect to the hogfish question, for example, if you had an exogenous increase in hogfish landings, perhaps you get a good weather year for hogfish or for some reason there was an increase in catch, that can have several different economic effects or different multiplier effects.

If it was a small increase in hogfish catch and did not change the number of trips, that would just be an increase in vessel revenues without an increase in vessel cost, but, on the other hand, if the increase in hogfish catch was large enough to warrant additional trips, then you've got increased revenues and increasing costs, vessel costs, and you have to see how that affected the profitability. If the hogfish catch was even larger, maybe there was a climate change or there was a shift in hogfish and all of a sudden many more were available in our area, you could see an increase in catch per trip, an increase in the number of trips per vessel, and an increase in the number of vessels entering the fishery to capture that huge increase in hogfish.

That's an exaggerated example, but they're different margins. They're different economic margins that come into play depending on how large a change in sort of species availability occurs, and those different margins can come into play for increases in catch, increasing species availability in

catch, and they can also come into play when you have decreases in species availability and species catch.

In analyzing any of these possibilities, I-O models are useful, but you have to use them in ways that take into account these different margins that come into play, and I'm sure that Jim is aware of all of this, but he's right in saying that you have to be careful when you use I-O models, but they are useful tools. That's all. Thanks.

MR. HADLEY: Thank you for that comment. I don't see any other questions online or in the room, and so, with that, I will move on to the recreational sector, and so going over some of the recreational components that are typically found in, here again, Chapter 3, the human environment section, of our FMPs.

Looking at the recreational sector, number of for-hire permits, where available, and similar to the commercial section, kind of breaking them down by year, looking at a five-year timeline, and then a geographic component of how those permits are distributed. There is information, typically, on recreational landings by weight, by region or state, the seasonality of these landings, and the harvest and discard information.

Looking at examples here, this is very typical of the table that we just saw, just looking at landings and how these compare to the ACL, and that's where appropriate. Here again, looking at recreational landings and how they may be distributed by either region or by state and then total landings overall. This figure is displaying sort of the seasonality that is observed in landings.

Finally, this is a table that is typically included for all species, again, where this information is available, as far as recreational harvest, and so harvest and discards, and so total catch, and broken down by mode, and so shore, for-hire, private/rental, or all, and then kind of a percentage comparing those as different modes.

In addition to catch information, there is effort information. This is target trips. It is including angler trips, and so this is the output of MRIP, and so it's target trips for a species, and so where a species was a primary or secondary target, catch effort, and so trips where a species was caught, regardless of whether or not it was kept, and these trip estimates are broken down by state and mode. Then also there is information for headboat effort.

Looking at examples, here is a similar table. In this case, it's looking at -- These are hogfish recreational catch trips by mode, and this is broken down by state, where information was available, and then here is an example of the headboat angler days, and so this comes from logbook information from the headboat, from the Southeast Regional Headboat Survey, and, here again, the distribution of effort by area, and so angler days, and, again, over the same similar five-year timeline.

This is information where available, and obviously this varies quite a bit from species to species, but economic value information. This is willingness to pay, typically for per fish harvested, and so, if a value estimate is not available for a species, we typically use at least, if it is available, a similar substitute species, and then, finally, net operating revenue per charter or headboat angler trip.

I have included an example here, but it essentially goes over the bullet items that I just mentioned, as far as consumer surplus estimates, and then the NOR, net operating revenue, values by for-hire angler trip. Similar to what we just discussed, there is also economic impacts of recreational fishing activity, and so this is, again, using an I-O model, and the major input into this I-O model is based on target trips, and so primary or secondary, to estimate jobs, income, value added, and sales impacts. It's specifically looking at trip impacts and not necessarily durable goods expenditures.

Here, I have provided an example. This is from the hogfish FMP. In this case, it actually breaks it down by state, and so, again, remember the input, as far as what you put into the model, and then you get the outputs, and so target trips and then you get output or sales impacts, value-added impacts, jobs, looking at it across modes and then all modes together. Before I hop into the social science sections, I will hold off for any questions or comments.

Seeing none, these are some of the social components for the commercial sector. Typically, there will be information on commercial permits, and so permit type, if applicable. Here again, it's using the snapper grouper fishery as an example, between limited and unlimited, and there is also information on top commercial fishing communities. These are ranked by regional quotient and based on landings, and so looking at both pounds and ex-vessel value of species being examined.

They are ranked by vessel local quotient, and so this is the amount of -- For example, using the hogfish example, it's the amount of hogfish harvested, or insert species, so to speak, but harvested by a vessel out of all species harvested within a year and averaged here by community. This helps show which communities may be most impacted by a change in access to the species being examined, and they are ranked by regional quotient, and so based on commercial fishing engagement or alliance.

Commercial fishing engagement uses the absolute number of permits, landings, and value, while commercial fishing reliance includes many of the same variables as engagement, but it divides the population to give an indication of the per capita impact, based on the impact of this activity, and so, looking at an example of how these are typically included into the FMPs, here is looking at the regional quotient based on pounds and values, and so these are the communities that essentially are the most important for -- Again, we're looking at mutton snapper, but, essentially, you will input a specific species, and whichever communities come up as the most affected, so to speak, based on that species are what are ranked. In this case, it's using the top ten.

Here is the average vessel local quotient and some of the -- Essentially, over here, you have the communities that are most significantly impacted, the average vessel local quotient and the number of vessels in that community that landed that species. Finally, information, as mentioned, on commercial engagement and commercial reliance. In this case, it's looking at mutton snapper and the different communities that have the highest commercial engagement or commercial reliance that were previously identified.

There are effects on fishing portfolios and multispecies fishery participation, and so qualitative information, where available, on potential effects of management changes and discussion on potential effort shifts, if access of a species is restricted, effects on consumers, restaurants, and fish houses. There again, for species that are locally popular for restaurants and consumers, discussion on species tied to local cuisine and tourism, and so often a qualitative discussion.

Moving on to the recreational sector, the social components, and, here again, looking at permit numbers by community. Here is an example of some, I guess, significantly-identified fishing communities, and so looking at the number of for-hire permits and number of permits and so how they are ranked, permits based on the population, and then the average rank.

Similar to what was just discussed with the commercial community, and so, in this case, ranked by recreational quotient based on recreational fishing engagement and reliance. This demonstrates whether recreational fishing likely plays a prominent role in the local economy. Finally, broad social benefits and cost of habitat conservation and protected species, and so primarily a qualitative discussion on broad social effects and how conservation of habitat or endangered or threatened species can produce societal benefits by maintaining the aesthetic, economic, scientific, and historical value to the U.S. and its citizens.

The last section that's typically included is environmental justice considerations, and so that's looking at communities with high commercial and recreational fishing engagement, and so looking at issues such as poverty, personal disruption, and personal composition. I have included a description there, but here it is. Typically, this is a similar example, where you have the indices on the left, you have the different communities, and then the different items that are specifically focused upon, and so, here again, social vulnerability indices of top commercial and recreational fishing communities in the South Atlantic.

Upcoming information, we're looking to tie in information, where available, on the land-based component of fisheries, where data are available, and it's going to include information on seafood dealers, retailers, or tackle shops. I believe Ben had a very good suggestion earlier to maybe tie in some population components of that as well, and, finally, two questions that were developed for the SEP.

One of the goals of the new FEP is to include information that is relatively simple to update, in order to keep this document relevant, and so one thing that Roger mentioned is that we did have a social and economic component of the original FEP, but it was fairly large and complex, and it was very difficult to update, and especially since we were parsing these out, with the idea of parsing them out by species, having something that is readily available to keep them as up-to-date as possible.

We touched on this earlier, but, with this in mind, is there other readily-available social or economic data that the SEP would suggest including in the FEP update? Then the other question is does the social and economic information provided in the FMPs represent the best readily-available information to profile a species or a fishery? With that, I will turn it over.

DR. BLOUNT: I will commit heresy. I do that all the time anyway, but one question that kind of looms in the back of my mind in all of this, for commercial, but certainly for recreational, concerns the population distribution that I was talking about, although those kinds of topics can be addressed through the quotients and various charts and tables that you had.

One could take that information and sit down and sort of pull it together and look at historical factors and come up with a better-grained picture of what's happening with the various fisheries and the fleets in relation to them. Just for example, I noticed, several slides back, that, if you look

at the recreational growth through the years, it has grown in Florida and Georgia, but decreased everywhere else.

A question is why would that be the case? What is going on there, and there are any number of possible answers that you could give, but sustainability of the fleets is one, and there are all kind of questions related to that, but the bigger picture that I wanted to bring it up, and I will just throw it out there and it can sink or swim or flounder or whatever, is I keep thinking about fishing communities and areas and large-population areas, like Miami and Houston and New Orleans and so on, and I would raise the question not of catchability, but of fishability.

Who are the people in those areas who are in a position to go fishing, socioeconomic considerations, and a lot of it would have to do with the physical coastal areas and populations of fish available there, because you can see, in some places, you have fairly low-population areas, like Murrells Inlet, for example, but a very high amount of fishing and for-hire boats and so on going on there.

One of the things that I think would really help in understanding the socioeconomic aspects of all of this would be to look at this kind of weird notion that I was mentioning of kind of socioeconomic fishability. Who can fish and what do they fish for and what is the nature of the fishing? Is it shoreline, small boats inshore, or is it the larger, wealthier, private fishing clubs, like in south Florida?

It wouldn't really be that hard to get, I think, some of this information. You would just really need to add some variables for the fleet characteristics and whether those are increasing or decreasing. You could also look at simply the -- Well, let me give an example. I was thinking about the decrease of fleets through time, and I am biased in the way that I look at this, because what I know best, in fact almost exclusively, are the shrimp fisheries in the South Atlantic and also in the Gulf.

Those have decreased really substantially over the years, I mean a really huge drop, for lots of reasons, but if you look at the employment that they provide, that has changed radically through the years. At one time, it basically was working-class whites. Then it was working-class African Americans, and then you couldn't even get them to work, and so now virtually all of the strikers and all the laborers in the Gulf, and I'm not quite sure about the South Atlantic, are actually Mexican, and not Mexican Americans, but Mexicans who hold work permits to work on those, and so the fleets there are really highly vulnerable, if you ask sustainability questions.

They're highly vulnerable in terms of their continuation, and so I won't go on and on and on, but, if I think about sort of who can fish and when and where and how and what's going on in regard to that, then lots of those socioeconomic kinds of things will begin to tie together and help. Like graying of the fleet is another one. When the fleets begin to diminish because your fishermen are getting older and older, who are the new people who come into the fleets, or are they coming in? The answer is I don't know, but that information may be available, but, again, I am not sure of that. I will stop on that point.

MR. HADLEY: I think you bring up a good point on how to tie it into the bigger picture, and, there again, getting back to how you can move outside of the fishery-specific participant data and how you can expand that, where information is available, and so thank you.

DR. BLOUNT: Let me just add one more point on that, an important point that I forgot to bring up, and that is that one of the most difficult problems that people working in socioeconomics have faced is to try to figure out what a fishing community is, and there are lot of different ways that they have tried to answer that, and none of them really particularly satisfactory.

Perhaps the most useful recently is the social indicators that a number of us have worked on, but, in particular, social indicators for community vulnerability and resilience, but those include a whole battery of social, economic, and even ecological variables, and it doesn't necessarily tell you that much about their relationship to fishing, per se. In fact, there's a great deal of discussion and even discord among sociologists and anthropologists in terms of how much a particular community is actually fishery-dependent.

There are ways of measuring fishery-dependence, and I almost think that we would be better off if we had a better and quicker and easier way to look at a community and decide whether it's really fishing-dependent or not. I don't think we necessarily have the data for doing all of that, but this kind of connectivity that I was suggesting, if we could get data and I think tie it to the current analyses, current data collection, to the extent possible, but build off of fleets and fleet characteristics and ownership characteristics and labor characteristics of those, and that would go a long way in aiding us in figuring out what really is a fishing community and what's not a fishing community. Jim, thanks for the patience.

DR. WATERS: I wanted you to complete, because I have a question or a comment about a slightly different topic. I confess that I'm not familiar with this concept of regional quotient, and I wonder if you could go back and explain to me again how exactly that's calculated.

MR. HADLEY: Kari, I might ask you to help me out on that one, but I will scroll back up here.

DR. MACLAUCHLIN: This looks like page 16 of this document, and this is a figure that we use regularly in the social environment sections, and so the regional quotient -- The Regional Office will calculate for us maybe the top ten or fifteen communities with the relative highest landings in the South Atlantic region. That way, we can say here are these areas where we have the highest commercial landings of mutton snapper, for example, in this one.

You can see these are Key West, Mayport, Miami, Key Largo, and Islamorada, and the blue represents the pounds. Then the orange represents the value. That way, we know which communities to kind of focus on. Then there is the local quotient, where you take it at that community level, and it's the most pounds and/or value by species for that area, and so, for example, golden crab, the first -- If you did a regional quotient and it showed up like this and we showed you the areas where the highest landings were of golden crab, one of those would be Fort Lauderdale. Then, if you broke it down for Fort Lauderdale, that's probably golden crab is not one of their top species.

We also find that, when we are comparing regional and local quotients, maybe in some of the smaller communities, they may have the highest landings of a certain species, but then, when you go break it down, it's actually maybe crab or shrimp or something like that that would really affect them at a community level, and so it's really good, because it gives us here are the communities that we want to really focus on, but then you can also look at it and say that there may be individual impacts for vessels, but probably not a community-level impact.

DR. WATERS: Okay, and so a quotient is a numerator and a denominator, and so, the numerator, what's in the numerator? I am going to guess that, if you're calculating something for mutton snapper, you are looking at landings of mutton snapper in a particular fishing community divided by landings of all species in that fishing community.

DR. MACLAUCHLIN: Yes, and so it would be landings for one community over the total South Atlantic landings for that.

DR. WATERS: Okay, and so the numerator is a ratio of landings of say mutton snapper compared to landings of all species and then the denominator would be the landings of that species for the entire South Atlantic divided by all pounds of all species in the South Atlantic?

DR. MACLAUCHLIN: For the regional quotient, it's just pounds of the one species, and it's community over the entire South Atlantic. For the local quotient, it would be the proportion of the total landings of all species, all commercial species, for that community, and it would be the species in question for that community over the total, and so you can see the proportion of their total commercial landings coming in.

DR. WATERS: So it's relative to the entire Southeast, right?

DR. MACLAUCHLIN: The regional quotient is relative to the entire South Atlantic, comparing communities to each other. The local quotient, which I don't know if you had an example of that in there, but the local quotient is for one community, and it's comparing the species in that community.

DR. WATERS: Okay, and so then the region is the South Atlantic region as a whole, and you had some presentations where you broke the South Atlantic into say North Carolina and South Carolina and Georgia or whatever, and those are not regions for this computation?

DR. MACLAUCHLIN: No, we do it with the entire region.

DR. YANDLE: A follow-on question, sort of almost taking what you're saying and I think, unless I am completely confused, flipping it on its head. Is there any way to use this information to figure out which communities are landing the most of a particular species and which communities are most dependent on specific species?

DR. MACLAUCHLIN: I think that which communities are landing the most of the species is the regional quotient. The local quotient kind of indicates, or at least suggests, the importance of that species for those main communities.

DR. YANDLE: But couldn't you have a community that is not a top producer, but is, nonetheless, highly dependent on one or two species, and would this be able to capture that? If you were trying to go through and figure out which communities are going to be the most impacted, would you get those small-producer, highly-dependent ones in this?

DR. MACLAUCHLIN: No, but we have the qualitative information, either from our experience and knowledge and public comment, to be able to identify -- I mean, I think, at this point, most of

us can almost automatically identify what species without even having to look at the data, just because of our experience and knowledge of the region at this point, and so that, I think, highlights the importance of qualitative, so that we know to go back and make sure that we do look at those communities.

DR. YANDLE: Yes, and, believe me, I'm not going to get in a fight with anyone using qualitative data, but I was just trying to, as much as anything, figure out what the strengths of the limits of these measurements were.

DR. SWEENEY TOOKES: So then, because we all agree that this qualitative data is important, and, yet, we've had a very excellent presentation with a lot of data, and none of it speaking to what you just said we all know, and so does that mean it gets sort of left behind on the editing room floor, because it's not able to be quantified, and therefore showing up in a regional quotient or a local quotient?

DR. MACLAUCHLIN: No, and so usually our Southeast Regional Office folks are the ones that put together the social environment, and they will generate -- They have the database that generates these for us, and so, when we're working together, if there is -- I mean, I see the social environment before I write the social effects, because I refer back to it. If there's something that is left out of the environment, then either I add it or I ask them to provide some additional information about a community, so that, when I get to the social effects of each action, potential action, I can talk about those.

I guess it is possible, but I feel like, between the social scientists, the council members, folks from public comment, that we'll hopefully see that, if there's something missing, and ask if they can please add a little more information about this and we want to make sure that we have that to consider. We do really depend on public comment and input from our council members also.

DR. BLOUNT: One of the issues in trying to sort out fishery-dependence for any particular community is that you can come up with one set of measures and then rankings if you simply look at particular species, or the question here that Tracy was asking of a community dependent on a particular species or a set of species and so on.

There are broader issues that are involved, though. You can have communities that are fishery-dependent, not so much on the landings, per se, but on kind of the secondary things, like boat companies, marine companies, fish houses and all of that. You can have a community as fishery-dependent as one that you can really calculate and quantify is dependent on catch levels, but that are equally dependent, because, in fact, if some of these things go awry, then these communities are as vulnerable and can be socially and economically damaged as much as they would be if in fact there were a really sharp decline in the landings for a particular period of time.

DR. MACLAUCHLIN: I know there has been some work to kind of get a little more information about infrastructure. We did have -- I am actually working really hard to finish the draft of the last one, the fishery performance reports, which were so interesting. We got those from our Snapper, Mackerel Cobia, and Dolphin Wahoo APs last week.

They did talk a lot about dock space and losing that space, especially in the Keys, and this property is so valuable, and you can't blame the owner for selling it, but that it's really negatively impacting

them, and that's not something that the council can directly affect, but it's definitely something to keep in mind when they're developing any kind of new regulations that you are always -- I don't know, but, if there are obstacles, work to remove them, like get out of their regulatory way, because there are some other things in place for the communities.

DR. CROSSON: John, how are we doing on answering the questions for the committee?

MR. HADLEY: That is certainly food for thought, as far as some ways that we could go, and, as long as it's a specific dataset that we can refer back to, I think it can easily be tied in, once we get the FEP developed, and so I think it's certainly constructive comments, certainly constructive decisions. I think that's great input. I don't know if anyone else has anything to add, but we certainly have a way we can go with it.

DR. WATERS: I am a little bit of a contrarian here. You have asked us if there are other available data that could be used, and I think what you have laid out for us is very comprehensive. In fact, I am wondering -- Given that there are scores of species in the South Atlantic, it would probably take hundreds of pages of text and presentation to do this type of analysis for every single species, and I wonder if we can economize a little bit by just focusing on a few of the species that are prominently managed and then maybe creating groups of all other species for a presentation just for the group, rather than trying to do this type of thing for every single species.

MR. HADLEY: That's a very valid point. I mean, if you look at the snapper grouper complex alone, there is scores of species in there, and so that's a good point. I think, as we look at this, we can maybe group them by -- For example, as I mentioned earlier, some of the visioning amendments are looking at deepwater species, and so maybe you could aggregate deepwater groupers or something like that, rather than parse it out on a species-by-species basis.

Really, when we're putting together the human environment chapters of that, we will be pulling that information in, and it will be available in one place, and so I think that's certainly something to keep in mind and to, as you say, economize and make the process more efficient, so we can more easily keep everything up to date and keep the document -- Really, what this boils down to is keeping this document relevant and useful to folks that are interested, and so that's a point well taken.

DR. BLOUNT: One last comment, perhaps, on that, John. In trying to think through these questions and answers to them, sometimes it strikes me that it's not so much that we really need that much new data. Maybe it's just that we need additional analyses or pulling information together, like you were referring to in the human environments, or the section to it. There are more analyses that could be done, particularly demographic, tying back and all of those kinds of issues. The information is already there, and it's already collected, but it's just that the analyses often don't include those, in terms of what some people, at least, think are important socioeconomic dimensions of the work. I would add the environmental information into that, too.

MR. HADLEY: I appreciate that. Unless anyone has any further input, I think we're good to go with this.

DR. CROSSON: We've been doing this for a while now. It's 4:12. I am going to give us an eighteen-minute break. I think we'll start again at 4:30.

(Whereupon, a recess was taken.)

DR. CROSSON: Let's get this going again. We need to get this restarted. We are going to shift gears here, because we won't launch into red snapper right now. There is no way we would finish that this evening, and we're going to try and do it as one long push when we do, and so we have now finished Items 1, 2, and 3.

Item 4 would be next, which is red snapper, but, rather than do the red snapper and the ABC control rule, we're going to shift over to the socioeconomic profile of the snapper grouper fishery, which is Number 6, because we just got finished giving John a bunch of advice on something rather similar to this, and so we're going to be able to continue this discussion, and Kari, I think, is going to start.

DR. MACLAUCHLIN: This is Attachment 6 in your briefing book, and this is -- I kind of wanted to give you guys a briefing about this project. We have been talking about it for a while, and then, at the council meeting, they put that into our workload priorities and everything, and so we're going to start working on this.

We got together and got some ideas down on paper. This was at the very beginning. It kind of goes into the Snapper Grouper Regulatory Amendment 27, which is the commercial management measures, and we are focusing on the snapper grouper commercial fishery. There's been a lot of talk about traditional bandit boats and then just, in general, this overall socioeconomic characterization of the whole snapper grouper fishery, who is fishing, where are they fishing, information about the permit holders, information about folks fishing on those.

There's been questions about the lease, how the permits, via vessel leasing, kind of move around and latent permits and vessel characteristics and then getting into the participant catch portfolios, dealer information, and then economic information.

DR. CROSSON: Can I ask you for a clarification right here, Kari? This is for not just bandit boats though, but this is for all the different sub-sections of the snapper grouper fishery, such as the black sea bass pot endorsement and the tilefish endorsement? I would assume that wreckfish is excluded from this, or are we just talking about the bandit boats?

DR. MACLAUCHLIN: All of them, because what we wanted to get into also is that this -- The permit holders and the vessels associated with the snapper grouper commercial permits are so diverse, and we want to get into who are all of these people and what are they fishing for and what's their portfolio, so that, when we talk about potential regulations that affect this species, it's going to affect these people in this way.

Even though we do this, I guess, and kind of not very deep for the social and economic environments in the amendments, I think maybe this is something that we can do and then update every few years. That way, we can refer back to it, and so the AP really was talking about this a lot for a couple of meetings, because they were like, we don't know how to talk about a vision when we don't know everything about this fishery, and so they want to just get -- They think that looking at traditional bandit boats, but then what are the other types of fishermen and what else are they doing and catching.

The first would be, and some of this is kind of based on a previous kind of whole commercial snapper grouper fishery characterization that was done, maybe like fifteen years ago or something, and so we were kind of using that and then we're building on it, and so, first, it's kind of a description of the fishing communities and looking at the regional quotient, but then also bringing in qualitative information and engagement reliance about the different communities.

Then we kind of broke them down into the different areas. We did get some input from the AP about like the northern part of South Carolina and then the southern part of North Carolina. Those are more similar than all the South Carolina fisheries, and then breaking Florida up a little bit, and so we do want to try to capture as much as we can and be able to at least kind of talk about them in blocks a little more. We have some questions in there for you guys, and we'll go ahead and get some input about the division and consolidation, or further divisions.

DR. WATERS: The first question for us is about the geographic division of regions here that you just described. For the description of fishing communities, you're going to be identifying community-by-community, or at least major communities, and why do you need to have these regional designations at all?

DR. MACLAUCHLIN: Well, I think that it was a good suggestion with lumping like the parts of South Carolina and North Carolina together and maybe southern South Carolina with Georgia a little bit, but I don't know -- I mean, there will be individual communities, I think, but you don't need to do all of them separately, because there are some in certain areas that are really similar and we can kind of talk about them as like this part of the area.

I think it was just a little more to get input like we got from the AP, you know Little River and Myrtle Beach and that area should be -- They're really similar to southern North Carolina and that kind of input, and so that's probably how we'll break it down, but there still will be some individual communities that they're just going to be different, and we'll have to talk about them separately.

DR. WATERS: There are communities meaning individual urban areas, but a lot of our NMFS datasets go county-by-county, and are you talking about working county-by-county and defining a community by county, or are you actually going to do individual urban areas as communities?

DR. MACLAUCHLIN: I don't think we've decided that yet.

DR. WATERS: I think your lumping makes a lot more sense if you went county-by-county.

DR. MACLAUCHLIN: I think, as we progress and get feedback from the council and the AP -- I mean, this is a project. This is not going to take a month to do. I mean, maybe for somebody that didn't have a million other things to do, but it's me and Hadley, and so we'll be working on it, along with the other staff, and so it's going to take us a while to do, and so hopefully we'll be able to get feedback along the way, if we need to.

DR. CROSSON: What is your timeline on this? When has the council asked you to produce this?

DR. MACLAUCHLIN: There is no specific timeline with the deliverables. I mean, obviously, some of these parts that we -- Like this stuff, we will probably get done and be able to present over

the next couple of council meetings. Some of the basic number-crunching of the permit holders, the distribution and information like that, we will have for the June meeting, and then a little more detail for the September meeting. I kind of am seeing this as an evolving document. Like we get the basics and then we're just constantly updating it as we get new information. Then some of the bigger stuff, like the catch combinations, those are going to be -- Those are going to take a while to analyze, and I don't know when that will be done.

Then, like I said, we're probably going to do some just basic descriptions of the snapper grouper permit holders, a little bit about some historical changes, you know has the distribution changed, looking into corporation and individual ownership, and there are two snapper grouper commercial permits. One is the unlimited permit, and so you only are applied to the trip limits for each species, and then you have a 225-pound limited permit, and those are non-transferable, except to family, and those were kind of -- When they went into a limited-entry program for the commercial fishery, those were provided. People who had historically participated in the fishery, but not at a high enough level to qualify for the unlimited permit would at least be able to catch some snapper grouper species.

We want to take a look at both of those different types of permits and how the two-for-one requirement -- To enter the fishery, you have to purchase two unlimited permits and then you get one, and so it's for a reduction over time. However, corporate law -- If it's an asset in a corporation, it kind of works differently. You don't have that requirement of two-for-one. The demographics, the permit holders, and then the permit portfolios. What other permits are these folks holding and using?

Then we will look at the permitted-vessel characteristics, and so permits can't be leased, but folks can use someone else's permit for a year or two through leasing of a vessel, and then we also -- Especially with the AP, we talked a lot about latent permits. We wanted to ask them what would be a latent permit. Like what is so low of a level of a permit that you're not using, and it was really interesting, in that discussion of what would define a latent permit, like how many years and what level of landings, and that is a subject that some folks were a little sensitive about on our advisory panel.

It kind of turned into we're not actually going to talk about how to define a latent permit, but we're going to talk about the types of permits that have very high or low levels of landings and what those people are doing. Like why do they have these permits that are worth tens-of-thousands of dollars if they're not fishing on them? Should ever a conversation about latent permits or latent effort in the fishery come up, we will be able to talk about those people who have the permits and are not using them.

Look at permit costs and availability, with whatever we can find, and the distribution of the vessels by their port city, their homeport city, listed. Then, as much as we can, get some vessel characteristics, and that can kind of go into this definition of a traditional bandit boat, and we did get some input from our advisory panel on what they would consider to be a traditional bandit boat. It's specifically the gear type that they have on there, but also trip length and things like that.

DR. SWEENEY TOOKES: Can I suggest an addition to the homeport? To actually have the home of the fishermen, because there is often a homeport which is not even in the same state as the fishermen.

DR. MACLAUCHLIN: I know we do have information with the permits and the vessels, the mailing address of the holder and then the homeport of the vessel. Then we want to get into participant information, and so the catch portfolio, the species composition of the landings, by pounds and value. We kind of get into this a little bit when we talk about like an annual portfolio that fishermen use, but they kind of vary, but we do want to look and see if there some kind of typical catch portfolio. Is it kind of associated with a region or is it associated with your vessel type or if you're a traditional bandit boat, and just kind of develop the typologies for that. Then, of course, look into dealer information, where they're at and how they're involved, and then if they're involved with other species, such as the HMS species.

Then we will get into the profile of the snapper grouper landings, and so the landings by ex-vessel value and weight, kind of breaking it down, and John has put together some groupings, shallow-water grouper, deepwater grouper, snappers, jacks, porgies, grunts, triggerfish, tilefish, and other. The seasonality and distribution of landings by sub-complex, landings by gear, the economic impacts of the commercial fishery, and the growth potential analysis.

Right now, we're planning to use data with 2014 through 2016, and so do you think that these are sufficient for this section? Then is there available information included in our outline that could help better describe the snapper grouper commercial fishery, and utility in expanding this profile to include information on the recreational sector, where data are available and as time allows?

DR. CROSSON: I spoke to Kari and John earlier, and I forwarded some examples, but we have -- At the Science Center, our group is creating an R-based query tool that will pull the information that we get from the logbook program and also from the economic add-on that we get with the logbook data, and so we can produce, for a sub-section of the fishery, depending on how the query is structured, landings and break it down by the different geographical regions, using the logbook data.

That is nothing that the Fisheries Statistics group doesn't already do, but we can break it down, and then that's a census-level, or near-census-level, and then we also can have, based off of our 20 percent sub-sample, our cost data estimates for what's going into that fishery, including the profit estimates that are in that, and so we can produce that. We're not up to speed on it yet though. It's probably going to be four months away or so before we can start producing those regularly, because we're still getting that off the ground, but that's one thing that could definitely be of value to this, because we've been collecting that data for quite a while.

DR. WATERS: One question posed is about the time period, 2014 to 2016. I am wondering, since, in the fishery ecosystem proposal, you had a rolling five-year plan, why don't you go with five years here? That way, maybe what you prepare for this can roll right into your Fishery Ecosystem Plan.

Having said that, for some of the variables, like landings and ex-vessel value, I might recommend even longer time series, because your three or five-year period will give you a pretty good picture of what the fishery is like now, but it really won't give you a measure of changes in performance in the fishery over time, and you can't really get that sense without a longer period of time.

DR. YANDLE: I just wanted to say, just broadly, that I really like this approach, because it's taking the low-hanging fruit and getting it in a usable format, and there is nothing stopping us, you, other people or whoever, from going back and fleshing this out further later, but just having this fundamental information in a readily accessible format, I think that's going to be wonderful.

DR. WATERS: Another question was is there information available that's not included in the outline that could help better describe social and economic characteristics? You might want to ask the Science Center if they happen to have any information about harvesting and ownership costs for these vessels that might be included.

DR. MACLAUCHLIN: I think the vessel information is going to be -- The description of the vessels, I think that data may be tricky for us, but that is something specifically that the council has expressed interest in and the AP has expressed interest in, in having that information.

DR. CROSSON: I agree. We're in communication. What else?

DR. WATERS: Another question is, is there a utility in expanding this profile to include information about the recreational sector, and my answer is no. The reason is that it seems like, in the introduction to this write-up, the council's focus was on the commercial sector, and I think, if you included the recreational sector, it would provide more information about the fishery as a whole, but it probably would delay the production of the final report, and so, if you did want to do something for the recreational sector, I would say do that as a separate report with a separate release date, but focus this one on the commercial fishery and get that one out.

DR. CROSSON: Perhaps once the electronic reporting for the charter industry is brought online, we can add that to it.

DR. MACLAUCHLIN: I do want to say that there -- I think, as far as the for-hire sector, there will be some that we just can't -- Especially when we're talking about the portfolios, and there seems to be, with some folks showing up at our meetings down in Florida, a young group, and they have -- They are part-time commercial and part-time for-hire, because they can't make a living with commercial, and so they have to switch back and forth.

They seem to be younger, but really eager to get involved, and some of them are like really great businessmen, like very good planners, and so they see this as maximizing their ability to use both of these, and, even though they're not full-time commercial fishermen, they would like to be, but they're just basically supplementing their income with charter right now, but we did have some conversations at the AP about like traditional bandit boats I think are not equipped to really participate in other fisheries, and so they do kind of confine themselves, and I think that we're going to see these different groups come out. They're all, in my opinion, important, and fleet diversity is important, but I think maybe Ben has something to add.

MR. HARTIG: In talking to some of these younger fishermen, some of them are primarily charter, but they commercial fish as well, but their social challenge is that they want to spend time at home. They don't want to have to do what some of our commercial guys do. I mean, our full-time commercial guys fish part-time on the east coast and part-time in Louisiana, on the west coast, and so they're gone for almost six months of the year, fishing in the Gulf.

The new guys don't want to do that. They're talking family lives. They want to have a charter business, but they also want to participate in the commercial fishery when they don't have a charter, and so it's an interesting construct to see the change that has happened.

DR. BLOUNT: Ben, are there particular constraints on the younger fishermen that make it really hard for them to participate in the commercial fishery?

MR. HARTIG: Yes, and, I mean, certainly the historical fishermen -- They have to buy their licenses, and so that's an added expense, and that is -- Boat prices are more expensive, and it's just more expensive overall to get into the fishery, period, but the charter fishery, even though it's going away in places, where it's still active, it's still pretty lucrative.

DR. BLOUNT: I was wondering if the fact that these guys really know the for-hire, and they know where the fish are and where to go to catch them, that would give them perhaps an advantage, in terms of the commercial, and so I was trying to think on both sides of the equation there, but that would give them a bit of an advantage.

MR. HARTIG: The other thing is that they will use a lot of live bait in their charter businesses, which you're targeting bigger fish, and so they find those bigger fish. If they get a day to fish the live bait, they can put a lot more pounds and fewer fish on the dock than the traditional guys do, because they're not going to target those bigger fish, because it's a whole different deal.

DR. CROSSON: Okay. I think we're wrapped up here. Again, we are talking. They're talking to us, and they're talking to the Regional Office about information that's going to be coming with the permits, when they change the way the permit data is gathered, and so there's a lot going on, but that's good. It's five o'clock, and I think we will stop for today.

What time do we want to start tomorrow? I would think we could probably do this at nine. Is that too late? What do you think? I'm open to feedback. We have two big items. We have the ABC control rule, and we have the red snapper management. The SSC meeting starts at 1:30, and I'm sure we want to finish well before that.

DR. MACLAUCHLIN: I would say 8:30.

DR. CROSSON: 8:30? 8:30 is fine with me. All right. We will restart the webinar tomorrow morning at 8:30, and thanks to folks on the webinar as well. Hopefully that's not too early for Kurt.

(Whereupon, the meeting recessed on April 24, 2017.)

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APRIL 25, 2017

TUESDAY 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 Town and Country Inn, Charleston, South Carolina, April 25, 2017, and was called to order by Chairman Scott Crosson.

DR. CROSSON: Good morning. We are starting the second day of the South Atlantic Council Socio-Economic Panel meeting. A couple of items. First, we need to do voice identifications again today, and, after we get done doing that, I was speaking with Jim Waters about our committee report. If we have time afterwards, I think what we're going to try and do -- Especially this morning, to the degree that you can, try and take notes, because the red snapper discussions are always very involved, and, after we finish up here this morning, we'll try and get together.

I think Jim already has a little bit of a draft of the report and how we've answered the questions that the council has tasked us with. We'll try and pull together an outline of that and make sure our notes are looking good, and then we'll get that draft together and we'll circulate it among the full panel, including the people that are out there in internet-world. That way, we can have something to the South Atlantic Council's SSC, relatively briefly, hopefully by tomorrow afternoon or something like that. That is it for right now, and so we're going to do the very quick voice call. Do the people on the internet need to do the voice recognition?

MR. HADLEY: Yes.

DR. CROSSON: All right. We'll start in this room, counterclockwise again, starting with Ben.

DR. BLOUNT: Ben Blount, retired anthropologist.

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

DR. YANDLE: Tracy Yandle, Emory University.

DR. CROSSON: Scott Crosson, economist, Southeast Fisheries Science Center.

MR. HADLEY: John Hadley, council staff.

DR. MACLAUCHLIN: Kari MacLauchlin, council staff.

DR. WATERS: Jim Waters, economist, retired.

DR. CROSSON: So who do we have on the webinar this morning?

DR. MACLAUCHLIN: It's Chris Dumas, Jason Murray, and Kurt Schnier.

DR. CROSSON: In that order, can they go ahead and give their voice recognition?

DR. MACLAUCHLIN: They are losing audio.

DR. CROSSON: Those are losing audio? If they can hear us --

DR. MACLAUCHLIN: They are sending me like the chat.

DR. CROSSON: We are pausing here while we get the webinar running again.

DR. MACLAUCHLIN: John Whitehead is also on. Can you do a sound check real fast?

DR. WHITEHEAD: Good morning.

DR. MACLAUCHLIN: That sounds great. I guess, starting with John Whitehead, go ahead, and we're going to do our sound ID, and so say your name.

DR. WHITEHEAD: John Whitehead. Good morning.

DR. MACLAUCHLIN: Chris Dumas, one more time?

DR. DUMAS: Chris Dumas. Good morning.

DR. MACLAUCHLIN: Great. Jason Murray.

DR. MURRAY: This is Jason Murray. Good morning.

DR. MACLAUCHLIN: Great. I think we're ready to go.

DR. CROSSON: Okay. Again, we're going to start this morning, and we moved items on the agenda a little bit yesterday, and so we finished the first three items on our agenda yesterday, and we also jumped up and finished Number 6, which was the socioeconomic profile of the snapper grouper fishery. We are now moving over to Items 4 and 5 that we will finish up this morning, and the first item is red snapper management and analysis of fishing behavior, and I guess John Hadley is going to start this discussion for us with a slide show.

MR. HADLEY: Thank you, Scott. If you will remember, last year, the SEP had a pretty in-depth discussion on red snapper and the stock assessment that had come out, and that has progressed, and, essentially, we're in a situation where the council is working to develop management measures that will allow for red snapper to be harvested, potentially, in the future, but are challenged with the current removal levels and dead discard estimates as the red snapper stock grows.

Essentially, one of the main issues here are discards in the private recreational sector, and so private recreational anglers, and ways specifically to address those and potentially minimize those discards, and so there are two main management objectives with Snapper Grouper Amendment 43. One of the primary management objectives of the council is to discourage targeting of red snapper, should limited harvest be allowed, in order to keep red snapper harvest at or near target levels, and the other primary objective is to reduce the number of dead discards through regulations or through promotion of best handling practices.

In addition to these management objectives, the council will also need to provide data to verify that fishermen are in fact complying and try to come up with a way to quantify how these discards

have been reduced, and so that's the situation. What I'm going to do is I'm going to go over a few of the actions that are currently in Snapper Grouper Amendment 43, and then we'll get into -- Essentially, it's a graphic that kind of brings these different actions together and how they may play out. With that, I will start with some of the management actions.

As background information, there was Snapper Grouper Amendment 43 options paper that was included. What we'll be discussing is we'll actually be jumping forward to Action 10 and going from there, and so I will skip to that. Action 10 in Snapper Grouper Amendment 43 would modify reporting requirements for private recreational fishermen. Right now, there is no reporting requirement for private anglers.

DR. COLLIER: There is a reporting requirement, but it just has not been approved by the Office of Management.

MR. HADLEY: Thank you. Thank you for the clarification. As Chip mentioned, Alternative 2 would require private recreational anglers to complete electronic logbooks, and so this would require all fishermen with a recreational snapper grouper permit to report all catch and discards electronically when fishing for or catching species listed, and this is from a previous action.

I will briefly go over the sub-alternatives, but, essentially, you would be looking at a subset of recreational anglers that would need to report, depending on the sub-alternative, and so Sub-Alternative a being 20 percent of private recreational anglers will be randomly selected each year to electronically report, 25 percent, 50 percent, or all. Then, finally, private recreational anglers could voluntarily report their catch.

Alternative 3 would require private recreational anglers with a snapper grouper permit, should one be created, to submit records for each trip to report, and these look at the different options for reporting, and so it would be looking at monthly reporting or intervals shorter than a month, if notified by the SRD via electronic reporting. Electronic reports would be due by seven days following the last day of the month. 3b would be weekly reporting, and at intervals shorter than a week, and then Alternative 3c would be electronic reports would be required to be completed prior to disembarking from the fishing vessel. You are looking at increasingly more real-time reporting requirements.

Then the last two alternatives would require reporting to NMFS or the state agency, prior to returning to shore, of an incidental catch of red snapper. Fishermen would be required to inform of the location and the approximate time of returning to port, and, finally, Alternative 5 would require recreational fishermen to hail-out via phone or electronic device if targeting species in the Snapper Grouper Fishery Management Unit. The fisherman would provide a number issued to the phone or the electronic device, and so this is essentially a hail-out provision.

DR. CROSSON: I have a question about that. This is news to me that Mississippi is requiring this for red snapper, and do you have any information on how much compliance they're getting with this? Is this working relatively well?

DR. COLLIER: They feel it's working pretty well, and they are actually going through the process of getting it MRIP-certified, which would mean that it would take over for MRIP values. There is other states that are going through the same process. Florida has developed an enhanced MRIP,

and so they actually do an additional stratification within the MRIP survey design to focus on snapper grouper species. Other states have gone to something like iAngler, and they have used that as a technique. Texas has done that, and so each state is doing something different, which makes it a little bit more difficult to get comparable landings.

MR. HADLEY: Any other questions before moving on? All right. Then the second action that we wanted to go over was what is currently Action 12 in the amendment, and so this would require the use of best fishing practices when fishing for snapper grouper species with hook and line gear, to reduce mortality and bycatch of red snapper, and so, here again, it's trying to reduce those dead discards.

Currently, fishermen are required to use stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear north of 28 degrees. It is unlawful to possess snapper grouper species without possessing non-offset, non-stainless-steel circle hooks. The regulation for the use of circle hooks applies to the use of natural baits only. Additionally, fishermen are required to have de-hooking devices onboard. That is where we stand currently.

Alternative 2 would require a descending device or a venting tool to be onboard a vessel possessing species in the Snapper Grouper Fishery Management Unit to increase survivorship of released red snapper, and there is different sub-alternatives here that would relate to that alternative, Alternative 2a being requiring a venting tool to be onboard a recreational vessel possessing species in the Snapper Grouper Fishery Management Unit. Alternative 2b would require a venting tool to be onboard a commercial vessel, which falls a little bit outside of our discussion. We're trying to focus it largely on, there again, the private recreational component.

Alternative 2c would require a descending device to be onboard a recreational vessel possessing species in the Snapper Grouper Management Unit, and Alternative 2d would require the use of a descending device when releasing red snapper in depths greater than 100 feet, and so you can see that that last one is requiring the use of, whereas the other ones are requiring the device to be onboard. That's a distinction there.

Moving on to Alternative 3, this would require the use of single-hook rigs if fishing for or possessing red snapper or if fishing for or possessing snapper grouper species, depending on the sub-alternative. Alternative 4 would modify the requirement for the use of stainless-steel hooks when fishing for snapper grouper species with hook-and-line gear north of 28 degrees. The circle hook requirement applies only to natural baits, and there is several different sub-alternatives here.

Sub-Alternative 4a is requiring the use of non-offset, non-stainless-steel hooks when fishing for snapper grouper species with hook-and-line gear, and so that's just in general. Sub-Alternative 4b would require the use of non-offset, non-stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear north of 28 degrees. In this case, it is unlawful to possess snapper grouper species without possessing non-offset, non-stainless-steel circle hooks.

Alternative 4c would require the use of non-offset, non-stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear in depths of greater than -- That is one thing that, if this sub-alternative is chosen to move forward, those depths would need to be identified, but it's essentially looking at a depth range when these additional requirements would be in place.

Finally, Alternative 4d would require the use of non-offset, non-stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear in the South Atlantic EEZ.

These two actions are -- They summarize kind of where the council may be going with this, and, as I mentioned earlier, this discussion is -- There is the two-pronged approach. One is how could we influence fishing behavior and the other one is what are some mechanisms of measuring that, and, with that, I will -- Before we get into that discussion, I wanted to bring up a graphic, kind of a demonstration of -- I will clarify this is not set in stone. This was put together for example purposes.

This graphic is an example of how this system may work, kind of looking at the different gear requirements in different areas that may be open or closed, based on the depth contour line. Essentially, what this would allow is possession and harvest of red snapper, in some circumstances, and, with that, I will turn it over to Chip to run through this graphic, and this was, I will mention, Attachment 4a in your briefing book.

DR. COLLIER: What we were trying to go forward with this was the council is looking at an adaptive management approach, which is going to include several different actions, and sometimes it can be very complicated to see how all of these actions are going to interact with each other, and so this takes several of the actions that we didn't really go through in this, because, right now, we don't have an ABC for red snapper.

We are looking to discuss that with the SSC at the upcoming meeting, and so, without that, it's very difficult to comment on some of these issues, but this is -- When we did have one, prior to this, this is how we were envisioning certain things. It was going to be a very short season, in all likelihood, for red snapper. The MSY value for the species is 80,000 fish, and, just to give you an example of what kind of situation we were in, MRIP estimates there were over 770,000 red snapper discarded just in the charter boat and private recreational fishery last year.

We have an estimate of 28.5 percent dead discards, and so just dead discards well exceeds the MSY value. Needless to say, what the ABC would be -- It's overfished and overfishing, according to the last stock assessment. Due to the closure, NMFS has indicated that we have likely ended overfishing, and so the stock might just be overfished now, with overfishing not currently occurring.

Regardless of that, we are in a pretty hard situation of how to manage this fishery, and so we have come up with some complex management measures in order to keep us under the ABC for red snapper, and so, going into this graphic, we are looking at maybe putting an area out there in the ocean where it would be limited where fishermen could fish, and the reason for that is, as you get to deeper water, dead discards tends to increase. If you're in shallower water, your discards are more likely to survive, and so increasing survivorship.

In that deeper water, we are looking at different options for that, and so the shallow water -- This depth range could change, depending on some of the management options we select, or what the council selects, and I will say that the council wasn't in favor of this overall adaptive approach. They didn't like it much, but it is something that I think is -- I think it was a great infographic, and maybe you guys can comment on what you guys think we were trying to portray at this point, but, if you look at less than a hundred feet, there is some different options.

We have options for private recreational fishermen. Some of those options include that you're allowed to fish in the shallower water year-round. You are required to have a venting tool on the vessel. There would be no possession outside of the short open season, and, once again, you would be required to have an electronic permit and report your catch as well, and so, if you go to the right of that, if you fish in deeper water, for the private recreational fishermen, you would be required to have -- You would be required to have a venting tool or a descending device, report electronically, and you would only be allowed to fish in these deeper waters during certain times of the year.

It's very restrictive, and that open season would be open during the red snapper harvest season, and so it would be limited to when red snapper was open, and so, if you go all the way down to the bottom now, and to the middle, for the commercial fishermen, that was -- The dead discards in the commercial fishery has not been identified to be a big issue, based on current reporting estimates. It's very minimal in the commercial fishery, and so there will be little impact to that. They would have to stay within an ACL that would be developed. It would be -- Overall, this is going to be a pretty short season, but they would be required to have a descending device in greater than a hundred feet.

One of the issues for this is what to do for the for-hire fishermen, and so the headboats and the charter boats. If it is an open-access permit, you're going to have a different response to this, because what could happen is, if it's open access, any private recreational fisherman could then become a for-hire fisherman and get those permits and do what they need to do in order to call themselves a for-hire vessel, but the for-hire fishermen in the open access would be limited to essentially the same as the private recreational fishermen. They would fish within the annual catch limits and bag limits. The red snapper retention would only be allowed during the short open season, and it would be catch-and-release in the shallower waters after the ACL closure occurred.

If you go to the right of this, when we're still in the open access, the for-hire fishermen would be limited to the short season in the deeper waters. They would be required to use the descending device, and they would also have to stay within the catch and size and bag limits. One thing you might notice is there is not requirement to report for the for-hire fishery. That is currently going through as an amendment, and you guys discussed that yesterday, and so we're not working on reporting for them, but we are working on the reporting for the private recreational fishermen.

The big yellow box in the middle, that would be a limited-access for-hire fishery. In order for the for-hire fishery to be allowed to have more than essentially probably a wave, at best, which would be just two months -- In all likelihood it would be a one-month season, is probably what we're expecting, in order to stay under the ABC.

In this situation, the for-hire would have a limited access. They could potentially have a longer season in the deeper waters, and the reason for that is the charter boats and the headboats seem to have been able to avoid red snapper in certain situations, and their bycatch and discards of red snapper seems to be less than the private recreational fishery. Due to that, they would be allowed to fish in those deeper waters for a longer time period. That is essentially the biggest difference, and so if you guys have any questions on that, I would be happy to answer them.

DR. CROSSON: In our briefing book, it has a very brief mention that the Snapper Grouper AP looked at some of these things, and can you give us a little bit longer summary of what the -- That is made up of both commercial and recreational anglers, right, and so what was the feedback from the AP?

DR. COLLIER: Actually, this wasn't presented to them. It was there for them to see if they wanted to look at it, but we did not get into it, because the council really wasn't in favor of it. I will say that the for-hire fishermen that are on this, they are not in favor of a one-month season. They don't feel like they can make it in the deeper water for just a month. They want a longer time period. They have mentioned -- In the past, they have voted in favor of limited entry for the for-hire fishermen, as far as the Snapper Grouper AP, but it wasn't brought up at this meeting for a vote.

DR. BLOUNT: A quick question on the venting and the descending tools. Are there indications that they would be used, or what kind of actions might be taken into account to try to have some sort of enforcement?

DR. COLLIER: Well, venting tools are commonly used for red snapper right now. Descending devices, it's not as frequently used by fishermen. I believe less than 10 percent of fishermen -- There was a report by Chuck Adams, and he was indicating less than 10 percent of the fishermen use descending devices, but greater than 90 percent will use venting if the fish look like they are in poor condition.

I talked to a fisherman that was fishing back in the 1990s on a tagging project, just to see how common venting was, and they were using it back in the 1990s as well, and so they seem to have been using venting for a while, but descending devices, hopefully, will come onboard. In order to get some estimate of compliance, there has been some observer work done on headboats and charter boats, looking at the circle hook requirement.

If you know that rule, that rule is effective north of 28 degrees, and, for those vessels operating north of 28 degrees, it appears that around 50 percent of the trips are using the circle hooks, and so that could be an estimate of compliance, although that's likely a little bit different than what you're going to see with a descending device or a venting requirement, because fishermen feel that it might be changing the catchability of fish and changing their opportunities, and so descending devices actually could have a much higher compliance rate, because they feel like it's going to improve their catch.

DR. CROSSON: We're going to go back to John again. There's a little bit more here.

MR. HADLEY: Okay. With that, before I get into the discussion questions with the group, just a couple of things to remind you of. There was some background reading information or additional references for discussion, and then also emailed out to the group, to the SEP, later were the two grant documents, and the reason that I included those were to go over some of the upcoming -- Here again, it's very early in the process, but the upcoming electronic reporting options for the recreational sector.

The first one was supporting the electronic logbook for the for-hire sector that will be going into place, and then the other one was looking at -- It's essentially a project working with -- Chip, if I

misspeak, please correct me, but it's the Snook and Gamefish Association, and working on a private recreational reporting app, where private anglers can use essentially their cellphone and report landings and discards and that sort of information, and so those are the two. As I mentioned, it's very early in the process, but that's something that is on the table and is moving forward, and so, with that, I will get into -- I will go over the three discussion items, and we can figure out together how we want to attack these.

The three major areas of discussion -- I will go over them very quickly, but, one, are there ways to -- This is a very high-level question, but are there ways to economically or socially incentivize a change in fishing behavior for the private recreational sector to use best release practices or actively avoid red snapper hotspots in targeting, in an effort to reduce the number of dead discards? Can you think of examples from other areas of social science study, healthcare or behavioral economics or workforce management, that could be applied to help build, and this is a term that came from one of the additional references, but the conservation inertia, where you get that sort of conservation aspect and it becomes the popular thing to do, and, here, we're kind of looking at descending devices, but to help build conservation inertia as it relates to recreational fishing behavior.

The next one is what methods could be used to quantitatively measure how fishing behavior changes to provide guidance in how discard mortality estimates should be adjusted in reaction to a change in fishing behavior, and so how could -- A good example of this is how the change to circle hooks affected the discard mortality estimates in the stock assessments, and so that's kind of that mechanism. How can we measure that change in fishing behavior?

Then, finally, in regards to a potential red snapper or snapper grouper permit, what type of socioeconomic or behavioral data should be reported by the permit holder, and so that's looking at who is fishing, where they are fishing, demographic information, potentially trip costs, and what data elements could be included with the permit, or as a stipulation of the permit, as a way to measure a change in fishing behavior? With that, I will turn it over to the group.

DR. CROSSON: All right. These are three very interesting questions, and I am very open to the committee suggesting how we want to tackle them, but I guess we'll just start with the first one, in terms of behavioral science and behavioral economics. Are there some thoughts from the committee on this? They're welcome right now. Everybody is in deep thought.

DR. COLLIER: I've actually been talking with our Outreach Specialist, Cameron Rhodes, about this and trying to really figure out some of the issues for red snapper. It appears to be that, in certain spots, you can catch them very easily, and so how can we convince some fishermen to target red snapper last? If they are common everywhere, you can go to some spots and try to avoid them, and maybe you pick it up, but avoid that hotspot in catching this, essentially a choke species, first and maybe target it last. We are trying to figure out different ways to slow down the number of discards of red snapper, and that would be one way, but I don't know.

DR. SCHNIER: This is actually quite interesting, and so the focus I have is this sort of real-time information provision, because, from a behavioral economics perspective, something that can be very effective is knowing how you are performing relative to peers. If you're doing more damage than your peers, it might have sort of a negative connotation to it and make you do things that are more conservation-based. There is evidence that this has worked like with water management and

things of that sort in other areas. I guess it kind of depends on which of the alternatives are being selected for reporting and how that information could be aggregated and then used in a way to sort of motivate behavior. It depends on the alternative selected.

DR. YANDLE: Just very much thinking out loud here, one of the whole points of behavioral economics is basically feeding small bits of information to induce small changes over time, and so how does this relate to particularly the ideas that have -- I think part of it is trying to create a pride in avoiding the snapper, rather than, hey, this is the rare thing that I've caught, and one of the things I am wondering -- This is going to sound like a really weird place to go look, but there has been a lot of efforts made to reduce traditional use of endangered species in traditional medicines.

I wonder if there is something in that about the subtly trying to change some of the perceptions that way. I think that may almost be the bigger thing, to make the pride in, hey, this species is coming back and we need to help it along, and I can help it by doing this. There may be something there, but, again, this is the kind of thing that people study a lot and come up with plans on, and so that may be one area to look.

DR. CROSSON: Chip, are the areas that you mentioned that are hotspots that you would prefer anglers avoid, are they below a hundred feet or greater than a hundred feet, because that would seem to be a very central question for this.

DR. COLLIER: They're both greater than a hundred feet and less than a hundred feet, and, to Tracy's point, a lot of fishermen believe that the stock has already come back, and so it's going to be hard to get them to buy into the fact that they need to help it along even more, and so they definitely believe that the stock assessment is wrong and they should be able to keep the fish, and I think that's going to be one of the perceptions that we're going to have a real hard time with.

DR. BLOUNT: How readily available is the information, and how well known is it where the hotspots are? If a fisherman is going out, how do they know if -- Is there up-to-date information, maybe falling on the first questions that were asked, and so is that something that you really have to dig out information to find out or you just have to be an old-timer or how might that work?

DR. COLLIER: Fishermen really don't like to give out their spots, and so that one might be pretty difficult. If they're catching something else on a spot, would they be willing to say that there is red snapper here to avoid you to fish there? I don't know, and it's a multispecies fishery. Some species are difficult to avoid, and so I don't know.

DR. BLOUNT: It's complex, in other words.

DR. COLLIER: Yes.

DR. SCHNIER: This isn't the first time we've had this sort of problem. I don't know if you guys are familiar, but, up in Alaska, with the flatfish, they had these issues with trying to avoid halibut in crab bycatch, because there was sort of this -- The flatfish and these species cohabitated, and so they had this information provision that was sort of providing these hotspots, whenever they would arise, where you would have high bycatch rates of halibut and crab, which seemed to work really effectively in the early part of the season, because, if they hit their halibut or the crab quota, it could shut down the flatfish fishery, but what happened is that, as that quota sort of became

binding, they started using the information to basically go target these places, because they knew the season was about to end, and they could just have a more effective catch per unit effort. You have to be very careful about what type of information is being provided, because, from the hotspot perspective, if you provided it, it could be good for a while, but then it could backfire on you.

DR. DUMAS: It seems to me that this type of problem is generally one of that is sort of in the area of mechanism design, thinking broadly, and so you've got an activity that individuals are taking that is hidden from the managers. They are catching these red snapper, and you don't know how many they're catching.

On the one hand, you want them to reveal, to tell you how many red snapper they're catching, or discarding or whatever, but then also you want them to minimize that. You want them to minimize the number that they're catching. If there is some flexibility with the license or permit fees, and they could be maybe adjusted, depending on various information you get from the fishermen, or maybe even some rebates on permits or fees, maybe some type of reward program, some kind of -- Suppose you could get them to truthfully reveal how many red snapper they caught and then you could give some kind of prize or reward for fishermen who minimize the number of red snapper caught per grouper that they caught or something, to kind of make it into a type of indirect tournament, where they would win a prize for minimizing the number of red snapper caught per other fish or just minimizing red snapper per trip or something like that.

There might be ways to design a policy mechanism design to induce that type of behavior in fishermen if we had some flexibility on fee levels or rebates on fees or permits or reward or prize programs, something like that, and this could be something that could be applicable not only to the red snapper fishery, but also perhaps more broadly, when you've got this issue of fishermen doing something that's unobserved and you want them to reveal truthful information, designing a policy that would induce that, an individual, and so policy mechanism design is sort of a general area in economics that might be useful here. What do the rest of you economist folks think? Thanks.

DR. SCHNIER: That could actually work, but what are the fees that they currently are paying? That would be important to know.

DR. COLLIER: The fees currently are the different state licenses that they have to have for saltwater fishing. What we're considering in the future would be a permit that would be issued through National Marine Fisheries Service, potentially by a third party, and, with that cost -- The only thing that NMFS is allowed to do is actually charge for the cost of the permit, and they wouldn't be allowed to charge additional costs for that, but there are other rewards that could be given.

If there is a species that has let's say a low bag limit, but there it appears there is a lot of room in the ACL, maybe that species, if you're doing something, you would be able to have an additional bag limit for that species, where they're not approaching their ACL, but, if another species is approaching that ACL, it is going to be difficult to give them extra bag limit for that. Maybe, if it's limited in some other way, that these guys would be allowed to fish an additional day or something like that. I am not positive.

DR. DUMAS: You could do some research on thinking about how policy mechanism design could be applied to issues like this, and, if you are thinking about coming up with new licenses or permits

or something, there could be a permit fee amount, of a given amount, but then maybe there could be rebates or reductions, depending on behaviors. The idea is, if you could design a system that would cause the fishermen to truthfully reveal how many red snapper they were catching or discarding, could you make fees or prizes or rebates possible, in order to generate that type of truth-revealing information? If we had some management flexibility on the fees or prizes or rewards or rebates and things, then we might be able to design a mechanism that would do that.

DR. BLOUNT: Following along those lines, the increase in flexibility, but also increase in real-time electronic reporting, could very well facilitate rebates, and it also would encourage the use of descending devices and so on, and it would put those things together, and the technological possibilities are there now, whereas, in the past, it might have been a bit more limited, but it seems like having something like a rebate system or a reward system could actually work now, and then you will have secondary benefits and gains for other parts of the system.

DR. DUMAS: Rebate and prizes could also make a management system more palatable.

DR. SCHNIER: The rebate here is what would be an acceptable permit level price that they could charge them, because basically you're ratcheting it down. As they do more activities, their realized permit price goes down, and I don't know what would be sort of a palatable level to start with and then what are the palatable reductions that would incentivize it.

I think the only way to really do this would be to actually set up some sort of randomized experiment, where you tried to use this mechanism to figure out different price levels, because, initially, they would have to pay a pretty large upfront fee for the permit and then have to receive some rebates that are incrementally -- It's that rebate increment that generates the activity.

DR. DUMAS: Right, and, typically, there would be something like that, an incremental rebate, but then also there needs to be some other type of fee that typically is involved to get them to reveal the truth, and so you've got sort of an incrementally-adjusting part of the fee and then you've got a fixed fee, and, working the two of those together, you can design a mechanism that will provide the incentive for the fishermen to truthfully reveal what they're doing.

That's something that possibly could be worked out. Yes, the permit fee could be relatively large upfront, but then they get the discounts, and there could be some other reward or fee or prize, in conjunction with that. Typically, you need two policy instruments to get them to design a mechanism to get them to reveal the truth about what they're going, to give them incentive to do that, but I think there is a lot of potential application for these kinds of ideas, especially now that we have the technology that we have now at the individual level.

DR. SCHNIER: Do you have any idea how much the permits cost right now?

DR. COLLIER: Right now, what we're envisioning the cost of permit -- The electronic permit that we're looking into is ten to fifteen-dollars, and so that's not that high price that you guys were talking about, and I am a little scared in thinking of the randomized design part of this. These guys are really involved in social media, and having one guy say that I got 50 percent off my permit and another guy saying I got 10 percent off, that will be a frightening explanation to go through, especially if it's already out on social media.

DR. CROSSON: When Scott Steinbeck, one of the economists in the Northeast Fisheries Science Center, did this experiment a few years ago, where they were paying fishermen not to fish and they were using random offers of value, they got a huge blowback up there. I know that it was all over the radio, and there were a lot of complaints about what these crazy economists were doing, and so that would be something.

One of the things that I was thinking about, and just in conjunction with this, is that, whatever reporting mechanism, electronic reporting mechanism, is used, if it's something that is done through a smartphone app, smartphones all have a GPS locator in there, and so whatever design is used for that app being built, it might be possible in some way that the app could record what they're -- Not record what they're fishing, but at least record the reporting using the GPS location, and so that would be something definitely to talk about in any app design.

I don't know how to do these sort of things, but, if the GPS was turned on and they were able to do the reporting, and, even if they didn't have a connection, a data connection, because they're twelve or fifteen miles offshore, that information can be stored by the app. Once they're back in data coverage, then, when it's downloaded, it would have that location on there, just like photographs can.

DR. SCHNIER: If you wanted to have a longer experiment, you could change it by year.

DR. COLLIER: Can you repeat that? That was to change the incentive by year?

DR. SCHNIER: Yes, you change the incentive by year if you're worried about them just -- Then you could just map out sort of a demand curve perspective from -- If you did it for like five years with different types of rebates for each of the years, you still have some other issues, but, if you don't want to deal with the backlash from the social media perspective, you could perhaps still be able to learn some good information that way.

DR. WATERS: If one impediment to changing fishing behavior is concern about the stock assessment -- Whenever anybody is asking the public to voluntarily conserve, there is always a big education aspect to that, and so it is possible that, if we could somehow do a better job of convincing the public that the stock assessments are correct, somehow doing a better job of explaining or showing some type of evidence that their stock assessments are correct, they might be willing to get onboard a little bit more willingly.

I know these stock assessments are very complex, and I know we've been trying for many years to explain how they're conducted, but it seems like, based on what you said earlier, Chip, that the message hasn't really gotten through yet, and maybe we need to think a little bit more about how we can explain what we're doing in the stock assessments.

DR. COLLIER: I think that's a really good point, and outreach is something that we're really focusing on for the next year-and-a-half, almost two years, where we have an electronic reporting app that's coming through for the charter boats, and so we have an outreach specialist that's going to be coming onboard for that, and then we also have an outreach specialist that's going to be coming onboard for the electronic private reporting as well.

We'll be having more one-on-one discussions with both charter boat and private recreational fishermen, and I think that will be beneficial, although they're going to be focused on those permits and different things like that, but they will be able to explain some of the issues with the stock assessment, and we will provide some background, or at least contacts with someone that they can talk to.

DR. YANDLE: A question here. We've been talking a lot about sort of economic incentives, but what about non-economic incentives, and I don't know the community well enough yet to know what those would be, but something possibly just looking more at status or other non-financial incentives that would motivate behavior.

DR. BLOUNT: Just to follow up on that, and also in relation to Jim's original question, a venue that would be very useful here, I think, if this all would work out in the right direction, would be the Citizen Science Advisory Panel, because it would be a context in which you could get kind of feedback that would amplify the social aspect of it. In other words, you could get kind of social credit, in a way, social recognition, for working to make the system more acceptable and efficient.

DR. MURRAY: Along these ideas of maybe non-economic incentives, and somebody mentioned tournaments earlier, just utilizing social media and the fact that we have GPS and the ability for people to video their best practices and that sort of thing, if there was some kind of inducement to competition to get -- Even if it's just recognition for best practices. Fishermen typically happen to be competitive about these things, and so there may be a way to induce sort of ways to the top, through social competition.

DR. SWEENEY TOOKES: As we think about some of these non-financial incentives and the citizen science, it might also be useful to tie that to the graying of the fleet and the concern of the fishermen that the younger generation is not following in their footsteps, and so perhaps emphasizing the fact that you're rebuilding the stocks and that you're making sure the stocks will be there for the next generation of fishermen.

DR. MACLAUCHLIN: Chris had written a comment that non-economic incentives too, and I didn't know if you wanted to speak, Chris.

DR. DUMAS: I was just agreeing with what others were saying. I had mentioned economic incentives, but that certainly does not exclude non-economic incentives, awards and competitions and things just for recognition, and I think that's a great idea, and maybe some combination of these things could be put together that would, one, be a truth-revealing mechanism for the fishermen to truthfully report what's happening with the red snapper catch and targeting, and, two, it gets them to -- It gives them an incentive to reduce the red snapper targeting and catch. I lost audio for a while, and so I may have missed some of the discussion, but the other economists out there, do you think I'm crazy, or do you think this is a good idea worth pursuing? It's impossible to offend me on these issues, and so give me some feedback.

DR. SCHNIER: Chris, I was actually kind of agreeing with some of your ideas. I was just trying to think about the implementation of it. I'm trying to figure out how one would structure the permit price and the rebates to generate the incentives, but I also kind of like these ideas of not necessarily having to use monetary purposes, and this is where sort of the framing and information provision side of things could work, but this kind of gets back to what is the actual information that's coming

in, because, if you're going to use informational treatments, which is definitely a behavioral economics perspective as well, it would require some real-time data processing that could go back to the individuals, so they could figure out things like -- You could tell them what is the expected number of red snapper you saved on this trip because of your activities or things like that, and then it would -- You have to know what they did and what others have done nearby at a similar time.

DR. DUMAS: Yes, that's true for some things, but, for other things, for other types of mechanisms, you could just have them report what they did on a trip that had already been completed. Then they would receive rewards, whether economic or non-economic, based on that.

There could be additional advantages with having real-time information and additional things you could do, but you might also be able to design a mechanism without the real-time element, although I think it would certainly be helpful. Exactly how it would work practically, that would be the object of a research project, and someone mentioned doing a controlled test to see if it actually works, and that would be an interesting thing to do, too.

DR. CROSSON: Just thinking in terms of non-economic rewards, back when I worked for the North Carolina Division of Marine Fisheries, I remember the citation program that they have for recreational anglers is just a certificate that you receive if your fish was over a certain size and it was weighed, I think at an official station, and then you would send in and they would give you this nice piece of paper that I think had a picture of the fish on it, and people were very, very competitive and took these things very, very seriously, even though it was not a monetary award, but it was some kind of recognition, and so people do respond positively if you put the incentive structure in there.

Anglers can be very proud, as people have pointed out, about their behavior and showing others what they've done, and so something along that program's lines might be something that the council might want to consider, and that certainly wouldn't require as much controversy as some of the economic ideas that we have batted around.

DR. COLLIER: Just to build on that is the Virginia Marine Resources Commission, they actually have rewards for like the most number of fish that were tagged, and so they get the tagger of the year and different things like that, and maybe we could tie into these best fishing practices the amount of data that they're supplying into the data, and you would get some kind of credit for that. You could look at the number of released fish, using best practices, and look at catch of sustainable species, compared to number of discards showing that you're avoiding hotspots and different things like that. All of those could be weighted in to give somebody like a conservationist of the year or something like that.

DR. CROSSON: Yes, and I think that, because that sort of citation, that certificate, is sort of the recognition for yourself, a pride in something that you have managed to accomplish, I don't see -- Maybe I am being naïve, but I don't see a strong incentive for people to lie about getting an award for being conservation-minded and avoiding particular hotspots and discarding fish properly, using venting mechanisms or anything else, and so I think that might, again, be something to consider.

DR. DUMAS: Did you say that people might lie about that? Was that your point?

DR. CROSSON: My point is that, no, I don't think they would lie. I think, because it's a certificate, it's something that people would put on their wall in their study or something like that, and, again, it's something that you look at with pride, and I would be surprised if people would lie about say their discard rates or their use of venting mechanisms just to get a certificate from the state or from NOAA or whatever.

I think it would be something that -- Again, it's a reward program that I think people might be -- It's a way of encouraging that social behavior, and I don't see a lot of disincentives, in terms of people lying, to get that sort of certificate. I would be surprised, but I guess there's always some people that might want to do something like that, but, again, it's just something else to consider, I guess.

DR. MACLAUCHLIN: I don't know if you guys know about this, but I thought it was a pretty cool incentive idea. The State of Florida, when their spiny lobster mini-season opened, and that's a recreational season that is two days before the official season opens in August, and, down in -- Well, all over, the Caribbean, the Gulf, and the Southeast, lionfish are a problem, and we've been trying to promote people catching more lionfish, and they have lionfish derbies.

The State of Florida actually set up an incentive program where you have a spiny lobster bag limit, and you got an extra lobster in your bag limit if you also harvested a certain number of lionfish, and so it was kind of this incentive for people to go out after the lionfish, with a reward that probably didn't have a lot of negative impacts on the lobster fishery, depending on how many people actually were able to harvest the lionfish. Then it also raised awareness. I don't know if we have anything that we could do that with, where your incentive was actually getting to harvest something else above a bag limit or something like that, but I just wanted to bring that to your attention.

DR. WATERS: Stated another way, red snapper has a long history of being a premium fish, and what she is suggesting is that -- It's very unlikely that there are any other species out there that we could tout as being a better alternative and make them want to do something different. I kind of suspect that all the fishes out there have been pretty hard hit already and there aren't any underserved species out there, but the whole idea would be to look for an alternative and hope that they would want to do that instead of red snapper.

DR. SCHNIER: In the presentation that we had yesterday, there was the citizen action program, and I'm actually kind of curious if there's some way of companioning the two, some sort of a way to provide information that the citizen action group can do that, and then that can be used to generate some of this information that we need. That's just a thought.

DR. CROSSON: I think we're slowing down. We have been mostly addressing the first question, and I think the second question is maybe something we can move on to right now. What methods could be used to quantitatively measure how fishing behavior changes to provide guidance and discard mortality estimates? What methods could be used to quantitatively measure how fishing behavior changes to provide guidance in how discard mortality estimates should be adjusted in reaction to changes in fishing behavior? Have we addressed some of that already?

DR. COLLIER: I think you guys have provided some guidance on that, and we do have some background information, and so we're not starting from zero, which is always a positive. We do

have some information that there was indication that descending devices weren't used commonly prior to 2010. They seem to be used more and more now, and so we could provide some benefit of that.

There is some information on types of hooks being used off the State of Florida, and so that information can be used, and so those are two of the best fishing practices that could be used. Then, if you think of some other best fishing practices, one is to keep the fish in the water, as opposed to taking pictures off the water, and so that would just be looking at social media, potentially.

I am not aware of too many people releasing snapper grouper species in the water currently, but that would definitely be something we could look into and potentially quantify in some way. These are just some ideas that we have, and, if you guys have any additional, we would love to hear them.

DR. WATERS: Would we be able to use the dockside creel surveys that are conducted by MRIP to look at data to look for changes in species targeted over time or maybe changes in location fished or depth fished? Maybe look for changes in incidence of catching red snapper or maybe changes in the disposition, but all of this information would be reported on that creel survey, and we could be looking for behavioral changes, and that might, with some econometric techniques, be able to quantify the changes in behavior.

DR. COLLIER: Some of those might be difficult. Right now, MRIP doesn't record depth. The information that they record is generally in state waters in the ocean or outside of state waters in the ocean, and so, depending on where you are in Florida, state waters could be fairly shallow, or they could be pretty deep.

Given some of the number of intercepts that we have, with the exception of the State of Florida, it could be pretty limited, but I think some of the ideas you had there, I think we could definitely do. If you're looking at the change in targeting based on an overall species composition or overall number of trips targeting snapper grouper species, I think we might be able to look into that. That does increase your sample size quite a bit. Sample size is an issue for any of our snapper grouper species when you look at them as a singular species, but, as you begin to aggregate over species, you get more and more trips, and I think that could be beneficial.

DR. WATERS: I want to give a little call-out here to either John or Chris or Kurt. Have you used any data like this that might be feasible to estimate changes in fishing behavior?

DR. SCHNIER: I think that John probably is the one that would probably have done it in the rec world, but I think, if we were look at some of those data collection alternatives, we're supposed to be collecting information on the location of where they caught fish and whether or not they used a certain device, like the descending devices, and then look at the retained catches as well, and we would be able, over time, if you collected that data for a couple of years, be able to sort of do some estimation about what these impacts would be, but it requires some sort of assumptions about the survival rates for using different devices.

DR. DUMAS: One issue about maybe using the creel data is those would be data on what actually occurred, in terms of the fish that actually were landed, but it might not give you information on the discards or how fishing behavior changed out there on the water, if they're moving to areas

where they're less likely to catch red snapper. If you look at the creel data, the catch of snapper might go down because they are trying to avoid snapper or the catch in the creel might go down because they are still trying to target snapper, but just the snapper were less abundant or not at those places.

If the goal is to encourage behavior that avoids snapper, then we need something that is based on their behavior based out there in the water, and that induces them to change their behavior out there in the water, and the difficulty is we don't observe how they're behaving out there in the water, and so we need something that operates, some policy that operates, to change behavior in situations that we don't observe, and so that's why I talk about mechanism design, because that's what that is for, and so maybe we could figure out something using that.

DR. WHITEHEAD: Since I was called out, I just wanted to say that I've never done anything looking at discards, and I'm having a hard time thinking of ways to do this within a survey of anglers, which is my experience.

DR. SCHNIER: I was the one that called you out, John. I was thinking more about your work in the recreational demand stuff, because you've done a lot of work there, but I think, if we were collecting real-time data on them, about location and techniques, we could, over time, probably create some inference about how it's affecting stocks, if you were combining the two sort of data sources, but, again, it does require the assumptions of what is the survival rate for different techniques of whether or not you're using the venting devices or using the descending devices.

Since no one else is talking, the other thing we might think about is the reliability of the data. Since this is going to be sort of their personal record of what's happening, we might have to think about how reliable that data is going to be.

DR. COLLIER: Can you think of any ways that we could get to that how to estimate the reliability? Validation is definitely a concern. One way to potentially validate some of this data is the MRIP creel surveys obviously aren't going to go away, because they seem to be much more effective for some of the inshore species.

Many of our offshore species are rare events, and so we could potentially have the interviewers see what they're reporting on their app, to make sure that there is consistency between those two, but, as time goes on, accuracy begins to decrease, and so some of the lower-profile species, like number of tomtate, you might not remember thirty minutes or an hour after you caught them, but those two red snapper or three red snapper, you might remember those for three months, and so there is going to be a difference in remembering what you caught just based on your avidity for different species.

DR. SCHNIER: I think you would have to just be able to compare two surveys. That would be the only way that I could think of doing it, unless you have observers, which would be very costly.

DR. CROSSON: I think we're going to move on to Question Number 3 then. Usually our answer to these questions is everything, but what type of socioeconomic or behavioral data should be reported by the permit holder, and there is some examples. What data elements should be included with the permit or as a stipulation of the permit as a way to measure the change in fishing behavior?

DR. COLLIER: I guess, before you guys get into this, some of the council thoughts is one of the alternatives, or one of the ideas, is should this be a permit for an individual or for a vessel. Currently, everybody that we've heard speak about it has been towards the individual level, as opposed to the vessel, and so that might give you some idea of -- When you're thinking about trip costs, that could be very difficult for an individual that doesn't own the vessel, and so his trip cost is going to be much different than the owner of the vessel.

DR. WHITEHEAD: I hesitate to make this comment, because I am sure there is some federal rule that doesn't allow it, but if you could get the email address or some other contact information from the permit holder, then you could conduct a survey of them at a very low cost, especially if you get their email address, and the information that you could collect includes all of that stuff in that parenthetical.

DR. CROSSON: John, I don't think that's that controversial. If you just put it in as a requirement for applying for the permit, just that they provide their email address and they agree that they could be contacted for follow-up information in the future, your liable to get some pretty good compliance that way, and I know people have pulled -- I know researchers who have pulled information from Florida's recreational fishing license, and there is quite a bit of email address information, I think, in there, and I know that people have used that.

I guess perhaps that's required when you apply if you have one, and I'm not sure, but I would assume that if people are going to apply for these permits that there's probably going to be some way of doing it electronically, through the internet or something like that. If that's the case, you're probably bound to get their address information, including their zip code, and they probably -- If they want a receipt or anything like that, and, if they're applying through the internet, they probably can provide an email address as well. It's not onerous at all. It's probably part of the normal process. Just make sure that you put something in there that this information may be used for contact information from the state or from NMFS in the future about red snapper or whatever.

DR. WHITEHEAD: It's great to hear that I was overly pessimistic. I apologize. If folks are applying for this permit and it's a brand-new thing, then this seems like it's a great opportunity to survey people. If you're looking to try to find fishing behavior changes, then you can track their behavior over time, asking questions at the beginning of the short season and at the end of the short season, and do this every year.

DR. YANDLE: Just to what Chip was saying earlier about the whole thing about some people have vessels and some don't, it seems to me to be a relatively quick, easy question to ask that could get into a lot of that complexity, and that is just do you fish on your own vessel, yes or no, and then, if yes, what is the vessel number. Then that would let you figure out, from the address information and all the rest of it -- You can calculate out all kinds of nice stuff.

DR. BLOUNT: Scott, you had already mentioned, in addition to email address, zip code, but, following all the discussions we had yesterday about demography and place-based kinds of things, instead of fishermen PDF functions and those types of ideas, it would be really essentially to have that information.

DR. CROSSON: It's been on my list for a few years to look at zip codes, in terms of angler trips, when you have these short mini-seasons, because I have a suspicion, when you have these very

short seasons, that it tends to favor people that already live on the coast, versus people that are traveling in from inland, and I know that's a question in my mind, in terms of allocation. You've sort of done a de facto allocation, with these mini-seasons, towards coastal residents over non-coastal residents, and so I've been wanting to investigate that question. I just haven't gotten around to it yet, but the information is there in the databases that we use for MRIP, and so, here, I would, again, be curious about that.

I guess then the question is we don't want to go overboard, asking everything from where they born to -- But what questions are going to be -- Demographic information is one of the things listed on there, and what kind of stuff would be of value, and why would it be of value, to answering the questions that the council has put before us?

DR. WATERS: I can't answer your question right away, but I think what we want to focus on are the variables that we need to answer Question Number 2. How are we going to measure fishing behavior and what data do we need to make those measurements?

DR. SCHNIER: To that point that was just made, my question, a little bit, is maybe for clarity. It would be, if we have the email addresses, we're basically going to be able to do some retrospective type of stuff. Rather the information about the individual, where they live and that sort of stuff, but I am really more interested, I think, in thinking about obtaining some of the real-time data through the electronic reporting, and are we talking about two different things here, or are we talking about both at the same time?

MR. HADLEY: I think, with the permit, it's probably more retrospective. I guess it really depends. I mean, it's hard to answer, since it's so early in the development stage, but I think you could have that discussion on both terms, because -- Chip, correct me if I'm wrong, but isn't there some kind of stipulation that's going to go along with that reporting app, for the recreational reporting app?

DR. COLLIER: With the recreational reporting app, they're likely going to be required to have a permit, and so the permit could have the requirements to get some of this demographic information. It would likely be based similar to what was used and maybe getting less information on like ice and different things like that that they spent money on, but other information would be requested in the application of the permit.

I do like the idea that you could potentially look at are there different age groups or different areas where they're not using some of these descending devices or best fishing practices, and then you can focus outreach in those areas, and I think that would be really beneficial.

DR. SCHNIER: I guess what I'm thinking of is that some of the alternatives that have been discussed that I liked are ones that really recorded some of the actual fishing activity, like where they were occurring, what depths they were occurring at, what they caught, because that kind of mimics, in my mind, some of the stuff you get from commercial datasets that are pretty robust and you can do good analysis with. If you companion that with this email-based survey, I think you could have a really, really good dataset, but it would require that you did have that other electronic reporting on what they're doing on the water at the time.

DR. COLLIER: I think that's where we would try to incentivize with that fish conservationist of the year, where you would get bonus credits for turning on your GPS. The app that's being developed could potentially record that information, and so that would be the benefit of trying to add these different incentives into it, and I think, in the future, we would come back to you guys with this kind of program that we're talking about here and really flesh out the details, to make sure that it's meeting multiple goals and giving us everything that we need. I really like this direction.

DR. SCHNIER: I would recommend that it be sort of a research project as a first stab at it, before we actually try to really do full-scale.

DR. CROSSON: Kurt, what would be the research project? What's the question exactly that you would be trying to answer with the research project?

DR. SCHNIER: I thought he was alluding to the fact that you would maybe combine this information with some of these rebate mechanisms and incentive schemes to try to get people to report the information. Where you set those levels is key, and so that's sort of a researchable question.

MR. HADLEY: Chris, if I could get you to -- You had a great online comment, and if you wouldn't mind reading that out to the group regarding the potential online permit application.

DR. DUMAS: Sure. I'm sorry. I was under the assumption that everyone saw the typed comments, and is that not the case?

MR. HADLEY: No. Kari and I can see it, and we're just kind of trying to monitor it, as far as trying to get it on the record, but the rest of the group cannot.

DR. DUMAS: Okay. I was just saying, in response to the question about what type of information might we want to collect with the online permit application, I just gave a list of the typical demographic information, and so age of applicant; occupation, or last occupation, if retired; household income; gender; ethnicity; zip code; vessel number or name of for-hire vessel most often used, if they don't use their own vessel, if known, if they have a for-hire vessel that they most often use; and also where did they most often fish for snapper grouper.

You could put up an online map, and they can just click on the spot, or potentially multiple spots, where they most often fish for snapper grouper. It seems like that information could be easily collected at the time that they complete an online permit. John and Kurt might have some more variables that they might want to include, but those seem like the usual suspects.

DR. WHITEHEAD: If you have their zip code, then you should be able to do the sort of estimation that would be necessary.

DR. SCHNIER: I will just agree and say that all of that information sounds pretty good. I think they've outlined what would be the required elements, in my mind.

DR. CROSSON: Are there other thoughts on this?

DR. DUMAS: One other data element you might also want to ask for is port most often used, port or boat ramp most often used, and they could click a spot on a map, again, for that. That might help also.

DR. CROSSON: I think we've answered that. I think we're done with this section, unless anybody else has some concluding thoughts.

DR. WATERS: It strikes me that this whole topic of trying to influence fishing behavior or modify fishing behavior or measure fishing behavior might be a really good topic for the citizen science program, because probably nobody can understand fishing behavior or communicate with fishermen better than other fishermen, and so this might be a -- I think a lot of people, when they put together the citizen science program, might be thinking, well, we're going to collect primarily biological data, but here is an opportunity, I think, to collect some information that's relative to the economics of the fishery.

DR. COLLIER: I had a question for the group. Required versus voluntary and whether it is a regulation for a descending device or something like recording your income, and so ranging from the permit to the actual regulation of a device, if you guys have any comments on that, and so should we require or just have them voluntarily fill out the income requirement? What are the benefits or the pitfalls of those and the potential benefits or pitfalls of voluntary compliance with these different regulations compared to regulations to do it?

DR. BLOUNT: Just one thought, and I'm not sure how useful this might be, but what was going on in my mind as you were talking about that was that the greater extent that the fishermen themselves are responsible for reporting and recording and using new technological devices, I think the better. The design of the app that would provide location and all of that, for the fishermen to feel less monitored and more responsible for reporting themselves, and this could come through citizen science and sort of venues, I think would be helpful, or, in other words, voluntary with incentives.

DR. MURRAY: That's what I was just about to say. In addition to requirements and voluntary, you also have the option to incentivize, and that's going along with all of these ideas that we've talked here about with citizen science and competition and that sort of thing, if there are ways that we can reward people, even just in a recognition sense, for providing more complete and better information.

DR. CROSSON: I think we're wrapping this up now.

DR. MURRAY: I agree with the comments about trying to connect this with developing a policy with the citizen science. Using the citizen science participants might be an interesting pool of participants to use for some type of a field study to test out various mechanisms or to test a mechanism.

DR. CROSSON: All right. I think we're done now, and we need to change over. Have we answered your questions, John? Do you think we're pretty good?

MR. HADLEY: Yes, and I very much appreciate the input. That was incredibly helpful, and I think it will really help, as far as -- As we go down this road, as far as developing the app or if a

permit gets developed, that sort of information is going to be very helpful in that, and I certainly appreciate the input, and so thank you.

DR. CROSSON: We are going to change over now. The next topic is economic and social indicators of stock status, and we're going to take just a very brief break. Don't go very far. We will start again here at 10:15.

(Whereupon, a recess was taken.)

DR. CROSSON: We are about to start our last segment here, our last agenda item, for the Socio-Economic Panel, and that is social and economic indicators of stock status, and we have several of our participants through the webinar that have to leave at eleven o'clock, and so let's get this discussion moving. Kari is going to start this off.

DR. MACLAUCHLIN: I am going to give a little background on this discussion. You have a couple of attachments in your briefing book, an ABC control rule modification that was written a couple of years ago by John Carmichael that kind of explains the process that the SSC has been going through when evaluating changing the control rule. Then Attachment 5b and 5c are two examples of fishery performance reports from the Mid-Atlantic. Then, also, we have Attachment 5d, which is an updated version that John Carmichael wrote about the ABC control rule modifications, and the SSC is going to talk about this at their next meeting.

I just wanted to kind of give you some background of it. Basically, the control rule is where the SSC will evaluate the acceptable risk of overfishing and then, in that way, be able to generate the ABC that they then provide to the council, and the ABC sets the annual catch limit.

The control rule that's in place now, the SSC had developed it in 2008, and it had these dimensions that addressed these uncertainty parameters, and then there were tiers within each dimension, and they give a score on assessment information, like uncertainty, status, and risk, and then the SSC would sum up the scores. Then they would use that for their P* analysis, which is their projection, to define the ABC. The ABC would go to the council, and they could set the ACL for a stock.

Then it was modified in 2010 to include tiers for assessed, data-limited, and then catch-only species, and then that catch-only led to what we call the ORCS, the only reliable catch species, and the council adopted the ORCS approach for some of our data-poor species, but those are only applied to snapper grouper species right now.

Then, in 2015 -- The SSC has been continuing discussions for the past few years about the ABC control rule, and they wanted to add some flexibility to allow consideration for individual stocks, even after they used the ABC control rule and provided a score, and so they put a workgroup together last May, and one of their recommendations was to remove stock status from one of the dimensions, one of the considerations for the score. The council supports that.

Then the SSC is still looking at modifying that scoring system, and so they are going to start putting together a draft ABC control rule at this meeting and for their fall 2017 meeting, and so, a few times, when the SSC has discussed this, they have brought up incorporating economic and social information into these decisions, because they do want some flexibility when the scoring doesn't -- There may be some other information besides stock information to consider when they're setting

the ABC, and so we felt like this was, first of all, a good time for the SEP to be able to weigh in on that. What kind of economic and social considerations can go into the ABC control rule?

Then, also, we wanted to present some of the fishery performance reports, and so I sent you all, last night, and I'm sorry that you received these draft fishery performance reports so late, but our AP meetings were last week, and so we were putting together these reports, and we're going to pass them along to the SSC also today.

What we did was we based these on the Mid-Atlantic fishery performance reports. They have been doing them for about five or six years, and they don't have as many managed stocks as we do, and so they do all of them every year, but, pretty much, once you get your first one, then you're just updating it each year, and so we thought this was like a perfect timing to give this a shot. These are our first fishery performance reports.

We want to get that line of communication between the APs and the SSC about what the APs are seeing on the water and get that information to the SSC. Maybe this is something that the SSC can incorporate into their ABC control rule while they're making some decisions on modifying that, and also to give you guys that here is an example of something that we can use. Then, of course, if you have additional information that you would want to build into that.

At the Mid-Atlantic, when they do a fishery performance report each year with their AP, for each of their managed stocks or their complexes, that goes to the SSC, and it's incorporated into the SSC's decision-making for their recommendations for that species, and so that's kind of what we are hoping to do.

We did three last week. We did red grouper with the Snapper Grouper AP, we did cobia with our Mackerel Cobia AP, and we did dolphin with our Dolphin Wahoo AP, and these are drafts. We are going to go back through the minutes, and we need to have our AP Chairs review these, and so it will be a little bit before we finalize those, and so there may be some more information, because we were writing the drafts off of our notes, but we were quite pleased with it. We felt like the APs had a lot of really great information.

We also provided you with -- On your online book, and then we also had sent you guys a link, we have the information documents that we provided to the APs, and they included some questions to generate their discussion specifically for what we could put in here, and so this is the red grouper one. It didn't have an attachment number, but it's your briefing book. It just says "Red Grouper FPR April 2017 for SG AP".

We sent this out to our Snapper Grouper AP. This was just an overview of the fishery. It's like a fishery information document, with a little bit of information. Red grouper was under a rebuilding plan, and then, after the council made some changes to their definition of overfishing and overfished, it was no longer overfishing, but it is still under a rebuilding plan, I believe. It's still under a rebuilding plan, and then there is a stock assessment coming up. The SSC is reviewing the red grouper stock status, and so we wanted to be able to provide them some information of what the fishermen are seeing on the water, and that's why we had our AP weigh in.

We also provided them with some information about landings and the seasonality of it. It's a very regional species. There's a little bit about economic information, about the price per pound, just

some really basic information, so, if anybody wanted to go back and talk about that, they could also see landings and economic information from the past five years or so.

Then we had some specific questions that we asked them, and, for each of these, we kind of all used the same format when putting together our fishery information document, but then, depending on the species, we tailored those questions a little bit, but we wanted to ask them how is the catch levels over the past five years, how is the price and demand for commercial red grouper, how is the demand for red grouper on a charter/headboat trip, are the fish available, has this changed, has the sizes of the fish changed, what are the efforts shifts to and from red grouper?

We asked them to give us some input on the management measures and are those working and should the council consider other ones and then some environmental factors that could affect abundance and availability and then about low recruitment. Are you seeing lots of different sizes of fish, lots of small fish, and then a little bit about the regionality and then any other suggestions and research that they would suggest.

I hope that you all had a chance to look over the drafts. We thought they were really informative. With red grouper, they did seem to -- The overall report is that it's primarily a regional fishery in North Carolina, but they do catch it in other places. They talked a lot about the depths, and they were talking about they are not seeing as many lately. However, some people say there is a -- One of the AP members was talking about speaking with an older fisherman, and he said there's a seven to nine-year cycle of abundance, and so they just may be in a low period.

In recent years though, they haven't really been seeing -- We talked a little bit about the commercial market. Red grouper is not really a restaurant favorite, and so they tend not to target those. This was from some of folks in South Carolina and Georgia, but they will try to sell them, if they do catch them on a multispecies trip, but, in the Florida Keys, the South Atlantic red grouper does have some demand, and it kind of goes along with the Gulf red grouper.

The management measures, they felt like it may not have any effect, the minimum size limit, because discard mortality might be high anyway, although we did have some Keys fishermen tell us that the red grouper are hearty, and so they thought that the discard mortality wouldn't be quite as high. They were supportive of the seasonal closure in place, and they didn't feel like the management measures were affecting their ability, and then they had some research recommendations on life history, on juveniles, and just mostly about the size, and then they brought up a little bit about lionfish.

One thing that somebody noted was that there's been an increase in spearfishing in Florida for red grouper. That may be a result of a shift from hogfish, which was a really popular spearfishing species, and there has been some more restrictions put in place for hogfish, and so people are switching to red grouper, because that's also available.

We also got into -- I am not going to go through all the details of all of these, but we also chatted with the cobia folks, and that was really interesting. We have two different stocks in the Atlantic region, and it's the east coast of Florida, which is considered to be part of the Gulf cobia, but it's still managed by the South Atlantic Council, and then Georgia through New York is Atlantic cobia, and so, recently, the Atlantic cobia has shut down early. This year, it shut down twenty-three days

into the season in federal waters for recreational, because of an overage and recreational landings exceeding the recreational ACL by at least two times as high as the ACL.

There is a lot of information and a lot of different points of view, but, overall, our cobia folks did feel like, for the Chesapeake Bay, that the fish are being found further north, and it's not that there aren't fish still everywhere in the Chesapeake, but there's just a lot more in the northern part of the bay, up by Maryland. Maryland had their record cobia last year, at ninety-six pounds, and so this is kind of a new thing happening. They used to not catch many, if at all, in the northern part of the Chesapeake.

They say there is a lot of fish, but they're not as big, or you didn't see as many of the big ones, and a big cobia is smaller than it used to be, and then one thing we talked about a lot is this increase in sight-cast fishing. This is really popular, and people either have a boat with a tower on it or they will use a skiff with a stepladder, and so cobia have become very popular, and landings have increased, because this is fun and it's easy to be successful, and so, in the Chesapeake and in North Carolina, there has been a big increase in the sight-cast fishing and then just in recreational fishing overall, and so it was really good to dig into that and get some information.

We did find out that the Florida cobia, in general, are smaller. Their big fish are eighteen to forty pounds, and that's a lot different than the big cobia further up in the Atlantic, but that they feel like size hasn't changed, abundance hasn't changed, and they told us a little bit about the availability, that they're available throughout the year, but there are these periods where they're inshore, and they hit them really hard, but it's only for six weeks or so and then the fish move along.

Also, and I thought this was interesting, down in Florida, the cobia are starting to move with the bull sharks, and so people will chum the bull sharks, and then the cobia will be swimming with them, and then they will target the cobia, and there is lots of different points of view on chumming bull sharks. I don't know if you want to do a quick overview of the dolphin.

DR. CROSSON: Actually, I want to interrupt this right now, because we have the time constraints with a couple of the members. I think we had a chance to look over the reports, and I think the example that Kari has given is a good one, but I think I want to try and move into addressing some of these questions while we still have some of these people online.

We have two separate questions here that we've been asked to address. One is the usefulness of these fishery performance reports, and so, if we have suggestions, perhaps, for improvement or comments on those, then we should give those. Then if we have comments about other things that could inform the ABC control, from social and economic information, and so let's start, I guess, with the first question and feedback on these fishery performance reports and potential improvements.

DR. YANDLE: Really briefly, I love the concept of these. I think we've had private, off-the-record conversations for a few years, and I'm delighted to see this moving forward. The question list looks fairly comprehensive. I wonder if -- You may already be capturing this with some of the more specific questions, but is it worthwhile having a question in there, sort of more generally, about what are you seeing that is unusual, trying to get at the whole thing of, a lot of the time, we end up hearing, at the SSC, that the data is down, but remember that we were telling you guys five

years ago that it was a lot colder or it was a lot hotter or a hurricane came through, whatever it was.

Documenting, in the like very recent history, what has happened in the last year that you observed that's usual and could -- It could be useful or it could be that you're already capturing this with a lot of the more specific questions, and so I will just throw that out there as something to think about.

DR. MACLAUCHLIN: We are hoping to do this every year and get this one, and then, at an AP meeting every year, at least for our three coastal migratory, king and Spanish mackerel and cobia, and then dolphin and wahoo, and we'll be able to update them every year and hopefully capture things like that, where they noticed that something changed recently. As far as snapper grouper, we will have probably our main species that we'll try to stay on top of, but, of course, there is tons of species, and so I think that's a great general question. For now, I think we kind of just trying to get the baseline from them, like tell us about your fishery and what you observe.

DR. CROSSON: Are there other thoughts?

DR. DUMAS: This is pretty interesting information. I think it's a good, sort of systematic way to allow the fishermen to provide input in a way that's kind of consistent across species. Some questions you might want to consider adding would be whether anything -- Asking whether anything new or unusual is affecting their number of trips, and in what direction, more trips or fewer trips, and whether anything new or unusual is affecting their cost per trip, and is it increasing or decreasing their costs. That's all.

DR. CROSSON: Other thoughts? I don't hear any other -- I think it's pretty interesting stuff, and so I think we will probably have comments in the future on that as well, but, at least for right now, that's some good information. The other question is, and this is one that's been perplexing me for a while, is what other social and economic information could the South Atlantic SSC incorporate into its ABC control rule, and I'm going to start off the discussion with this, because this is something that I've been thinking about a bit over the years, and it's difficult, because, with the biological information for a lot of stocks, it's difficult to argue against a model that the stock assessment scientists are coming up with.

I think, for unassessed stocks, one idea that Tracy and I have been fiddling with the past few years, and we've done it twice, just because it was an offshoot of other research projects, but, for some of the unassessed stocks, the social and ecological systems analysis is something that is a multi -- What is a way of putting it? Maybe Tracy can sum this up better, but this is multidisciplinary. It's a way of looking at the intersection between fishery management and looking at the economic performance of the fishery, looking at the biological factors that you have, and looking at how the whole natural resource management system is working as one.

It's a holistic approach, and so there is actually a citation we have somewhere, but we did this for both wreckfish and the golden crab fisheries, and there are lists of dozens and variables, both biological and economic and social and management, that you can fill in and it's, again, a semi-quantitative way of looking at a fishery, or any kind of natural resource system as a whole, and so it's -- I think it was particularly illustrative when we were looking at the wreckfish fishery and the

problems that that fishery has undergone over the years. That is the citation there, and it's Ostrom in 2009, and we can provide that to staff.

The papers, we have both published papers on golden crab and on wreckfish, and both of them have examples of that sort of systems analysis in there, and I think, if those fisheries come up again before the SSC, in terms of setting a new ABC, those are something that the committee should definitely be looking at, because it's definitely trying to answer some of those questions for -- Like, for example, about wreckfish, about why fishermen were not going out there and using their quota during the late 1990s and early 2000s. If Tracy has some other comments on that, I would certainly -- That's good? Okay. Are there other comments from this committee?

DR. DUMAS: For economic variables to potentially include as part of the ABC control rules, to help get at uncertainty, I would say, if I was allowed to pick three, I would say variation in ex-vessel price, variation in fuel cost, and variation in interest rates, and so maybe looking at the last X number of years and what is the variance in ex-vessel price for the major species landed for that fishery, what's the variance in fuel cost, and what's the variance in interest rates.

Looking at those as far as three key economic variables that have a relatively large amount of uncertainty associated with a lot of variance over a span, potentially of five years, and how uncertainty in those three things might be considered together with the biological factors and biological uncertainty to look at some sort of overall assessment of both biological and economic uncertainty. Thanks.

DR. YANDLE: I would also add on to that the variance in pricing of other species that could be targeted that they could easily shift to, and this is probably a broader discussion for the SSC, but I may as well raise it here too, because I'm interested in what the rest of you all think about this. Also, the idea that uncertainty is not always negative and that we know what the model is showing, but the uncertainty may be going the other direction, that things are better than we think the model may be showing, rather than just it may be worse than the model is showing, and then how would you address that question?

DR. DUMAS: Good point. Yes, for example, fuel prices might be really high this year, but, if there is a lot of uncertainty in fuel prices, then that might mean that they could be low next year, and so realizing that fuel prices are uncertain might indicate that things are potentially better than -- I mean, they're bad right now, but they might not stay this way. They could get better, and so that's a way in which including uncertainty could, in a way, have a positive effect, rather than always a negative effect.

DR. CROSSON: We just mentioned several things that affect the commercial fleet, and I guess they affect the recreational fleet as well, but are there any more recreational-specific variables that we might want to consider that could be affecting landings from the recreational sector? Weather? Is that in the current ones that the committee is providing? Is there anything about it was blowing offshore for a month-and-a-half or anything like that?

MR. HADLEY: I will mention that came up a little bit in the dolphin discussion, in that FPR. They mentioned that, for especially this year, it's been a very windy year. In south Florida, the Florida Keys, it's essentially weather limiting recreational effort for dolphin, and so that has certainly been mentioned.

DR. DUMAS: Regarding recreational, I would second that comment on weather and also unemployment rate. Unemployment rate could also have a significant effect on recreational trips and catch.

DR. BLOUNT: Another possible variable to look at in regard to the social and the economic would be the volume of tourism, because that will be -- What made me think of that was weather impacts, and so the general economy also plays a role there, but, particularly for the recreational fishing, what the conditions are like that either constrain people to go fishing or to stay away from it would be important in regard to tourism volume.

DR. MACLAUCHLIN: One thing that came up a little bit, at least in cobia, and a little bit in red grouper, is any kind of increase -- Especially for cobia, the increase in recreational for both the Atlantic stock and the Florida east coast, with some kind of change. They would say, well, we can't catch red snapper in Florida anymore, and so cobia seems to be what people -- It's this easy, popular recreational species. Then, in the Chesapeake, the recreational cobia landings have increased because they know they are -- I can't remember what they talked about that they used to have available there and it was popular and not so available now, and so people are shifting. Maybe are there species that are almost -- Somehow being able to see a pattern in how people shift, when one species closes, to another one.

MR. HADLEY: Somewhat related to that is -- I am thinking of cobia and dolphin, and two things that came up in both discussions were human population changes, and specifically on the east coast of Florida, where, in some areas, you have an increasing population. Related to that is private vessel ownership.

DR. BLOUNT: I wonder if you would also see an increase in for-hire when you get population really going up very rapidly and people's access to fishing is constrained in various ways that -- For-hire fishing, I think, would increase too, but that's just off the top of my head, and I don't have any data to support that.

DR. CROSSON: Are there other thoughts from the committee?

DR. MACLAUCHLIN: I think that we are really hoping that, especially for the SEP members who are on the SSC, that they will be able to provide some input to the SSC, and we were hoping that these would help you guys a little bit with here is some information that's available, and is this going to be helpful for you guys, and how can we incorporate that, maybe, into the ABC control rule or decisions?

DR. CROSSON: Great. I think that's it, and so, just in time for John and Chris to get to class. It's ten to eleven, and I guess, at this point, we have a few other little items, Other Business and so on, that we can move to.

DR. MACLAUCHLIN: I don't believe we have any other business to discuss, unless there is something else. Right now, we have you guys on the schedule for another meeting here in spring of 2018, maybe with the ABC control rule, if there is some social and economic information the SSC wants to weave in there, and we may send that out to you guys and get some input to provide the SSC for their fall 2017 meeting.

DR. CROSSON: Okay. The other item, of course, is the report. As I indicated earlier, we are going to sit here, I think, for a few minutes and at least get the draft outline. Then I will send out a copy of it to all the members of the SEP, including members who are attending through the internet, to get more feedback, so that we can get this wrapped up and delivered to the SSC in the next couple of days, hopefully. I guess that's it. If we don't have any other items, I am going to adjourn this meeting. Everybody travel safely home.

(Whereupon, the meeting was adjourned on April 25, 2017.)

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Certified By: _____ Date: _____

Transcribed By
Amanda Thomas
May 22, 2017

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

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South Atlantic Fishery Management Council

Socio-Economic Panel:

Wednesday, February 2, 2016

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