SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

HABITAT PROTECTION AND ECOSYSTEM-BASED MANAGEMENT ADVISORY PANEL

Crowne Plaza
Charleston, South Carolina

May 15-16, 2018

Summary Minutes

Habitat Protection & Ecosystem Based Management Advisory Panel

Anne Deaton
John Ellis
Wilbur Vitols
Bob Martone
Jeff Soss
Laurent Cherubin
Brian Hooker
Cynthia Cooksley
Bill Kelly
Rita Merritt
James Geiger
Bill Parker
Laura Busch
Lisa Havel
Steve Ross

Staff Members

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Roger Pugliese

Observers and Participants

Deborah Hernandez
Shane Staples
Tracey Smart
Lora Clarke

Other observers and participants attached.

The Habitat Protection and Ecosystem-Based Management Advisory Panel of the South Atlantic Fishery Management Council convened at the Crowne Plaza, Charleston, South Carolina, May 15, 2018, and was called to order at 9:00 o'clock a.m. by Chairman Anne Deaton.

MS. DEATON: I am going to call the meeting to order. Thank you, everybody, for coming and taking time out of your busy schedules. Today and tomorrow, we have a really busy schedule that Roger and his staff have put together, and I will just kind of go over what the expectations of this meeting will be.

Today, this morning in particular, we're going to be going over a lot of what we've been discussing with the Fishery Ecosystem Plan II and pulling that together, with those bunch of different speakers, and so I think we're starting to see it come together, and it's kind of nice. I had trouble myself with the vision of this, and so that's today, and then, in the afternoon today, we'll be more focusing on the threats, and Cindy Cooksey is going to help us with that, and we'll have breakout groups.

This is my first meeting as the Chair, and I would honored if I hadn't been the only one that was up for it, but that's all right, because Roger is going to -- He does all the heavy work, and I guess the only -- My thought that I wanted to share is that we're an advisory panel, and so I have always thought, well, what do they want from us, and so just be thinking, when you're commenting, about what can I contribute that will help the council, and give us your input. Don't hold back. Just raise your hand and share, because there is a lot of expertise in the room.

With that, I think we're just going to go around and do introductions, because there are some new people, and just say who you are and what your affiliation is and maybe something about your expertise and what you represent, whether that's commercial fishing or recreational fishing or whatnot, and so we'll start with Steve Ross.

DR. ROSS: I'm Steve Ross, and I'm with the University of North Carolina in Wilmington, and I'm a research professor, and I'm a fisheries ecologist and also a deep-sea ecologist working on deep-sea coral habitats and, lately, Mid-Atlantic Canyons, and I've been on the Coral AP for the council for a number of years, and this AP for several years as well, and I also belong to Gulf of Mexico and Mid-Atlantic advisory panels.

MS. BUSCH: My name is Laura Busch, and I'm the Natural Resources Program Manager with the U.S. Navy Fleet Forces Command in Norfolk, Virginia.

MS. COOKSEY: Cindy Cooksey with NOAA Fisheries Habitat Conservation Division.

MR. VITOLS: Wilbur Vitols, and I'm on the advisory panel from New Bern, North Carolina, on the Habitat, and I'm a recreational fisherman.

MR. PARKER: Captain Bill Parker, Hilton Head Island, South Carolina, and I've been a charter fisherman for thirty-two years there. I just sold my charter business a month ago, and so I guess you might call me recreational now, and a good conservationist. Thank you.

DR. LANEY: I'm Wilson Laney, and I'm with the U.S. Fish and Wildlife Service, and I'm here in my capacity as the Co-Chair of the council's Habitat Protection and Ecosystem-Based

Management Committee. Our other Co-Chair, Doug Haymans from Georgia, recently was elevated to the Chief of the Coastal Resources Division, I guess, in Georgia, and so he's the Director, and so he is otherwise occupied and couldn't be here.

MR. PUGLIESE: I'm Roger Pugliese, the council staff responsible for all of our habitat and ecosystem activities.

MS. DEATON: I think I already said that I'm Anne Deaton, and, for the new folks, I'm from the North Carolina Division of Marine Fisheries, and I work on habitat protection and restoration type work.

MR. STAPLES: Shane Staples, Division of Coastal Management in North Carolina, and I review permits for development in the coastal zone to try and reduce impacts to fisheries habitat.

MR. ELLIS: I'm John Ellis with the U.S. Fish and Wildlife Service Ecological Services in Raleigh, North Carolina.

MR. WEBB: Dave Webb, and I'm from Islamorada, Florida. I'm a native Floridian and lifelong recreational angler.

MR. MARTORE: Bob Martore, and I'm with the South Carolina Department of Natural Resources, and I work in the Office of Fisheries Management with the Marine Resources Division, and this is my first Habitat Committee meeting.

DR. CHERUBIN: Laurent Cherubin, and I'm a research professor at Harbor Branch Oceanographic Institute, which is part of Florida Atlantic University, and my experience is in physical oceanography, but I bring to this table also experience about new observing capabilities for fisheries-independent surveys and habitat mapping, et cetera.

MS. HERNANDEZ: My name is Debra Hernandez, and I am with SECOORA, the Southeast Coastal Ocean Observing Regional Association, and I have a background in coastal management. I worked for the State of South Carolina for almost twenty years. Then, for the last decade, I have been working with ocean scientists and researchers on observing systems and priorities for the Southeast.

MR. KELLY: My name is Bill Kelly, and I represent the Florida Keys commercial fishing industry, and that's spiny lobster, stone crab, and finfish.

MS. MERRITT: I'm Rita Merritt, and I'm with the Onslow Bay Artificial Reef Association out of North Carolina, and I have some past experience with the council, as a commercial representative, and as well as some recreational background dealing with tournament fishing, and so there is both the recreational and the commercial there, but now I'm on artificial reefs, and so we serve everybody, especially the fish.

DR. GEIGER: My name is Dr. Jamie Geiger, and I'm formerly with the U.S. Fish and Wildlife Service. I retired as Assistant Regional Director of Fisheries, after thirty-five years, and I'm representing the State of South Carolina, and thank you, South Carolina, for reappointing me. I appreciate it. My expertise is I was a research biologist, and so I have a few publications on

toxicology and biochemistry and physiology, and my expertise is in habitat restoration and dealing with numerous and different politicians after thirty-five years. Thank you.

MS. DEATON: Great. Thank you, everybody. First on the agenda, which I was supposed to do, I guess, before the introductions, was to approve the agenda. Did anybody have any changes they needed, or can we just agree, by consensus, with the agenda?

MR. PUGLIESE: Just a quick footnote on some participation. Amber Whittle is unable to attend this meeting. Her daughter has some health issues, and so she had to stay home. Family first always with our organization, and so she needed to be where she's at, and so she will not be able to participate. Cindy Cooksey is taking over in the Habitat Conservation Division slot for Pace Wilbur, and so, welcome, Cindy, and she will dive in feet first with everything, and so it's great to have her. Both Lisa Havel and Brian Hooker got caught in some of the northeast storms, and so they should be here shortly, pretty soon, but they got caught in some delays and so we will have some late arrivals in a little bit, and so I wanted to just give a heads-up on some different things.

Also, just generally, if there are other issues that individuals may want to highlight from organizations or whatever as we go through, and I actually meant to talk to Laura about some of the activities on the Fleet Forces that is involved right now and marine mammal authorizations and different things, but some of those are probably going to be good to get somewhere into the discussion as we go forward, and so just a heads-up on that.

MS. DEATON: Okay, and so we have consensus on the agenda?

DR. GEIGER: If possible, I would like sort of a brief summary of what the funding outlook for this fiscal year is for NOAA as well as the U.S. Fish and Wildlife Service as well as how are the state fisheries, fish and wildlife agencies, coping with their various funding issues. Also, are there any problems or issues facing them in the future that needs to have any red flags raised by members of the advisory committee? Thank you.

MS. DEATON: Okay. I guess we can try and fit that in, if Roger knows the answer.

MR. PUGLIESE: I think we have at least -- Maybe we can allude to some with Wilson. On the NOAA side, I'm not sure if Cindy knows. A lot of that, at least the most updated, will probably happen next week, because the council chairs are meeting together, and I think that's definitely going to be on the agenda, exactly what is the status of the short-term and long-term for NOAA and different aspects.

On one good side of NOAA, the Ocean Observing Associations actually had an increase this year. With all the things going on, I think that really says a lot, and Debra will get into more of the detail as we get into that session tomorrow on specially where things are going with ocean observing, and so there is some good news and tough news on different levels, but I think there's a lot of uncertainty still.

DR. LANEY: To Jamie's point, I literally just got a Greenwire article this morning on the 2019 budget picture. Relative to 2018, I had breakfast this morning with Roy Crabtree, who is the Regional Administrator for NMFS, and neither NMFS or the Fish and Wildlife Service, unless Cindy knows differently, we don't have budget advice yet from -- The House and Senate did reach

that compromise agreement, I guess, and so there is a budget coming, but none of us have the dollar numbers yet, and so things are still up in the air. My understanding, from within the Fish and Wildlife Service, is we won't see any numbers until June sometime, and so we're all still just operating on status quo from last year.

MS. COOKSEY: That's the same information that we have for NOAA, is no specific numbers have come down yet for us.

MS. DEATON: Okay, and so we got the answer on that quick. It's that we don't know. The agenda will stay as it is, and that's all right? Okay. Hearing nothing, the agenda is approved. Then the Approval of the November 2017 Minutes, which was the last meeting, and that was in Florida, and I wasn't there, but did anybody review the minutes and have any changes or edits that they saw needed?

MR. PUGLIESE: If there are any editorial ones, just go ahead and submit them before we finalize those, and we'll send those on afterwards.

MS. DEATON: Okay. Hearing none, the minutes are approved by consensus. The next real item on our agenda is the FEP II Dashboard, Implementation Plan, and Two-Year Roadmap. Cameron Rhodes is going to provide that information. The attachments that were in your mailout would be Attachments 2, 3, and 4, and those relate to what Cameron is going to go over.

MR. PUGLIESE: As Cameron is getting ready, I will get into more on the details on the implementation plan and then the evolved roadmap, and what we're seeing is the culmination of a number of years of work that this group has really been the foundation to advance, and the FEP Dashboard is the Fishery Ecosystem Plan, and it provides access to the newest information that has been compiled over time, but it also links to all other types of detailed information that we can keep as updated and current as possible, and so what we really wanted to do is to highlight how it has evolved and, with the council approving it, the FEP, the implementation plan, and the roadmap, everything is advancing, and Cameron is going to get into the good look of the FEP II Dashboard.

MS. RHODES: Good morning, everybody. Really, this is an opportunity for us to walk through this together and see what's on there, and, if you have any suggestions for how we can go ahead and add things in or make things different. I've been working with Roger and our website developers to design this page. Most of this comes directly from Roger's and your work, and so, if you have any suggestions for how we make the way the page looks different, we are totally open to it. This is your opportunity to kind of voice those concerns.

Has anyone been to the page on our website yet? Okay. We've got some hands. Just for your reference, one of the ways to navigate to that page is via our site menu. You scroll down to Habitat Conservation, and then you just click on this button here, and now you're in the Fishery Ecosystem Plan II Dashboard.

If you go to the right of this page, you will see that you have this menu here, and all of these are clickable options. We're on the introduction page here, and so you can see a brief intro to the development of the plan, the plan itself, and so then we can scroll into all of these cool features that you all have added in, under Roger's guidance, and so South Atlantic ecosystem. Within the South Atlantic ecosystem, we have started to implement a Google Doc format, where these are

basically living, breathing documents on the website that can be actively updated, as opposed to being a standing PDF.

That is currently in place for a number of documents that are hosted on the website, and so, at any time that you all want to make edits to it, it's something that we can do rather quickly without having to go through a PDF process, and so let's just hop into -- This is one of our PDF forms here, and, as you can see, it's pretty static, but, if we go to some of our other documents in here, you will see more of that Google Doc format.

We also get into our policies and considerations, and so all of these are just clickable links here, and we're talking about adding some photos in here as well to jazz it up a bit, so it's not so black-and-white, and so, if you have suggestions for what kind of imagery you would like to see in here, so that it's a little more visually appealing, we are totally open to that as well.

Then we get into all these different sections here, and so let's go ahead and move on into a different page. Let's hop into habitats. This is where we have artificial reef, shallow water, all of those newly-established or newly-approved documents by the council. Those are now on the site. This is where we have these Google Doc structured documents that are basically a living, breathing document, and there are multiple opportunities for adding things to these to make them look different, and so, if you all have suggestions for how you would like to see these presented differently or have something added to them, we are totally open to whatever suggestions you all might have. You can visit all of these different documents on the page, and we get into state coastal habitat protection plans, state wildlife action plans, habitat programs, and regional information.

If we scroll back up, and let's dive into managed species. This is another one of these online docs, and this one has a lot of exciting features, and so all of these -- It's like a living table of contents, and so you can click into one of these. We are in gag. Is there anything that you would like to add on this one?

MR. PUGLIESE: This is an evolving system. One of the things that was really intended is to make this a nice, concise presentation of information on the individual species. Then, as you go through this, you also have a direct link to a system that we have been developing for a number of years with FWRI, the Ecospecies System, and so you can get into detailed information. That entire system is evolving to have everything from life history to habitat to connections into a lot of different aspects of that individual species, the fishery, and ongoing information.

The intent is that it will ultimately be a source that gets used through the SEDAR processes, but it also is updated after SEDARs with the most recent information to refine that, and so that's, very specifically, a living system. FWRI is directly involved in trying to fill a lot of the other information that is needed for Ecospecies right now, literally, and so this is not just managed species in the Ecospecies System, but it includes -- It's intended to include a snapshot of the entire ecosystem, and so, while this is the managed species frontend, you go into the detailed Ecospecies, and it actually has information on the complex of species in the entire South Atlantic region.

That is a continually-evolving process, but, ultimately, you should be able to go to each one of these and then both have a nice, concise view and then be able to go to the query, because, the way it's set up, it actually has a query that's live. You go into the query right into the system, the

database system, and then you can look for other things and refine it and consolidate, whatever you want to do, and so it's an evolving process.

DR. GEIGER: Roger, if I had a question there -- I mean, it would be very interesting to me, as an outside person, to look at say the black sea bass complex and immediately know what it's status of the managed population is. It is underfished or overfished, or what is the status, and know that right upfront. One of the things I'm seeing is we see a lot of outputs in these things, but I think what we need to do is focus more on outcomes, and so we have that right upfront. If it's a managed species, let's know what the status is, so people know that from the get-go. Then, if they have more interest, they can explore that information more deeply. Thank you.

MR. PUGLIESE: Yes, and I think we've talked about adding -- That's exactly the type of input we want to have. Those are some of the other types of things. You have the summary, and you have the link to the very detailed information, but there are things such as status. Ultimately, it would be nice to have links to maps of distribution, core distribution, spawning distribution, and some of those things right in the frontend, so you could look at it and see some things fairly quickly, and so this crosswalk between this system and our spatial information system and other systems is what we want to do to get quick --

MR. GEIGER: If I may follow-up, one thing I have noticed, dealing with a bunch of Millennials, and forgive me if you all haven't had much experience with Millennials, but, Roger, you know what I'm talking about, but they want to know -- You have to capture their information in the first fifteen or twenty seconds. Yes, you can have multiple links, and this is all good for folks like us, who are research biologists or whatever that want to follow the information, but, if you want that immediate information, let's get the hook right there in front, which is going to peak their interest to explore those other links and utilize the website.

I mean, there is nothing worse than an underutilized or underappreciated website, especially given all the work that has to go in, and so let's make it a little more user-friendly for those that are ultimately going to be looking at that and using that information hopefully for informed management decisions. Thank you.

DR. LANEY: To follow-up on what Jamie just said, and I agree that having that status information would be very useful, but it occurs to me, given especially the agency representatives sitting around the table, Shane and John Ellis and Anne, do we have the capability yet, Cameron or Roger, to -- It seems to me that it would be nice to be able to -- If you're dealing with a site-specific project, the first thing you want to know is what are the habitats at that site and what are the species at that site, and you mentioned cross-linking to spatial capabilities, and that would seem to me to be a very high-priority thing.

If I was Shane, I would be able to put in a latitude and longitude for a given project site and somehow then that links me to what habitats are present at that site and what species are present at that site, based on this tremendously huge data-rich website that we've created here, and is that something we're going to be able to do in the future maybe?

MR. PUGLIESE: Well, I think that's the evolution of both sides of this, because, if we develop more detailed distributional maps of species distributions of the habitats, the EFH designations, then it just becomes a merging or an overlay, and so you just need a tool that would be able to just

query those and come up with intersections and say, yes, this is it. Once upon a time, we actually, when we were doing the MPAs, we have a pan-over tool that I worked with the National Ocean Service on, where you would pan over an area and it would tell you what the overall catch was for snapper grouper over this period of time and deepwater species or whatever, and so some of those types of tools I think are going to be important, and so it's the two sides of it.

I think to have maybe like images immediately on the frontend, so that you could look at distribution maps, but then have linkages or query capabilities that are either imbedded in the more detailed systems or in Ecospecies itself, and there is a number of different ways to do that, but I think those are actually fairly straightforward. You just have to make sure that you've got all the layers to be able to advance that, and so it's the translation of some of this directly into spatial information and then a tool that can just kind of overlay and do it, and then you make the frontend fairly straightforward, to say, yes, this is --

We just have to work on that, and that's something that I've been working with Tina, and she will be presenting in a little while on more of the detail, and that's one of the things she was getting into, is the use of a lot of this information, and so she's actually done some connection with some of our ocean observing discussions, to try to tease this out of how this can be used, and I think your input on what for your activities would be an added benefit or immediate access or capability is exactly where we're at with this. Now we actually have the ability to both highlight it on the frontend but then also create tools or capabilities that can begin to have it available for any of the bigger picture more detailed looks.

MS. RHODES: We do not have a tool like that now. That is a pretty complicated overlaying of information that typically has to come from something like an additional app that functions within the website, and so there is something like a shiny app that will source information and overlay it and then present it back. It's not to say that this isn't something that we can do.

We absolutely can, but I would say that it would require a consideration about of staff time, and so I wouldn't think it would be something that would get done right away, but it's definitely something that we have on the agenda, but it would most likely, if we're thinking about having it be something other than just having links hosted on a page that links you to a bunch of different places on different websites, it would be something that would require an outside tool to allow that to happen.

MR. PUGLIESE: This is a follow-up. Some of the evolution of the services that we've been developing for EFH, for managed species, for all those things, in their evolution for presentation there are also evolving report capabilities, and some of those report capabilities I think may have things that are closer to some of these types of things, and so that would be -- It will be interesting to see how far some of just the canned capabilities of those services may be able to at least get closer, and then maybe some of the tools that is used on websites could actually then grab and use some of these different things, and so I think it's evolving fast, and some of these are definitely not outside the realm of being accomplished in a reasonable amount of time.

MS. DEATON: I will just add, for North Carolina, we have something I think like this, just at a North Carolina level, that we use for, for example, shellfish lease investigations, and so we've got all the habitat info and different like parks and lands and all of that kind of thing, and threats, but they're working on -- It's in an ArcGIS online system, and then they're working on making that

more available and getting that at a state level just within our division, but, for that really specific information, like for Shane, investigating that -- I don't know if you want that on a Southeast region, because that is so large. You really need the smaller scale.

MR. PUGLIESE: Again, I think what that gets to is the crosswalk of systems. Some of that evolution is that we are already having some of the different components of the Digital Dashboard that are accessing Navy information directly, and it's cross-walking with the available information, so that it becomes layers within the systems.

I think we can figure out ways to advance, and that's some of that discussion about how much more can we work with the states to get those, so that you don't have to reinvent the wheel, but you're keeping the most recent information available, and then figure out how some of those layers actually may be able to just be even added to the systems there. Then, if you do that, then you figure out what tool does it all and walk through the different pieces, and so I think it's definitely more doable, because the states are evolving a lot further, in terms of their detailed information, and so how we can work those together I think is --

MR. STAPLES: I was just going to -- As cool as it would be to do it how you were talking about there, with the typing in the latitude and longitude and it being like, poof, this is what lives there, I am the user group is going to actually be clicking around and researching, and hopefully somebody in -- If it's not me, but in my type or line or work, they have that cursory knowledge anyhow of the habitats and the environment, and so we might be looking for specifics just to back it up.

Depending on the user group that you expect to use this website, and, like you said, not only Millennials, but politicians also have that twenty-second -- So, at some point, if they Google search for something and this is what pops up for black sea bass or gag grouper, and these things are overfished, and they're like -- They type it in and you can see that, yes, it's overfished or overfishing is occurring, and they can understand that.

Even for me, and I'm not as familiar with some of the offshore managed species, and we deal with mostly the state stuff, and so, if we have a project that deals with that, just getting that -- Sometimes I just need that cursory first bit of information, and I don't need this super in-depth when commenting on a certain thing, but, actually, I think that would be an easier task to start with, as cool as the other would be, for sure.

DR. LANEY: One other comment, Madam Chairman, too, and that is -- I imagine that the state agency reps may be being pushed to get things done faster, and those of us in the two federal agencies definitely are, because the current administration is mandating that reports have to be shorter and produced in a much more rapid timeframe, and so NEPA documents, NEPA reviews, are all being shortened considerably, and so the faster we can get the information that we need to review these documents -- Most of the time, we're not actually writing the documents. Some contractor or some consultant, some engineering firm, somewhere is going that.

Part of it is the agency has to sign-off on it, and it has to go through the Council on Environmental Quality, and so we're under those deadline constraints, and so rapidity is something that we're looking for too, being able to put our fingers on the information we need as fast as we can possibly

get it, and that's becoming just more and more urgent, and we know that's going to be the case for at least another two years or so.

MS. RHODES: Okay, and so I think we left off with managed species, and so let's go ahead and visit the social and economic page, and this is where we get into the human environment. Again, this is all links to documents that are hosted within our website, and now let's head on over to essential fish habitat, and so we've got the user guide in here, and the old ecosystem plan, and there is a whole series of amendment documents.

Then we get into managed areas, and there are story maps available that are hosted on other websites, like MyFWC. We've got some maps here for the spawning special management zones and a map for deepwater coral and Oculina. Then we've got some helpful coordinates and zones and other web mapping applications available to folks.

DR. LANEY: Cameron, if I wanted to know, using Roger's selected species here, if I want to know where gag EFH is, how do I get there? Can I find a map for that particular species, or is it going to be EFH for the whole snapper grouper complex, or how do I do that?

MR. PUGLIESE: It would be under the EFH services, and, right now, it's for the complex, and the intent though is, while it's for the complex, there is descriptions that were developed in a table form that discuss species by life stage and use of habitats, and that was something developed and is available in the EFH section, and so it does get there.

Ultimately, we want to be able to have some spatial footprints of species distribution, and so I think that's something that Tina is probably going to highlight in how we evolve that further, and so, right now, the EFH for most of these -- There are some individual species, but many of them are specific to the complexes, and so they've combined those. The detailed descriptions may have information on the individual species, and so it's only as good as what we have so far, and it's an evolving capability.

One of the aspects of the species distributions is some of those have been built based on known temperatures and known different parameters of a species life history, but what we're doing is evolving that further with on-the-water observations, and so connecting that with the fishery-independent survey detailed information to be able to come up with more even refined polygons for those, and that's something that we want to do, and then, ultimately, I think that will provide at least some initial footprints of core habitat distribution for species and then how those other ones align with that, and that's going to be a combination of all of those, ultimately.

MS. RHODES: All right. Now we can hop into research and monitoring. Again, there's a bunch of links heading off to different areas within the website and on other sites. We also have the council's citizen science initiative and blueprint in here, and then we can head to the tools section, which just provides some helpful direction for where people can go to find more information, the Ecospecies database and the Digital Dashboard, things like that. This is a very dry walk-through of what's available, but, again, if you guys have any thoughts on what you would like to see different, any more comments on how we can engage other user groups, that would be helpful.

MS. COOKSEY: This website is used a ton by people that are preparing environmental impact statements and EFH assessments, and I see it all the time, and so something to think about is

maintaining a clean digital footprint as you are continually updating documents and making sure that they have time stamps on those updates and then cleaning up what gets left behind, and so, when folks are doing Google searches, they are getting to the most recent version of those documents.

Within the past couple of months, I got an EFH assessment that was still listing red drum as having a fishery management plan, and I was wondering how did this happen, and so I did just some Googling on EFH, and I got an old document that is still live on the website, and so, as we talk about live, current information, keeping that digital footprint clean from the backend, because people are coming into this a lot of times from a Google search.

MS. RHODES: Do you happen to know where that red drum link was?

MS. COOKSEY: It was an old, early version of the EFH user guide that I think was like from 2008 or 2009, and it was a PDF. It popped up on a Google search, and that was where this contractor had grabbed it.

MR. PUGLIESE: The problem we have with some of that is that the likelihood is that it came from a briefing book or something that it pulls from that is somewhere, and a lot of that historic information is embedded on our archives and briefing materials, and I'm not sure how you deal with some of those things. People need to be aware of the times, and I think what we need to do is maybe get more, in here, identifying the fact that these are the most updated information.

MS. COOKSEY: Right, and time stamps on all the updates as they come in, and, like I said, I don't know, on the backend, if it's possible to prioritize for search engines coming in, and I'm just throwing that out there, that people, because of briefing books and whatnot, are still going to old information sometimes.

DR. LANEY: Cindy, you put your finger on a problem, I think, and anytime a species management is transferred from a council to, in that case, ASMFC, and it may be happening again with cobia, EFH goes away, from a regulatory perspective, but it's still there in the historical record, and we have had this conversation ad infinitum at ASMFC, and I wish Lisa was here to weigh-in, and maybe Pace has put a bug in your ear, because it's one of his pet issues, but the whole EFH picture is muddled, I guess, would be a good adjective, by virtue of the fact that there are jointly managed species by councils and on the east coast by ASMFC, and those have EFH, but then the ones that are solely managed by ASMFC used to have what we called EFH, but I guess we're going to call it something different now, thanks to Pace.

We're working on a document that will put that information all in one place for the ASMFC-managed species, and that will include the species that are jointly managed with the councils, which still do have the EFH, and so it is a complicated picture, and that's why those of us who sit in the agencies who review all these EISs and other documents have to be alert, like you said, to pick up on consultants that may sometimes get old information into a new document.

MR. PUGLIESE: Yes, and, to that, I think we do have the date stamps specifically on the user guide, and I think what we need to do is maybe, within specifically the EFH section, is maybe have some verbiage in there that talks about where the most recent information -- That this constitutes the most up-to-date information for EFH and any other things, and so I think we just need to do

some frontend loading of not just having the user guide there, but then maybe a description of what the user guide is for, and I think this is the evolution of the site, is to have some of that stuff on the frontend.

This gets to that idea too of maybe abilities to have different types of access for different users, and those are things that we can discuss further about what that means, because maybe we could funnel somebody -- If they're coming in and have something on use for environmental impact statements or assessments and then have it pointed to these different locations or whatever, and so I think those are going to have to be things that we think about and figure out a way to maybe work with you on figuring out a way to represent it upfront, so that, as it's used for these different things, it's used correctly and it's very clear that what's here is the updated information.

It's like with our EFH spatial information. Our spatial information on the council's website is what EFH spatial footprints are, and the issue we have is that there has been a crosswalk with some of the national ones, and they don't line up, because they're not updated, and so we made it clear that this is the official information that we use for EFH, and so I think we need to do more on the frontend of some of these, I think, to highlight the utility and the timeframe and whatever for the different uses that it's being used for.

MS. RHODES: That's all for me. If you guys have additional feedback, you are welcome to contact me or reach out to Roger, and we're happy to make whatever changes you guys would suggest. The briefing book materials, unfortunately, will remain available on the website unchanged, and so, if people do a Google search, it's pretty likely that they could dig up that stuff, and we're required to have that available to the public, and so we will maintain them on the website, but we can definitely do as Roger discussed just now. We can definitely add some things in there to help users figure out what it is they actually need for current information.

MS. DEATON: Okay. That's great, and that's a good point, but it might be beyond like Mr. Google and asking him how to undo some of those things. Now, Roger, were you going to go over the FEP II Implementation Plan?

MR. PUGLIESE: Yes, and I wanted to just at least highlight -- Just quickly, I wanted to touch on the evolution of the implementation plan and now a two-year roadmap that has been also developed and advanced with the input from the advisory panel. The FEP Implementation Plan development started with a core team that provided some of the foundational structure to the FEP. The plan itself was laid out and tied in, and it has a nice continuity with the council's discussions and deliberations and review and development of policies over the years, and so the idea was to really build from there into how we implement ecosystem-based management in our region.

The timing, this is basically the bottom line is that we went from the core team being designated in June of 2017 to the original plan preparation by August of 2017, and the draft was reviewed at the council in September, and the document was posted and then reviewed at the committee and then the Habitat and Ecosystem Advisory Panel, at the last meeting, got into the details of the plan itself and then really was tasked to provide what the council really wanted to also have, which was a short-term action plan, which is the two-year roadmap.

The review occurred at the last advisory panel and they provided that foundational information from which the council and the committee further developed and refined the implementation plan

and provided additional input and actually went a step further. Originally, they were going to try to wrap things up, but there was a desire to take even more time, because of the importance of making sure that it accomplished what they really wanted to get done, and so there was input provided even after the December council meeting to finalize it, and, at the March council meeting, the council approved the FEP II, approved the FEP II Dashboard, the Implementation Plan, and the two-year roadmap, and so hats-off to the Habitat and Ecosystem Advisory Panel for being the foundational group to advance the foundation, which are the policy statements, but then to advance the Fishery Ecosystem Plan to ultimately get to the point where we are and just seeing the operational characteristics of the FEP II Dashboard, and we go from here and beyond.

That pretty much gives us the idea of the timing and, in a fairly short period of time, translating a lot of years of work into the operational Fishery Ecosystem Plan as it is now, and the real desire was to make sure that it was going to be a living system, and I think the dashboard absolutely has done that.

The implementation plan that you all saw before is structured essentially the same. The refinements really got into getting into adding in more of the detailed actions and items for the implementation plan, setting the stage for how this connects and advances the council's addressing of ecosystem-based management and the goals to maintain ecosystem structure and function and improve economic, social, and cultural benefits and to maintain and improve biological, economic, and cultural diversity, the foundational move to address ecosystem-based fisheries management.

As everybody remembers, in the beginning, it was to take the policies and look at the components and then the real focus on all of this effort was to look at what types of actions could be accomplished to address those specific policies and then to specify specifically the timing to accomplish this, and so, under the implementation plan, it provides not only the description of all the different actions that it's taking, but it also provides some foundations on priorities and actions to address, and so it identifies things that are underway or priorities that are being advanced.

In this overall implementation plan, it goes through each of the policies and lays out those and identifies some of the priorities, and then what the council really wanted to be able to see was advancing the ecosystem plan so that, in the next two years, some of the specific priority actions could be accomplished, and so what you have is this is the culmination of those discussions and the input that was provided by the advisory panel and the refinement by the council in creating what is now the Fishery Ecosystem Plan Roadmap.

What it does is it provides the policy statement link that discusses the overall policy, and then it identifies the specific priority actions that were identified, three to five under each one of the policies, and it provides the context. In this case, for example, right on the frontend of food webs, it's looking at the policy component addressed. In this case, it was forage fish.

Then actions are identified, where it facilitates the development of interstate innovative public and private research partnerships, and it provided additional actions beyond that, and so then what it does is it provides the actions, it provides the context, and then it provides the potential partners, and I think that's a key thing that it talks about. In this case, it's the opportunity to work with potential partners at the state agencies, NOAA and the Southeast Reef Fish Survey, the Ocean Observing Association, SECOORA, and our Landscape Conservation Cooperative.

It also gets into some key foundational actions, such as the development of food web indicators, and, again, it's tied directly to working with our partners at NOAA Fisheries and the council and the use of things such as the detailed Ecospecies information, et cetera, and so this is what the council has identified as the priorities under each one of the plans, and the idea now is to take this forward and work with potential partners to address these specific actions. Some are very much identified by NOAA Fisheries as being able to do it, but I think, in our region, they can be accomplished with partners in the region to be able to get this. In other regions, a lot were funded and provided, but this is what the challenge is.

Now, this is an active system, and so what the intent is, it's that the roadmap and implementation plan are living, and so, annually, what the advisory panel is going to be doing is getting a briefing on what of these actions have been addressed or potential partners or how things have advanced, and so, come spring -- We've set a timing that it's really supposed to be like this meeting to do this.

Now, we just approved this, and so this is going to be essentially next year by the time we get there, and I will probably be putting together an overall report on how far we've gone with the roadmap and how we advance it and work with our partners to begin to advance some of these different things, and that's some of the reasons that we have some of the presentations at this meeting, collaborators, because there are some key individuals that are involved directly in providing and addressing some of these very specific actions.

MS. DEATON: Roger, I was just going to ask, and you kind of answered my question, and I love the roadmap, because it takes something overwhelming and makes it a little bit more doable and tangible and helps you focus, and I was going to ask you if you have staff that are going to follow-up on all of these actions, because it's still a lot of actions, but you just said this group is going to do that.

MR. PUGLIESE: We're going to work together, and I'm going to provide as much upfront identification, beyond this initial review, especially in that focus on who the partners are, and then I have to work with you all and other members to figure out who -- What is the realistic idea that individuals that accomplish this and resources and programs that may be able to advance these different things.

As I mentioned, some of them, I think, are in process. If you get into the climate variability, some of those are in process, because there's going to be like a -- Well, we'll get a briefing by Cindy a little later on about a climate variability analysis that is underway in the background, and so some of the potential partners are coming to the forefront to actually accomplish these upfront, and then they're going to connect to -- The information from that actually feeds some of the other actions, and so, now that we have a template, then we can figure out how things are and then where we need to get work on identifying who else needs to address some of these other ones, and that's going to be the challenge, to take those a step further, and so it's not going to be a static system. The intent is that this advances and that, after the two years, we hopefully see some fairly significant advancement of the ecosystem-based management needs and the actions identified in the roadmap, and so that's the plan.

Unless anybody wanted to really --I wasn't going to get into the details of all the actions. I think individuals can look at these and see, and I think the first step we can do with this is look at some

of these things, especially, when you see some of the actions, if you know specific partners or activities that are ongoing, that's where it would be really good to begin to highlight those, so that we can start the process of advancing this beyond what I know or some of the other members may know, and so that is, I think, the challenge.

It's to look at the actions and look at the partners that might be able to accomplish it and then identify if there are programs or partners that could actually do some of these different types of things, and then we can follow-up on figuring out if that's actually going to be able to be accomplished, and so I think that's kind of homework type of a thing into the future as we move forward and then how some of this type of thing actually may benefit what you're working on or your responsibilities under your organization, agency, et cetera, and so then we can use that as justification to advance these things.

If that seems reasonable, I think that's as far as I think we need to go at this stage. I think you all did a heck of a job at the last meeting to get the priorities kind of at a beginning core that really the council -- I will tell you that they really appreciated that, because then it provided exactly what you said, taking this overwhelming -- Which everybody knew needs to be done, because you need that bigger picture for the whole thing, but down to something that we can focus on and actually advance this, and so there was a lot of support to get this done and then go beyond here now, and so we're off and running, and we will advance as we can work together to do that, and so that's all I wanted to kind of say.

DR. GEIGER: I appreciate that, Roger, and, again, I think this document has a lot of good potential, but, like everything else, it has a lot of priority actions, and, at some point in time, they're going to ask you, okay, what are the highest priority actions that you would like to take and then how can we implement those priority actions and then what is it going to take to complete those priority actions.

I am looking at that at some point in time, because everything is about priorities, as you all know, and we're going to be making hard decisions on what is the highest and what is the lowest and then putting whatever resources we have to accomplish it. Not a bunch of outputs, but what outcome are we seeking to achieve from some of these? I think we still have a way to go to sort of fine-tune this thing a little bit and really get down to the real meat and potatoes or what are the highest priorities that we need to do and then how do we need to get there, or else this is going to be another nice, great effort that's going to sit on a bookshelf or in a cloud somewhere and be a wish list of what we could have done, but we didn't do. Again, I am looking for priority actions. I am always looking for priority actions, and that would be my comment. Thank you.

MR. PUGLIESE: Again, I think that can be part of that step beyond where we are right now. If you want to look at these and then identify what you feel should be the highest within even the list of individual activities under an individual area, that's great, because that then does provide some focus on where to spend as much time to get those accomplished, and then some of them I think are going to be obvious, because I think some of them have to be done before some of the other ones get done.

Some of these different things that are ongoing are going to feed that, and then it's going to be a ripple effect on, once you accomplish this, then you can take the next steps, and so that is something that I would encourage individuals to look closely at this and provide some of that input

sooner rather than later, because maybe we could have a session to kind of focus at the November meeting, and so it doesn't have to be wait until May to get the whole thing reviewed. Maybe we can set the stage to kind of feed into the system. This is a developing system, and so maybe that's what we need to do, is have like a two-tiered step on how we actually get this accomplished annually.

MS. DEATON: I think that's a good point, Jamie, and the interesting thing is that it is all based on the policies broken down, and so, if we agreed on the policies in general, then everything we do should be helping that policy, and so it will be hard to have -- I mean, you're almost going to need priorities within each policy, and so I think we should move on, because it's ten o'clock, and we're on Item 1. We have three more items to get to, but that's all right, and so are we good to move on, Roger?

MR. PUGLIESE: Yes, we're good to move on. I need to call Tina, and so how about you all just take five minutes and get some coffee and let me get her on the line.

(Whereupon, a recess was taken.)

MS. DEATON: We're going to go ahead and get started and get Tina on the phone, if everybody will take their seats.

MS. UDOUJ: My name is Tina Udouj, and I work for the Florida Fish and Wildlife Conservation Commission, at the Research Institute in St. Petersburg, but I actually work from home, and I'm in Arkansas this morning, and so I hope you all are enjoying Charleston. Just a little bit of background. My agency has been working with the South Atlantic Council for the last several years to compile, create, and host spatial and non-spatial data relevant to their management.

The Digital Dashboard is a great way to access GIS data. It serves as a one-stop shop to access all of the data and web applications that we have developed thus far, and it provides links to collaborative projects that the council is working on with regional partners, and we hope to enhance the visibility of all of our state and regional partners and their efforts.

The GIS data is available in a variety of formats. There is map services and a data catalog and web applications and story maps. This map services page provides a brief description for each of our core and complementary map services that we use, and there is also information about some external services that we point to in some of our applications, and you can learn more information through a REST endpoint. Each image is linked to that endpoint.

The REST service endpoint provides information about what data layers are available in the map service and spatial reference information, the extent of the map service and other supporting information, and then this REST endpoint is very versatile, and it can be viewed in a lot of different applications, such as you can view a map service in ArcGIS online, if you have an account, or you can get one for free. There is Google Earth, and you can look at these map services this way, or, if you have GIS software yourself, you can pull them directly into your ArcMap or ArcPro software. If you want information on a particular layer, the description tag will provide some more information and a little metadata for that particular layer.

The data catalog is an easy way to download the GIS data that we are serving through our applications. There are metadata files, and there is also Google Earth files available for most of the data. The EFH data layers are rather large, and so they don't -- It's not a friendly format for Google Earth, and so we do not have those available as KMZs, but the other data layers we do.

Then, again, we'll go into the web apps. Briefly, we enjoyed the Flex Viewer technology for our web applications for quite a few number of years, and then, in 2016, ESRI discontinued the development of that technology, and so we've been working on migrating all of the applications to JavaScript, and so, today, I'll be showing the newer applications that are using the JavaScript API, which is a little more versatile and modern, and these web applications will run on any device, and so you can use your smartphone, or you can borrow Roger's iPad, and it will work, and, through the web app builder, you can easily customize your application and add widgets that are of interest to you and/or change the themes. Those are all easily changed between applications.

Then we'll go into the managed areas. This web application displays all the managed areas for the council. The information widget, up at the top-left-hand corner, just provides a little more information and a link to the council's webpage. The measurement widget can be used to measure area lengths or grab coordinate values off of the map, and you can change the units to what you prefer to work with here.

The print widget is a little customizable too, and you can choose to have only a map, or you can be more advanced and add legends and notes, if you prefer, and it has different formats, too. You can do JPEGs or PDFs, et cetera, and so this is just an example of a landscape format that I chose, and it's nice that it provides the legend and the data and a scale, with sources listed at the bottom.

The Basemap gallery widget allows you to change the background map service, and so I always just usually work with the oceans map service, but, if you click the next slide, you can see what this looks like with the National Geographic map service, and it's a nice background service as well. Quickly, the legend just shows you what is displaying in the map currently. The layer list provides ways to turn layers on and off, and you can also change their transparency. You can turn off the pop-up information. Like, if you were to click on a feature, a pop-up would occur, and, if you don't like that, you can turn those off, and you can turn off labels. You can move a layer up and down within the list, and you can also get more information by looking at the attribute table. Then, of course, a description. If you clicked on that, you would get more information about the layer.

The add data widget allows you to bring in other information sources to view within the application. This is a great way to bring in either tons of information on ArcGIS Online, the living atlas, and you can point to a REST service endpoint, and I will show that, and then you also can bring in different files from your computer, and so the ArcGIS Online offers just a ton of information, and so, if you wanted to look at sea surface temperature, you could type that into the search window up at the top-right, and it would return all of the map services that have "SST" in their title and/or description.

Since there are so many choices, and, if you want more details, you would click on that link and then get information about the sea surface temperature layer. This is a great way to look, and it's current, and then you can see what exactly the map is displaying. Then you can see sea surface temperature, and this was just from the other day, and it's an average for the day.

As I mentioned earlier, you could also point to a REST service endpoint, and so this is through the add data widget. This is the REST endpoint for the South Atlantic habitat map service, and then you can bring that in with the managed areas and then view that information together, which is really powerful and necessary sometimes, and so all those same things you can do with the moving layers up and down and changing transparency you can also do with this new map service that is displaying in the application.

Then, as I mentioned before, you can bring in different file formats from your computer. There is shape files as an option or CSV or KMZ or GPX, if you have GPS coordinates that you want to bring in, and then a new one is the Geo JSON, which Roger spoke with Debra Hernandez from SECOORA last week and said, you know, it would be great if we could show what you guys are planning to do with gliders in the coming years, and so her team got something Roger right away, and I noticed this Geo JSON file, and you can easily add that into the application, and it displays their tracks of where they would like to send gliders.

There is also quite a few built-in queries so that users can search for different managed areas based on the name, and so, if you're looking for the spawning SMZs, you can use this query, and this is an example for Area 53, and then it would take you -- Then you can zoom in the map to that feature, and it will give you more information about it.

The select tool is a way to get more information about an area of interest that you are looking at. If you draw an area of interest, it will select the features that touch that box, and they don't have to be wholly contained within the box. If they touch the box, they are going to be highlighted, and so the results show, over on the right, that there were three deepwater snapper grouper MPAs within that square, twenty-four management zones, et cetera, et cetera, and then there are ways to work more with those selected features.

You can do map interactions and zoom in. If there is any numerical fields in the shape file or feature class, you can get information about the statistics by using the statistics function here, and I will just show you to the export to CSV file and what that output looks like. Then this shows all of the artificial reefs that were in that square and what restrictions apply to those specific artificial reefs.

This last widget I will talk about for the managed areas is called a screening widget, and so it's more -- It's like that select tool that I just showed, but the area of interest you can draw on your own, and you can draw a square, or you can draw a line, or you can draw a polygon. In this example, I am just drawing a square in the map, and it zooms into the area, and then you can choose which layers you want to use, and that's over on the right-hand side, and you can choose a buffer, which I did in this example with one mile, and you hit the "report" button, and it returns all of the features that are in the box.

What I liked about it too is that, in the background, the gear restrictions is not turned on, but you can see, by clicking on the prohibition of black sea bass pots, it will show you exactly where that polygon intersects with this box and how many acres are impacted by that box. Then this is just another example of what I'm talking about with the prohibition of octocoral harvest is only in the top part of this box that we have drawn.

You can also download this information, and the only file format available here is CSV, but that's pretty generic, and most people know how to work with that, and this is an example of the information that comes with your CSV file for the gear restrictions, and, any of those other layers that were impacted, you could download CSV files for those as well.

You can also print out a report of this analysis, and then you would get this type of report with a map and legend and then a breakdown of all of the areas impacted in this square that we have drawn, and there is a zoom button, but the information is all compiled in a nice PDF that you can share with colleagues.

Then, also, I just wanted to show that you can use shape files for this analysis as well, and there is an upload button for zip shape files. They always have to be zipped, due to the nature of the format, but, here again, we're using the planned glider checks for SECOORA, just to see how they interact with the managed areas in the region, and you hit "report" here, and then I have zoomed in to show, with a one-mile buffer, this is kind of what the tracks look like and where they are going across managed areas off the coast of Florida. If you click on a particular layer on the right-hand column of the screening widget, then you can see exactly where that area is. It's highlighted in blue on the map. This is an example of a report for that analysis as well.

Now we're back to the main page, and, when we go again to the SA Fisheries, and this web application provides online tools to support the SEAMAP South Atlantic component in the database that is housed at SC DNR. FWRI is responsible for GIS products in this effort, and this is just a -- That's actually a dated diagram, but it kind of shows how all of the agencies are working together to compile information in one database and we're all getting the same information, and it's current, and it's quality controlled.

The SA Fisheries web app is displaying information from that effort, and then this shot -- We see just the different surveys that are active in the SEAMAP SA Program. The legend shows you what all the different topology is for the layers, and the layer list again that you can interact with and move around and change transparency. This is descriptions, and here we're at the REST service endpoint again, and we're getting more information about the particular data layer in a map service.

Add data, again, this is just so wonderful to be able to bring in your own data or view other information from other sources in conjunction with this fishery data. As I mentioned before, the REST endpoint, that's great, and you can look at other South Atlantic mapping services or NOAA services, just about anything, and then different file types, again, can be added here. This is just quick information about the viewer and links to all of the components of the SEAMAP program.

This information summary widget is pretty neat. It allows you to provide an account of features contained in the current map for each layer specified. Here, we see the point data as clusters for the reef fish survey abundance data layer, and then here is the coastal survey abundance data layer, and then each layer can be grouped by species, so there is more specific information. It's not just how many records, but how many species that are within those records. Then, as you move in, the map expands, and the number on the right, in the widget, changes based on the map extent.

Then, finally, one of my favorite widgets is the chart widget, where you can draw an area of interest and then it will apply and get information on number of species within that box that you drew, and the bar graph on the right and the map are interactive, and so, if you were to click on gray

triggerfish in the bar chart, it shows you in the map where gray triggerfish were collected. There is an option to view that same information in a pie chart versus a bar chart, and there's a lot of species, and so it's nice if you can use that zoom, that magnifying glass, to make the chart larger, and these little arrows that are on the left and right side of the chart, of this graphic, will take you back to the bar chart or to the pie chart, and so there's two different charts for one set of data.

Now we're back to our main board, which is the coast survey summary viewer, and this is just -- These next few slides will just show you targeted applications that we have built through like one layer or one resource, and this one is that same information summary tool in a different application for the coastal survey abundance data, and the bottom will show you the total number and weight for the coastal survey collection records.

Up on the left, you can click on that magnifying glass to search, and you can filter this data based on species, and so, in this example, we select Atlantic spadefish, and then the results show you where Atlantic spadefish are found from the coastal survey and their total. This is information for total number and weight for that specific species. Then, when you zoom in, those numbers change, and you can search any species up there that was caught, and I think that's a great application. It's quick and easy.

Now we'll go into artificial reefs. In this one, there's just a few screen shots. I just wanted to show it off, and you guys can use it if it's helpful. The splash screen page displays at first, and then all of the states in the region, North Carolina, South Carolina, Georgia, and Florida, their artificial reefs are displayed and also the special management zones, and Georgia was -- Their data is pretty interesting. With some of their points, they offer photos to see examples of the artificial reef that you are interested in.

The ACCSP data viewer, this application displays charts of landings and values for the ACCSP's statistical areas. If you click on a particular area, information from related tables are available in time steps, and they're mostly ten-year increments, but this last time-step, 2010 through 2015, is the latest available data. When you click on a particular time-step, you can get information for that species, individual species. This shows the black sea bass values in dollars and pounds for that particular area.

This landings widget would summarize the pounds caught for a particular statistical area. If you click on a map, it will show the landings for a species caught in that statistical area, and then you can step through and compare across time-steps. This value, dollar value, widget will do the same information, but just the dollar value instead of pounds, and it's broken out by species and time-steps for each statistical area.

We're back at the zoom board, but, that ACCSP data, I am working to update that, and then I've talked with one of the scientists there, and we're going to bin the data differently, and so the values would be more accurate, because, the first time we did this, there were a lot of confidential records that were held, and so, with the new data, it will be more representative, because the confidential data was binned, and it wasn't an issue anymore, and so that particular application will be improving. The data behind it will be more representative of what was actually caught.

Next, we'll go into story maps, and I just love story maps. I think they're a great way to convey a lot of information in one space, and this was one of the first story maps that I made, and it's one

of my favorites, because I just love that it's an easy way to see what the bottom of the ocean looks like and why we think these areas are important and special and need to be protected. The images, the thumbnails, below, you can click on, and it will zoom to the particular MPA. In this example, I clicked on the East Hump MPA, and it zooms the map to that area and gives you more information in the little image caption, and so it's very simple and basic, but it's very useful.

This is a new format for a story map for the managed areas. It's basically that same map service displayed walking through the web application, but just in a simpler format and more easy to digest, maybe, and user friendly, and so what happens here is that users just scroll down, and then you can -- Each component is highlighted. On the left, you have descriptive text and links to perhaps more information, and the map changes based on as you scroll.

Then you go into special management zones, and, here, you have links for the CFR pages that provide more information on the legal descriptions. Again, the coral habitat areas of particular concern are highlighted on the map, and then the information about why they're important is on the left, and then, when you click on a link, something that is underlined with a dash on the left side of the story map, that activates that layer and zooms the map to that particular area for the shrimp fishery access areas. Then the same thing for golden crab. It turns on the golden crab allowable fishing areas layer and zooms the map to there and shows exactly where they are.

Then the spawning special management zones, which are new, and small and hard to see, this is a great way to -- Users can zoom to North Carolina or South Carolina or wherever, and then, in this example, we just hit the Florida Keys link, and the map zooms to that area down in the Keys. This story map, I made this last year at the SEAMAP annual meeting as a way to display the current data for the previous year, and so there is background information and links that are on the left. Then there are specifics for each particular survey, and the first one shows us the coastal survey, and then there is a link to more information there.

Then Pamlico Sound, and it's hard to see, but there is little light green dots on the map, and then they provided a graphic that shows their species of interest and CPUE for their survey. This is North Carolina again, but it's the coastal longline survey data with some summary data that is provided in the text panel. This is the Georgia longline survey, their sampling points, and there is some more information available in the chart that Pat Geer provided me, and then, finally, a description of the reef fish survey and where they sampled for that particular year, which I believe this is 2013 data.

This is back at the board, and we can go to the links, and this slide will take you to all of the places that I showed today, the dashboard, the web applications, and the story maps. Then I am very happy to take questions or ideas for new story maps or targeted web applications or just improvements in general, and so, if you guys have comments, please feel free to email me those. Thank you.

MR. PUGLIESE: Thank you, Tina. Do we have any questions for Tina?

DR. LANEY: I have a question for you. I know that anytime we do research cruises off the coast, at least on federal vessels or university vessels, those data are archived into what I think is called the R2R, and I can't remember. I get a -- Every time we do one, I get a follow-up email, and I

have to certify that those data are available. Does our system here link to that database as well for all those data that are collected while the vessels are underway?

MS. UDOUJ: No, and, right now, it's just working with the SEAMAP SA component and the specific surveys that are in that database, and so that's the longline surveys for South Carolina, Georgia, North Carolina, the coastal survey, the reef fish survey, and then I think there's an ichthyoplankton survey that maybe will be available soon, but I don't see why we couldn't add data from the R2R database if we had access to query it.

MR. PUGLIESE: Wilson, I think we've had discussion at the SEAMAP meeting about expanding the overall dataset to bring in other information sources, and both the system that you're talking about as well as other state systems, potentially, and it's just a matter of factoring that into the processing and what it would take to actually expand the overall online system that's been developed, and so it would take some resources to be able to set it up, but I think the one you alluded to, the most recent one was expansion of the ichthyoplankton surveys that were collected through Beaufort as well as through some of the areas in Rutgers, but the key with that is it set up a stage of a formatting component already within the system, and so that can open the door for additional surveys that may collect that information to be formatted more readily and quickly into the system, and so that's -- As those become available or are identified, we can factor that into the discussions, and we have our annual SEAMAP meeting coming up, and I'm sure some of these types of things are probably going to be on the slate for discussion.

MS. COOKSEY: I had a question, and this might be for both you and Roger. This is a lot of work and some very cool utilities and apps that have been developed, and so are there any plans for offering the larger user community webinars or online training to send people in the right direction and teach them how to use all of these tools?

MS. UDOUJ: The question is like training webinars?

MR. PUGLIESE: Yes, and we've talked about that before. Tina, the question was plans for potentially training webinars or some type of ability to inform the public on how to access it, and I know we have discussed doing this for specific things. I think that, in addition to probably our next November meeting, to maybe actually have some hands-on -- Last time, we access information, and we may be able to take it a step further with some of the newer capabilities of actually everybody creating representative maps for things that they may want to use, and so that's something that we can do at the AP level, but I think Tina can respond.

We have discussed this in the past, and we've had requests for this before, and so we need to follow-up. The one key, I think, is that it's evolving, and so I think we're at a stage where the newest capabilities are probably something that we really need to catch people up on, because I think one thing she did do is create the user manuals for these, but a lot of the capability has already changed, and so I will let her get in further on it, but it's definitely an issue.

MS. UDOUJ: That is a good idea, and I think that there hasn't been a big effort to push these out and do it, because we feel like we're always refining it and making it better, but sometimes you just have to go for it and do it, but I think a webinar is a great idea, and it's an easy, cost-effective way to provide some training. Then updated user manuals and links for those, and I certainly don't

have that, and I realized that. These new applications, I don't have links readily available in the application for documentation on how to make things work.

MR. VITOLS: Over the last two years, I have done two presentations just about our organization to fishing clubs, and you have to keep in mind that some of these folks still have their flip phones, and so I think this is -- I mean, it's remarkable, and I have dived into it and found out a lot of different information, but I think it does begin almost at the grassroots level with a primer, like what you were talking about, an access to the site for dummies, and I think one of the ways would be great -- I know you send a newsletter out to specific organizations, but, like we were talking about, just a real quick primer, because there are people that would go there if they could figure out how to do it and do it easily and quickly for their areas of interest, and so just a real -- Like I said, for dummies.

MS. DEATON: I was going to actually suggest focusing on the consultants at first, because of what Cindy's concern was. It would be a win-win, because it would help the agencies get more accurate documents, and it would help them create their documents faster, and I would charge them a fee and maybe not do a webinar and have state conferences. Then you almost need to do this hands-on, and then you get the money back, and they will get better training, and then maybe a webinar for the more basic, and that's almost a different user group, more of the general public, the fishermen, and so that's just a thought. You could make some money here.

MR. PUGLIESE: Tina, the one thing that I think we didn't highlight in here, but it is embedded, and it's something that I worked with Pace and Cindy in the past on, and that is to add in all the permit reviews that have occurred in actual spatial -- One of the things that is really important is the opportunity to understand and look at a location where there may be very specific permit information on reviews and identifying species and utilizing the areas, things that I think are very valuable, and so what we've been consciously doing is building the data system spatial footprint so that you can go to the location and it will give you the actual review of that specific location, talking about all the EFH considerations.

Even beyond the EFH consultations, I think we were trying to get at any of those types of habitat discussions and permit activities, and so that is something that is another group that I think is going to be real valuable to be able to expand this kind of -- Highlighting that type of thing, and then people can see that as they're moving into that, too.

MS. UDOUJ: That's right, and I didn't talk about EFH today, but that's a great example, yes.

DR. GEIGER: I would like to reinforce all the previous statements. Having a training seminar or something to get the general public more aware of this particular instrument as well as becoming more familiar with using this information is huge, and this is a self-fulfilling prophecy if you want to generate support and appreciation and usage of this kind of information.

I would urge a state-by-state briefing organized by the state DNRs on various targeted coastal communities. I mean, I will look at Seabrook and Kiawah Island as an example. This would be huge to brief these people, with all these upcoming issues that they're concerned about, and it would be extremely valuable for those two communities to understand and have appreciation of what has been collected, who has collected the information, and what the information is being used for for management purposes. I mean, it could be one of the best things you could do to get support

and appreciation and understanding by the general public, and I highly support that approach. Thank you.

MS. UDOUJ: I'm sorry, but I didn't hear very much of the last comment, but could you synthesize it, Roger?

MR. PUGLIESE: Tina, I think what Jamie was saying is that the opportunity really exists to focus these types of presentations to the local communities, so that they can see what is available and how it's being used in management. I mean, this is getting -- He is actually picking up exactly what the intent of this was, and it was to advance our understanding and the public's understanding of the values of habitats and the spatial information.

Some of the apprehension to go further is just that there is one more thing that I would like to see. I would like to see species distribution, and I would like to see -- There are, I think, some very key foundational things that we're not far from getting a lot of those also in there that, once we get even the baselines for a number of those, it's even going to take it to beyond anything, because then, when you get into reviews and be able to look at locations and see the habitat distribution and collected information, et cetera, I think it's going to be good, but the point that Jamie made is the value and the desire to task individuals to bring this forward, and so creating some type of a basic primer is something that could be used and then brought forward at a number of different levels, all the way down to local.

MS. UDOUJ: Yes, I agree.

MS. DEATON: Tina, thank you. Are there any more questions or comments? I think we're good here. Thank you, Tina.

MS. UDOUJ: Thank you, guys. You guys have a nice meeting.

MR. PUGLIESE: Tina, thank you very much, and we'll be in touch.

MS. DEATON: Okay, and so next on our agenda is NOAA Fisheries Ecosystem-Based Fishery Management Activities for the South Atlantic Region, and I guess that's being done by Cindy, the Ecosystem Status Report, Climate Vulnerability Analyses, and NOAA Fisheries Ecosystem-Based Management.

MR. PUGLIESE: I really appreciate Cindy diving in with her transferring over. I immediately tasked her to go far beyond just the baseline of what she was working on with the threat analysis and essentially compile everything that NOAA Fisheries is doing for the South Atlantic on EBFM right now, and it's really important. With that, I will pass it over to Cindy.

MS. COOKSEY: I reached out to NOAA colleagues throughout the region, and they developed slides. They developed this presentation, and I am giving their information, and so I will do my best to answer any questions as we go along. The first thing I'm going to cover is kind of the overarching ecosystem-based fisheries management roadmap implementation plan, and the point of contact for this is Karla Gore in our Southeast Regional Office.

She is working on leading this project, which is a joint project with SERO and the Southeast Fisheries Science Center, working in coordination with the council, and their overarching objective is to advance the capacity for ecosystem-based management in the Southeast South Atlantic region. They have to primary outcomes that they are working towards, enhanced ecosystem-based decision-making tools as well as increased coordination across the agencies, which I think is huge.

Key milestones are the development of an ecosystem status report, which I am going to report on in just a second, continue multispecies aggregate production modeling, develop community vulnerability analysis, complete a multispecies climate vulnerability analysis, which I am also going to report on, as well as supporting the larger council-led ecosystem-related activities, including FEP II and modeling.

So far, they have presented the roadmap timeline to the council, last May, and they released it for public comment last June, and they are actively working on revising and finalizing it, hopefully by the end of the year, and so that was kind of the overarching implementation plan, and then I've got some updates on a couple of the components, and so the ecosystem status report is being headed up by Kevin and Todd out of the Beaufort Lab, and they are working with numerous other scientists from across the region. As Todd wrote, "many others", and it's a large group of folks that are coming together.

Todd put this presentation together, looking to define the ecosystem status report and provide some updates, and, most importantly, give you guys an overview of the ecosystem components that they are planning on including to offer all of you an opportunity to provide comment on that as well as potential ideas for sources of data.

What is the ecosystem status report? The general idea is to provide trends over time for multiple system components and how are they interrelated, and so the example that Todd gave me was for walleye pollock out of the Bering Sea, and so, for walleye pollock, an important prey item is zooplankton, and an important predator is the arrowtooth flounder, and, right now, they have data coming in that are showing zooplankton abundances to be declining, and arrowtooth flounder abundances are increasing, and so, based upon this kind of ecosystem approach, they are concerned about declining recruitment for walleye pollock, and they have reduced their total allowable catch in the Bering Sea.

These status reports are prescribed as part of our ecosystem-based fisheries management policies, and they have been developed by NMFS already for multiple regions, and they're intended for use not only by the councils, but other management bodies, and they are meant to be living documents that are updated periodically. This is not a one-and-done kind of scenario.

The rest of this is focused on their specific efforts for the South Atlantic ecosystem, and so let me back up. The majority of these folks, this is not their primary job. However, they have been working diligently at monthly meetings and developing their indicator list for this first iteration. That's what it is, a first iteration, to include the accessible data that covers regional scales. They have developed a draft indicator list, and they are actively working on the acquisition and analysis.

I am going to go through each of these categories and show you the data that they currently have identified. If you see a question mark, that means they are still debating whether or not to include it in the analyses or they are still looking for sources of data to include in the analysis portion, and

so they've got a variety of climate forcing indicators that they are bringing in. There is a whole suite of physical indicators for the region. Again, they're really focused on bringing in regional-scale data. The big question mark for contaminants, and this is for kind of many of our offshore regions, and there is limited data. There is some out there, but it's extremely spatially limited, and so, if folks know of good data sources, Todd would be a great person to contact about that.

Benthic habitats and land use, they're looking at including that, and they also are debating how much to bring in, based upon the quality of the data. It includes lower trophic levels, and, again, you see question marks for the zooplankton and ichthyoplankton and invertebrate abundances. It's still being discussed about do they have enough good, solid data to bring it in at this point.

Upper trophic levels, fish abundance, fish functional groups, sea turtles, marine mammals, and there's some discussion going on about whether or not to include birds. Fishery indicators, landings, and effort for both commercial and recreational fisheries, as well as a whole suite of human dimension indicators.

Their goal is to have a draft report completed by the end of the year that they can send out for reviews and feedback as they work in partnership with all of these institutions, and so now we have the climate vulnerability assessment. This is being headed up by John Quinlan with the Southeast Fisheries Science Center, who gave me a great set of notes, and so I apologize that I'm going to read a little bit, because John was very adamant that certain information be relayed.

The climate vulnerability analyses are planned and underway for all U.S. large marine ecosystems, including the Gulf and the Caribbean. The South Atlantic will by the Southeast's next assessment, and so John is currently heavily involved in the Gulf and Caribbean assessment, and the South Atlantic is just at the very, very beginning stages. The CVA is simply a way to infer whether a given stock will respond to climate change by shifting its abundance or productivity.

We seem to have already seen shifts in abundance and productivity for some stocks, suggesting that these processes may be one of the more direct manifestations of climate forcing. Stocks with the ability to shift distributions are less vulnerable to climate change, but stock productivity may be altered via the shift in location. The CVA methodology draws from previous work done by the EPA, USDA, and several NGOs, and it has been standardized for use in the NOAA Fisheries assessments.

Why is NMFS interested in conducting these assessments? First, in a changing climate situation, establishing hypotheses regarding which stocks are more likely to expand or contract can support management decisions, trigger actions for improving monitoring of at-risk stocks, or aid in identifying communities that could be reliant on potentially-declining stocks. Second, the CVA takes a long view across stocks, and this presents an opportunity to conduct a kind of gap analysis on our base ecological knowledge for each stock, information which could help set research priorities.

Third, the CVA allows for the transition of climate model projections to the fisheries arena. Climate models are run under complex sets of assumptions and produce volumes of data. The CVA sifts through some of that volume and attempts to make a salient output a bit more accessible for managers and other stakeholders. Another motivator is pragmatism. The CVA is designed as a kind of rapid assessment tool for examining a large number of stocks. A CVA for a suite of

species can be done in less time, theoretically, than it takes to develop other, more quantitative, detailed models. The CVA is not meant to compete with these other models. It is meant to complement them. CVA findings may also play into environmental impact statements, biological opinions, and perhaps lead to land use options that reduce vulnerability.

How is the CVA done? Southeast Fisheries Science Center staff will run the program over the next year. There are several components, including training for experts engaged in scoring, data compilation, independent scoring, a workshop to reconcile expert scores, analysis of the scoring data, and then report writing. Outreach will happen throughout the process, and we hope to make all information publicly available. Vulnerability is assessed by considering climate factors and life history sensitivity attributes.

The species profile is just a tool for compiling life history attributes, and it gives the experts a mechanism for sorting. Not explicitly shown here is the climate factor analysis, which runs parallel to the species profile development. The climate factor analysis gauges the magnitude and direction of change in each relevant environmental variable, and stocks are then scored by each expert into four bins of low, moderate, high, and very high, and the scores are then compiled across experts to secure a measure of the certainty of the vulnerability of the stock to each climate factor.

This slide presents details within the climate exposure factors and life history sensitivity categories. In the climate exposure box, we see a variety of physical processes commonly associated with climate change. Both the mean response and the variability are evaluated during the process. Additional climate factors are available beyond the seven listed here.

In the life history sensitivity box are a variety of attributes that can be imagined to contribute to stock resilience or sensitivity in the face of environmental change. These two classes of information are assessed separately and brought together during the analysis to develop a species vulnerability ranking. Recall that these end up as categorical values of low to very high.

An example of how these scores are determined is right here. A rubric was devised to allow consistent scoring of each of the sensitivity attributes that we saw on the previous slide. Each of these discusses the intent and the goal and provides some rationale for how it might work, relationships, and a little additional information, the background, and some advice on how to think about the attribute. The rubric then lists the basis for choosing among the four possible categorical scores of low, moderate, high, and very high. This particular rubric was aimed at assessing dietary specificity. A low score might be given to any generalists, while a very high score would be given for a species which is an obligate specialist feeder.

This is an example from the Northeast CVA. It shows how their assessed stocks fell out with respect to the potential for the stock to exhibit a distributional shift in a changing climate. Stock with low potential may be more vulnerable to climate impacts than those with a very high potential to shift distributions.

We know that substantial expertise exists within our partner institutions in the region. As always, we appreciate and want your input. The CVA will be very successful if it is useful. To ensure that it is useful, we are seeking the council's advice and participation. The CVA represents a vehicle, one initial step in delivering climate-ready fisheries management.

Strong regional support and collaboration are critical to achieving climate readiness, and we would like to hear your insights into important regional climate processes that may not be captured in the process or in the large-scale climate models which support the analysis. If you can suggest or have an interest in any additional products that could be produced while we work through this analysis, we would like to know, and, finally, maybe a few brave souls could even volunteer to score some of the species or volunteer life history and fisheries data.

That was all the information that was provided, and John and I had extensive conversations, and he is very much interested in potentially coming back in the fall, to the next meeting, to provide more information as well as seeking folks that would like to take part in the scoring process, and, again, training would be provided for all of that.

MS. DEATON: Thank you, Cindy. If someone was interested in helping with the scoring, when would that occur? When would they need to sign up, or who would they tell?

MS. COOKSEY: Well, they would reach out to John, whose contact information is provided up there. Because we are just at the beginning of this stage, now would be a great time to provide your name if you were interested, and he is looking to maybe sometime late in the fall or early in 2019 to work on putting training together for folks on the scoring process, but hopefully you saw, from the presentation, that this is a very standardized process, and there is very detailed information to help guide any volunteers through the process.

MS. DEATON: Thank you.

DR. LANEY: I will put in my two-cents' worth, Cindy, for including the birds, since that had a question mark after it, since Fish and Wildlife Service does have some management responsibilities for those, and I know, Roger, when we first began working on the Ecopath model that the Southeast Fisheries Science Center -- Joan and I were working on the birds, actually, and we compiled a whole bunch of the diet information and energetic information, and it probably needs to be updated, because hopefully -- How long has that been, twenty years ago?

MR. PUGLIESE: It's been a while.

DR. LANEY: It's been a good while, but hopefully there is a lot -- I know there is a lot of information out there, because there is a lot of interest in sea birds and consumption and how they relate to forage species, and definitely there is a need to consider them, and so hopefully that will happen.

MR. PUGLIESE: Just, first, picking up on that, I think that was some of the most extensive information we had in the Ecopath model. They did a yeoman's job to get that and work with partners to get that. BOEM has done extensive work on marine bird distribution and different things, and so I think there's a lot of other -- That was a point that I was going to make about the advancement.

On a number of these different ones, we have been building very close ties with our partners in the region, and here's the opportunity to reach out and use -- Go through the mechanism we have maybe with BOEM and with SECOORA and with the Landscape Conservation Cooperative and SARP and the habitat conservation, ACFIB and different ones, to be able to work with some of

those systems to address the vulnerability analyses, and then, on specifically the species side, one of the things, when we were building the sections for the managed species, we had a team that provided a lot of the core input on that, and it was like the compendium of a couple hundred years' worth of snapper grouper knowledge in the region, and it would be good to maybe link some of those discussions, because I think, if you want that type of information, being able to engage those key players is going to be a high-priority group that would be able to work on -- Because we're going to be refining our Ecospecies.

There is an opportunity to connect a number of these different things so that they could be working on some of that refined information there at the same time and working on the vulnerability analysis at the same time. One of the things we're still working on is a mapping prioritization, and that ties back to the species, and there are some things that we're working with all these different datasets to advance that, and so the two biggest recommendations that I see is working with our stakeholders that we've been really building the partnerships in the region to advance basically all of these different ones.

MS. COOKSEY: Where would be a good place to point John to get that information to start making those partner connections?

MR. PUGLIESE: Well, let me talk with John some, and then we can reach out to the different members we have here, and we can identify the different players. I think some of the things that we did highlight in say the existing roadmap or the implementation plan is who some of these partners are that would be providing additional inputs on developing climate vulnerability, such as our partners with the Ocean Observing Associations and some different members within there, like Ruoying He and others. I think he has already reached out to some of these members.

MS. COOKSEY: Right, and he has started that process, but he definitely needs more people to start making those connections with.

MR. PUGLIESE: Because like the Landscape Conservation and all the work that went into building the blueprint on that and species beyond council-managed species are addressed in there, and there is a number of these things that we have been building for a number of years, and so he can work with -- Our advisory panel has a lot of the membership, but then, beyond that, the partnerships that we have with those regional associations and partners I think are going to be key ones to really advance that.

DR. LANEY: For the birds, Cindy, it would be John Stanton, I think, and Brian can tell me, but I think John has been heavily engaged with BOEM, especially with respect to offshore wind and potential seabird impacts and trying to avoid those impacts, and so John is our South Atlantic migratory bird coordinator, and he's based in North Carolina, in Columbia, North Carolina, and, again, he is already engaged in a lot of these discussions, I think, with respect to the presence of birds and the distribution of birds.

Then all the states -- I think, Anne, wouldn't you agree that David Allen for North Carolina probably would be a key person, because the states have, in most cases I think, these big databases of colonial nesting seabird colonies and numbers through the years. They've got the data on how many birds there are, and then, again, a lot of the new information on consumption is being generated and is out there in the peer-reviewed literature, and they have some really great

advantages. On the west coast in particular, you can sit there with a pair of binoculars in the breeding colony, and the parents are bringing the prey to the nestlings, and you can even identify the species that they're carrying and count them, for those species that don't consume at sea and then regurgitate everything for the offspring. I think there is tremendous potential to include the birds in it, and I would hope that would happen.

DR. LANEY: I was just discussing with Anne that I think this is good guidance for John, is to work with the individual state representatives on the panel to identify the suite of experts at the state levels. Then the other members of the panel that may have connections through either work being done in BOEM and SECOORA and different things in different areas of the Navy that may be able to add to that grouping.

MS. DEATON: I think the state reps on this advisory panel can get in touch with the right people within their states, but, if there is a NMFS fishery management plan, there is usually state representatives, and those are usually the species lead for that state, and so, in terms of fish expertise, that would be -- It may be the same person that is on our list at DMF that's also on the FMP committee.

MR. PUGLIESE: Yes, and that crosswalks with Lisa and working with ASMFC and the managed species at the regional and state connections, and so I think we're going to have kind of intersections of these, but the group to work with to identify it, I think, is the people that are on this panel.

DR. LANEY: I will mention, real quickly, for the birds, you've got some big partnerships out there, and, again, Anne and the state reps know who the people are that work with those, but there is a Partners in Flight Group, which is really more for terrestrial, I guess, but then there's a South Atlantic Migratory Bird Initiative, SAMBI for short, and, again, John Stanton is our staff person who is heavily engaged in that and would be able to tell you who the contacts are. Most of these have published plans, and so they have targets for different population levels of different bird species, and, again, that, I think, would be a useful thing to factor into planning as well.

MR. HOOKER: I was just going to follow-up and I think maybe explain what some of the BOEM things are talking about. We have the Atlantic Seabird Compendium, which is just the database of bird sightings, and that's held at Fish and Wildlife Service, but then there's the modeling aspect that it was done using some of that data by NCOS, and so it's, again, NOAA doing it, and so you probably are aware of it, and then there is actually some active surveying going on that I will talk about some tomorrow in the South Atlantic, but I think it's the modeling, which was done by NCOS, is probably the most appropriate for this type of work, but feel free to reach out to me if you need names.

DR. GEIGER: I highly support the comments on including the birds, because one of the reasons and the benefits you're going to get is you're going to get a huge advocacy base that is going to tie everything together, and one thing that I have noticed is the birding groups are extremely vocal and active and important in providing support for local, state, and federal, and I would not underestimate those groups of local and state and even national on that endeavor.

The second question I would have is I'm a little concerned about one of the sentences that said that primary staff involved in this effort is -- None of them it's their primary responsibility, and so I

would ask a very pointed and direct question. What is the support among NOAA for ecosystem-based fisheries management activities? Please answer.

MR. PUGLIESE: I think we're playing some catch-up in the Southeast, but the hierarchy in NOAA has changed, with Cisco Werner moving in as the Chief Scientist for NOAA, and he has foundations in ocean observing and ecosystem, and he has worked with the Pacific and is knowledgeable about the California currents and all of the technologies and everything, and so I think that intent of advancing ecosystem-based fisheries management and the mechanisms in the individual regions is there.

Jason Link is the foundational writer of the climate roadmap and the EBFM roadmaps, which is directing NOAA's advancements of all these different components that you're seeing here, and so I think the commitments there -- This is the same question that I actually had internally from some of NOAA right now, is I think the directive needs to get translated into the regions and into the Center in the Southeast to make sure that they are advancing it, because that statement about it not being a primary has been an issue that is still somewhat unclear right now.

However, the chairman's meeting is next week, and I think some of those types of things are going to be highlighted as advancing for the South Atlantic, and so hopefully those directives are reinforced, and they advance moving forward on making sure that these things are done. One of the things -- I mean, with that, the other part of it is working with Howard Townsend now as the ecosystem modeling for the entire program. He was directly involved in our latest efforts on ecosystem modeling, and he was directed by Jason to be involved as a partner, and so I think they have to follow-up to make sure that those are priorities for the Region and for the Center, to make sure that these different things are the foundational components that advance what we're doing in the Southeast Region.

I think, right now, there is a little uncertainty, and I think that needs to be clarified, and hopefully from the top all the way down, and the new Science Director, Clay Porch, hopefully also has foundations in ecosystem-based management and ecosystem modeling, and so hopefully that will advance, and Cindy may want to pick up further on that.

MS. COOKSEY: From a national perspective, NOAA has very heavily embraced the EBFM approach, and I hope you picked up from the presentations that what we're doing in the Southeast is building upon what's been done and completed in other areas, and so I think we're engaged in some shifting right now and working on getting more support directed in that direction.

DR. GEIGER: I appreciate those updates, and I think it's -- Again, I would ask one follow-up. Are we on schedule with the timeline that you put forward to get one for the South Atlantic? Is it a good timeline? Is it overly optimistic? Give us a good sense of when can we see a draft product or a final product that can be shared.

MS. COOKSEY: Todd was very confident that by the end of the year that they would have a draft ecosystem status report, and John is very adamant about making sure that he is getting the experts together and getting the training going for the South Atlantic. The good news, from that perspective is, because he is already heavily involved in the Gulf initiative, it's his thought that it's going to be very easy to transfer a lot of those items to here, which will speed up the South Atlantic assessment.

MR. PUGLIESE: One additional point though. I will follow-up on that, because I have my own concerns about some of these. The entire ecosystem modeling under Ecopath and Ecosim was funded through the Landscape Conservation Cooperative, and we're going to need to make sure that there is additional follow-up and support to see this go beyond when we anticipate a model being developed for the next SSC fall meeting, but, beyond that point, the resources under those contracts run out, and so there has to be a follow-up to see, because just doing these, just doing some of the production models or whatever, don't give you the final products that translate that into enhancing assessments and creating the tools that you really need, the SSC needs and the council needs, to evaluate options and alternatives and the -- It's specifically an output that you can get from some of the modeling efforts that provide that ability to compare different analyses and different population levels and different forage arenas and different types of things like that.

Those are critical that that be supported beyond just getting the baselines and that those tools then are actually provided and developed and advanced, and we have some of those specifically identified in the implementation plan and the roadmaps and different things, and so they're a step beyond even some of these, and so hopefully they're going to be all in, to see it go not just to one point that we've done this and that's it, but beyond and actually be something that gets incorporated into true management.

MS. DEATON: Wilson, last comment.

DR. LANEY: Jamie, just to follow-up on what Roger just said, the Landscape Conservation Cooperatives, which were very strong and supported under the previous administration and provided a lot of funding through the South Atlantic LCC to the council for the Ecopath and Ecosim work, they have received less support under the current administration.

Now, fortunately, in the Southeast, the Southeast Conservation Adaptation Strategy, or SECAS, was basically generated at the request of the Southeast Association of Fish and Wildlife Agencies, through the Association of Fish and Wildlife Agencies, the national group, and so they are still pushing very hard for the six LCCs that cover the Southeast geography to collaborate and come up with a seamless conservation blueprint across the whole Southeast.

Unfortunately, and I will say it's unfortunate anyway, the only LCC that pushed their boundary out to the 200-mile limit was the South Atlantic LCC, as a result of Roger's presence on the steering committee for that group and as a result of my encouragement, and, actually, it goes back to the development of the operations plan for that LCC before it was even staffed, because we had strong support from our regional office for involving whales, for example, in that LCC's planning as an indicator, and, actually, they do have marine mammals now as an indicator for their conservation blueprint, and, as far as I know, they're the only LCC that actually has an offshore component to their conservation blueprint. They are still, even at a reduced level of funding, a very important support component for the councils' efforts and the staff there in Raleigh, and so I would hope that that's true across the whole Southeast, the Gulf of Mexico as well, but we'll see.

MR. PUGLIESE: I think he brought up a critical -- The work with SECAS is building on what the Landscape Conservation Cooperatives did, and it is the foundational operational capabilities of that entire process, and so I think that's the light at the end of the tunnel, that there still is this moving forward, and I see advancements of integration of other information systems, et cetera,

and so I think -- The hope is that that stays in there, and we've had enough discussions with the components of Florida that I think we still will be able to see the connection, so that the whole footprint aligns with what we have in the South Atlantic and supports the entire South Atlantic region and not just the SA LCC, but Florida and that, so that we can connect it with our developing spatial information systems, too.

MS. DEATON: Okay. One quick last thing.

DR. GEIGER: As you are aware, we have had a paradigm shift. LCCs were the previous administration, and you're going to have to reformat and repackage it and change the names and emphasize an economic outcome and resell it to the new administration. You can't use the same names, and you can't use the same concepts. You have to repackage it. It's good information with enough support from the Southeast that you can reenergize and re-support that initiative, but it can't be with the fingerprints of the last administration. You guys have got to get a little smarter and a little quicker. Thank you.

MS. DEATON: Good point. Just trying to push this along, because we want to get our lunch on time, and it's 11:32, and so we're supposed to break for lunch at noon, and we have one big item left, and that's the Fishery-Independent Research Supporting the Ecosystem-Based Fishery Management and Developing South Atlantic Ecosystem Model. We're going to have an update from Tracey Smart about the Regional Fishery-Independent Research, and then Roger is going to give us an Update on the South Atlantic Ecosystem Model Development.

MR. PUGLIESE: We really appreciate Tracey being able to attend, and Marcel is actually offshore right now, in the SEAMAP cruise, and so I do not envy him, because he is running right into this weather.

MS. SMART: I want to thank you all for having us today. Yes, I got lucky. I was assigned to a cruise that came back last weekend, where we had I think two-foot swells the whole week, and so Marcel is facing about four to five this afternoon. Our group at South Carolina DNR works with two big fishery-independent sampling efforts, and so I just wanted to give you an overview today of how both of them work and then the data that we deliver to the ecosystem modeling program.

The first group that we work with is reef fish fishery-independent sampling, and these efforts are focused on natural live-bottom habitats. Bob's group at SC DNR focuses on artificial reef habitats for their sampling, and these efforts were initiated by the MARMAP program at SC DNR. In the 1970s, they focused on trapping and longlines, starting in the 1980s and 1990s, and we've been doing standardized efforts since the early 1990s.

SEAMAP South Atlantic came onboard, the reef fish efforts, in 2009, along with the Southeast Fisheries Independent Survey, or SEFIS at the Southeast Fisheries Science Center in 2009, and so those collaborative efforts now, which use between two and four vessels in a given year, and identical sampling methods for the trap survey, are often referred to as the Southeast Reef Fish Survey, or SERFS, now.

To give you an idea on where the reef fish sampling occurs, we range in geographic scope from about Port St. Lucie Inlet, Florida, which is a little bit south of Cape Canaveral, up to just about Cape Hatteras with the trap survey. The traps are here in blue on the map, and we also have some

deepwater efforts called the short bottom longline survey, which focuses on high-relief ledges as well as some very deep, greater than 100 meters, efforts, and that's still live-bottom habitat, and then, throughout the years, we've also had this long bottom longline survey, which supports tilefish data collection, which is very deep soft-bottom habitat, and that's relatively restricted in scope as well as in funding the last few years.

We have anywhere between about fifteen to twenty-something cruises per year in the most recent couple of five-year sampling plans, because of the increased funding from SEAMAP and SEFIS, and we do over 100 days at sea for reef fish sampling. We average about 1,300 traps per year that cover that full regional range and then anywhere between a hundred and a couple dozen longlines, depending on where our funding is at.

We do one sampling season from late April to early October, and then, also, when we have access to a vessel with mapping equipment, the SEFIS group heads up our bottom mapping efforts as well, and so our data uses for reef fish data are fairly broad, but primarily we support stock assessments and management. In the last five years, we've been heavily involved in assessments for red grouper, amberjack, blueline and golden tilefish, black sea bass, vermilion snapper, red porgy, and red snapper, and we provide data on abundance, biomass, and some of our temperature and salinity data, or hydrography, goes into the assessments as well as our life history. We process all of our ageing and reproduction samples at the SC DNR lab, and then we also process diet data for a selected group of species, and we also support a variety of other projects.

Most recently, we've been involved in sort of alternative uses of data for red snapper, in particular how the index of abundance from the chevron traps can be used to help inform some management decisions, and so we have provided an update of our abundance data in 2017, which included the 2017 data for the season, which was a really good turnaround, and I'm very impressed with our data people for making that happen, mostly because they were curious whether or not the increasing trend that they saw in the last couple of years of the SEDAR 41 assessment had continued, and they certainly have. We are seeing more and more red snapper, and, from what I've heard this year, small red snapper, which is a good sign, in the first couple of cruises.

We also work with the SEAMAP South Atlantic coastal trawl survey, and this survey focuses on natural, trawlable habitats. This is led by South Carolina DNR folks only, but our regional range is from Cape Canaveral, Florida, to Cape Hatteras, North Carolina. The trawl survey uses paired falcon-type trawls in nearshore habitats, and so less than fifteen meters depth, and it's primarily focused around about ten meters depth. We do three seasons per year, spring, which is April/May, summer, which is July/August, and then fall is October/November.

The spring cruise is currently in progress, and they are on their way home from their last sampling day today. One of the big things that we've seen so far this year are very low shrimp catches, which usually our white shrimp catches are very good in the spring cruise, and we assume this is because of the cold winter events.

Some of the challenges, and I think that question was asked earlier today, but the Lady Lisa, which is our only sampling vessel for this survey, was built in 1982. It has a really colorful history, if you ever want to hear about it, but it has had some significant repairs to engines, the transom, and probably it cannot be severely overhauled again, and so we've already started discussions about how to replace and try to identify funding sources for that, and that's particularly challenging,

because our funding levels have been fairly stagnant, but our costs of doing things, like fuel and personnel, have not stayed stagnant, and they are only increasing throughout the years, and so that is our big challenge right now.

Some of the data uses, for the trawl survey, it's actually very wide-ranging. The reef fish sampling is primarily focused on the federally-managed species, and the trawl survey gets a really wide variety of species. For the State of South Carolina, they are particularly interested in our white, pink, and brown shrimp catches. For ASMFC, whiting, croaker, kingfish, bluefish, horseshoe crabs. Then, for the South Atlantic Council, king and Spanish mackerel as well as shark data series are used, and then we have also had various diet studies throughout the years.

For example, one of the things we did recently was provide an update on the king and Spanish mackerel juvenile catches to the Mackerel AP, in April, in order to get some discussion about what they've seen in terms of recruitment to the fishery and how it relates to our catches. For king, it's actually pretty close. For Spanish, not so much.

Then, as Tina mentioned earlier, seamap.org is our web-based data portal, and that houses SEAMAP-funded programs data, and I think we're just finishing up the updates through 2017, and so that data is publicly available. We have recently completed an overhaul of the data formatting, in order to provide better consistency and faster turnaround for how the data is provided and loaded in, and we are currently working on a hydrographic data application to house our CTD cast that all the various programs collect, and so that will be rolled out soon.

We are pretty involved in the ecosystem model, in terms of providing some summarized data. The trawl survey, we were able to provide data from 1990 to 2016 and biomass for three species of interest as well as fifteen trophic groups, which constituted a little over a hundred species that the trawl survey encounters, and we had diet information for six species to provide. For the reef fish survey, the same year span, and we provided biomass for twenty-one species of interest and diet information for fifteen species. With that, these are very long-term projects. A lot of people have been involved, and so I certainly want to give a shout-out to everybody who has been involved over the years, and, if you all have any questions, I will be around today, and you can certainly email if things come up later on.

MS. DEATON: Thank you, Tracey. Are there any questions?

DR. GEIGER: Explain to me more about funding problems in replacing the vessel if you would, please.

MS. SMART: Part of the problem is to get a vessel that can most closely mimic the way the Lisa trawls, which is two paired trawls off to the sides. The best estimates to get a commercial shrimp trawling boat to be reoutfitted to house all the scientists and everything is about $600,000, we think, at best guess. To get a new vessel, it's going to be well over $1 million. I think the entire five projects we do under SEAMAP South Atlantic through DNR, I think our overall budget for a year is about $1 million, and so that pretty much sucks it up really quickly.

DR. GEIGER: Has your director been approached to looking at contributions of Wallop-Breaux/DJ funding to do this?

MS. SMART: We've basically been looking at specs and what the various needs are. In particular with our vessel ops people, they are very interested in increasing safety on the vessel, and so we've had a couple of meetings about that with the scientists and the vessel crew, and now we have sort of a wish list versus a needs list, and we're going to take that to our directors and try to identify what sort of funding sources. That's the next step.

DR. GEIGER: I would really look hard at the contributions of this vessel to the economic outcomes of the state and look hard at the Wallop-Breaux DJ funding. Given the amount of funding you all get in South Carolina, I think there is some real opportunities, just because, with your cooperation through ASMFC, especially the horseshoe crabs, and you're tying into the shorebird group, which is going to be very important, and it would make another linkage to DJ/Wallop-Breaux funding, and I would highly urge you to really look hard at that approach and put a couple of good, solid briefings together, and I think you would have a fair shot and good support.

MS. SMART: We are all about the R/V Carolina biological and whatever else. We'll do it, if anyone wants to own a boat.

DR. LANEY: Tracey, I'm going to ask you a question that somebody asked me recently, to which I had to reply that I have no idea, but I will look into it. Since you're the diet person, sitting right next to me, I will ask you the question. What eats mantis shrimp? Do you have any idea? Do they show up in the diet of any critters? I had a guess, but tell me if I'm right or not.

MS. SMART: I have no idea. I will have to look. Our benthic invertivores, red porgy and triggerfish are probably candidates for that. Those are the ones that tend to scrounge in the mud, but I have the diet data on my computer, I think, and so I can definitely look into it. We certainly catch them in the trawl survey, mantis shrimp, and so I imagine there are quite a few other things, and probably rays, but we have never done diet studies on rays. They certainly provide us back very many things once they get collected in the nets, and so I should probably pay attention to what they are eating within the nets as well, but I will try to look.

DR. LANEY: Thanks. The only response I had was that I know Atlantic sturgeon, with that big suctorial mouth, suck mud shrimp out of their burrows, and so I was guessing that maybe they do the same thing with mantis shrimp as well, but, of course, there are not too many diet studies around on Atlantic sturgeon these days. One of our colleagues in the Northeast region was using gastric lavage to pull stomach contents from Atlantic sturgeon for a while, and that was before they were listed though, and I'm not sure that anybody is using that technique now.

MS. SMART: I'm not sure either. I can ask around with our sturgeon folks and see what they see.

MS. DEATON: One thing I heard the other day is that snapping shrimp, the sound of snapping shrimp, is a cue for oyster spat to settle, because they are often in with the oyster shell, and I wonder -- Who knows?

MS. SMART: I would imagine that rays are probably a good candidate for that.

MS. DEATON: Okay. Is there any more questions or comments? All right. That is such a good program, and it just seems so weird that the funding is always an issue, but that's beyond me. Roger is next.

MR. PUGLIESE: Yes, and, truthfully, the biggest thing I wanted you all to see was her follow-up on how much of the information coming from these programs was supporting the modeling efforts. I think this is absolutely critical to advance ecosystem modeling information and the diet contents and everything. We started using some of the things, such as the trawl survey, for baselines when we first did the first Ecopath model, and so it's really something to see us go this much further in terms of the reef fish, in terms of the diets, in terms of all those different components. It's a very significant portion of what's going into the modeling efforts.

On the overall program, I did include the five-year plan for SEAMAP as one of our briefing materials, and it does a really good job of showing how connected the different programs, MARMAP and SEAMAP and SEFIS, are and how the baselines are there, but it also set the stage for if we want to go beyond this, in terms of getting the sustained resources and the questions about what do you need to do that, and there are a couple of different levels that talk about advancing this and going even beyond for collecting and even creating new surveys, such as a pelagic survey for king mackerel, which we do not have anything right now for fishery-independent surveys.

It also discusses the complications about vessels and what we need in terms of vessels, and so some of those are actually in hard dollar numbers within that document that present a good foundation from which to say, if you really want to support this in the South Atlantic region, these are the different levels to get these types of really critical needs for assessment, for management, for ecosystem modeling, and beyond, and I think it's pretty critical.

The work that's being done through this program, and it's really pleasing for me to see the footprint that the programs have now, because I've been involved with SEAMAP over a number of years, from its -- From almost its inception, and to see us advance to this point -- It is frustrating to me to see that we're at that point where you get so much money, but then costs keep on going up or whatever, and it's not without big investments, like the state investing significant dollars into the research vessel to get it up to speed and at least see significant levels under the R/V Palmetto and advancing to be able to really see longer-term. With the Lady Lisa, I mean, people don't understand how critical we are in the Southeast, and we're tied to a couple of things, and we need to make sure that these are long-term.

Getting back to that comment about support for ecosystems and everything, it has to go beyond just those to these types of things. These need to be supported. When I see three or four highest tech vessels getting deployed in the Pacific, I'm going, well, what about the South Atlantic? Somebody needs to step up and do that, and I've had discussions with the regional -- Back when Bonnie was there, about can they step forward to provide resources to advance and foot the bill for some of these vessels, and we actually did under SEAMAP for the Caribbean at one time. We supported funding some of those types of things, and so those types of things that -- Hopefully there is ways, either through partnerships, like you had talked about, or through just saying, well, we have to have this for the region to advance this and here we go.

Those are some of the things that I was going to -- The only other side on the ecosystem modeling that I was going to update everybody on is that we're still working closely with Tom Okey and

partners to advance the model efforts. Kevin Craig is supporting and providing information, and he's coming off of a vermilion assessment, but he is providing more of the extended information that were used in the pulling from all the existing stock assessments, so that they're aligned with the Ecopath and Ecosim modeling work.

Also, the connection with ACCSP, and they're working to make sure that a number of these different things are aligning with those systems, and so we have a whole checklist of different to-do's. We're working also with Ruoying He to look at the environmental components and how those are going to align into the model system, and so a lot of things are still in process, but, from everything I understand, we're still on schedule to be able to have an operational model by the fall SSC meeting, and so that's the plan right now, and these -- Again, this is foundational information that is supporting moving that forward. Any other comments or questions?

DR. GEIGER: I forgot to ask this earlier, but are we -- Are you guys getting more blowback on the climate assessment vulnerability studies, in terms of either concerns or increased questions about the validity of some of the information you're getting or whether it's still a priority within the agencies or not, and I know I'm asking all these politically-incorrect questions, but I need to know. Thank you.

MR. PUGLIESE: I think, earlier on, that was continuously an issue. I think, under this broader sense of the move toward ecosystem-based management and the fact that we even have the initiation of the vulnerability analysis that there is a gut-check in terms of we have to accomplish these things to really see where we are and what we need to do, and those are foundational components of advancing this, and so, regardless of some of the other rhetoric, I think these are moving forward, and they are being done, and I think the thing that helps drive some of this is, not as much in our region, but, when you look to the Mid-Atlantic and New England, you have such significant stock movement patterns, and you can't deny those.

Those are absolutely getting states pitted against states, because some of the species are not even existing off of their states anymore, and they're moving further north and whatever, and so I think there are some things at the political level that are calming down some of those real -- That you can't look at this, because dollars and cents are starting to advance and say this is significant enough that we have to figure out where we are relative to the rest of the country.

DR. GEIGER: That argument is extremely powerful, and, again, I think that you guys obviously -- Certainly we found that out with Atlantic salmon recovery efforts in the Northeast, and, again, those are powerful facts that people -- You may disagree with the data, but still they are self-evident, and tying that on to the importance of this in the South Atlantic, and I still find it amazing. This is just a personal observation, but the South Atlantic has so much political support and power, yet it's so reluctant to tap into that support in combination with some of the folks in Northeast. I am still amazed that we haven't been able to mobilize that level of increased political support for the benefit of some of these programs, and we may want to have that as a discussion issue offline later on, but I am still blown away by that.

DR. LANEY: One good thing, Jamie, as far as we're concerned here at the South Atlantic Council, is the Southeast Climate Science Center did get funded again, and it will continue to exist at NC State. There was some uncertainty about that early on, and they may have to reconfigure things a little bit, but they're still there, and they are still very closely linked to the South Atlantic LCC,

and they are still doing a lot of modeling that is going to benefit the council, I think, and the Ecopath model.

MR. PUGLIESE: Yes, and I think that's a really critical thing, because I think USGS basically said that we are going to maintain our Science Centers, period, and they're just going to do it, and I think that's a really critical aspect, and it's tied to what we're working on. Also, our partnership with the Ocean Observing Association, and they are working on ocean acidification and the current changes and the temperature changes, and so we can work -- The facts, I think, will tell where we are and what we need to do in the Southeast, and that's why those partners are so critical to be able to advance all these things.

DR. LANEY: To that point, and Lisa may want to speak to this too, but Tom O'Connell, who some of you know, was formerly with Maryland DNR Fisheries Service, and he is now the Director of the Leetown Science Center of USGS, and Tom is working very hard to forge a much closer relationship with the Atlantic States Marine Fisheries Commission and providing science support. They have done that for years anyway, through Tim King and Dave Smith especially, and Dave with horseshoe crabs and horseshoe crab modeling and the whole bird thing, but Tom is going to be attending the next MOU meeting between NMFS and the Fish and Wildlife Service and the ASMFC, specifically to talk about USGS's role in providing science support.

Some of us recently were involved in the review of like twenty-five, I think, proposals that they put together and submitted to Pat Campfield, and Pat farmed those out to different ones of us who reviewed those and provided some feedback, and my understanding is, unless Lisa has heard something different, that USGS was planning to fund I think the top four or five, maybe, or at least that was the last I heard about that, and so those things are happening anyway, and I hope they will continue.

MS. DEATON: Okay. I think we're good on that discussion, and then the next thing on the agenda is lunch, which is a good thing, because I am looking out and seeing tired and hungry faces, and so we have an hour-and-a-half. We're due back at 1:30.

(Whereupon, a recess was taken.)

DR. COLLIER: My name is Chip Collier, and I'm a biologist with the South Atlantic Fishery Management Council, and, as Roger said, this is a document that was put together by SERO staff, and so the Southeast Regional Office, as well as council staff, and we're looking at regulations that might be a little bit outdated. We indicate at the top that it's regulations that are recommended for removal, but it's also regulations that are considered for changing as well, and this is kind of just gathering ideas of what should change for some of these issues.

The first group of regulations we have here are from the golden crab fishery, and the golden crab fishery was established as a limited access fishery years ago, I believe in the mid-1990s, and what they're recommending for removal is just how we established some of the criteria for the limited entry program. Since it's already a limited entry program, we don't need that criteria anymore, and so they're talking about removal of some of those issues, and I did forget to mention that, when we're talking about removal of some of these, it is a two-for-one policy that the President put in place, and so they're talking about two regulations being removed in order for one regulation to go into place.

There is a dollar criteria that is associated with that, and I believe it's over a million dollars, or it may be a $100-million impact. Most of our fisheries, if not all of our fisheries, would not meet this criteria, but they might be able to use some of these in different areas, such as roads or different other programs that are going into place, and so keep that in mind as we go through them. The major idea is just trying to clean up the regulations that we have in the South Atlantic region.

With the recommended for removal from the golden crab fishery, and this is just an example, you can see that these regulations can be removed because they're outdated, and the actions described here took place when the zones were set up, and they're not reoccurring. Therefore, they are no longer needed, and so what we try to do with any regulation that we're recommending for removal is we have rationale on why that should be removed or changed.

Some other ideas that they put in there were under 622.4, the RA will mail a vessel owner or dealer whose permit or license is expiring an application for renewal approximately two months prior to, and a lot of that has gone online, and you can see the recommendation down below, and I will just give you some of the highlights that they're talking about right now.

There is an amendment looking at gear-restricted areas. There is a powerhead prohibition off of South Carolina, and so they're considering that for removal, and there is also some size limits for some deepwater fish that they're considering for removal, and it does -- In the document that you have in front of you, it lists I believe yellowtail snapper and gray snapper in there, as well as cubera, and those are going to stay in place, but it's the deepwater species, the blackfin snapper, the silk snapper, and the queen snapper, where they are considering removal of those size limits. These fish are caught in deep water, and they are likely impacted by barotrauma, and, therefore, releasing them, they are not going to survive, and, therefore, getting rid of the size limit is just converting what is likely dead discards into landings, which we can track better.

There was some discussion about removal of operator cards for the rock shrimp fishery in the South Atlantic region, and this is the only commercial fishery where we have an operator permit required for the operator of a rock shrimp vessel, or any commercial fishing vessel, in the South Atlantic region. When we brought this to the Deepwater Shrimp Advisory Panel, they did not recommend removing this, because the boat owners felt like it gave them some buffer. It's a way to track if a fisherman has not abided by all the laws, and they have the potential to have their permit removed or sanctioned.

Adjustment of management measures, right now, we have several different procedures in the development of a fishery management plan, where we're looking at framework procedures, which is a little bit faster than our standard fishery management plan. This can be done in a matter of maybe six months, as opposed to a full management plan, which likely takes over a year or two to develop.

Included in this was the coral HAPCs. We have noticed that whenever we're dealing with coral HAPCs that it takes a lot longer than six months, and so removing it from the framework procedure is probably a likely -- That's how it's going to be treated anyway, and so it's not really changing much as far as how we're doing it, but it's just, on the books, we would remove it from the framework options.

Some of these definitions, it's looking at -- We have inconsistent regulations for shrimp trawlers when they transit closed areas, and what I mean by closed areas are we had a severe winter this year off of basically all the Southeast, and that resulted in a closure for the shrimp fishery. The closure goes from three miles out all the way out to twenty miles, and the states of Georgia and South Carolina are compliant with that as well, and so we have a large-scale closure, and some of these regulations were noticed to be pretty inconsistent for the fishermen. Some of the commercial fishermen, some of the shrimp trawlers, had to stow their gear below deck, and that's not possibly on some of the vessels, and so we're actually looking at all the transit provisions for the shrimp trawlers.

We have really four different types of managed areas. In all four, we have slightly different language, and so we're trying to make -- Either is there a reason to keep consistent language or are there reasons for deviations and then making it so it's compatible with the way the shrimp fishery operates now. I am going to scroll through all of these, but these are just different examples of how different transit provisions could be written, and so I'm going to go down to page 7, and they start talking about an operator card for the dolphin wahoo fishery.

This one does require operator cards for the commercial vessels as well as for the charter boat vessels, and they're talking about removing those. A lot of the charter boat captains feel that's an unnecessary burden that they have. They have talked with several law enforcement agencies, and not many have been using it, or even asking for it, and so there is consideration for removing these operator cards for the charter and commercial vessels.

For the coastal migratory pelagic resources, there is discussion of removing cobia, at least the Atlantic migratory group, from the South Atlantic Fishery Management Plan and the coastal migratory group, and, with that, we're in discussions with ASMFC on how that should occur, but, right now, we have some of the language stricken for cobia as an example of what would be done. From page 8 through halfway through 10, that would be removing all the cobia regulations on the South Atlantic side, and what we're talking about with that is, since there are two genetic stocks of cobia, there is consideration for removing from the Georgia/Florida south and around into the Gulf of Mexico, and that would remain in the federal fishery management plan, but the Atlantic migratory group, which is mainly from Georgia northward, that would go under different management.

For spiny lobster, there is consideration of removing annual catch limits for this species. It has a unique life cycle, where there is significant input from external sources for recruitment, and they also have a long larval life stage, and so there is some consideration that this might meet the requirements for exemption of ACLs under the Magnuson-Stevens Act. That is all we have listed here, and what we're taking right now is if you guys have any ideas of regulations that should be considered for removal or other options.

Some other examples that they considered was removal of a two-for-one buyback for the snapper grouper fishery. If you have a Snapper Grouper Permit 1, in order to get an individual license, you have to buy two permits in order to get into the fishery, and so that was some consideration to remove, as well as several other discussion items.

MS. DEATON: Thanks, Chip. Are there any questions on that or any comments? All right. You did good. They all understand.

DR. CHERUBIN: (Dr. Cherubin's question is not audible on the recording.)

DR. COLLIER: For the removal, there was some discussion at a spiny lobster review panel that a lot of the recruitment was coming from external sources. Therefore, it's not necessarily internal recruitment that is driving the patterns that we're seeing in that population, and so, if you're getting significant sources of external recruitment, then it doesn't necessarily need to be monitored under an annual catch limit. Some of the genetic evidence is indicating that it's coming from the Yucatan Peninsula, but you can probably speak to recruitment processes much better than I can.

DR. CHERUBIN: (Dr. Cherubin's comment is not audible on the recording.)

MS. DEATON: I know I've heard that the lobster spawn in the lower Caribbean, and for decades I've heard that, but I don't know the science behind it.

DR. CHERUBIN: (Dr. Cherubin's comment is not audible on the recording.)

DR. COLLIER: Thank you for those comments. We'll get those incorporated.

MS. DEATON: All right. That was the last thing that was on our agenda for today, but it's only 4:11, and so we have until 4:30. I am just thinking, if would could knock anything off the list, then we'll get out a little bit earlier tomorrow, and so, tomorrow, a lot of the items are sort of connected and large, but, if we go down to the very last item, it's a Vice Chair Election, and I guess it was at the last meeting that you guys agreed that the Chair would be for a one-year term and then there would be a Vice Chair and the Vice Chair would basically move into that Chair role, so it kind of rotates around a little bit better.

MR. PUGLIESE: It was two years.

MS. DEATON: Okay. Anyhow, I was wondering if there was anybody -- We need a Vice Chair, and if anybody would like to nominate another member, or someone could volunteer.

AP MEMBER: Cindy, did I hear you were interested?

MS. COOKSEY: I was willing to volunteer if needed.

AP MEMBER: I nominate Cindy.

AP MEMBER: Second.

MS. DEATON: Thank you. Congratulations, Vice Chairman, Cindy Cooksey.

MR. PUGLIESE: Just as a footnote, I really appreciate you stepping forward and moving in immediately as Pace's replacement, essentially, and I think we have been working together on different issues over time, and I knew, if you got involved in this process more, which you did at the last meeting, that you would really bring that kind of enthusiasm to really advance a lot of things, and I think this is going to help really make things even go further than they have before, and so I really appreciate you stepping forward as Vice Chair and everything you got tasked with.

I threw things at you, and you stepped forward and really brought the whole NOAA involvement, I think, fairly clearly to this entire group, and so thanks.

MS. DEATON: If there is no other business today -- Is there anything else? Then meeting adjourned.

(Whereupon, the meeting recessed on May 15, 2018.)

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MAY 16, 2018

WEDNESDAY MORNING SESSION

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The Habitat Protection and Ecosystem-Based Management Advisory Panel of the South Atlantic Fishery Management Council reconvened at the Crowne Plaza, Charleston, South Carolina, May 16, 2018, and was called to order at 9:00 o'clock a.m. by Chairman Anne Deaton.

MS. DEATON: It looks like everyone is here, and we have another full day. We are scheduled to go through 4:30, but we may be able to shorten that up a bit, and so -- We have some new people that are here with us today, presenters and members, and so, if you weren't here yesterday, we'll start and just go around. We'll start with Jeff, and can you just introduce yourself and say who you're with and why you're here.

MR. SOSS: My name is Jeff Soss, and I am a recreational fisherman in Georgia and South Carolina.

MR. BROWNING: I'm the other Jeff from BOEM. I'm the project lead for the RFF that just came out for the Path Forward, and so I'm here to discuss that and answer any questions you all have on that.

MS. DEATON: Okay. Great. That leads into what our topics of the day are, and so, this morning, we're going to have a presentation about SECOORA and the Ocean Observing and some applications of this network of technology, and then we're going to hear an update on BOEM and energy development activities. We're going to use that information, following that, to do two breakout groups, similar to yesterday, but just one will be talking about priorities for the ocean observing system and one will be talking about priorities for, I guess, research for energy activities, more or less.

MR. PUGLIESE: Just a quick note that it is a little open-ended, but there are some additional support documents. I have a session that was held last year for the SECOORA, and some of its focus was very specifically on mapping locations for HF radar and mooring inputs on some of those and also just to cite some of the sections on our website that talk about fisheries needs and then just highlight some very key locational key parts that we have, and we want to be able to look at everything that may be needed for fish, fish habitat, fishing operations, and so the recreational

and commercial fishermen can have some very specific input, and then even the potential for what types of things would be used for citizen science.

On the BOEM side, we want to have -- The session is going to be very specifically on getting some input on the Path Forward, and what I've got is just the -- A lot of the material for both SECOORA and BOEM are included in your briefing materials, but I've got actually just a hard copy with a list that they talk about and then those maps. All of those have been provided, and so the idea is to at least begin to provide some input in those breakout sessions, and they'll be fairly open to have some just beginning discussions on how we move forward to support that.

Now, SECOORA is actually -- We've got our meeting next week, the board and the SECOORA membership meeting and an open stakeholder session, and so there's another step beyond where we are to get fisheries input and advance this even further, and then that's just the beginning of this whole process here, and so I know some of the open-endedness of this is there, but I think seeing all the different capabilities that we've been building in the background yesterday and where we're going -- A lot of that can support advancing what the priorities are and what the recommendations and different things are, and so we want to just have some kind of frank discussions and opening those discussions on recommendations into those different areas, and both are exciting areas for our region, alternative energy and the capabilities on observing and expanding that to better utilize for fish and fishing operations and habitat conservation, and so that's my two-cents.

MS. DEATON: A good two-cents. All right. Debra, do you want to come over here to do your presentation? Debra is giving the Overview of SECOORA Observing Capabilities and Plans Supporting Buildout.

MS. HERNANDEZ: Good morning. I am excited to be here. I really appreciate the invitation, and so thanks to all of you for having me. I am the Executive Director for SECOORA, which is the Southeast Coastal Ocean Observing Regional Association. For those of you who know about us, I will apologize that I'm going to take just a couple of minutes here at the beginning to sort of give the background on who we are and what we do.

Our mission is pretty straightforward. It's to observe, understand, and increase awareness of the coastal ocean, promoting knowledge, economic, and environmental health through strong regional partnerships. We are a little over eleven years old, and we're in our second, I guess, comprehensive strategic plan, and we're just finishing up year-two of that plan. I will highlight just a couple of things. If you read all the words, you will see that science is emphasized. We are science-based, objective, and policy neutral. We are primarily about the data and the science. We rarely take policy positions.

You will see partnership in our core values and our mission and in our strategic goals. We make a real effort to conduct all of our work in conjunction with others, like the fishery management council, where that make sense, and state and federal agencies and the private sector.

We have a majority of members from academic institutions in the Southeast, and you all might recognize some of these folks, and we also have some fisheries expertise on our board, and Marcel Reichert is currently on the board, and so is Roger. Then Mitch Roffer, some of you may know, also has some fisheries expertise. This is just a little more information on who our members are,

and you will see we have private sector folks, like Surfline. We have some state agencies, like South Carolina Sea Grant, and Miami-Dade County is our only local community, and then we have a number of universities and folks who do work in and around the coastal ocean.

We are a non-profit with a seventeen-member board. Our bylaws require geographic distribution, and we cover the Carolinas, Georgia, and all of Florida, and so we need representatives from all of those places. We also require sector distribution on our board, and so academic and private sector, and then what we call other, which includes non-profits and state and local agencies. We are a dues organization, and we have a small staff. There is myself, an RCOOS manager, who is Jennifer Dorton, and she sits in Wilmington, North Carolina. Our business manager is Megan Lee, and she is here in Charleston with me, and a part-time bookkeeper, and then Abbey Wakely is the communications director, and she is in St. Petersburg, Florida.

Our primary funding comes via a five-year cooperative agreement with the IOOS program, which is the Integrated Ocean Observing System, which is housed in NOAA, in the National Ocean Service. This is where most of our money goes, to support high-frequency radars, which are represented by the fans that you see on the graphic. They provide surface current data in real time.

We also support buoys, primarily off the West Florida Shelf and off of the Carolinas, and we support some coastal stations. We just added a new one in Charleston Harbor this year that South Carolina DNR is managing for us, and then we started deploying gliders regularly two years ago, and so with the beginning of this cooperative agreement. Some of the stations in our system have nearly twenty-year data records, and so our core is about sustaining long-term observations, so that they can inform decision-making on the coast.

A little more about our budget. We receive $2.7 or $2.8 million a year. You will notice that most of it comes -- 86 percent is from the IOOS program. We do get some other federal funding and then a little bit of non-federal funding. On the left, you will see how our funding is distributed. As I said, the bulk of the money goes to observing and then modeling, which relies on the observing data to make sure it's valid and accurate, and then a little bit to gliders, and the rest to data management, products, and modeling, in terms of the funds that go out to our partners to do work. There is about 18 percent that is program development. Please interrupt if anybody has any questions as I go through.

DR. LANEY: Debra, I have one. With respect to gliders, do you all own your own glider, or do you contract with universities that have those or other institutions?

MS. HERNANDEZ: Right now, we're contracting with universities. I am really hopeful that we might buy our first glider sometime in the next year. This came up yesterday, of how does the budget look, and I think Roger mentioned that the IOOS program did see a 14 percent increase last year, and that map of the U.S., on the top right, is a graphic of the high-frequency radar system around the country, and so, where there are colors, there are operational radars that are providing surface currents. That data can reduce the search area of the Coast Guard by two-thirds over seventy-two hours, and so it can have a very significant effect on safety at sea.

You will notice, in our region, we don't have the continuous coverage that you see in the Mid-Atlantic and on the west coast, and the IOOS Association is an association of the eleven regional associations that exist around the country, and so I manage the Southeast, and there is one in the

Gulf of Mexico, Mid-Atlantic, Northeast, Great Lakes, Northwest, Central and Northern California, Southern California, the Pacific, and Alaska.

Collaboratively, we annually lobby Congress for funding, and we launched a campaign to fill gaps in the nation's observing system last year, with a focus on closing the gaps in radar and increasing the use of gliders. We have a lot more surface measurements of the ocean that we do subsurface measurements, and gliders provide a lot of very useful data that you can't otherwise collect. If we get the funding we expect, we will be adding radar to the Canaveral area of Florida, and so on the east coast, and, as I just mentioned, we anticipate having the funding to increase our glider activities.

SECOORA is enabled by federal legislation. It's actually up for reauthorization right now, and it passed the Senate by unanimous consent in January, and we're really hopefully that it will move in the House this year. There are federal regulations that establish the standards for being certified as a Regional Information Coordination Entity, or RICE, and SECOORA was certified last year, and it means we meet federal standards for data gathering, management, and long-term archiving, and it also means that we operate inclusively, transparently, and by soliciting input from folks like you.

As you do, we contract with somebody to manage our data systems. Axiom Data Science is a private company, and they are currently handling all of our data management activities. I encourage you, if you haven't, to take a peek at SECOORA data portal. You will see 2,300 datasets, and we're highlighting some of the data we have from gliders right now, and, again, one of the big components of certification is that gold seal on how we take care of our data, and it means it is as accurate and reliable and useful and meets all the standards that the federal government requires.

This is just a reminder. People seem to forget that SECOORA is not just the South Atlantic Bight, but we also cover the Keys and the west coast of Florida. About 30 percent of our funding annually goes to that Gulf of Mexico work. In case you don't know what an HF radar looks like, those antenna on the beach in the bottom-left picture are the high-frequency radar. Then, on the top, on the left, you will see a coastal station and, of course, to the right is a buoy. We also have some modeling work that we support. How's the Beach gives advisories related to swimming in Sarasota, Myrtle Beach, and it's just beginning this year in the Charleston area.

The near-term priorities for SECOORA are recovering from the hurricane. The radar systems are antenna connected by cables along the beach, and you can have from two to a dozen antenna, and so, when there is beach erosion, they experience significant damage, and so we are actively working to get hurricane supplemental funds to repair that damage. We have also this year focused on adding acoustic sensors, largely because we think it's really important to also collect biological data in addition to all of the physical oceanographic data that we've been collecting for years, and I've already mentioned filling our gaps in HF radar and increasing our work with gliders.

We also sponsor the Southeast Ocean Acidification Network, and we're looking to leverage that buoy and coastal station infrastructure by adding ocean acidification sensors, and then we also ramped up our student opportunities, quickly. We saw a million dollars' worth of damage as a result of the hurricanes. Given the fact that our budget is just around $2.5 million, that's a huge impact that we really can't address without additional support. The fans in red, and so the ones in

Miami, were completely destroyed, and one of the ones off the Savannah area was completely destroyed. The ones in yellow have had components damaged, and a lot of these are still not operational, because hurricane supplemental funding is hung up in Congress.

A little bit about our student opportunities. We work closely with our academic partners, but also with some sensor developers, like YSI, to train and support the training of the next generation of ocean experts. We lost one of our staff members a little over a year ago, and, in his honor, we raised $50,000 last year, and so we'll be making an annual award to a student in perpetuity. These are the winners of our data challenge, which we started last year, and each student won $2,500, and they are creating products using some of the data from our data portal.

Roger attached a lot of information for you and for our discussion today. SECOORA has worked on many observation plans over the years, and the ten-year buildout plan was created in 2011. There were no funding constraints on that planning exercise, and it's sort of like a chicken in every pot. There's a lot in there and not much about what the priorities should be. We did a build-out plan amendment last year as part of the certification process, which generally spoke about where there are major gaps and where we would like to fill some of those, both with moorings and with high-frequency radar.

In working with the board over the past year, they have directed us to segment the plan into what we're calling technology plans. We are currently updating the high-frequency radar plan, which was last published in 2011, and we're working on a mooring and coastal station plan, and then, additionally, gliders, and then the last thing we'll take up is models.

What you see on the right are our plans for glider operations. We are trying to run about six missions a year. Any of you that have done field work know that there are always glitches. One of the gliders that we put in last year was out for a day or two, and a fisherman saw it transmitting. When they transmit the data, they just sort of float on the surface, and they thought something was wrong, and so they scooped it up and brought it back to the dock. Luckily, we recovered it, but it sort of created a lot of logistical challenges for that particular mission.

We currently don't have the funding to support the glider missions depicted on the West Florida Shelf, and so that's a priority. Roger, I don't know if you made a map, but I gave you some data on what was actually flown over the last year, and it doesn't exactly line up with what our plans are, and so we can take a look at that later.

For modeling, we support one regional-scale model. Dr. Ruoying He with North Carolina State University and his team do that work. The graphic you see is his model prediction for Hurricane Irma, which was remarkably accurate. We also do some other model support, as funding allows. We have never really had a plan for that work, and so we will take that up over the next year.

Roger mentioned our annual meeting, which is next week, right here in Charleston, and we would love to have you join. If you're not registered already, let me know. It looks to be our largest meeting yet. We have about ninety people planning to attend. There is a fisheries session on May 23 at 1:30. You will recognize some of those names, if not all of them, and John Quinlan will be here, and Ben Hartig will be here, and then Lad Akins is with the Reef Environmental Education Foundation. I know there are potential citizen science efforts that they're doing that might be of interest to you all if you're not familiar with them already.

Then, on Thursday, we're having a workshop on our data portal, and this came up with you all yesterday, and you've got an amazing system and information, but it's not that helpful if people don't know how to use it. We're in the same boat, and we will be offering training on Thursday for that.

To close, I think there are lots of opportunities for collaboration. Roger sits on our board and represents you well. We do share data, and I know that Roger has pulled in Dr. He and other experts on ecosystem modeling and how that relates to the modeling work that we already support. I do think some additional opportunities could be realized to talk about glider mission planning and the timing of when they're out, to align with things that might be of interest to you all for particular stocks, and I think there may be some other opportunities with the high-frequency radar data. It gives you real-time surface current maps, and, if you know something about the timing of when spawning is occurring, there might be some useful applications with that data.

Maybe you all know about this, but the Nature Conservancy's South Atlantic Bight Marine Assessment, they launched the product in the last week or so, and I think it was funded with the South Atlantic Landscape Conservation Cooperative funding, at least in part, and they have developed some really nice data layers, looking at habitat and linking it up with marine mammals and other biological information, and I just wanted to make sure that you all were aware. Mary Connolly with the Nature Conservancy would be the person to contact about that. That concludes my formal remarks.

MS. DEATON: Thank you, Debra. It seems like it's come a long way since I first started hearing about it. You have a lot of stations out there.

DR. LANEY: Debra, two comments relative to the gliders. Have you all put acoustic receivers on your glider missions?

MS. HERNANDEZ: Yes.

DR. LANEY: Great. I'm glad to hear that, and the other question is, because I know that East Carolina has one now that they are looking for partners to use, is one of the big costs for these gliders is the insurance costs, and I was wondering if you knew whether there has been any discussion -- I was thinking maybe the universities, all those who -- Maybe universities and agencies who have gliders, and I wondered if they pooled together that they might get some sort of a reduced rate on the insurance, because it seems to be such a huge part of the O&M costs for these glider operations.

MS. HERNANDEZ: We are actually actively investigating that, in part because of all the damage from the hurricane. Most universities are self-insured, which means the administration sort of decides whether they're going to find the money to replace equipment that gets damaged and lost. Actually, we have an insurance representative that will be at the SECOORA meeting next week, and this is an item on my board agenda on Tuesday. We are looking to pool not just members in our region, but, with the IOOS Associations across the country, to do exactly what you said, try to get more reasonable rates.

DR. LANEY: That would be terrific.

MR. HOOKER: This question kind of follows on with what Wilson was saying about the gliders are going to have acoustic data collection. My tie-in was with your RICE certification, and congratulations. I know that was a big deal for all the ocean observing systems. Is the acoustic dataset part of your current data architecture? Then my other question was is there a biological component to your current data architecture?

MS. HERNANDEZ: There is a biological component t to the data portal. If you opened it up, you would see a lot of information from Florida, probably a lot of the same information that you all have from FWRI, and we have just started on acoustics. We funded a pilot project two years ago now, and James Locascio integrated acoustic sensors to one of the coastal stations in Florida, and he processed the data for that project, and so it's not downloadable from the portal.

There are new acoustic receivers that were installed on four buoys off of the Carolinas, in partnership with the Smithsonian, and they are processing that data. The receivers on the gliders are active, and so they occasionally get pinged if they happen to pass a tagged animal, and that information is sent to the animal telemetry network for our region, so that they can process it and let the owners now and get locations. My understanding is -- I spoke at a consortium for ocean leadership, forum, a year-and-a-half ago, Sound in the Sea, and my understanding is there is still a lot of work to be done to develop data standards that are consistent, and so, for that reason, it's a work in progress.

MR. HOOKER: Thank you. I know that's a challenge that a lot of us are facing, and so I was just asking to see how far along you guys were in that discussion. Again, thanks for the clarification on the gliders, and so they're only listening for that small-frequency band for tagged fish, right, and it's not doing --

MS. HERNANDEZ: Currently, that's all we're doing. I think you might hear about some other work that is a little different.

MR. HOOKER: Okay, and so I guess a quick other -- On the biological data side, on your data management, can you maybe briefly touch upon what's in that data architecture currently for biological data?

MS. HERNANDEZ: It all has metadata. We can't -- Since we're certified, any data that comes through our portal has to meet federal requirements, which are primarily that you follow the best practices and you have consistent and reliable metadata, and so, depending on the dataset, you can look at the standards that were used, and some are state agency datasets on turtles, and the states do it differently, and some of it is bird data, some of it, but, when you look at the data, you can get right to the metadata and right to the source. Anything that's on our portal also is sent to NCEI, the National Center for Environmental Information, for long-term archiving.

MR. HOOKER: Okay. Thank you.

MS. HERNANDEZ: I'm not sure if I answered your question adequately. I can push it to my data manager and get a more comprehensive answer.

MR. HOOKER: It's fine for now. Thank you.

MS. HERNANDEZ: We might could pull it up and just take a look real quick, if that -- I don't know how we are on time.

MR. PUGLIESE: Brian, one aspect -- I think you're probably wondering about some of the fisheries information and fish data, et cetera, and a lot of that -- That's some of the ongoing discussion, but a lot of it has been building from our SEAMAP data portal as the base for fishery-independent surveys. Then, as you saw the SA Fisheries, that is developing the spatial distributions, or spatial information, associated with a lot of that information, and so the intent is to have crosswalks between the different systems, and so those are some of the things that -- Then the REST system capabilities, et cetera, that we were talking about, to better align and connect the observing capability information with habitat and with species information that we will be serving through the existing services, and so that's something that is an ongoing activity, because it's done differently in other places.

We've built an entire data system as well as the spatial connected system, and so we don't want to reinvent the wheel on these, but we're in the same situation, in terms of any of that type of information that actually is distributed. Some of it has to be in a process form, because of getting to point locational information, and we always run into issues on some of that type of thing, but it also has to meet the data standards, and FWRI serves all of our information, and so they are pretty meticulous on making sure that metadata and data standards are complied with, anything that goes online, and so, again, my point to that is on the fish information, fishery information, we're discussing how to better -- That's one of the reasons why we were having this discussion, is to better connect and serve or be able to merge these different types of information, so that you can look at this.

MS. HERNANDEZ: The one thing I would also mention is Axiom Data Science is the data manager for one of the marine biological observatory network projects that is led by Dr. Frank Muller-Karger out of the University of South Florida, and so all the biological data that has been gathered for that project is also available via the SECOORA portal.

DR. LANEY: Just one follow-up, tacking on to Brian's question. I know that -- I think that when ECU sent their glider out for the first trip that they had acoustic receivers on there for detecting marine mammal vocalizations as well, and is that kind of where you were headed on that, because I figured you guys would be very interested in those sorts of data also, and I think Roger partnered with Doug Nowacek and Andy Reed at Duke in putting that one on there.

MR. HOOKER: Yes, and we're definitely interested in both the tagged fish and the low-frequency vocalizers as well.

MS. HERNANDEZ: SECOORA also provides administrative support to the Florida Atlantic Coastal Telemetry Network, FACT, and are you all familiar with them? They're an affiliated program, and so we're hosting -- It's actually not live yet, I don't think, but we're hosting their website, and we also serve as their data node for the ocean tracking network, and so, as soon as they let the data go, we are -- They want to publish, but we expect to get funding to support a data manager for FACT, and I was going to -- They have arrays off the Caribbean and off of the whole east coast.

MR. HOOKER: BOEM does participate in the FACT array, and we have an array off of the Canaveral Shoals, and we're active in the Mid-Atlantic and the Northeast as well, but my question was more just as -- I think it's more along what Roger was talking about, just the challenges we have in data archiving and sharing data, and I was just trying to figure out where you guys were currently and how BOEM might be able to plug in as well, and so it was more of a broad question.

MS. HERNANDEZ: There seem to be more sensitivities within the animal telemetry community about releasing their data. We're going to get funding from the steering committee that's going to come through SECOORA to fund the Georgia coastal array, and I have already talked with that manager about letting that data go as soon as it's available, and so, where we can, we're pushing the envelope a bit there.

MR. HOOKER: We're doing the same with all of our contracts. We don't have any in the South Atlantic right now, but, in the Mid-Atlantic and Northeast, we require that they are submitted to the data nodes, whether it's Matos or just the big animal telemetry network giant node, and so thank you.

DR. LANEY: Just to tag on to that too, I know there are sensitivities about that, and Lisa could speak to that, with respect to the recent Atlantic sturgeon assessment and the analysis of all those data, and I know we had some issues, I think, and I just heard about it secondhand, and I don't know firsthand information, or neither one of us do, but it was an issue.

MR. PUGLIESE: Thank you, Debra. I think it sets the stage for additional discussion in the breakouts, and I think it also sets the stage for the next presentation by Laurent. What we were trying to do is to take the next step beyond here and then begin to look at very specifically applying some of the technology to advance our understanding of species and fish and different things that would go into characterization and potentially assessment as we move into the future. With that, I will pass it over.

DR. CHERUBIN: Thank you, and thank you for having me here and for giving me this opportunity to present some of the work that we've been doing. I just want to follow-up on acoustics in general. Basically, for this type of data that we can talk about, this data from telemetry, and so we need to tag a fish, and you need a receiver to listen to the presence of the fish, through the acoustic tag, and you also have active acoustic data that gives you basically -- It's based on backscatter from active sensors or sonar data that can be used for fisheries as well that now it has advanced so much that you can, based on the echo and basically the target strength and the frequency response, you can identify the species to the individual, basically.

Then you have the passive acoustic data, which is what I'm going to talk about here, which is to listen to the sound in the ocean. By doing that, you realize that, depending on the frequency range you are listening to, you can identify different types of animals, and so mammals in the high range, or sometimes the low range, but also fish such as groupers, which I am going to talk about here, in the very low range frequencies, the fifty to 100 hertz. The advantage of those frequencies is that they propagate really far, and so you can pick them up with moving vehicles and autonomous platforms, such as gliders, relatively far away.

First, let's talk a little bit about the spawning aggregations and the life cycle of spawners, in particular groupers. As you know, every year, adult mature fish gather at specific locations near

the shelf break at a specific time of the year, a specific phase of the moon, and, all together, they will release their gamete and hand the fate of their larvae to the ocean, and, by some miracle, those surviving larvae will make it back to the nursery habitat, all the way across the shelf. Then, as the fish, the larvae, move to the other habitat, then the life cycle is completed that way.

If you look at the distribution of those spawning aggregation sites, this is an example in the Caribbean. This is south of St. Thomas in the U.S. Virgin Islands, and you see there is a little rectangle on the shelf of St. Thomas, and that's where one of the multiple spawning aggregations of groupers in the Virgin Islands exists, and, also, if you go around Puerto Rico, you will find those aggregations distributed along the shelf edge.

If you go around the Caribbean, for instance in Belize, you see the same kind of attributes to those spawning aggregation sites, which is remote from shore, next to the open ocean, the pelagic ocean, and near promontories, in that instance, and, if you keep going north along the Yucatan Peninsula, you will also find a lot of spawning sites near the shelf edge, which makes those locations usually difficult to access, in general, and particularly during the spawning months, which is, for groupers, as we know, mostly in winter and a little bit in spring.

This is an example of known spawning aggregations in the Southeast, and, as you can see, they are distributed along the shelf edge, and, as you know, surveying those aggregations during the winter months is, most of the time, impossible. That is where the use of autonomous platforms that can replace the human presence can be valuable to assess the dynamics of those aggregations.

An example here on the right is gag grouper, whose aggregations have disappeared from Florida since the last ten years, and then there's been a recovery since the closure of grouper fishing during the spawning season of gag grouper populations in Florida, but we don't know where those aggregations are, and so, if you're not in the water during that time and that specific location, it's difficult to identify where they are.

If you keep going to the Florida Keys, those yellow dots show you where more aggregations were observed, and this is particularly true for snapper aggregations. As you see, there is many of them, we have been getting an idea of their status, recovering or declining or variable, and you can't survey all of them at the same time, and so it's a difficult logistical challenge, basically.

Basically, our idea is based on species, in particular groupers, and the question here is how can we use the sound that they produce to identify them. If you look at these four species of grouper that I have laid out here, starting with red hind at the top, Nassau grouper, yellowfin, and black grouper, they all produce sound in a specific range and in a very specific way during spawning aggregations. Those sounds are called courtship-associated sounds, and they are species-specific, and, as you can see here on those different diagrams, which are spectrograms, and so it's the frequency distribution over time.

First, you see that the range of the frequency is between 150 and 250 hertz, and so really low band. If you go to the upper-left diagram, that is specific to red hind. Then, if you look to the right of this, of that one, that is specific to yellowfin grouper. Then if you look to the middle one, that is specific to black grouper. The upper-right is Nassau grouper. If you look to the bottom ones, that is specific to yellowfin, but you have two types of sounds. You have what we call a tonal call,

which is on the right side, and so you see how the frequency basically converges together and goes down in the frequency, and, on the left, it's more like a pulse, like a drum beat, basically.

You can use that information to identify a unique behavior of species, and so what can we learn from those sounds? Basically, we can study the dynamics of fish spawning aggregations, and we can discover new or returning or recovering spawning aggregations by just scanning the shelf and listening for those sounds, but also you can understand the relationship between the fish presence and the site, the habitat, what I call the spawning habitat and the spawning habitat constraints.

I am going to show you an example here of that very close relationship, and so this is the spawning site in the Virgin Islands, which is called Abrir la Sierra, and what you see is the blue bars basically are the number of calls per hour for each day, and it starts five days after the full moon. As you see, the number of calls starts increasing from five days after the full moon to the peak spawning day, which is basically four days after the full moon, but what is also interesting here -- That number, of course, decreases as you move away from that spawning day, but what is also interesting is -- On the left side, I have the current magnitude. On the right side, in green, is the current direction, and you can't see it very well, but I'm going to tell you what happens.

What we see is that, as the current magnitude increases and gets minimal over that entire time period, that's when we get the peak spawning day and the peak spawning calls, and so there is a very -- This type of relationship has been observed, and we are currently working on that, establishing that connection, for specific locations of fish spawning aggregation sites between basically spawning activity and current magnitude and direction.

In relation to that, you can study fish spawning behavior in relation to their spawning habitat constraints and evaluate, for instance, the effect of the presence of predators, of fishing pressure, temperature, and other environmental variables, such as water quality, water clarity, and other environmental conditions.

Ultimately, you can use the sound production to get an estimate of the relative fish abundance from one year to another, for instance. If you come one year and you have a lot of calls and then you can validate -- You can use those calls and accounts from divers to get a correlation between the number of calls and the fish presence and use that in the future to get an idea of how your spawning aggregation stock, basically, is evolving. From all that information, you can relate fish abundance, fish calls, and other environmental variables into a nice principal component analysis to understand the relationship between your aggregation and what has happened and the pressures and the constraints on their spawning habitat.

We can identify them, but how far can we hear them? If you use a simple what we call a sound level transmission loss model in the ocean, you can estimate, for a given frequency, how far the sound is likely to propagate, and, of course, there are constraints due to environmental factors, such as the water temperature, the water depth, and the bottom substrate, but, basically, with a simple low, you get a good, valid estimate of that propagation distance, and so, knowing the average source level of those fish, and so how loud the sound is, knowing the ambient noise made by waves breaking at the surface and by shipping, and so ship noise, and knowing the transmission loss at about 150 meters, which is about twenty-five dB, you get a detection threshold of about forty dB above noise level, and so, if you have a hydrophone that is sensitive enough and you are less than 150 meters away, you can definitely capture the sound produced by those fish.

Some people have had the idea of using gliders, as we saw, as we heard earlier, to monitor the presence of some species and also, in particular, fish spawning aggregations in the water using autonomous platforms, and they started with sub-sea gliders, and, as you may know, you had similar experiments that went on in 2014 on the West Florida Shelf, where they looked at red groupers.

More recently, in the Southeast U.S. they also were able to identify the presence of red groupers, but the inconvenience with that type of platform is that, once it's underwater, you don't really know where it is, and the error on the precise location of those gliders can be up to ten kilometers, and so you may hear the sound close by, and, if you want to go back exactly to where you hear the sound, you have a narrow estimate of one kilometer from where the sound was produced, and so it would be really different to go back to that specific location, and so that's one of the challenges in using sub-sea gliders.

This really caught our attention, and what we thought about is what other platform do we have at our disposal that would give us -- Because, as you know, and I maybe didn't insist on that earlier, but the spawning site is a very key element to where the aggregation is going to be, and so you need to know that precise location, and sometimes it can vary by a few hundred meters from one year to another, for reasons that we don't really know.

Anyway, now we have platforms, for instance here the Wave Glider, that can provide that very precise information in terms of location, because you are basically continuously connected to that platform as it operates at sea, and so the Wave Glider, for instance, can conduct long-term oceanographic deployments, because it's solar powered, and, also, its mechanism for propulsion is waves, and so you don't have to generate any mechanical energy. It is generated by nature for you, and it provides a web-based interface that transmits control system and sensor data information in real time, that you can access in real time, at any time. You can also have a large payload that it is not possible to have on regular sub-sea gliders, and so it's a very interesting platform that offers generous capacities.

What we did is that we created what we call the passive acoustic monitoring system, which integrates environmental and acoustic sensors all managed by a single board computer that is integrated into the Wave Glider command unit, and so, when you run the Wave Glider, you basically have this web page where you can access all your sensors and all the command system and make it do all sorts of things, and this basically happens in real time, especially when you navigate in regions where you have a lot of traffic, but also high currents and those sorts of things.

The current payload on our system, we have an ADCP, which is a 600 kilohertz RDI that can basically measure current down to fifty meters. We have a sonar, and it's a small recreational sonar, and so it's a fish finder, basically, but it has these capabilities which gives you basically an estimate of the relative size of the fish that you're looking at, so you can see whether you're looking at plankton or a bigger fish chasing the plankton and those sort of things.

We have an onboard pressure sensor, and so what is interesting about our glider is, if I go back here, you have the surface floats, and, below that, you have the wing section, which is the propulsion system of the glider. In addition to that, in the tail of it, you have what we call a thrudder, which is the thruster and the rudder at the same time, and then, as shown here in blue,

we have a towfish, and that's where the PAM was installed on it. The towfish is towed behind the glider about eight to ten meters below the surface, and it trails behind by about ten meters behind the glider.

The whole system is silent, because it moves slowly, but also the wing system is really well designed, and it produces almost no noise in normal sea state. When you get to high sea state, the pull on the cable creates that what we call cannon effect, and you get really, really loud cannon-like sound from the pull on the cable, but there is a way to mitigate that.

We have also environmental sensors, fluorometers, and we can measure CDOM and chlorophyll-a, and backscattering, and, all that system, the PAM is on the towfish, and so it's trailed behind the glider, and then we have very highly-sensitive hydrophones that we have in the frequency range that you see below, which is from two hertz to thirty kilohertz, which basically allows you to hear sound coming from groupers, for instance, as well as whales, and so we have all this data, but, for my purposes, I only look at less than 500 hertz, but, if anyone else is interested in looking at the rest of the data, it's really -- You have access to it.

This whole system is, very importantly, silent, and it's self-powered. We used to have acidity, and that requires a pump, and that pump makes noise, and so got rid of it, and, instead, we use a YSI self-logging multiparameter sonde that collects pressure, pH, temperature, salinity, and dissolved oxygen, and so you have even more data than just acidity. Then, in addition to that, as you see, it's a very versatile system. You can plug all the sensors, and we use the Remora hydrophone as a backup, for instance, and we use a VEMCO VMT receiver for acoustic telemetry, and we put all of that on the towfish.

What the whole system looks like is that, and so that's the towfish with the whole package, the hydrophone housing, the Remora, the C3 sensor, the VEMCO receiver, and then the controls that run all of that in real time, and so that was on the deck of the Nancy Foster on a cruise in the Florida Keys, and I just want to give you a little idea of what it looks like when you operate the glider. That is the glider in the water. As you see, the towfish is trailing behind, and that is how it goes around.

All right, and so we collect that data, and what do we do with it? Well, in order to avoid having to wait for it, I go to it and analyze it and have someone see it and look in the spectrograms for calls that look like the grouper that I showed you earlier, and we said, well, why don't we build an automated algorithm, an automated system, that would do the detection for us, and that's what we did here.

We developed something called FADAR, which is the Fish Acoustic Detection Algorithm, that runs in real time on the PAM system, and so the PAM records ten-second audio files every thirty seconds, and those audio files are analyzed in real time by FADAR, and, if you get a detection, it puts out a three-second snippet, and then you can go through the web interface to the basically data center on the glider and pull up the snippets. That comes with specific location, latitude and longitude, of where the sound was recorded, and so you know exactly where you heard that sound, and then you can call your divers and you can go on the site and basically verify the aggregation, if you can access it. If you cannot, that's why we have the sonar, because the sonar will tell you whether you have fish in the water or not.

How this FADAR works is basically we have -- This is the schematic given to you here, and we have this signal acquisition, and some of the noise is removed, and then, because we use spectrograms, we do what we call a feature extraction, and so let me take you back to your college calculus class. What is the feature extraction? Remember when you take the transmission signal and you get coefficients, and those coefficients, if you use them, and we combine them with the cosine and sine function, and you can rebuild the signal itself, but it also means that those coefficients described -- You need the signal that you just transformed, and so we do the same thing for that. For each of those sounds, we can build a suite of coefficients that will identify uniquely the sounds produced by each of the fish, and that's how we make the detection.

Then you put this into what we call a classifier, and that's where the -- You have to train the classifier to tell it to look at this is red hind and this is yellowfin, et cetera, and you do that with a lot of data, and so that is how you finetune your classifier, and so that's how it works in your cellphone, basically. For Siri, that's exactly what it does, or Alexa, if you prefer.

You create your training library, and then that training library is basically implementing the algorithm, and the method that we call it here, which is called the mel frequency cepstral coefficient, shown here, it converts a linear scale spectrogram into a mel-scale spectrogram using the formula that is shown here, which makes it maybe more likely to adapt it to the kind of sound that we are looking for, and so that's the whole principle behind it.

We took all of that and packaged it, and we had a grant to do all of that, to develop that system, and we took it out in the field, but, first, one of the things that we did is we evaluated the performance of the algorithm. We evaluated the performance of the algorithm, and so we took a student, and basically we trained him to recognize the different sounds, and so we had human detection versus machine detection, and that's what it shows here, and so that's data from another site called Bajo de Sico in Puerto Rico.

The colors shows you the machine detection versus human detection for each species, and so let's say blue and let's say brown/yellow is for Nassau grouper. Then, if you look at red and light blue, it's for black grouper, and, through the month, the number of calls and how they were determined, and so what we found is that there is a relatively good agreement between human detection and machine detection, and so we published those results, if you are interested.

We took it out in the field, and our first survey was just of Florida, off Jupiter, where you have every year massive aggregations of goliath groupers, and, as you know, people go there, and it's really a hot spot for diving with goliath groupers, and those groupers are usually hanging out on the wrecks out there, and so our first idea was let's go survey the wrecks during the night and see if we can get some calls and sort of map out the dynamic of this aggregation.

What happens is my engineer confused the coordinates of the wrecks, and, as you see on the upper right, the glider never made it to the wrecks, but, by some miracle, that point is two kilometers away from where the grouper are hanging out, and that's where we had detection of calls, and in huge numbers, in a way that is very similar to observation on the west coast, and, if you ask me the question, I really don't know the answer, but goliath grouper, for some reason, will start mating or producing those calls at a very specific time, which is let's say 9:27, and end their calls at 11:32. If you go on the west coast, you have exactly the same pattern at the same time in the same sort of specific timing. I don't know what the timing is based on, but it's what we observed, and so we

could take that call period and basically overlay it on the call period on the west coast, and it's exactly the same, and so that was an interesting discovery that we made purely by accident.

Then we went -- In the Caribbean, we had planned to take that glider to the Caribbean, and I show you here the Marine Conservation District. It's off of St. Thomas, and there is yellowfin grouper detection, and the yellow dots further to the left is right at this site called Grammanik Bank, which is a very famous spawning site for yellowfin grouper in the Virgin Islands, and, basically, the glider confirmed -- We confirmed the presence of yellowfin. We confirmed that the glider was able to detect yellowfin sound at a known aggregation, and so that was a sort of validation of the glider capacity.

The next year, we went back, and we were looking for red hind, and the same thing. We were able to really map out the red hind distribution at the fish spawning aggregation south of St. Thomas and at the MCD, Marine Conservation District, areas. The red circles show you the red hind fish detection that we had, and that was a very strange year, because they had a giant aggregation in January and a very small aggregation in February, and the fish were almost scattered around, and so that's why we have this scattering of the calls, but the most interesting part was -- We took the glider, and we sent it to Puerto Rico, and, in Puerto Rico, at Abrir la Sierra, they had an idea that -- They knew one specific location, aggregation, for red hind, which is the one at the top of the diagram here, and they had an idea of another one for the south, but they didn't know exactly where it was. The glider was able to pick it up, and then I was asked not to show you something else about the presence of the finding of a new aggregation, the returning aggregation, of Nassau grouper in Puerto Rico, and so we also found it, and it's not shown here.

Then we took it to the Keys, and that was during the summer, and so no grouper spawning aggregation, but some big snappers, like cubera snapper, aggregation and also mutton snapper, and so we are trying to see if there were some species, multispecies, gathering at those aggregation sites, and so we did -- What I show here is the number of calls from -- At the top, you have the glider path around Riley's Hump, and so this is Riley's Hump, and then the middle diagram shows you number of calls from red grouper, and so these are the black dots, and then, to the upper left, the red and blue are the location of where cubera snappers seemed to aggregate.

Then the lower diagram shows you the distribution of squirrelfish, a very noisy fish that likes to hang out around aggregations, and so, anyway, you can get a clear idea of how some species assemblages are distributed and organized around the system, and you can also correlate their presence with water quality, and Riley's Hump is very interesting, because it's close to the loop current.

The loop current impinges on the shelf, but the tide controls the impingement of the loop current, and so what I show you here is -- You have to look at this diagram as the motion of the glider over time, and, as the glider moves over time, of course the tide changes, and so what you see is the light green dots show you basically the low-salinity water, and the red ones show you the high-salinity water. What we observed is that, as the tide was pushing the loop current, we got water coming over -- There was shelf water coming over Riley's Hump, and, as the tide reversed, then the loop current came closer and basically it was flowing over Riley's Hump, and that's why we get this high-saline water, and what we notice is that, depending on the species -- The aggregation, for instance, of cubera snapper was more on the loop current side and the mutton snapper were more on the shelf water side, and so these aggregations shift with the choice of the aggregation

depending on the species and based on the environment and the dynamics of the system there. That is possible.

I guess I will give you a beautiful picture of the system, and we still have challenges. One of the challenges would be the false alarms, and so the false positives, and so we're working on that, working on new algorithms to do that. The other problem is that the surface noise, in particular the wave breaking and the boat noise, can really affect the detectability of the calls. The other thing is, as you noticed, we don't have hydrophones close to the bottom, next to the aggregation. We are pretty far away at the surface, and so we get distortion in the water of those calls, and that's what I show here.

For instance, if you remember the nice diagram that I showed you earlier, you can see, on the upper-left diagram, the Nassau calls, which looks very different, and then you have your yellowfin to the right, and then you have the red hind. The two bottom plots show you the red hind, different types of calls, and what we notice is that, in nature, in an aggregation, you have variations within the call for one species, but also there is other factors that change the sound, the frequency distribution, the energy distribution, in the sound. Once you know that, you can train -- We train the algorithm to learn about those in the future and increase its capacity at detecting this type of sound and identifying the species that are there, and so that's some more that we've been doing.

Then we also are working on finding a way to get an estimate of relative abundance. For instance, we could use divers or sonar to quantify biomass. You know that now you can -- On FAD systems, you have tuna buoys that will give you a very precise estimate of the biomass that you have below the buoy, and so we're thinking that that may be a way to also get an estimate of the biomass at those spawning aggregation sites.

Then we are working on a new algorithm to add not only new species, like goliath groupers, but also any of the species may be of interest to fisheries or to science in general, and I just give you an example here of maybe buzz words that are around, like deep learning, deep neural network, long short-term memory, et cetera, et cetera, et cetera. Then I guess I will leave it here, and these are all my partners in this endeavor and the people that have helped me in the field and the fishermen, like Captain Silva in Puerto Rico, et cetera, and so, if you have any questions, my contact information is here, and I thank you for your attention.

MS. DEATON: Thank you very much. That's amazing. I heard your webinar your other day, but it was easier to hear you here. I think this really gets at the sensitivity issue again, too. The spawning aggregations is really what we need for conservation, but it tells you where to go, too.

MR. HOOKER: My question is just regarding future deployments. Do you have, like in the Southeast, planned future deployments right now, or do you have any long-term -- Basically, do you have any long-term monitoring agreements signed up for the use of this?

DR. CHERUBIN: We are waiting to get signed up to do that, but I would love to, and so I want to say is that the system is also available for use by anyone or any association or any institute who wants to benefit from that system and deploy it. We have a daily rate that we've been working on, but we don't have any plan right now to conduct monitoring of any kind, but that's something definitely that I would like to see coming.

MR. PUGLIESE: This is exactly why Laurent -- That's why Harbor Branch and FAU, and we've been discussing the beginnings of these in the background before, and we're really getting to the stage that advancing this technology and aligning it with being able to do this type of characterization is pretty critical for fisheries needs. We are advancing, and we've established spawning special management zones, and we've got marine protected areas, and we've got a lot of places where we can really begin to address what we have in the system management plans to talk about characterizing the use of it, and we also have the opportunities to take this information and integrate it into other developing systems.

We have talked before about Ecospecies and expanding the entire Ecospecies to integrate the characteristics of the individual species, and now, seeing those laid out, then you can actually put it in and work with some of the other partners, like Grant Gilmore, in terms of the actual sound bites, some of the newer ones, and build a library and build the characterization and then figure out we can get resources to actually expand that type of work to do this.

This is exactly one of the key things, I think, that we really need to take advantage of that and work with SECOORA and work with the partners and work with BOEM where we can do this and figure out how to advance the capabilities and technology, because it's really cutting-edge, and it has opportunities to do what has not been able to be done before, but it also brings that whole aspect of really understanding the sound nature of the systems.

BOEM has done a really good job of bringing that from the beginning, right from the beginning, of understanding what the sound characteristics of the ocean are, and I think we need to get baselines on that and then understand the species use and the habitats and everything with sound as a parameter of the other environmental components, and so I think this is excellent, and it does really translate why these ocean observing capabilities and technologies and needs really begin to align and advance further with the resources, and that's the key, to find the resources to make it happen.

DR. CHERUBIN: Thank you.

MS. DEATON: Any other comments? I think one other interesting thing that -- To be able to use this to identify the key spawning aggregations for protective measures, I guess you need to look at how typical is it, and like go back again and again and make sure it's -- Like is it a one-time thing or how often is that an area that is used by who and how variable or not.

MR. PUGLIESE: I think one of the really important things is, as we begin to expand this kind of capability, finding locations, they may not necessarily be spawning aggregations, and I think that's one of the issues. We get a little wrapped up into that terminology, and people get concerned, but the spawning locations, to be able to see that really -- One of the things we were trying to set the stage with, with even specifically the spawning special management zones, was characterizing what are the physical characteristics that really are defining this, so that, once you begin to build the structural characteristics and the oceanographic and temperature and all those other variables that are providing that, then that could actually be something that we could figure out how to use that to be able to reach out beyond, along the same depth contours or whatever, to see where other areas like that may be.

Also, the fact that that may be -- During this season you have those species, and similar to -- I always look at these offshore areas as similar to some of the nearshore areas, say right in our backyard right here, like Dynamite Hole in Charleston or whatever, and you've got like black drum spawn at a certain time in that area, and trout spawn at a different time, and red drum spawn, and so they're using the physical characteristics and accomplishing the same task, in terms of spawning, and so it's such a key thing to begin to do that, but that idea of building something that provides a mechanism to then look beyond where we are now to use those dynamics to identify other areas that may be as significant or are part of the network of those systems is where we're trying to get with the whole idea of creating those areas.

DR. LANEY: To take that one step further, Roger, it seems to me that not only can we look for new sites once we understand the physical attributes, but why not use it to design artificial reefs too, to take it that one step further? You could design your own spawning sites.

MS. DEATON: Thank you. Now we're going to shift over to BOEM and energy development, and I think Brian is going to talk to us.

MR. HOOKER: I will go ahead and get started here. Thanks again for the opportunity to give you an update on kind of where we are with some of our renewable energy leasing and then just an update on some of our environmental studies. I'm going to kind of run through the whole coast, but then focus on the South Atlantic when we get to that point.

Again, where we are now, we've had seven competitive lease sales, and I think twelve leases. I think we just removed one. Cape Wind, I think, is almost officially completely relinquished now, and we are anticipating two auctions for this winter off of two areas off of Massachusetts that were identified previously but that didn't receive any bids in a previous round. The total is around 1.4 million acres of federal waters that are in lease.

What I'm going to do is I'm going to just kind of, again, like I mentioned, start from the north and move south. Vineyard Wind is off of Martha's Vineyard. We received our first construction and operations plan since Cape Wind associated with that project, and we held scoping meetings recently, and that scoping period is just wrapping up.

Adjacent to that, to the west, is the Bay State Wind project, and that's Orsted. They have ongoing surveys, and they have a site assessment plan approved for buoy deployment, ocean buoys being deployed, and we do anticipate a construction and operations plan from them in late 2018. Still moving further to the west, the South Fork Wind Farm, with power going into Long Island, New York, and surveys are continuing. They have a SAP for their buoy deployment nearly complete and a construction and operations plan anticipated again in 2018.

I mentioned earlier the Massachusetts unleased areas west of Nantucket Shoals, and there is a proposed sale notice out for public comment right now, through June 11, and the Empire Wind area in the New York Bight, the planning is underway, with a SAP, site assessment survey plan, submitted in November, and it's finalizing review right.

We're also considering another round of leasing in the New York Bight area. A call for information is currently out with a comment period ending on May 21, and we recently held a taskforce meeting in New Jersey discussing those areas, and these are the areas that are being

considered. Again, we're only looking at leasing about twenty-five percent of that total area to help meet some energy demands identified by the State of New York. We're not looking at leasing all of these areas in their entirety, but we're just trying to identify what areas within these four areas can be leased.

Moving further south, off of New Jersey, there is the Ocean Wind project. We anticipate a COP from them in late 2020. Off of Delaware, we have the Skipjack Wind Farm, and we anticipate a construction and operations plan in late 2018, with power being sold to Maryland. Similarly, U.S. Wind off of Maryland, and a sight assessment plan is nearly complete, and we expect a meteorological tower, the first tower we will actually have permitted, to be installed this summer or early fall.

There is a demonstration project off of Virginia, formerly known as VALTAP, and it is now the Coastal Virginia Offshore Wind Project, which is just two turbines, and, after some changes, the Virginia Department of Mines, Minerals, and Energy, in association with Orsted, is revising the research activities plan.

Then, still moving into North Carolina, the commercial lease, what we call the Kitty Hawk Commercial Lease, north of Cape Hatteras, was executed to Avangrid Renewables in October, with an effective date of November, and we're finding it's quite common for developers, lease holders, to ask for an extension of their preliminary term. A preliminary term is initially a one-year term, after which they are supposed to submit a site assessment plan to BOEM. It's not uncommon for the preliminary term to be extended by a period of one year or more.

BOEM is continuing to work on the 2019 through 2024 proposed program for oil and gas lease sales. The Atlantic G&G Seismic Survey Permits, there are five permits being processed for incidental harassment authorizations, still. I think the last time that I updated this group, they were still under consideration. We are still hearing that they may be authorized soon, and I know, for folks in this room, that will trigger then the EFH consultation for those as well once the IHA is completed, and so there's still that EFH component, EFH assessment component, to those survey permits that would be completed after the IAHs are published.

Then, moving on to our Marine Minerals Program, of the highlights that they wanted to make, which is I think something you're working on with them, is an EFH mapper tool, and the goal of that tool is to improve the understanding of dredge impacts to sand features and EFH by identifying fish-shoal associations within that GIS framework, and it's still a work in progress, and I think they're working with both the council and NMFS on how to refine this and to really improve their EFH consultations for sand dredging projects for beach renourishment. The contact for that is Deena Hansen, and her contact information is at the bottom of this slide.

Moving on to BOEM studies, BOEM's Environmental Studies Program, again, this is -- I am only giving you a snapshot, but we do cover basically all these different categories that are on this slide, from birds and bats and social sciences to fish and fisheries as well as cultural and archeological resources, but I am going to focus primarily on the fish and fisheries aspect.

We just finished up a new study on electromagnetic fields, and that was done in Long Island Sound using existing high direct current cable, where most of the projects that we're looking at right now are using the alternating current fields versus the direct current fields, but some early indication

indicated that, with some of the longer distances from shore, that the direct current fields would be potentially something that would be stronger and would need our focus, and so I just wanted to put that context out there, that we're kind of going after what could be the largest impacts, and alternating currents would be lower than the direct currents that were measured and studied in Long Island Sound.

We are continuing to look into impacts on structures to fish and larval transport as well as creating best management practices. We did a study from basically North Carolina to Maine, and different states have then tried to fine-tune the best management practices that have come out of that document for each individual state. The primary thing that we've adopted from that project was the fisheries liaison process and fisheries representative process, and that has been adopted into guidance to developers and even included in at least one lease, and possibly future leases, moving forward.

Then, lastly, I wanted to make you aware that, just within the past couple of weeks, we have teamed with the National Academies to convene a Fisheries Steering Committee, and that committee convened a workshop in November, looking at fisheries research priorities, and the results of that study have now been published on the National Academies webpage. It's basically what they term a workshop in brief, and that is available on our -- A link to that is on our webpage, our studies webpage, and you can also just get to it directly from the National Academies' webpage as well, and, if you have any questions about that, I am happy to send you that link directly.

The one thing that I really wanted to highlight for you is, at the last meeting, I mentioned that we were doing some aerial surveys in the South Atlantic, and here is the track lines for that. We now have data, and I can pull this up, and I think the best way to do that is -- Let's see if this works. This is the website that the contractor has developed, and anybody can access it. It's kind of not necessarily developed primarily for public consumption, but it is open to the public, and it's kind of a way to communicate the status of the project to funders, but it is open to everybody.

In this particular one, this is the BOEM tab, and, if you back up one level, there is actually some other projects that are funded by other people, but, anyway, there is a data portal associated with -- From this, you can actually look at all the survey track lines that have been done to date, and so, in this particular map, what you can do is -- There they all are down here, but you can zoom in and see all the species sightings for birds, and what I can do is also take the birds off and do the turtles, and you can see where all the turtles are sighted, as well as large, boney fish, which, if you click on them, I think they will -- Most all of them are sunfish, because they're the easiest ones to see from a plane, but you can also see boats, and I guess they don't have any -- They saw no boats, or they're not in there yet, and then there is a couple of structures, mammals, and then they have one for sharks as well, and you can see that one hasn't been identified yet.

Again, this is -- I think they have only done a couple of survey flights so far, and so this is just brand-new data that is available, and you can also look at -- This is only including one survey, the February survey. That's the only one that is currently included in that, but, as each survey occurs, each quarter, they will appear and populate on this webpage. Anyway, I'm just happy to show that we're starting to get data from this project, and we will continue to update you guys on this, and you're also free to just go and play with it yourself, and so there is other information here on the top as well. The final report on that is the summer of 2019 is when we're anticipating that.

DR. LANEY: Brian, and so, the high resolution, are you guys doing it photographically?

MR. HOOKER: Yes, and I think there might be -- I don't think they have the -- I think, under the document, sometimes if there's a presentation, they will have some of the photos included there. We will get the photo library at one point at the end, but I don't think -- At this point, the photos aren't uploaded.

Another study that we continue to fund is the real-time opportunity for development of environmental observations. This is when we're actually going out in the field and measuring what we're seeing from different activities. The focus of that was primarily the Block Island Wind Farm, and we just completed a science forum on that, also, this past fall/winter. The sediment suspension from cabling report is complete, and the benthic monitoring report is complete, and the preliminary report on the acoustic monitoring, which included some particle motion studies, is out on the street already as well.

Again, a quick summary of where you can find information, and we do have a studies development plan. We solicit ideas every fall and winter period, and sometimes that winter bleeds into spring, and we're currently working on the 2019 plan right now. With that, I will -- Maybe we will hold questions until after Jeff comes up and talks about the Path Forward, I guess, and I don't know if there are specific questions about the renewable energy program or some of the studies we have ongoing, and I can take those.

MS. DEATON: Brian, just on the RODEO, you said there is the study done on the pile driving and sedimentation, and that's on the website, the study results?

MR. HOOKER: Yes.

MS. DEATON: Okay, and so just go to BOEM and we can navigate and find it?

MR. HOOKER: Yes, and so this is kind of the revamped website that we have. We do have a science year in review for 2017 that I highly recommend. It's a nice, colored, glossy thing that even on the website looks glossy, and we did that for 2016 as well. If you go to ongoing and completed studies, that's where you will find those studies, and I think most of the RODEO studies are -- They're either under fate and effects or -- Yes, and here is the observing cable laying and particle sediment during the construction of the Block Island Wind Farm right here, and I think we're also working on trying to consolidate the rodeo ones, because I think people want to go just to RODEO and see all the studies from RODEO. Right now, they might be broken out a little bit in here, but that's where you will find them.

MS. DEATON: Thank you. I guess, unless there is any other questions -- Debra.

MS. HERNANDEZ: I was just wondering about the ADEON study. I don't think it was funded by the renewable energy side.

MR. HOOKER: Thanks for reminding me of that. That was funded by our Gulf of Mexico office, and I don't have an update on what the status of that is, and I can definitely reach out to the PI on that.

MS. HERNANDEZ: That's the Atlantic Deepwater Ecosystem Observing Network.

MR. BROWNING: My name is Jeff Browning, and I'm a Project Coordinator in the Renewable Program, and so what that means is my branch of project coordinators were broken up mostly by states, and so the states I'm responsible for that are active right now would be Maryland, and so, if you had any other questions about Maryland, I could follow-up afterwards as well, and, if anything comes up for Florida and Georgia, that would be me at some point, but, right now, there is no renewable activity going on down there.

The purpose of today is to talk about the RFF that we currently have out for our proposed Path Forward, and I want to explain what that is and what it's not and hopefully solicit some feedback. The reason this came up is we have multiple leases out there, and we've done it on a state-by-state basis, kind of hodge-podge, if you will, just the way it's come out, being a brand-new program in 2009 and moving along as we could.

We also wanted to step back and look at a very high-level assessment of the Atlantic, to determine what could be the next steps, and, if you're not familiar with our process, we typically have a -- We start very early working with the states, whether the states have requested a taskforce to look at offshore renewables or if a developer has identified some areas that they are interested in, and that gets to the first big milestone, is that call for information, which is what Brian mentioned. In New York, we're at that stage now, where we have identified some areas, after discussions with the taskforce, and whittled down some areas, and those will further be whittled down during area identification, ultimately to lease areas, and so this is even before that. This is much broader and not as detail oriented.

The goal is to identify areas where we expect leasing activity or the desire to find more leases to occur over the next three to five years. Again, when I show you the map at the end, the areas that we've identified, it's not BOEM saying, okay, here's where we're going. It's just, based on these parameters that we've come up with, this is where we're expecting activity.

As I said, it's to help us understand the future planning, and a lot of that too is also, from BOEM's perspective, is resources. We're in the stage now where we have or are going to be receiving more construction operations plans, and these things are not just two-page documents. There is a lot of work involved, and so, if we can better understand where we think we're going to be expecting workload, it helps us manage our staff resources as well.

Some of the big goals here is we're really looking for the input from industry and stakeholders. If there is something that we can identify at this high-level assessment, that would be very helpful for us, and it also puts things on the table early on. If we identify some of these things early on, they're still going to be looked at during the normal processes with the call and the area identification, but it just kind of gets it out there.

The other big thing that wasn't really planned, but it has kind of come up as we've developed this, is this is really the first time that we've actually stepped back and looked at everything that we've done along the Atlantic, and so all of the assessments we've done, and this is kind of an easy, one-stop shop, once it's up on -- It is up on the webpage now in draft form.

I am not going to go through all of these. Brian already touched on these. These are the existing lease areas, or call areas, and this just kind of shows right here though what we're expecting over the next few years as far as these projects being built. Obviously, things can be delayed, but this is kind of what we're expecting, and so we have quite a bit going on over the next few years, and so, again, this Path Forward is not identifying things that are occurring right in the near future, but it's basically the beginning of the stages of the next three to five years, and we'll then have another list of potential lease areas that will be probably ten or fifteen years down the road.

Here is the big thing that so far we're looking at as what this is not. It is not replacing area identification. It is not replacing any of the information that we really want to dig into the details, and here is some examples of stuff that we know that we cannot look at at a very high level, or at least right now we don't know. With the fisheries stuff, if you guys can identify things that could be assessed at a high level, maybe not for the entire Atlantic, but maybe just for the South Atlantic or something like that, that could be very helpful.

We don't want to take away from the really good analysis that we do later on, when we actually are meeting with multiple agencies and stakeholders and talking about specific areas, and my concern is that we might lose some of that analysis early on if we just kind of gloss over it at such a high level.

Here is the factors we have come up with so far. They are written in -- They can be kind of confusing the way they're written, but the goal is so that they can basically be a yes or no, and what I mean by that is this is -- We took the approach of developing a heat map, and so the more that fit in these parameters, the darker it gets, so that the darkest areas on the overall map will show what has the most -- You know, check the box on these, and so we're going to expect to see some activity there.

I will highlight the first three. Those areas are pretty much right off the bat no-go areas. They will be gray on our map, and those are the only thing that show exclusion, and that has come up in some of the comments already. For example, the shallower than sixty meters, for right now, that has come up, or we developed that, because we know floating technology is on the horizon. At this point, it's not quite commercial, and so, since we don't expect it to be in the next two to three years, that's kind of why we went to sixty-meter depths. We are in discussions with the DOE and some of the floating folks to maybe reevaluate this, but I have to stress to them that, just because we say sixty meters, we're not excluding deeper waters, but it's just highlighting where we're expecting stuff to take off over the next couple of years.

With that, we'll start with these first things that are prohibited just by our regulations. We are not allowed to do leases in Marine Sanctuaries or National Monuments, and there's not a whole lot on the Atlantic. It's hard to see, but there is one off of North Carolina that barely -- Because it's so light gray, it -- It is there, and I was asked this at a previous presentation, and it is there, and the only other one is down here off of the Keys. Then, of course, off of Massachusetts.

We started, right here, just kind of giving a ten-mile buffer from shore. This has not been the perfect answer for everyone, but we have found that, in most cases, this has been a good starting point for visual concerns, and that's the reason it's there, and, again, there could be some areas where it could be within ten miles, but it does not mean that it's excluded.

Here is the DOD, and this is kind of what I was referring to as like everything is all in one map. Previously, all the DOD assessments were done for each taskforce, and we never really put it all together, and so, here, you can actually see what all has been assessed and not assessed. For example, nothing south of Georgia has been assessed by DOD, and the section between Virginia and New Jersey has some pretty big gaps, and the same with between Maine and Massachusetts up there, but, for the most part, we have a pretty good assessment.

We have an outstanding request with DOD to fill in those gaps and update any of the other assessments, because we want to be operating with the most current information, and that actually brings up a point that I forgot to mention. This Path Forward is not going to be -- Once we get our comments in and we're done, this is designed to be a work in progress, and so any of these factors -- If the information changes, we want to update it as soon as possible, and so it will be on our webpage updated as information comes in or changes. With that, if a new factor comes in that we should be applying at this high level, we could update it. It does not have to be tied to this request for feedback. This is going to be a policy that we are going to be utilizing for the next few years, and, with policies, we can update that and change that as we see fit.

This one is we had some feedback on the navigation. What we decided to do, again because of high level, is just identify the TSS, and there were a couple of areas that we have already identified and removed previously for shipping traffic, and we didn't want to put it at this level for an exclusion just yet based on the AIS data, because we want to really dig into that analysis when it gets on a more local scale, because, working with the different operators, depending on if it's tug and barge or container vessels, some of those areas can be shifted over, but that's just too much in the weeds for this kind of assessment, but we did want to identify that. We didn't forget about shipping when we're thinking about future leasing.

Here again is the bathymetry for the sixty meters, and we did look at -- Before this came out, we did look at the ninety meters for floating, and it really didn't change too much. I'm sure some of you all are familiar with a lot of the bathymetry out here, and there is only a handful of places where it actually adds a considerable amount of distance or spatial area, but this is open for comment and discussion.

MR. PUGLIESE: Just to make sure I'm -- It's an exclusion beyond sixty meters?

MR. BROWNING: No, it's no exclusion. This has been part of the tough thing for us. It looks like an exclusion, and, if you all have ideas for a better way to represent this, I would be extremely grateful. It is identifying areas where we expect something to occur in the next few years. It is not excluding -- The only ones that were excluded would be those gray areas for DOD and the TSS and the Marine Sanctuaries.

All the green is areas that we expect, just on this one factor, that if -- For example, if it was just avoid shipping, then all this area could potentially be a place for leasing, and so this is just identifying that's where the sixty-meter contour goes to, but we're not excluding beyond. If the state or a developer came in and said we're looking at just a hundred meters offshore in New York, we would, of course, work with them and look at that, but it's just we don't expect that to happen in the real near future.

MR. PUGLIESE: Right, and the reason I asked that is I've been kind of looking back and forth at some of the alignments with ours and similar to what we did with that glider track alignment with managed areas, et cetera, and it's interesting that some of those very specifically, like the sixty-meter potential area that is laid out right now, and that actually excludes most of our deepwater marine protected areas and the deeper spawning areas already, and so at least the likelihood that that's going to get into those is less, given that type of anticipated activity is going to be in the shallower waters. I am just trying to begin -- We'll get into those discussions later on, but those have some -- Then, if you move to ninety, then, all of a sudden, you encompass all of those, or most of those.

MR. BROWNING: Okay, and that's why --

MR. PUGLIESE: It's an interesting -- It's good to align these things.

MR. HOOKER: I think that's important to hear too from either this panel or the council as a whole, that it supports the preferred areas that are currently identified or it doesn't, and so I think anything that supports like either the current factors or additional factors that you think we should consider would be very helpful to this process.

MR. PUGLIESE: That's exactly why we wanted to have this discussion, and that's why it was perfect timing, as this moved forward, to do that, because there is a number of different ways to skin a cat on this type of thing. If you have the priority areas really focused outside of it, you don't have to necessarily do an exclusion on some of these, because it's already kind of encompassed by depth areas, and so we can get into further discussion, but I was just trying to, on the fly, look at some different things, and that caught my attention.

MR. BROWNING: Like I mentioned, the technology is kind of why we're at the sixty meters, and this is kind of representing the current technology that's being utilized. They can go deeper, but, typically, we see the preference of sixty meters or shallower. Now, once the floating takes off, and that's part of the reason why it's not quite commercial, is because they haven't really coalesced around a single type yet. They have these different various ideas out there, and the High Wind off of Scotland has five, I believe, and they're out there, and so that's the first --

MR. PUGLIESE: The first real deployment.

MR. BROWNING: Yes, and, I mean, there's been a couple of these small projects off of Portugal, I believe, to test them out and everything, but this will come into what you just mentioned. I mean, if they get to a point and they want to start exploring the deeper waters, then we would definitely want to look at that other information and see what kind of issues we're going to have potentially with those areas. It may trigger a need for two types of assessments, depending on the technology and those issues raised, because they're going to have different potential impacts, and so it might not really line up to have them all in the same overall assessment.

MR. PUGLIESE: Yes, because obviously you're not going to have nearly the bottom impacts that you are on the floating ones. You may have other -- If it's aligned in migration paths, et cetera, but it becomes different --

MR. BROWNING: Yes, with the moorings versus the pilings or whatever.

MR. PUGLIESE: I specifically had talked to Brian, because literally those deployments on the floating, and so the technology is advancing so fast that that was an issue that I thought it was good to have on the table, and so this is all continuously moving, but that's a little further down the road.

AP MEMBER: But these diagrams and these depictions don't talk about the infrastructure associated with it, do they, and so the transmission cables from either the floating or the permanently-affixed ones is going to be a whole other infrastructure impact.

MR. PUGLIESE: Yes, and he can get into detail on that, but I think that definitely is an additional component on these, but it's a far cry from some of the other support mechanisms for other types of energy, I think, and so, yes, we'll have to deal with those, but I think those are things that we can figure out exactly how that's going to happen, and a lot of planning, I think, is already going into place, I know in the Mid-Atlantic.

The other key thing is the difference that you've got the hubs already to bring some of these types of things in, because of the energy systems that are existing at the state level, and so that's a very different thing on the land-based side of things versus other types of advancing technologies.

AP MEMBER: But the intent is still that it's going to be bottom-based, right? These are going to be cables. Whatever the transmission structure is, it's going to be on the bottom.

MR. BROWNING: Yes, that would be my guess. I think the question would be will they all be buried or not. With the depths that some of the floating can go to, I don't think that they're going to be able to bury them at that depth, but, when you get in shallower waters, they can bury them. That, of course, would be -- When they come in with the COP, and that would be so far down the line, but, yes, those are definitely going to be concerns, and I am really curious to see how floating -- Just given the -- People really familiar with the monopile and jacket foundations, given the oil and gas industry and what we've already dealt with in the renewable so far, the floating is going to open up a lot more unknowns, and the discussions to evaluate those potential impacts are going to be interesting, to say the least, I think.

Another factor we have that is pretty important, because, currently, like I mentioned, how we look at leasing is in response to states or areas identified by an unsolicited application by a developer, and so we wanted to highlight the state interests, and there is two components here. A state can be interested and just say, hey, we want some renewable leasing, but they don't have the legislation, which is the next one, which really is the money for the developer that really draws them, that there is some sort of offtake or proposal to buy power and whatnot.

This one is also important, because, with this RFF, we sent out a letter to each state asking them what their interest was in future leasing, and so there are a lot of states that have existing offshore renewable leases, or they're in the process, and what's the appetite for the future, so we would have a better idea, and we would love to have this map populated with all the states, so it's up to date and we know -- Because administrations change, and, in each state, those ideas can change, and so, the more we can keep this up to date, the better.

That feeds into what I mentioned with the offtake and market incentives. As legislation gets approved, this component would change as well, and this is going to be a big driver. It's kind of

already self-explanatory why we're seeing the activity off of New York and Massachusetts, largely because of this stuff. Examples are some of the different -- Either setting goals to have renewable energy offshore or the different -- It could be just a goal to fit a portfolio, or it could also be a power purchase agreement or whatnot, and so there is quite a different scope of where that offtake and market incentive can come from, but it is highly state driven. That's the key point there.

The other thing I wanted to identify is that we have removed areas in the past, and the reason these are not exclusions right now is because all these areas were removed for different reasons. There are some, and, actually, I believe it was off of New Jersey, that the state said, hey, let's just remove this now, and we'll look at it in the future, and so we wanted to identify that, hey, it was removed for some reason, and some of these reasons are going to remain valid and some of them may not, but it depends on the -- The information can change, and the just environmental condition, if that's what it was, could have changed, but we did not want to ignore that we have previously removed areas in the past.

As of right now, we have -- This one is going to be tough, because the industry does not want to identify things in the open, given the competition, but, at the same time, it really -- It would be nice if they could identify stuff for us, because it really is a driver for what starts the process, that along with the states, and so some of you all are familiar with the Carolina stuff, and the U.S. Wind is the sole interest right now off of the Carolinas, and we still have those two Wilmington areas that we're working on how to proceed with those, and there is a couple of spots up in New York and Massachusetts, and those are the two -- These areas are the remaining leases that went unsold in the previous auction for Massachusetts, and they came up last December or January of 2017. A couple of companies came in and identified that they wanted to move forward with those, and so that is how we're able to kick off and start the proposed sale notice, which is out for comment.

This is, ultimately, what we end up with, and, actually, I will go to the webpage in a minute, so we can zoom in, but the idea is, like I mentioned earlier, that you can see the darker has more of the factors. It has checked the box saying that it was okay or a potential on that factor, and so, with these darker areas, we see the real dark -- Obviously, the black are existing leases, but the darkest is that Massachusetts. It pretty much checked all the boxes. It was already a lease area, and so it makes the most sense that it would check all those boxes.

You've got the New York and New Jersey areas, and those are the next shade darker, and there is obviously the activity going on with New York, and so it's not too futuristic, but it shows that these parameters are identifying stuff that's going on, which is good. It kind of reassures that we're on somewhat of the right track. The next area that is darker is the call areas that we have down in the Carolinas, and there is actually a section down here that is dark, and that was one of those -- If you look back at the previously removed, it actually -- Well, I take that back. We did not include that one as previously removed, because it was -- This whole area was actually open after the DOD and Coast Guard assessment.

What happened though was we had so much area off of South Carolina that we thought at that time that it was a little unmanageable for a call, and so we just went with the areas to the north that we knew there was more interest, mostly because Myrtle Beach had more of an interest, from a local level, and so we kind of focused our attention there, but it fits a lot of those parameters, and this is what we're working with, and so, on our webpage, currently, where it's going to be, if you

go under the state activities, at the bottom, we have that the RFF is out, and this will be the page that we will maintain and keep all this information.

We will have each one of the factors, and so, if we add factors, they will be added on here, and you can click on each one and see those maps and zoom in to see what area that really -- Because these are by OCS block, and so you will be able to see what areas those parameters fit into. On the flip side, with this guy, it's much easier to zoom in and get a better understanding of where the different shades are darker.

We are working on a more interactive webpage, where you can go to -- It will have like this assessment will be the base, and you will be able to click on the area, basically by an OCS block, and see how many of these factors or which factors applied there, as an entire overlay, instead of having to flip through each one of the different factor maps. That one is still in its infancy of development, but that's a long-term goal that we would like to have, and so we're hoping, the more information that's out there, the better folks understand what's going on.

I do just want to hit on the next couple of things, and it kind of matches up with what we have already, the Massachusetts lease sale coming up, the New York Bight, looking at 2019, and then we're still working on the lease determinations for the Carolinas, and that came up really because, through the South Carolina development operating at a different time than North Carolina, we ended up with areas that were adjacent to each other, and we didn't foresee that happening, and so now we want to step back and say, okay, these areas, are they going to be a combined lease area, and we need to really assess that differently than saying, oh, it's just North Carolina and South Carolina and moving separately. With that, I can leave it on this, or the webpage, if there are any questions, and hopefully I can answer them.

MS. DEATON: Are there any questions for Jeff? That was very helpful. Thank you.

DR. GEIGER: Given the current status of the technology of fixed versus floating platforms, so to speak, do we have any active floating pilot or demonstration areas in the U.S. with that kind of technology?

MR. BROWNING: I think the only one that they -- I think there's one off of Maine, the state project, and that would be the only one that has actually been deployed, but it's a small scale. It's not a large scale. I want to say it's like a one-eighth-scale project. It's been deployed, and I'm not sure if it's still out there or they're going to redeploy it or whatnot. Then I do know, off the west coast, there was some talk and discussions of trying to come in and have a project -- They're a lot deeper on the west coast, and so, I think, if we see floating, it's going to occur on the west coast first, just because of the need. There is basically no shallow waters in federal waters out there, but that's the only thing that I can think of that's actually been in U.S. waters.

MR. HOOKER: The Maine one is called Maine Aqua Ventus, and it's a scale demonstration, and they were trying to look for a place to do a full-scale deployment, but I think they're have some issues with the state, and it's all in state waters, and so there is no federal nexus for us at least with that particular project.

DR. GEIGER: A follow-up, if I can. Certainly, in Europe, wind power has been expanded dramatically, and we're obviously looking to expand it here in the United States. I guess is it

possible to have a presentation to look holistically at some of the longer projects that have been in existence and look at the kinds of technology that they used and the infrastructure required to bring the power back on land and the ecological and biological and social and economic impacts of that infrastructure, so that we can get a common understanding of just what has happened in the past, so it will help us determine where we need to go in the future.

MR. BROWNING: The one thing that is different over there is that you have different things to impact, and so it may not be the exact same, and so we don't want to fall into assuming that it's going to have the impact or no impact over here based on what they have in Europe, but, as far as the infrastructure, from what I have seen, it's pretty much, depending on the foundation used, the monopile or jacket, they're going to have the inner array cables that tie each one together, and they may or may not have an offshore substation, and then there is typically a singular cable going to shore. That's pretty much the standard, if you will, if that's what you're getting at as far as the infrastructure, and I'm not sure.

MR. HOOKER: Maybe I will follow-up real quickly. Jamie, that's something that we struggle with in doing, because there is no federal energy policy as far as what is being procured, and so we don't know what each -- Jeff had a slide of what some of the states have proposed, and I suppose we could do something along those lines, where they have actually said, okay, we want to procure 800 megawatts, but, right now, the leasing isn't necessarily synced that well with what we know is going to be procured, and so our areas are probably vastly larger than what will ever be solicited for offtake, and so trying to match like what is anticipated and matching that to maybe some existing stuff that's done in the Gulf of Mexico or the Pacific is difficult, because, even though some of the technologies are similar, the scale and the way things occur for offshore wind is different. I think we have Block Island Wind Farm now, and that's the only existing wind farm in the U.S., and we can kind of look at that for some examples, but it is a challenge to try to say this is what the answer is for the offshore wind areas that are being proposed.

DR. GEIGER: I look at wind power, and, again, looking at the issues related to oil and gas leasing off the Atlantic coast and the misperceptions and the real perceptions that are entailed in some of those public hearings and everything else, and fast-forward to wind power and other renewable energy development, and it seems critical to me that the general public needs to clearly understand what is the basic infrastructure requirements of renewable energy development and have an idea of at least in the past projects -- For example, let's look at Block Island. People can relate. They know where Block Island is.

What is the infrastructure of that project? What does it look like? What are the implications to basically biological, ecological, social, and economic impacts? So then people have a general, clear understanding of what it's going to entail and what the past impacts have been, so that they can clearly make up their minds, in terms of public comment, of is this going to be good or is this bad, or I have questions in this area, so there is no immediate blowback or misperceptions or misunderstanding of what it is or, more importantly, what it is not. That would be very helpful.

MS. DEATON: What I think I hear Jamie saying is, when it comes to the scoping, we still don't get a clear picture of everything upfront, because it's so new. You would like to see more examples like at the scoping meetings of everything, from putting the turbine in to when the energy gets to shore, and is that right? Okay.

MR. BROWNING: I was just going to clarify that like at what stage -- Because, when we're doing the call areas, the leasing of that itself is not a guarantee for the infrastructure itself. It just guarantees the developer to conduct site assessment activities and then, in the future, submit a construction and operations plan that actually has all that infrastructure, and that's what the scoping meetings that we just recently had up off of Massachusetts were covering, and so, outside of that -- I am trying to understand if you think we should be -- Should that be a different stage of informing the public or --

DR. GEIGER: What I'm trying to -- Again, BOEM may not be the appropriate agency to get that feedback. It may be very valuable to have some energy leadership companies provide an overview to the general public, and even this group, that this is the kind of infrastructure that has been developed, and that is the kind of infrastructure that is shown, and this is real-life examples in either the United States or in Europe that has been impacted, and this at least gives you an idea of what the basic infrastructure needs are and what they're going to look like or not look like, but, more importantly, these are, to date, at least until now, these are some of the social, economic, biological, and ecological impacts or effects that these may have. I think having baseline information on this, just seeing and listening and having an opportunity to see the infrastructure, is going to go a long way for people to make an informed decision, and even professionals to offer input, into should this be good or not so good. Thank you.

DR. LANEY: Jamie, to that point, Lisa has got it pulled up on her screen, but the ASMFC Habitat Committee did produce a document on offshore wind, but it only looked at the biological/habitat aspects of it, and so that document is out there, and what's the date on that one, Lisa? We did that in 2012, and so it's six years old, and so I don't think we had very much in there, and I think we probably just noted that floating technology was under development, and so, again, it's one of those that we might want to look at updating at some point in the future, but some of the information that you're talking about is in that document, and it was mostly designed for use by state regulatory review folks and federal regulatory review folks or anybody else that is interested in the potential impacts of these sorts of installations offshore.

MR. HOOKER: As I mentioned in my presentation, for Block Island Wind Farm, we did have a -- It was a state waters project, but we did participate in a science forum in December, where I think getting at what you're saying. We had every single science project that was done and associated with it, including socioeconomic, and we had people come in to talk about their experience with it. There was talk about doing some type of road-show version of that, and so I think there is -- It's a recognized need, but it's just trying to figure out how to integrate that into our current process and at what stage in our leasing process, and so we appreciate that feedback.

MR. PUGLIESE: I guess one of the things that I was thinking about, and, as we're pulling together different regional distribution or information sources, was, when you're getting to like the transmission, et cetera, with the fact that you have the big energy companies already buying into advancing -- I know SCE&G is already putting wind on their portfolio, et cetera, and those are some of the ones that I would think could probably brief us on what they anticipate actually being used for those types of systems.

While understanding where they have may have done it in other areas for operating capabilities, and they may be able to, I would assume, provide what they anticipate the locations, the capabilities, because what's going on with some of these is they are already anticipating and

figuring out how it's going to connect into their grid systems, et cetera, and so they're doing a lot of pre-work in the background that would be really good to know, at least on the base layer, and then I think it leads to some of the other things of what that's going to mean, in terms of the economies in the area or the different other types of impacts beyond biological and social.

I would also add, on the biological and social, we did update our energy policy, and I think maybe there's an opportunity to crosswalk between the two to further dive into here, and the last thing is having this even in this form and seeing the bigger picture and focusing it maybe on the South Atlantic, all in one thing, and this is the real opportunity we have, because, the way things operate right now, they're still being primarily done at the state taskforce level, and so this is our regional opportunity to look at everything in context, and that's why we really appreciate Brian and Jeff being able to, kind of on the frontend, be able to provide this, and we can go further, but, going all the way back to that one thing about like SCE&G and others like that, I think that would be a really good thing, to be able to figure out how we could get some of what they anticipate already, because they're working it into their systems now. They anticipate it coming.

MR. BROWNING: Just to add to that, that is who is going to be driving what is -- It's either going to be the power company -- For example, with Maryland, they had some stipulations on what was going to be used or where, and so they drive it, and then the developer, if they have the latitude, they will determine what they want to utilize and which wind turbine manufacturer they have worked out a deal with to utilize, and so we're not in a position to say what's going to be there. We can say, okay, here is the stuff that's out there right now that we expect, but, because we're not -- We lease the area, and we don't drive it, and so it puts us in a weird position of everybody thinks we have all the answers, but we don't. The people who are building it have more of those answers, but I really understand where you're coming from, and I am trying to really pick my brain of how we can incorporate that.

I think it's part of a bigger question of how do you convey this information to a very broad audience up and down the coast that is useful. I mean, if we just talk about -- If we have it very broad and general, and we put it on the webpage, are people going to go look at it? I don't know the answers to really make sure that everybody has the information and actually wants to listen, because, some of the stuff, people don't want to listen.

AP MEMBER: Just to beat this to final submission, but I think some of the questions that the opportunity presents ourselves, because it is at the state and regional level at this point, is you had mentioned your assumption that the cables would probably be buried. Economically, the developers are going to want to go the cheapest way that gets the job done, and it may not be the best way, considering the environmental impact or whatever, and there is going to be some impact, but we're just talking about mitigating it to the best that we can.

Whether the cable is buried, whether it's suspended on pylons, whether it's floating, or whether it's just lying on the bottom, at some point, those questions have to be asked, because, if it's left up to the people that are looking to generate income from it, it's just going to be whatever is cheapest, and so I just think those are things that we should put on the table and try and find the right department to answer the questions or which ones to explore of those questions and try and come up with the answers.

MR. BROWNING: Those are specifically covered when we do the review and do the NEPA analysis and consultations on the construction and operations plan, because then we actually know what they are proposing. We don't mandate it, but I'm pretty sure we have a requirement for the burying cable, if possible. Where this has not been buried is some of these like really rocky areas, where they can't bury it, and they will have like the mattresses over it and whatnot, but all of that is what is evaluated and analyzed in looking for the mitigation potential in that phase.

Because we just now have our first COP, that's why it hasn't really been discussed on a really through basis, because we didn't have a plan to evaluate it, and we can't -- Especially like the cables, because the bottoms are so different, with rocky outcrops or shifting sands or really dense clay or whatever the bottom can be, we can't just have a blanket policy either for the entire Atlantic, and so we don't want to try to -- This is beyond the scope of this, and this would not even touch on that, but it kind of lets you see kind of where our mindset is. We want to look at things broader, regionally, but, at the same time, there are some things that it has to be at the very detailed level to analyze, to really do the best analysis that's fair across the board there.

DR. GEIGER: I am probably overdoing it, but, again, everybody has heard of not-in-my-backyard syndrome, and let me just use Seabrook and Kiawah as an example. You have a community, and those two communities are extremely interested in what is happening off their coast. They are a bunch of folks that are motivated and focused and usually environmentally sensitive, but still they're looking for what's best for the future.

If you bring wind power development, say a public hearing, to Kiawah and Seabrook, there is going to be a lot of questions, and it's going to start with what do these basic systems look like and what is the infrastructure and what is it going to cost and what are the basic impacts that not -- We don't want projected impacts. Based upon projects done in the past, either in Europe or in the United States, what is the current level of impact or effect or affect of these projects on social, economic, biological, or ecological issues.

They're going to want to know that, and that will set the stage for some interaction that I think, whether you're a regulatory agency or looking for some facilitative public input, it's going to be extremely helpful to have that common baseline understanding as you solicit input. If you don't have that established right upfront, you are going to prejudice, in many cases, what they think it is and not what it really might be.

We saw that in oil and gas sale discussions. The misconceptions of that were huge, because they couldn't separate monitoring and seismic evaluation from actually drilling. They couldn't wrap their brains around two separate activities that, if they authorized or voted for one, they're going to automatically get the other. I see this exactly as the potential for wind power or hydrokinetics or anything that may impact coastal resources, and that's just some feedback that you might want to consider as you develop it in the future.

DR. LANEY: Just a minor point. I think, with respect to birds and bats, and I don't know that you guys -- I haven't looked at the site, and so I'm sure there is some information on there, but one of the things that I wanted to make sure that you all were aware of, and hopefully you are, is that there's a lot of new technology being developed to minimize impacts on birds and bats. They have turbines now that are able to sense the presence of birds as large as golden eagles anyway, and I'm sure that would apply to pelicans and northern gannets and other stuff.

That actually will shut the turbine down if they detect one that's within a certain range, and then the other big thing, I think, in development, in terms of turbines, is the vertical ones that don't have the big rotating blades on them, and so there are lots of technologies going on that could potentially certainly minimize, but hopefully even eliminate, those impacts, and so hopefully that's in the mill there, too.

MS. DEATON: Thank you, Jeff. We do appreciate it. The more people understand, the more comfortable they will be, and then your job will be easier in the long run, and that's all everybody is saying. Now we're going to move into our breakout groups.

MR. PUGLIESE: I think what we ought to do is just go ahead and beat the rush and break early for lunch, because I don't think we could get too far into the session, unless we go way far into the afternoon session, and just be back around one o'clock, and that gives you a little bit more time, and then we can get into it and split the day.

MS. DEATON: We're going to go to lunch now. We're going to break for lunch, and we'll come back at one o'clock.

(Whereupon, a recess was taken.)

MS. COOKSEY: I wanted to extend my thanks to the panel for all the hard work yesterday. I have now compiled the feedback from both yesterday as well as the work last year, and so, again, the Fisheries Ecosystem Plan process is meant to be a loop, a feedback, and so, back during the initial development of FEP I, folks from across the region sat down and identified threats.

Policies have since been developed, and this was an opportunity to go back and put this matrix together to see how well we are potentially addressing the threats that were identified, and so you can just see, on the far-right column, kind of a summary of the total number of policies that actually addressed any of those specific threats, and so, out of the nine policies, I have sorted it by that number, and so we go from eight policies addressing threats related to navigation to zero addressing threats for silviculture.

I wanted to point out that, for both the invasive species policy and the marine aquaculture policy, we've got them addressing a lot of threats, and we have a very narrowly defined threat being addressed by climate variability policies, and so I wanted to provide -- For policies that you were not able to comment on, because you weren't in that working group or you weren't at the earlier meeting, this is a chance for folks to comment on like I feel that check should be removed or I feel like checks should be added in, and I know everybody is tired, but I did want to provide this opportunity.

MR. HOOKER: I guess I have a question to you. I mean, ultimately, you are the end user, right? Do you feel like you -- I mean, how do you feel?

MS. COOKSEY: The end user of the policies?

MR. HOOKER: The end user of policy and the end user of whether or not you have enough information, like if there's a threat that you don't feel is identified or that there is a big gap in or that maybe we missed.

MS. COOKSEY: The end user, to me, is the council, for the council to go back and look at this and evaluate, given the fact that there have been no policies developed for silviculture, is that actually a threat that should remain on the list for FEP II? If it is, then should we as a panel or the council then work on developing policies for silviculture? I would personally lean towards should silviculture remain on our list of threats as we move into FEP II. I think that's what this speaks to.

Then, as we kind of move up the list, non-point source pollution, and I'm also going to kind of add in contaminants and emerging contaminants of concern with something that came up that we don't really have a lot of policies addressing, and maybe that's something that, as we continue on into the second iteration of FEP, that we might want to devote some time to.

DR. LANEY: Cindy, it occurs me, and I will ask the rest of the panel to give me a reality check on it, that, as far as the policies go, or at least as far as the impacts go, silviculture could be just viewed as a variant of agriculture, maybe a less benign variant even, or a more benign variant, and so maybe we go back and take a look at the agriculture category and see if we think that really silviculture might be covered also in those policies that tough on agriculture, maybe, and I don't know one thing that we talked about at some point in the past is with respect to the flow policy, which we've got an X in the box for agriculture, and silviculture certainly has potential hydro impacts too, because of -- Especially if you're doing loblolly pine plantations in the Southeast, from the drainage and bedding practices and so forth and so on, and so that's just a thought on that one.

DR. GEIGER: I think this raises some interesting discussion points, and I would look at this and I would say, are all these threats still as relevant now as they were when they were originally created? That's the first question that I would ask the council. The second question I would ask the council is, okay, what are the priority list of these threats?

Do the hard labor and put them in some sense of priority order based upon some kind of consensus process, whether it be facilitated or whatever, but you've got to come up with some priorities, and not all threats are equal. There are going to be some more severe than others based upon the mission of the organization, and so prioritize the threats.

Thirdly, look at your existing policy statements in relation to a revised threats and reexamine what you really need in a policy statement. What is your intended audience for that policy statement, because I think it's all over the board. Some of those policy statements are more prescriptive and less policy, and I think it's time for a wholesale reevaluation of what we're doing and why we're doing it.

I know it's a lot of work, and I know it's going to be burdensome to do that, but, rather than build on a foundation that may be not necessarily appropriate in this time and age, you may want to just throw it out and say we've got a new paradigm here, and all the old rules and all the policies are not necessarily relevant, and what do we really need to address? What are the most significant issues facing us and impacting the mission of the South Atlantic Fishery Management Council? That is my two-cents. Thank you.

DR. LANEY: To that point, Jamie, I think that's probably a good idea, in terms of prioritization, and one of the things you could do is look at the scale of the threat within the landscape that is of concern to the council, i.e., how much agriculture is there across the South Atlantic landscape and what's the relationship of that threat to council-managed resources?

I think those are two criteria right there that you could look at, or at least that maybe would be where I would start, and then some of them may have a very small footprint. For example, navigational dredging and/or channels is a relatively small footprint, but it could have a proportionally greater impact. I am thinking of, for those of us from North Carolina, for example, the ship channel in the Cape Fear River estuary, which has dramatically altered the extent and volume of the tidal prism and extent of salinity incursion upstream and with consequent impacts to the adjacent wetland ecosystems and things like that.

Navigation in and of itself is a pretty small footprint within the footprint of the river, but the impact is perhaps a whole lot greater than the extent of agriculture within the Cape Fear watershed and that kind of thing, and I don't know. That might be a place to start, is what sort of metrics could we look at that would speak to Jamie's point about how much of an impact each threat potentially has on the resources of concern to the council, and then that would enable you to maybe put them in some kind of priority order and then go back and look at the policies again.

DR. GEIGER: Even tiering these existing threats, if all acknowledge that these are all still existing and significant threats, then tier one, tier two, tier three, whatever it may, but something that's going to drive priority setting and implementation of actions to address that priority setting process. I mean, I see this as a jack of all trades and master of none, and, in this time and age, I think, collectively, as an organization, we have to pick the highest-priority activities and demonstrate action towards those high-priority activities and demonstrate some kind of an outcome that results from that activity.

MS. DEATON: I was just going to add, Jamie, that I remember an early AP meeting, and I think we did breakouts, and there was a threats group, and they did some prioritization of threats, and so that's just one thing I think that has been done, and then I would just say, if you're going to do that, you've got to look at what is the policy meant to do and is it just meant for permit reviews or what other applications, because that will factor in how you prioritize.

MR. HOOKER: I think you just touched on what my comment was going to be, and, with the prioritization, it's that federal nexus, and that's what I was talking about with Cindy earlier, is which ones have a federal nexus and which ones are going to result in an EFH consultation and where you can actually apply the policy. Otherwise, you're just -- There is a tree clearing up river, but, if they're not doing an EFH consultation, you're never going to know about it or never have an ability, through NMFS, to effectively comment on that activity, or at least I think that's how it's done as least with the Mid-Atlantic, and I think New England as well, and so that was just going to be my comment.

If it's a priority action, in the sense of stuff that NMFS actually deals with it through the EFH consultation process, and maybe that could help prioritize, but I did think that we really -- It wasn't that long ago that I think we reevaluated, I think as -- I feel like we just went through all of these like not too long ago, and these things just never go away. They are just always circulating, and

so I don't know if they need to be wholesale reevaluated, but maybe part of that prioritization, as far as like actual needs that the Fisheries Service receives from a consultation point of view, and I could see something there.

MR. PUGLIESE: I think what we did is we actually did some state prioritization. We did prioritizing at the state level, and that's something that we need to look at, and I think that's getting almost to somewhere in between where Wilson was talking about, where we can begin to zero in on areas and then really what are the threats within those areas, because we have talked about that.

I was linking this to other opportunities, working with the Landscape groups, where we were doing that, and we were analyzing a lot of that information to put into that larger blueprint, and some of those types of things got to the point where, ultimately, we could go back and point to a watershed and then look at the habitat distributions in those watersheds, the real threats in those watersheds within individual river systems, which are the -- I think there is threads that we can go back to get more clarification of what has already been worked on and then how we go beyond here.

I will say that the foundational efforts of transforming the policies and working with a lot of that into the ecosystem plan, implementation plan, and the roadmap is a step forward to try and do that, because the roadmap is getting into the weeds on some of these real significant priorities, and some of them are tied directly to providing the policy in forms that can affect permitting activities and different things that are actionable items, and so it's a step forward in there, and so I think we need to go back and pull some things that we've done in the past and draw from that and take to heart exactly what these recommendations are and then advance them further, because I don't want to throw the baby out with the bathwater in this one, because I think we've done a lot in the background.

We have an opportunity to go further, and it's just going to be another progression step, because, when we redid the last couple of policy statements, some of those were very specific on focusing so they would be as useful as possible, eliminating a lot of the multiple pages of just discussion and getting to the crux, and so I think we're working our way there, but it's just taking and connecting back some of the things that we did in the past, and that's just one of these time things.

It was things that we really wanted to draw on, and we have them located in different places, and so how we actually translate those into even better things, and that's why I go to organizations like what has been done in the blueprint, and some of that actually exists already in those things, because that has built some of the conservation priorities, and so we can go back and pull from those and take it even further. That's just kind of my take on a way we can go forward beyond here to get closer to the better application and utilization and focus.

One of the things that we do different from the Mid-Atlantic and New England and other areas is that this council, relying on this group, very seriously takes the inshore conservation of essential habitats a lot more seriously than any other council in the country in how you apply that, to ensure that you do have that understanding of the continuity of those systems, and we don't want to lose that in just saying, oh, well, we really just have to deal with the offshore threats.

DR. GEIGER: I highly recommend that. That is the uniqueness that sets the South Atlantic Fishery Management Council apart, and please do not lose that, but, at the same time, you can see the depth and breadth of what we have here, and, at some point in time, it almost becomes

overwhelming. As I said, what do you all stand for? What is the real things that you guys are going to work on and focus your attention on? We can't do it all.

At some point in time, we have to narrow the playing field, and I think you have some mechanisms in place to do that, but don't lose the connectivity issue, but, at the same time, there is priorities within that connectivity and that roadmap, so to speak, that needs to be looked at closer now, and other issues may be two years down the road, and other issues three years down the road, but lay that out. I think that's going to be important, because everybody is going to be asking what are your current priorities and why are you doing what you're doing. Thank you.

DR. LANEY: One other place we can go to, Roger, would be, and you've already got it on the website, would be the state wildlife action plans, because I think they all address all the same threats too, and whether they prioritize them or not, and Anne or somebody else may remember, but -- For North Carolina, we have that coastal habitat protection plan, and so those are a good source of additional information that could help to prioritize.

The only other comment I will make is that some of you may be familiar with -- This is in the context of looking at the entire landscape of the South Atlantic, the terrestrial part of it as well as the offshore part of it, but, in the context of conservation, Roger mentioned the conservation blueprint for the South Atlantic LCC.

There is a relatively new movement that E.O. Wilson started called *Half-Earth*, and some of you may have read the book, but, basically, E.O. is saying, from a planetary perspective, if we want to ensure biodiversity and sustainability of natural resources into the future generations, we need to set aside half of the terrestrial landscape for conservation purposes.

There is a new article that just came out in *Science* two weeks ago that basically embodies the same concept and says, hey, not only do we need to do that, but we need to get corporations and industry involved in that effort and partnering with us to do that, and they also have some percentages in there for coastal and nearshore habitat that they think should be set aside for conservation purposes, however they define it, and so I will pull that article out and circulate that to everybody, and I intend to circulate it to Fish and Wildlife Service leadership as well.

MR. PUGLIESE: I'm glad you raised the issues about the action plans. I mean, that's why we brought those in. It also has another link that, while the LCC is still supporting some of those things, one of the newer ones that was discussed earlier on for the Southeast is the Southeast Conservation Adaptation Strategy that the states are still embracing, because there are economic impacts of different things, and so they are advancing that.

The foundational information is coming from the original LCC information on the blueprints, but also the state wildlife actions plans and the coastal plans, and so I think they're all there for a reason, because these things are all kind of coming together, and so there is opportunities to draw on that, to take our efforts further and become part of the broader thing that's focused on priorities that have been acknowledged even at a higher level than we can.

AP MEMBER: In our newest conservation strategic plan, the Atlantic Coastal Fish Habitat Partnership has also identified the primary threats to each of our priority habitats in our four sub-regions, and that is displayed in a table in our plan, and so I can share that with you.

MS. DEATON: One good point that Jamie brought up is that the policies are of different levels of specificity, and I think that's something we could look at in the future, and what is the most helpful and appropriate for those policies, because it's -- Some are very general, and some are very specific, and some are in the middle, and so there is probably something that is the most useful, and we should slowly get them all more consistent, I think, and that would be helpful. Any other comments? All right. Now is the last item on the agenda, and Roger asked Laura to give us an update on military activities.

MS. BUSCH: Again, my name is Laura Busch, and I'm the Natural Resources Program Manager for the Fleet Forces Command U.S. Navy in Norfolk, Virginia. I am just going to talk real fast today about our big environmental statement called the Atlantic Fleet Training and Testing. This is our study area, the black line, and you can see in the smaller map that we go out to just south of Greenland, and so it's about half of the Atlantic.

The different-colored boxes are our operating areas, our training areas. Off of Norfolk and then off of Jacksonville, Florida are our two main training areas, because we have homeports there, fleet concentration areas we call them. Then our document also includes testing activities for the SYSCOMs, which are NAVAIR and NAVSEA, and they're the ones that go out and test new systems. They build new ships and build new airplanes and new weapons and test those things.

I also just wanted to kind of go over our mitigation areas that we have, and so the yellow ones are planning-awareness areas, where we kind of limit our major training exercises in those areas, and then the blue and orange are North Atlantic right whale areas that we have different mitigations for depending on the time of the year and what activity that we're doing.

Then you can see, on the bottom-right-hand side, we have five National Marine Sanctuaries in the study area, and we have consulted with ONMS for three of those sanctuaries, the Florida Keys, Grays Reef, and Stellwagen Bank, and we don't do any activity in those areas that would put -- We call it marine-expended materials, any type of debris, onto the bottom of the ocean. We do conduct passage through those areas, and in some of them we can do sonar, and then we also have a buffer around the sanctuaries of 2.5 nautical miles.

I will also point out that one of our mitigations that we do has to do with sargassum rafts, and so any time that we're trying to do any type of live-fire exercise, there is lookouts on the ships. If they see sargassum rafts, they cannot fire towards sargassum. They have to turn their guns and go the other way, or, if sargassum comes into the area, they have to stop. Sargassum and seabirds as well, because we know that those two things indicate that there might be marine mammals in the area, but we also know that sargassum is an important habitat for our turtles and our fish as well.

This is kind of our interagency consultation timeline for this large document. It's kind of driven by the Marine Mammal Protection Act, because those expire after five years, and so that's why we have to do this environmental impact statement every five years, and it takes about five years to do it, and so, as soon as we finish, we start over. This is Phase 3, but it's the second of the large single document, and so where we are in the process is our current permit expires on November 14, and so we're hoping to have our new MMPA permit in place by 30 October.

I am not going to run through all of these, but we're also consulting under the Endangered Species Act with NMFS and with Fish and Wildlife for seabirds, manatees, crocodiles, and that's all. Our sea turtles are under NMFS, because our study area only goes up to the high-water mark, and so we don't have any inland. We have some minor inland waterways, the Chesapeake Bay and St. Johns, but we're not going up onto terrestrial land. As I said, we consulted under the National Marine Sanctuaries Act as well.

Our Magnuson-Stevens Act EFH is currently in consultation with Pace Wilber for the Southeast and Keith Hanson up in the Northeast. Those are two consultations. We're consulting under the National Historical Preservation Act, and we're finishing up our Coastal Zone Management Act. Our study area touches eighteen states and two territories, and so we have a lot of CZMA and SHPO consultations.

Now I just kind of want to switch to some of the monitoring projects that we're doing out of my office, just as part of our MMPA permits, and so continental break shelf survey and tagging. We're tagging and looking for marine mammals along the break, mostly in the Mid-Atlantic. The Hatteras Behavioral Response Study, we have been doing surveys for a long time to try to get location and estimates of marine species, and we feel like we have a good handle on that, but what we really need to know is how these animals respond to military training.

Our behavioral response studies involve tagging whales, off of mostly Hatteras, and then we have a Navy ship that's in the area as well that drives a straight line and turns on sonar, and we're at a far enough away distance that we're not causing injury, but we're trying to figure out at what distance and at what sound these animals will respond, and they have tags on them that are looking at their dive rates, their vocalizations, things like that, once they start to hear. Then also the receive level, so we know at what level they heard that sonar, and so that's something that we started last year, and this will be our second season doing that, and they've been doing it on the west coast as well.

Tagging and tracking North Atlantic right whales is another big one that we're doing, and we did some turtle tagging in Virginia Beach and kind of hit those arrays all up and down the east coast, and our humpback whale surveys are off of Norfolk. Here in Florida, we have the Jacksonville, Florida vessel surveys and tagging, just different whales that we can find when we're out there. We have three HARPs out, one in Norfolk Canyon, one off of Hatteras, and one off of Jacksonville, and so we refurbish those all the time, and so those guys have been out in the water for a long time.

We have also paid to do some passive acoustic analysis tools and statistical methods development, and I think, Laurent, you mentioned about trying to get standard data, and so we've paid to do some of that for us to use. We also do some passive acoustic data analysis, and then we do a humpback whale photo ID catalog for the Northeast and Mid-Atlantic.

We do have a monitoring website, and you can also just Google this "Navy marine species monitoring", and, under the projects tab are all the projects that we have going on, and you can get to all of that data as well, and then we also have just kind of little blog posts and news whenever something happens while we're out there.

Out of my office, I am funding some data gap studies as well. We did the sturgeon tracking array and tagging around the Chesapeake Bay. Right now, we're doing seal counts along the Chesapeake Bay Bridge Tunnel, and they're going to start expanding that tunnel, and they will be doing some pile driving, and so we're going to continue our monitoring to determine if pile driving is affecting those seals, and, if so, how. This past February, we tagged seven seals, and we're going to do some more next year.

Then another thing that might be of interest here is we've purchased an underwater acoustic camera, and we're looking at pile driving activities off the Chesapeake Bay, and that's just a screen grab from it, and so, once we kind of have enough data, we will publish that. We're just trying to look at what fish do when you are pile driving and if they react, how they react, if they're moving away, if they're coming back in, just that type of basic research, and so that information will be out.

I just kind of wanted to talk real fast about the different types of research that the Navy does. The first one is ONR, and that's the Office of Naval Research, and they do a large kind of innovation. As you can see, it's high-risk-type projects. They're really doing basic applied research. They do have an area where you can go and apply for funding, and so, if you have any projects that you think would satisfy their requirements.

From there, once they kind of figure out that a technology may work, the Living Marine Resources will take it and try to proof it, and so they also have -- They also accept proposals, and then, once they kind of proof it that it does work, then we will put that into our monitoring program, and so some of the things that Living Marine Resources has paid for is to develop better tagging for whales and try to have them stay on longer and have them record more types of data, and you can just Google these guys, and their websites will tell you how to apply for funding.

That's all I had on the slides, but I wanted to talk about one other thing, real fast. We are putting an underwater sea warfare training range off the coast of Jacksonville. It's going to be about fifty miles off the coast, and it's a 500 nautical mile area, and there will be hydrophones set on the seafloor, permanent, and we'll be able to record -- We are setting up for marine mammals right now, and I don't know if we're going to look at other types of species, but it will be a permanent, fixed range that will be fifty nautical miles off the coast of Jacksonville, and so if anybody has any data requirements, see me, and I will see if we can get that into that, and I know we talked about some of these fish, and, with Nassau grouper being listed, we do need to look at that in our EISs and stuff.

Then another thing is I'm going to try this, and I don't know if it's going to work, but we're going to try to put bat acoustic recorders on Navy ships that are traveling out, to see if we can figure out how far offshore bats are going. I know that's something that BOEM is worried about.

MR. HOOKER: I think it's something that is always raised to BOEM. I will leave it at that.

MS. BUSCH: I don't know what we're going to find, and I don't even know if it's going to work, but we've always got ships coming in and out, and I've got some bat recorders, and so we thought why not? It's a cheap study.

MR. HOOKER: I think we would definitely be interested in what the data shows.

MS. BUSCH: That's all that I have. Thank you for your time.

MS. DEATON: I have a question. With that bottom hydrophone off of Jacksonville, is that the one that they talked about doing years ago, and so they never put it in?

MS. BUSCH: It just took a long time to get all the permits and get it all set up, and so they have set the first sets of hydrophones in, and they will be finishing up. They are starting again this summer. We have to do the work outside of calving season, and so the first half of the range should be up and running by next year.

MR. PUGLIESE: Thank you very much. We appreciate the updates on where things are going, and I look forward to seeing the coordination and what the actual ultimate EFH responses are on this and some of the activities. I will say that the past information that was provided when some of the previous activities that the Navy was involved in, the detailed mapping and characterization, is still probably the best that's been done on the Atlantic coast, but it was very significant, because you all were pretty open with providing it, at least the core of the mapping information, and it provided a lot of the detailed information for the marine protected areas as well as allowed us to look at the detailed boundary connection for the deepwater habitat area of particular concern, and so hopefully, as additional things move forward, some of those other different opportunities arise that we can collaborate, and acoustics would be a nice one if we can do that, and so thank you.

MS. DEATON: All right. Is there any other business from anybody? Going once, twice, three times. I guess our meeting is adjourned.

(Whereupon, the meeting adjourned on May 16, 2018.)

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Certified By: _____ Date: _____

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