SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

HABITAT PROTECTION AND ECOSYSTEM-BASED MANAGEMENT ADVISORY PANEL

Town and Country Inn
Charleston, South Carolina

May 16-17, 2017

SUMMARY MINUTES

Habitat Protection and Ecosystem Advisory Panel Members:

Patrick Geer-Chair
David Bush Jr.
Rita Merritt
Pricilla Wendt
Thomas D. Jones
Bill Kelly
Dr. Amber Whittle
Dr. Lisa Havel
Dr. Steven W. Ross
Pace Wilber
Anne Deaton
Kevin Hart
Wilbur Vitols
Bill Parker
Mark Carter
David L. Webb
Dr. Laurent M. Cherubin
Brian R. Hooker
Dr. George Sedberry

Council Members

Dr. Wilson Laney

Council Staff

Kimberly Cole
Roger Pugliese
Dr. Chip Collier

Observers/Participants

Brittany Boston
Dr. Daniel Wagner
Lora Clarke
Thomas Okey
Brett Boston
Andrew Brumfield
Rua Mordecai

Additional Observers/Participants attached.

The Habitat Protection and Ecosystem-Based Management Advisory Panel of the South Atlantic Fishery Management Council convened in the Town and Country Inn, Charleston, South Carolina, May 16, 2017, and was called to order at 9:00 o'clock a.m. by Chairman Pat Geer.

MR. GEER: Good morning, everybody. I'm Pat Geer, and I'm the Chairman of the Habitat AP meeting, and welcome, everybody. Welcome to Charleston. The first order of business this morning is Approval of the Agenda. Are there any additions? I've already gotten one from Wilson Laney concerning the Yakama project that's going on, and so we'll add that to the agenda. I have an item, as far as I want to add to the agenda as well that I have been Chairman for four years, and I plan on stepping down as Chairman at the end of this year, and so I want people to start thinking about that, if somebody wants to step into this seat and sit here for the next couple of years, and so a little bit of discussion about that, and maybe also having a Vice Chair as well, as an alternate on the committee as well. Is there any other changes to the agenda or any additions that anybody might have at this point, besides those two items? Hearing none, the agenda is approved.

Approval of the Minutes from November of 2016, that is Attachment Number 1. Amanda Thomas did some very thorough minutes, 121 pages. She put a lot of things in there that I didn't want to see in there, but that's okay. Like everything I said was in there, but that's all right. They're very thorough. Any additions or edits or subtractions to the minutes at all? Hearing none, the minutes are approved.

As far as business for the meeting, as always, just silence your cellphones. The internet, I don't think you have to log in. It's just there. Whatever the best signal is, get on the internet that way, and we all should have received our travel orders this morning. If you were like me, looking through your office trying to figure out where it was in your mail, we just received those this morning, and so everybody should have their travel orders at this point. Let's just, real quickly -- We have a couple of new faces, and let's just quickly go around the room and introduce ourselves and give our affiliation, starting with Priscilla.

MS. WENDT: Priscilla Wendt, South Carolina Department of Natural Resources.

DR. WHITTLE: Amber Whittle, Florida Fish and Wildlife Conservation Commission.

MR. HART: Kevin Hart, North Carolina Division of Coastal Management.

MR. JONES: Tom Jones, Georgia, recreational fisherman.

DR. SEDBERRY: George Sedberry, NOAA Office of National Marine Sanctuaries.

MR. BUSH: David Bush, North Carolina Fisheries Association.

MS. DEATON: Anne Deaton, North Carolina Division of Marine Fisheries.

MS. MERRITT: Rita Merritt, Onslow Bay, Artificial Reef Association in North Carolina.

MR. KELLY: Bill Kelly, Florida Keys Commercial Fishermen's Association.

MR. PARKER: Captain Bill Parker, recreational representative, Hilton Head Island, South Carolina.

MR. VITOLS: Wilbur Vitols, recreational fisherman, New Bern, North Carolina.

DR. CHERUBIN: Laurent Cherubin, Harbor Branch Oceanographic Institute.

DR. LANEY: Wilson Laney with the U.S. Fish and Wildlife Service. I'm the Co-Chair of the Corresponding Council Committee.

MR. WILBER: Pace Wilber, NOAA Fisheries.

MS. BOSTON: Brittany Boston, Group Solutions.

DR. ROSS: Steve Ross, University of North Carolina, Wilmington.

MR. HOOKER: Brian Hooker, Bureau of Ocean Energy Management, Office of Renewable Energy Programs.

MR. WEBB: David Webb, recreational fisherman, Islamorada, Florida.

DR. HAVEL: Lisa Havel, Atlantic States Marine Fisheries Commission.

MR. BOSTON: Brett Boston, Group Solutions.

MR. PUGLIESE: Roger Pugliese, South Atlantic Council staff.

MR. GEER: Thank you, everybody. Rita, I want to welcome Rita back to the council. She was a council member for two terms, and welcome back. It's great to have your expertise on this committee.

MS. MERRITT: Thank you.

MR. GEER: It says on here that Roger and I are supposed to make a few opening statements. Just to let you know, the agenda that you have does not have times on it. Roger was gracious enough to put times on them for my guidance, which is great. Otherwise, we would be going crazy.

We're going to start off by talking about our Artificial Reef Policy Statement. Lisa Havel is going to lead that, and I'm going to add something to that as well. We have had some issues recently with our permitting for artificial reefs for the states, and that's going to affect all the states, and so we're going to probably talk about that a little bit as well. I think that's a very important topic. I have already been approached twice this morning about that. Then Brian is going to give us an update on some of the energy development activities in the Southeast. We'll have a break, and then Dr. Daniel Wagner is going to talk to us about a very ambitious deepwater coral mapping project that NOAA is doing.

Then we'll have our lunch, and there's a buffet here, if you want to do that, or there's plenty of places you can walk to. Then we're going to get into the meat of our FEP this afternoon with

Brett. We'll be looking at a lot of our different sections. A lot of groups are working very hard on that, in moving forward. Then, tomorrow morning, we're going to have the South Atlantic Landscape Conservation Cooperative -- We're going to have a workshop in the morning, the whole morning, with Rua Mordecai.

In the afternoon, Pace wants to talk to us about some of the activities for some of the permitting that NMFS is doing, some different projects, which will be interesting to see what's going on. Then we're going to finish up with the sargassum research and international conservation group. Andrew Brumfield from North Carolina State University -- They've asked us a couple of times if they can come speak to us, and we were finally able to get it into the agenda.

Just remember also that we are on a live webinar, and so, if your mic is on, the whole world is going to hear it. If my mic is on and it's not supposed to be, please remind me to turn it off, because that happens a lot to me, and so let's move on to the first -- Roger, do you have anything you want to say?

MR. PUGLIESE: Other than just I think there is some really key activities with advancing the final essential fish policy statement tied to our Fishery Ecosystem Plan. It's a pretty key movement. The council has already approved the last two that this panel had forwarded on food webs and climate, and this is the last of the package of actual statements.

One of the things I think we're going to set -- Potentially, at the end of the day, set the stage for tomorrow's workshop, and I think Brett will provide just a quick summary of what the conservation blueprint is and the location, so we kind of set the stage for tomorrow morning. I meant to mention that when we were talking, but that will be kind of a stage-setter for the workshop in the morning.

The other issues on energy are going to be critical, with the advancements and some of the positions of the recent activities that the council has taken, and also the advances are going to be really important on renewable energy. It's going to be a real key for us to advance. How the regional coral mapping is actively working is going to be important for us to provide some additional guidance that ties very closely to our longer-term mapping strategy that is tied to -- You can see it as we look at some of the live hard-bottom habitat section of the FMP, those tiering off of areas. We're trying to look at what has been mapped within those zones and where do we need to go, and then, ultimately, building prioritization so that that will feed into some of that discussion this afternoon.

The connection between the conservation blueprint and the Fishery Ecosystem Plan is a pretty key one, especially with the resources provided through the Landscape group. I think they are also providing our activities on modeling, and so the opportunity to look at indicators, et cetera, are tied directly into how the ecosystem plan connects very closely and works with and draws on the collaboration.

Some of the more precedent-setting policy permitting activities, I think Pace will touch on some of the activities. Then sargassum, our council has led the way on that conservation, and this was really just trying to advance some of the international activities, which the plan actually recommended that we proceed with, because of the importance of that resource in our region. Those are the only things that I was going to touch on, and thank you all for being able to attend,

and I think we've got a lot on the plate and a lot of guidance to the council can be developed, and so I will move on and get Lisa into the artificial reef discussion, which is pretty key.

MR. GEER: Okay. Just to introduce Lisa, she heads the habitat group at the Atlantic States Marine Fisheries Commission, and they were ever so kind in having their artificial reef committee work on this for us. At one of the meetings, the Southeast members stayed a few extra hours and started working on this for us, and so, with that, Lisa, you have the floor.

DR. HAVEL: Just as some background here, the sub-committee was Keith Mille, Christine Kittle, Brad Ennis from Florida Fish and Wildlife, January Murray from Georgia, Bob Martore from South Carolina, Jason Peters and Amy Comer from North Carolina, Brian Hooker from BOEM, Charlie Barans, and also Pat Geer provided comments as well.

In this policy, we tried to emphasize that properly-placed artificial reefs are essential fish habitats, but, if artificial reefs are not properly placed, they could actually be detrimental to surrounding habitats and also marine life, and so hopefully that was captured in this policy, and I guess we'll just go through section-by-section. A lot of this was modeled after the climate change and food web policies as well.

The first paragraph, some of it was pulled from the FEP II. I already suggested to Brittany to change the "same" in this sentence right here to "similar", so "artificial reefs function similarly as natural reefs". Then, also, I suggested to Brittany that we remove "purposefully" here.

MS. DEATON: Do you want us to jump in if we have comments on that? I guess that sentence really disturbed me, and I was wondering -- The natural reefs, they function the same as natural reefs, and, also, I would like to see some citations, because this whole policy, to me, and I had brought this up last year, seems very -- Artificial reefs are 100 percent great, even aside from the citing, and I don't think that the scientific literature shows that. I still think it's very up in the air about how it relates to fisheries management, and I don't think that this shows that at all, and so I would like to see some more citations. Then the citations that you do bring in later on, from Bohnsack and other ones, are from 1989, and so we're looking at like thirty-year-old articles, and so it would be good to update those.

MR. GEER: Do you know of any?

MS. DEATON: Not offhand, but I mean I can certainly get some, and I know that my people were heavily involved, but I also know that they're the artificial reef program. Earlier, I had sent that -- The Southeast Florida Coral Reef Initiative, they had done a whole artificial reefs management handbook, and that has a lot of citations, and I think it gives a balanced view of both sides, which I don't necessarily think this policy needs to do that, but I think that the policy should have a sentence about the research or the fisheries management still sort of being divided on the effectiveness of artificial reefs in increasing habitat or whether they're just congregators.

DR. HAVEL: Any other comments for the introduction? Okay.

MR. GEER: In several places, you use the term "vertical profile" and "higher profile". Would the term "relief" be better? We're talking about relief off the bottom. I think, if you look under Policy Considerations, the second line, it says "to add vertical profile", and I'm asking if -- It's

just wordsmithing at this point. Does anyone have any thoughts on that? Should be "profile" or "relief"? I saw that "profile" was used twice in the same sentence, and I thought of "vertical relief".

MR. PUGLIESE: That's kind of the common terminology that people use.

MR. GEER: Yes, and that's just a minor thing. I didn't know if there was a reason why it was called "profile" instead of "relief". That's all I had.

MR. WILBER: One thing that I think should be clear in this is that, in the actual implementation of the EFH program in the South Atlantic, we do not consider it to be an artificial reef unless it is in a government-sponsored artificial reef management area. The converse of that is, if it happens to be in a government-sponsored artificial reef management area, it is EFH, regardless of whether or not it's providing benefits to habitat or to fish.

MR. BUSH: Mr. Chairman, just a brief question to Pace. Is there someplace where we could maybe find a little more information on that, because, being a government employee, I understand where you are coming from with that, but -- I guess what I'm asking is, is there someplace that we can maybe drill into that, for those of us who want to look into that later?

Maybe I am misunderstanding this, but just arbitrary rules just because someone felt like we needed a rule, and it's one of those things that -- We have looked at a couple of different things. We've tried to encourage our guys to maybe consider getting involved in actually building a reef, but, for someone to say that it's not EFH because it's not in the right area or someone to say it is EFH, just because it happens to be in an area, and it's just very, very arbitrary, and that's what it sounds like that sort of is, and I would like to figure out where to do the research to guide my folks, rather than waste their time. I don't know if I'm making sense, because I got a little distracted there.

MR. PUGLIESE: Let me jump in real quick, because I think we're probably blowing this a little bit out of proportion, because what it is if -- You're going to have to get a permit from the Corps of Engineers, and so basically any place that is permitted and goes through the process to get that base permit qualifies under this, and so it's just tracking the way the system works at this point to do that, and so it's not excluding -- I think it's excluding like riprap and different things nearshore, things that were really not included in artificial reef development, and I will let Pace clarify some of that.

I think the bottom line is that any of those permitted areas would qualify as artificial reefs. Then, as stated further in ours, if they're not only permitted, but then also designated as special management zones under the council, they're EFH HAPCs in our area.

DR. SEDBERRY: I just wanted to point out, in that paragraph that's up on the screen there, that citation, Sedberry 1988, that paper does not say that, and I pointed that out to one of the authors when this was written. I said that I did not say that in that paper. The paper is about a feeding study of black sea bass. It just doesn't say that, and I don't know why it's still in there.

MR. WILBER: So a little more explanation. If you go through the EFH designations, there are some terms that are obviously exactly what they mean, and there is other terms that are kind of

fuzzy, and "artificial reef", in our judgment, is one of those fuzzy terms. We don't really know exactly what was meant when that was put into the EFH designations, and so we have to operationalize implementation of that designation in some way.

We have some fortunate circumstances in the South Atlantic that our Gulf counterparts do not have, and the fortunate circumstance we have in the South Atlantic is that artificial reefs are pretty well controlled, through the permitting process at the Army Corps of Engineers and then through state regulations. The state regulations identify who can apply for those permits, and so individual homeowners can't go out and build an artificial reef, with or without a permit, as they can in the Gulf of Mexico.

What we're trying to do is identify the artificial reef programs that are out there, government sponsored and maintained and monitored, from the events that just sort of happen by happenstance. Many of those things that do happen by happenstance eventually do get corralled into a government-sponsored artificial reef program, whether it's at the state level or the county level or even the local level, and so we don't really feel that we have excluded anything.

What we've done is kind of what Roger just said, and that is that we are now protecting ourselves from homeowners who want to riprap their shoreline and claim the riprap is an artificial reef and therefore they don't need to mitigate for the marsh that they're going to be covering on top and so that's really, ultimately, what we're trying to protect ourselves from doing.

MR. GEER: David, if your folks want to get involved, I would tell them to talk to Anne and her group and the artificial people, because I know, in our state, we could not do a lot of the work we did without the help of the fishing clubs who donated money and provided resources to us and have connections to getting materials for us, and so that's the way to get involved. If they want to get involved, most of the states have plenty of areas, designated areas, to put reef material out at. In our state, if somebody comes to us and says we want to put material, we work with them, and we say, okay, these are the areas we have and where do you want to put it within that area, and we work with them, and so that's, in my opinion, the way to go.

MR. WILBER: I am just going to flip it around a little bit, because now I think I understand the angle behind your question a little better, and so, if a fishing club were to decide that it wants to put out some kind of a structure, and we'll call it a fish attractor, for lack of a better term, and they go through the permitting process to put that out there, nine times out of ten, you get a no-objection letter from us when the Army Corps coordinates with us on that permitting action.

Now, whether or not we view that as EFH, for the purpose of us trying to protect it, when somebody else wants to come in and dredge it up, that's a different matter, and we would not view it as EFH if somebody wanted to come in there and do some harm to that structure, but we would not oppose, nine times out of then, the actual placement of that structure out there. We just wouldn't call it EFH for the purpose of the EFH designations.

DR. HAVEL: Okay. For the policy considerations, we have, I think, three paragraphs here. Are there any other comments for this section? Okay. Moving on, we will change that Sedberry citation, and it should probably be changed in the FEP too as well.

MR. PUGLIESE: Please, just a quick note. Everybody speak up. The volume on this can't go up any louder, and so probably just speak closer to the mic, and that's going to accomplish what we need on this.

DR. HAVEL: There is a couple of sentences under Threats to EFH and EFH HAPCs. I believe this text was already provided, and so we can move on. SAFMC Policies Addressing South Atlantic Artificial Reefs, that was also provided, but we can move into the general policies. We broke them down into different categories, but feel free to look over it, and I guess we'll start with the Uses, and let me know if you have any edits to that.

MR. GEER: Lisa, I have a question about -- At the very end of that, Number 5, and I guess it's under -- It's on the bottom of page 4, Number 5 on the bottom of page 4, where it says "Collaborations with regional recreational divers to retrofit many existing artificial reefs with Turtle Excluder Devices".

DR. HAVEL: Charlie Barans provided that comment. It was added at the end, and so I'm not sure if everyone had a chance to look it over, but we can definitely talk about that.

MR. GEER: Does anyone know what that would entail? Does anyone know what that would entail, putting some kind of excluder device on artificial reefs? I am just curious.

MR. HOOKER: I don't know what that would entail, but I think it's trying to get at that NMFS policy statement regarding gear getting trapped or lodged on an artificial reef. Then the turtle is then getting entangled in that debris on the artificial reef, and so maybe the person that submitted it didn't fully understand what that policy or what that statement from NMFS was getting at and thought that this was a different way of getting at it. I don't know.

MR. HART: Probably about a year ago, we had scoping meetings and special National Marine Fisheries -- The protected section actually came to one of those meetings, and they were requiring the artificial reef group to actually put excluder devices, like actually openings and stuff, for turtles to get out of the reefs. You might remember a little bit more than me.

MS. DEATON: That was in their letter, that they requested that we do that for oyster sanctuaries. They were concerned with reef balls, which do you know what they look like? We were concerned, and we really didn't understand how a turtle could even be stuck within a reef ball, and some other structures, if they didn't have -- They wanted an open bottom, and these things have a solid bottom, but I believe they dropped that, and so we have gotten -- That was over an oyster sanctuary permit in estuarine waters, and that has gotten its permit, and so I believe they dropped that, after many phone calls. That was also when they wanted us to do annual diving to remove all of the fishing line, and, at that site, it was concerns over sturgeon, but it wasn't actually in sturgeon critical habitat, but sturgeon could migrate through that area.

MR. GEER: It was my understanding that the pallet balls had to be closed on the bottom and open on the top, and that was my understanding. That's what we just went through. They didn't want the turtles to go inside, underneath.

MS. MERRITT: As I understand it, some earlier reef balls, which had the various sizes, one of which is the pallet ball that you're talking about, had the open bottoms, but the last time that we

were involved with an experimental configuration of something similar to a reef ball, which we called Atlantic pods, and they were put out in 2015 for four of our reefs off of North Carolina, and we were encouraged by the division to go with a solid bottom. One of the reasons for that was for placement and to allow the -- To enhance the stability of the device, and so that's all I know about whether it should be open or closed, and I guess there is two different trains of thought on that.

MR. PUGLIESE: I've got a question. Lisa, I understand probably what the intent was, and it may be a misinterpretation of intent, or at least where this is going, but would it be possible to more simplify this, because I think the idea is that maybe recreational divers could help in reducing, potentially, some of the things, and so it would --

MR. GEER: Entanglements.

MR. PUGLIESE: Yes, and so provide work to reduce the potential impact on turtles, and so it would be things such as gear removal or anything from lost traps or -- I mean, there shouldn't be lost traps on these reef systems anyway, but line or gear, something that would make it more generic, and I think the intent there is to engage the recreational community to help reduce the potential for interactions with sea turtles.

MR. BOSTON: On this one, I think what we do is we delete the "with Turtle Excluder Devices" for sure, and that seems like the problematic wording here.

MR. GEER: I think retrofitting -- I don't think divers are going to be retrofitting anything.

MR. BOSTON: No, exactly, and so it's just collaborations with regional recreational divers to remove debris and other stuff that might be entangling turtles. I mean, that's really what this is about. We'll simplify that.

MR. GEER: Protected resources.

MR. PUGLIESE: Yes, because that would get toward nets and lines.

MR. BOSTON: Got it.

AP MEMBER: You could have all kind of gear, and it's not just turtles.

MR. BOSTON: That will be good. We will change that out and get rid of the "retrofit" and everything after that and just make it, I think, more about the collaboration and the types of stuff that might be entangled.

MS. DEATON: My question is collaborate with who? If you're asking the recreational divers to collaborate with the state agency, is there liability issues? I don't know. Do we even need Number 5? I am feeling like just cut it.

MR. BOSTON: Just cut it? Okay.

MR. GEER: The other thing was public awareness, maybe raising public awareness. Instead of -- I agree with you, and say the collaboration, if somebody goes down there and says they're

working for DNR, which they're technically not, but having divers clean the bottom when they're down there, if they're willing to do it and they see something that's a threat, is not a bad idea, if they feel comfortable doing it, but having it be under the auspices of doing it for the state versus doing it for -- If you're in a park and you pick up a can, you're not working for the county.

MR. BOSTON: Anne, I think Amber can address this, but I know, in south Florida, for example, those counties actually have arrangements with the dive clubs to do exactly this. It's a public awareness issue, I think.

MR. HOOKER: Up a little bit further, under Number 8, there is also the sea turtle entrapment, and just, to the discussion we already had, just putting secondary effects or something to make that a little more clear what that is referring to.

MR. BOSTON: So we're going to change 5 significantly to make it just about public awareness and collaboration and get rid of all that other reference. Then on Number 8, Brian, you're suggesting that we --

MR. HOOKER: Just adding secondary effects, such as entrapment secondary effects, just something to give -- There is apparently two different things. They're worried about the actual entrapment from the physical structure, but I think most of the concern is over secondary effects from debris.

MR. BOSTON: That was in Number 8? Okay. Thank you.

MR. BUSH: A question for you. I was speaking with Anne here, and we just happened to mention this a few moments ago, but a different issue altogether. A lot of the clubs down south that made a lot of effort at some point to create artificial reefs or whatnot, areas where the fish would congregate, and trying to understand that this isn't simply just a place that attracts the fish, that it actually becomes habitat and contributes to the fishery, a lot of what we're hearing from some of the guys in our -- I guess we'll say the recreational side of the business, but they went to all of this effort to create this reef and, basically, after a while, they realized the reef was working. Now they've been told they can't fish on it, because it's working.

Again, I'm looking at it from our commercial guys, because these guys have so much crap behind their fish houses that I'm sure that we could find something to drop out there, but, if they were to go out there and they were to create a place that actually contributed, I guess I would like to see some sort of language encouraging local fisheries managers to maybe have some sort of a -- I don't know what you want to call it, but progressive sort of management options of those areas considering the efforts that the fishermen or the groups have put into contributing to this, and I'm sure maybe you all could help me out with some language or something, if there is interest.

MR. BOSTON: David, so that would be kind of a Number 6 under our recommendations area there. What are you thinking, Lisa?

DR. HAVEL: I would probably put it under the policies, maybe, instead of the research. We were in research just now, but -- I think it could go under Uses, Number 4.

MR. BOSTON: Number 4 under Uses? Okay. If you get with Brittany during break or whatever, and, if you've got some specific wording you want to tweak, she's putting that in right now.

MR. BUSH: Sure. Thank you.

DR. HAVEL: I will move on from Uses down to Siting or Construction. Any comments on the policies there?

DR. WHITTLE: I sent everyone the SEFCRI siting handbook, and I would at least like to see that cited within the construction.

MR. BOSTON: Amber, we will put that in the intro as well.

DR. HAVEL: I'm not hearing anything else, and so I'll move down to Mitigation, which is the last section for policies.

MR. HOOKER: I just have more of a question. My understanding of the SMZs in the Mid-Atlantic is they're not -- They cover a variety of different management measures, and it seems like, in this document, they have future expansion of no-harvest SMZs, and this is kind of getting at what David was talking about. Like a special management zone doesn't necessarily mean no harvest. I don't know if you want to just say "SMZ" and then -- You see to be predetermining what type of SMZ is going to be placed.

MR. PUGLIESE: That's intentional for our region, because we have just created the spawning special management zones to address that very specifically, and that's why that's actually highlighted for the South Atlantic. Relative to the rest of the SMZ designations, they are fairly small relative to those, but they play -- This is highlighted in those, because that is one of the tools that was really identified as an opportunity to create those.

Part of the natural areas also have artificial reef components that are specifically spawning special management zones, and so we have a variety of those in our region now, because you go from gear reductions off of various states to, off of South Carolina, special management zones actually have some species limitations in that state, and so the council has just expanded their tool capability, and one of the newest ones is the no-harvest special management zone areas that, off of South Carolina, for example, the deep artificial reef area, has been created.

As part of that process, creation of artificial reef is a major player in trying to advance that, and so it's very specific and very intentional in the way it's been enfolded into our region, and it's not intended to be big and large areas. You know what we've created are very focused and have a lot of input on how we advance those. It's adding that new tool to the capabilities in our region.

DR. HAVEL: Any other comments for mitigation? Okay. Then I will move down to Research, and so we broke this down into different sections as well, where the South Atlantic Council encourages the funding of scientific research on the following topics. The first one is Biological, and so please let me know if you have any comments for those. Okay. We will move down to Socioeconomics and Physical, which are Number 7 and 8.

MR. GEER: Brian kind of mentioned this, I think, earlier, but maybe just put "entrapment" and take out the "sea turtle", because other things can get entrapped as well. We were talking about protected resources, but something else can get entrapped just as easily in some fishing gear or an anchor line.

DR. WHITTLE: They also lay out the priorities in the report, in the SEFCRI report, and so you can look at those.

MR. BOSTON: One last point, Amber, just for our notes. For Number 8, we're going to change the "e.g." and just make that "entrapment", but you were saying that there's some specific recommendations in the report that we could reference there?

DR. WHITTLE: Yes, for probably 1 through 8.

MR. BOSTON: Okay, and so, 1 through 8, let's reference the report for the recommendations they have.

DR. WHITTLE: Yes, look at the report, because there are more.

MR. BOSTON: There are more in there?

DR. WHITTLE: Yes, more bullets in there.

MR. BOSTON: Okay. We'll look at that. Thank you.

MS. MERRITT: Just a question. One of the things that I haven't noticed in any of the draft document is I kind of expected to see, in the introduction, one of the side benefits of the artificial reefs being mentioned about water quality, and I wasn't sure that that really fit in here, since we're concentrating on the resource, the fish, but, for healthy habitat, you need healthy water, and that's a side benefit to your community and all of the user groups, and so I'm just wondering if that might be something that needed to be introduced in some way. I don't know whether the introduction is the proper positioning for it or to even be listed as one of the research items that is considered when you look at artificial reefs. Thank you.

DR. WHITTLE: I have a question about that. You're saying artificial reefs improve water quality?

MS. MERRITT: One of the things that we've been told is that the growth that is propagated, I guess is the right word, upon the structures is a filtering system, and, therefore, you have better water quality.

DR. WHITTLE: I think that that's theoretically possible. I just would love to see a paper on it, because we always hear the other side, of where people drop things that have poison in them or it leaks oil or whatever it is. I have heard the other side, and so I would love to see -- If you have any papers or articles on it, I would love to see that.

MS. MERRITT: I would love to see it, too.

MR. BOSTON: Mr. Chairman, on that one, I think that we end up at, potentially, per what Rita and Amber were saying, we put that in perhaps a research recommendation, that we would need to know more definitively the impacts of these on water quality, something like that. Is that okay, Amber?

MR. PUGLIESE: Just a quick note is I think where it's clear is if you're talking about building inshore oyster reefs or different things where you are literally putting in the species that is enhancing the filtration function, et cetera, and so you're making that leap of the enhancement of that offshore -- The research to accomplish that same type of understanding and what means for localized habitats, I think is a good direction.

DR. HAVEL: Any other comments for Socioeconomics or Physical? No? Okay. Then I believe, last, is the South Atlantic Council also encourages, and then we have five different points down there that didn't really fall into any of the categories. We are already editing Number 5.

MR. GEER: Any other comments on this section? All right. I am not hearing anything. It looks good to me.

DR. HAVEL: Okay, and so I will scroll down. The next part is the table, which was provided, and then references, and I welcome any references that you have that we haven't included in here as well, and we will include the SEFCRI references.

MR. GEER: The only thing I would have on this table is, under Artificial Reefs, the Snapper Grouper, I would also add spadefish, Atlantic spadefish. They are all over our artificial reefs. They're probably the most abundant species out there on our reefs right now.

MR. BOSTON: Do you have mark-ups that you can just hand us? Thanks.

MR. GEER: Anything else on the table?

MR. BOSTON: Amber, if there is other FWC or other research stuff that you know about on any of these things, we're happy to cite it and add it in the text as well. Thank you.

DR. CHERUBIN: I have one comment, and it's under Coral Reef and Hard Bottom. It says coral reefs, live/hard bottom, medium to high rock outcroppings from shore to at least 600 feet, where the annual temperature range is sufficient, and what does that mean? What does "sufficient" mean there?

MR. PUGLIESE: This wording is exactly the wording that's in the EFH designation, and the temperature range was tied to the species utilizing those deepwater habitats, and so I think this was adopted when we first were identifying the hard bottom areas that were associated with the entire suite of snapper grouper species, including wreckfish, and I think the temperature side of the thing was tied to what the bounds probably were for wreckfish, the depth, and so that's a carryover from the original EFH wording designation.

MR. HOOKER: Would it be more clear if it said "sufficient for that particular species" or something along those lines, where it's clear why it's just giving a range?

MR. BOSTON: Thank you.

MR. GEER: Any other comments on this table? Hearing none -- The next step would be taking it forward. I know the council saw a draft of it the last meeting, didn't they?

MR. PUGLIESE: No, this has been in development, in the background, through the collaboration between -- With Lisa coordinating it and the collaboration, we advanced it so that we would get the committee to weigh in and be able to help focus and wrap this up, so the council could be advancing this after the AP finalized it at this meeting, and so that's essentially what -- What we need to do is -- You don't have to necessarily vote on this. We can do it by consensus, to advance it to the council, because this is, as I mentioned, the last EFH policy statement that has been compiled to support the FEP II.

MR. GEER: Is there any concern about sending this up for review to the council committee, as indicated in the comments today?

MS. DEATON: I would probably like to see another draft.

MR. GEER: I was going to suggest that we have these changes and we get to take one more look at it. That's what I would suggest. Is everybody okay with that? I am seeing nods. Okay. That's what we'll do then.

MR. BOSTON: Okay, Mr. Chairman. We are making those edits live, and so we can tweak that, if Lisa will get with Britt, and, if you've got any specific wording, like David had some wording, or some others, just -- We will highlight those points and just walk through and make sure that we hit all the key points that you guys recommended.

MR. GEER: When would you need those comments by?

MR. BOSTON: Lunch.

MR. PUGLIESE: One of the issues we have here is that this meeting is pushed right up against the council meeting, and, technically, our briefing book is going out next week, and so this -- Whatever gets adopted or revised here will go to the council. It has to be actually brought in. I have to have it in for review at the beginning of next week, so that that gets advanced. We'll have an AP report, as well as any of these revised documents, for the council consideration. Again, this goes to the council. The council will then adjust it as they see fit, the members, in terms of it being a final, approved document.

MR. BOSTON: With that timeline, Mr. Chairman, I'm recommending that, as we go through and edit anything that we edit, that we have a pretty immediate -- Maybe like tomorrow morning or whatever, we can walk back through the changes, to make sure, because we really -- Once we leave the meeting, you have essentially until Sunday night at midnight, and so we might as well get it done here, if we can.

MR. GEER: All right. We would need a revised copy of it ASAP. Then, basically, if everyone can review it again tonight and give any final comments tomorrow or by the end of the meeting, if possible, or, at the very latest, Thursday. If you had it by Thursday?

MR. PUGLIESE: No.

MR. GEER: I am hearing no.

MR. BOSTON: We have a special dispensation that we need to consider. Our fabulous team leader for this is going on her honeymoon on Thursday, and so I would like to leave the meeting with these, if we can.

DR. WHITTLE: I mean, this needs work.

MR. BOSTON: A lot of work?

DR. WHITTLE: Yes, and if you guys are going to do a lot of work pulling stuff from that SEFSRI or going and get a bunch of citations that are less than thirty years old, and I just think we're rushing this a lot. I mean, how long have we been doing this that now we need it done in twenty-four hours.

MR. GEER: It's if we're going to take it to the Habitat Committee in June, it would have to be done. That's the problem. If it's going to go forward in June, we would have to move forward very quickly.

DR. WHITTLE: We couldn't have like another week?

MR. BOSTON: No, it has to go out Tuesday, by timeline, and so the only thing there, Amber, would -- Just process-wise. It would be going out Tuesday of next week, the 23rd I guess, and it has to be in the mail. Whatever edits we're going to make -- The big ones that you're talking about that would need to be made, I am kind of concerned that we didn't get those already, in terms of the FWC review, et cetera, and I understand, from your point, how that happened, but we just didn't have that information. Recommendation-wise, Mr. Chairman, what are you going to do there? Are we going to push it forward or --

MR. PUGLIESE: I mean, if we -- I understand, and I want to make sure that we have it as complete as possible, and that's why we are meeting, and so, if what we need to do is to do what Brett said, get as much done to agree on what ones can be adjusted now, specific ones that need to be targeted, and then, if we can get those recommendations, final recommendations, say by -- Honestly, by Monday, with the actual wording that would be into that, then we can proceed to get that in, if that is something that is reasonable.

DR. WHITTLE: When is the next time the Habitat Committee meets?

MR. GEER: It meets at every meeting, and so it would be August, right?

MR. PUGLIESE: The council? It would be the September council meeting.

DR. WHITTLE: Is that a possibility?

MR. GEER: Anything is a possibility. It's whether or not we want to push it off. Pace, did you have something?

MR. WILBER: Amber just basically brought it up. I don't see why we can't wait until September to put this to the council.

MR. BUSH: Even if you did put it to the council, you put it to the council with the intent that the supporting documentation is coming in with this, and it's up to you all, I mean, if you're going to do it at all or don't give it to them at all.

DR. WHITTLE: I don't think we should send them something that's half-baked.

MR. GEER: You want to take something as complete as possible to them.

MR. BUSH: Understood.

MS. DEATON: Just one thought, because I had looked at the -- There's an artificial reef section that was updated for the FEP. Are there references -- I see some 2007 references, and, real quickly, I don't know if that's sufficient, if they could pull more from this document into the policy document or reference this document, because we know the FEP isn't done yet, but I still don't object to waiting a couple of months either to do that, and so you would also want them to match, too. You want them to be consistent.

DR. HAVEL: I was going to say that we pulled wording from the FEP II, and so all those citations and stuff came directly from there, and so I don't -- I am not sure if the FEP II then needs to be revisited, but we can pull more, but it wanted it to be as consistent as possible between the two.

MR. GEER: The FEP, I thought it was a pretty good document, and it's very comprehensive. Now, I don't know if all the references are -- Then you're trying to take that and tone it down to a four or five-page policy statement. It's the pleasure of the AP. If you want to wait, we can. It's not my decision. It's the AP's, if we want to push it off. Then it gives us some time to get this thoroughly -- You don't want to take something up to the council, up to the committee, and have it be not complete, because all they're going to do is throw it back in our laps, and then we'll have to do it again anyway, which has happened in the past. What are you thinking?

MR. PUGLIESE: I guess the only question I have is, when you mentioned could it be done in a week, technically, the briefing book will be mailed at the end of next week, and the council will be essentially approving the core components, which are really the larger sections of the FEP document. There is a real desire to move forward with implementation, implementation strategies, and so they're wanting to move beyond here.

However, the policy needs to be in the best shape it can to be brought forward to the council, and so I guess -- I mean, there is benefits of advancing it sooner, because then it will be tied into kind of the approval of the core components, because all the other policy statements have been finalized, but that is a call for the panel members at this stage.

MR. GEER: Okay. It's decision time, folks.

MS. DEATON: I would feel more comfortable putting it off until September.

AP MEMBER: Second.

MR. GEER: All right. That's two. Any objections to putting it off until September? It just means more work for -- I agree that getting it done right is more important, but kicking the can down the road all the time, but it does need some work. It's whether or not we can get it done in a week's period versus over the course of three months. If that's the pleasure of the AP, that's what we'll do. We'll push it off until September. All right.

Lisa, thank you very much. I know the Artificial Reef Committee worked pretty hard on this, and I couldn't make it that day. Something came up, and you were kind of flying blind with it a few times, and I greatly appreciate all the work that you guys put into that. We have a few more minutes on this, and I just want to talk real briefly, because this artificial reef policy statement is very timely with what's going on with all of our artificial reef programs.

The permitting process through the U.S. Corps of Engineers, we have to do that every five years, and what -- I could tell you what just happened in Georgia recently. It was, during that process, it got bumped up to NOAA Protected Resources to be looked at, and they came back, NOAA Protected Resources came back, with a lot of requirements, many of which are in this document.

A lot of them didn't make a whole lot of sense to us when we looked at it, and what we were trying to avoid doing was going through a biological opinion, which could take -- They say six months, but my personal experience with them is they take a lot longer than that, because of the workload that they have in that group. All of the states are being affected by this. When we sat down and talked to the Protected Resources folks, they said we were the first state that had to deal with it. All the other states are having to deal with it. South Carolina right now has -- Their permit isn't even expired yet, and I believe they've had a moratorium put on deploying any materials until they go through this process.

Anne had asked me about it this morning, and we finally got ours okayed, after multiple calls with Protected Resources. A lot of these things came up, and, originally, it was about right whales. We pretty much went through that very quickly, and we resolved all those issues they had. Then they started bringing up turtles, about some of these issues, entanglement issues, getting entangled in anchors and fishing gear and going into structures and getting trapped.

They were telling us, initially, they didn't want us to put -- A lot of the materials we were using, they didn't want us to use anymore, like vessels, for artificial reefs, and so we worked through that whole process with them. We were at the verge, and I thought we were going to a biological opinion, and our review got okayed, which was -- We were pleasantly surprised and happy that it did, but you're all going to have to go through that process.

They're basing -- At least when we asked, whenever they cited literature, they cited that memorandum by Mike Barnett that just came out in January. I think Anne just got a copy of it, and we can send a copy to everybody, which is a thorough review of artificial reefs in Florida. Now, personally, when we looked through that, the conditions in Georgia are much different than they are in Florida. Yes, we do have sea turtles, and, yes, we do have a lot of -- A lot of the things that they were talking about in that paper, we really didn't feel applied to what was going on in

Georgia and South Carolina, maybe. Those are the two states that I could relate to, and probably to North Carolina as well.

I don't believe that has been a peer-reviewed document at this point. Correct me if I'm wrong, if anybody knows, but that is what they kept showing as a reference. This is the reference they were giving us, and it was impacts of artificial reefs in Florida, with sea turtles and other protected resources, and so I advise you all to look at that document. Some of the suggestions that came out from it, what we were told was we couldn't use ships anymore. We had a tugboat that was coming, and they didn't want us to use it, because a turtle can get inside. We said we would cut large holes in the side, so the light would penetrate through the whole vessel, so a sea turtle could get in and get out.

Then the concern was that any kind of railing would catch fishing gear and it would cause entanglement, and we said, well, we can take all that stuff off in advance. If you know in advance, you can take a lot of those materials off, but it's coming. She told us that we were the guinea pigs and that all the states are going to have to go through this.

If anybody -- Anne asked me what did we do, and I really don't know what we did. I think we just kept that line of communication up. We would send something, and the permit wasn't with us and Protected Resources. It was through the Corps, and so we had to go from us to the Corps to Protected Resources and back to the Corps and back to us, and so we tried to have phone calls with everybody on at the same time, and we tried to come to some reasonable resolution on it.

As your permit is coming up -- We put our permit in in January, and it was supposed to expire in July, and we just got it in April, and so we weren't able to deploy any materials this year, because we were under this, and so you're going to have to plan accordingly in your states with your permitting.

MS. DEATON: In North Carolina, it's been held up at apparently the Corps office, and they haven't even sent it down to Protected Resources, and it seems to me that it's been dealt with differently in the different states, and I haven't read this paper yet. I just got it from Wilson, and that's good, but that's a pretty big effect without any documentation. Like I would just like to see more documentation on interactions of different species in the different states at the different structures, and I don't know who would be the best person to contact from NOAA, but that's what we need.

If we had that, then I was wondering if it would be appropriate for the council to have some type of a letter stating -- Just summarizing support, if appropriate, support for artificial reefs, for their benefits, if done correctly. It sort of ties into our policy. We have this policy that promotes it, and could the council have a role here in a coordinated effort to get at this problem for the South Atlantic?

MR. PUGLIESE: I think that was the intent of trying to get this policy advanced here, was to kind of accomplish some of the ties of the new utilization, but also address some of these issues that have just recently come up, because, in the South Atlantic, the importance of artificial reefs and their value as habitat has been acknowledged for many years, and it continues on. Some of the discussions on production and whatever go on, but I think, in our region, they've been identified as an important part of our system, both in use and in habitat. In the ideal situation, it would have

been nice to be able to provide something like that and provide the supporting policy statement with whatever advances to partners.

MR. GEER: It's my understanding that the Corps offices work somewhat independent of each other. Pace is nodding his head yes, and it's also my understanding that Protected Resources, in the past, if the Corps didn't find that there would be an issue, it didn't move forward, and that was the end of it, but my understanding is that now Protected Resources wants to see these things. They are requesting it not only from this, but I know with a lot of our U.S. Fish and Wildlife Service grants. They're asking to see those as well. They want to comment on them, and so it's -- When we asked for documentation, we were given the Barnett paper. That's what we were given. That is the only documentation we were given, and that's what -- We said there's got to be more than this, and that's what we were given.

It's good work. For Florida, it's great work, but I kept saying Georgia is not Florida. We don't have the population size, and our artificial reefs are much farther offshore. We don't have the fishing pressure on our artificial reefs that they might have in Florida, strictly because of the proximity to shore and the population size, but there were several folks that came forward that provided information to us after this, basically saying, hey, if you want to use my acoustic data on sturgeon, to show that the sturgeon are moving in and out of these artificial reefs and nothing is happening to them and they're fine. I think South Carolina is the one that's coming up next. Then, Anne, I don't know when your permits are due.

MS. DEATON: We have some permit applications already drafted and at the Corps for new artificial reefs that are held up, and so not about renewal. Another thing is I noticed the Georgia one is like one permit did all of them, and we have not been doing that, and so ours are all more or less individual, and so they've talked about trying to get one comprehensive permit.

MR. GEER: It took a lot of work, but it's to our benefit now, having them as one whole, because we only have to do the one permit, and our areas are -- I think, each time you do a deployment, you have to do a permit. Is that how you do it, for the most part?

MS. DEATON: I think a permit modification.

MR. GEER: Okay. Once we have that permit, we're good for five years, which is great for all of offshore and inshore artificial reefs.

MR. WILBER: Just a couple of questions. Pat, do you have a copy of the concurrence letter from Protected Resources to the Savannah District for your artificial reef permit?

MR. GEER: Yes, but I don't have it with me, but, yes, I have it.

MR. WILBER: Do we know if it's the same individuals in Protected Resources that are looking at each of these artificial reef permits?

MR. GEER: I can guarantee it's not. I can almost guarantee it's not. We had to -- When we questioned this, we stepped it up, and we were dealing with one of their consultants at Protected Resources, and we stepped it up a level, and we had those discussions at a higher level. The person

we were originally dealing with, I don't know how much background she had in artificial reefs, per se.

MR. WILBER: Georgia just completed its permitting process, and South Carolina is about to start, and North Carolina is kind of in the middle. Where is Florida in its permitting process, or it doesn't seem to affect them at this point in time?

MR. GEER: It's by the county down there, and so you multiply that by how many coastal counties there are. It's got some major ramifications.

MR. WILBER: All right, and so there's an effort underway in Fisheries right now to identify clumps of things that are clogging the system inside Protected Resources and perhaps give them to Habitat, to see if Habitat can move them through the system quicker, and so I am not volunteering for that, but I am wondering if this is an issue that might fit the intent of that effort pretty cleanly, and so that's something to think about.

Then, as far as trying to maybe have the council exercise some of its leverage here, rather than a letter of support with the ode to the benefits of artificial reefs, what I would ask is, at a real, full-blown council meeting, ask -- Have the council ask for a briefing from the National Marine Fisheries Service on what the problem is, and we know there's at least one person attending every one of those council meetings from the National Marine Fisheries Service who is able to give that briefing.

MR. GEER: Does everyone agree with that recommendation? Does that sound like a -- It probably couldn't happen the next meeting, but maybe September.

DR. LANEY: I mean, since your Co-Chairman is sitting here, one thing I could certainly do is to request that, when Jenny does her normal quarterly briefing to the council that she include a briefing on -- Help me word it here, Pace or Pat and committee members, AP members, but what we're looking for is a briefing from Protected Resources on the status of their review of state artificial reef programs? Does that capture it, or, if not, how exactly do you want me to phrase that, because I can go ahead and send an email request to Jenny now that that be included in the June briefing to the council, if that's something the AP desires.

MR. GEER: I would say status and outcome, if there has been an outcome, because, at least two of them, they're going to say they're underway, and maybe what some of the recommendations were that came out.

DR. LANEY: Okay. So what I heard from Pace was -- Yours is finished, right? Georgia's is complete.

MR. GEER: Yes.

DR. LANEY: South Carolina's is somewhere in the middle, and North Carolina's is -- Yours, from what I heard you say, Anne, you just have some individual applications that are sitting at the Corps, and so you don't have an application that includes all the North Carolina reefs, and Chip is behind me, and he may want to add something to this discussion as well.

DR. COLLIER: Typically, at every meeting, we get an update on Protected Resources issues that are occurring in the South Atlantic. However, at this meeting, it wasn't identified as anything being a real hot topic, and so we're not having a specific Protected Resources Committee meeting at the next council meeting.

DR. LANEY: But, Dr. Collier, could we not ask -- NMFS, as an agency, does their routine briefing, even though we may not have a specific PRD briefing from Jennifer, and so we could still ask for an AR update, I guess as part of the NMFS overall briefing.

DR. COLLIER: A week is going to be very quick.

DR. LANEY: Yes, I know, but we can ask.

MR. WILBER: My two-cents added to this is I would not try to do this for the June meeting. It's just too much. Focus on the September meeting, or perhaps even the December meeting, if it needs to go that far, and what you really want is a discussion of the issues. You don't want a status of where various permitting actions are in their process, and so this is not two sentences in a broader briefing. You want fifteen or twenty minutes on the agenda to talk about the issues.

Now, this is only if the council believes this issue is important enough to warrant agenda time during a council meeting. Now, it does kind of sound like the Habitat AP's feeling is that it should be discussed at a council level.

MR. PUGLIESE: Yes, and I think the council members definitely would appreciate that, because that's -- When we were discussing advancing the policy statement, that was some of the discussions, to make sure that the developers of the statement acknowledged what was going on in the system and understand it, and so I think that's something that could definitely be added to -- If the policy statement is going to be advanced into the September council meeting, that could be probably part of that whole discussion on artificial reefs, and so the help of exactly how we word what we need to request.

I would also not like to lose the comment you made about the opportunity of habitat, transitioning for habitat, because of the importance of habitat components, and I think there would be probably a lot of support from members, because of the opinion already of the value of those, and so those three pieces could be actually dealt with in September at the same time.

MR. BUSH: Roger, I have a generic question. Over the last year or two, is there any momentum from any group or set of groups to try and make a case that protecting natural habitat need not take such a high priority, because we can replace it with artificial habitat? Is there any underlying thesis or approach to this that would suggest that that could be a possibility?

MR. PUGLIESE: That it replace the protection -- I think, as we've advanced say the spawning protection and some of those activities, in the background, those recommendations have been continually raised about opportunities, that creation of additional areas could be an avenue to enhance that process. With significant resources, say the Deep Charleston Artificial Reef, and they have already invested a million dollars in placing materials into some of those areas. From the fishermen's standpoint, that was an opinion, that opportunity to advance that.

However, the suite encompasses both artificial reefs and natural systems, and so I don't know if it would -- I think the preference, if you're advancing more areas, that maybe you could potentially use that as more of a tool than taking away other hard-bottom habitats.

MR. BUSH: I guess the point of my question is there is a pretty good debate going on about, and especially in Florida, about whether we're just aggregating existing populations or creating new habitat, and there is a lot of anecdotal evidence, coming from for-hire charter fishermen, especially off of the Palm Beach area, that we're disrupting the entire reproductive cycle of bait fishes, the sardines and the greenies, and we're breaking up the large schools. They're seeking better habitat on the artificial reefs and they're not congregating in large amounts to propagate how they have in the past.

One little anecdotal observation, but, looking at the cost structure of trying to protect natural habitat and the resistance to protect natural habitat, my question is, in the socioeconomic political world that this encompasses, is there any movement towards saying, look, it's a lot cheaper to do this, and we don't have to worry about the corals or the estuaries or anything else. We will just put these wrecks out there, and we've got new developments for how artificial reefs should be built, and I would just -- I think we should at least consider that, as we move forward, in trying to do things that are beneficial, that we don't blow up the underlying process of the natural habitat, which is always better.

MR. PUGLIESE: I think that's exactly why you have kind of this two-part component of it dealing with natural areas, doing the research and characterizing how those are, but also understanding that the artificial reef component both -- That's why you have multiple stages. We have the deep artificial reef areas, and we've got -- Especially the ones off of South Carolina, those near-shore areas, and so there is literally a staging of different types of areas that we can learn on how those actually contribute to the system.

I think that is part of the acknowledgment of exactly what you're saying, is the fact that this is a tool that can be used, and some are very clearly effective, if you look at someplace like the Snowy Wreck off of North Carolina. Some of the more recent dives off of the Deep Charleston Artificial Reef is already showing species coming in, and some of the -- It's interesting, because some of those issues on aggregation versus production are almost moot, because, if you're bringing them in and you can't fish on them, some of those areas may end up ultimately being very useful in the whole scheme of these, but I think that may be the way forward, to really advance newer areas, especially as we move up onto the shelf and other areas, and maybe a collaboration of enhancement of more fishable areas at the same time, some components that may enhance, and maybe critical staging points that could be added to the suite. That is why the policy statements are being advanced very specifically, to address that this is a tool for the council's ability to advance conservation.

DR. WHITTLE: I think, David, that you just hit the nail on the head, and I think that what you just summed up, because there's been decades of research on it, and there is absolutely no consensus at all. I don't think the point is moot. I think there is no consensus, and so I think that the artificial reefs have to be very carefully placed to make sure that they are along the life history continuum, and that hasn't really been done, to date, and I don't think that this policy statement really reflects that yet, and so I think that that's what we need to get.

Like Brian just sent out two papers, and then I sent one back to him that showed, in just the most recent papers we could find on Google Scholar, said the exact opposite about where you find the biggest red snapper in the northern Gulf, and so I don't think that we'll ever be able to answer that question, but I think that we need to pay tribute to that we can't answer that question.

MR. PUGLIESE: That's, to some degree, why we have been building management plans for these different marine protected areas and special management zones, et cetera, to get to the research, the mapping, the characterization, the understanding of really what is going on in these systems and how they relate with the best practices ultimately will be, whether it be natural or artificial components, so we really begin to go further down the road.

As you said, that's an ongoing discussion that really we can inform more by getting even more research, and even the oceanographic -- I mean, some of the things that we really haven't gotten to is some of the oceanographic characterization relative to these areas that are really driving why those habitats are there or placement of other ones are going to be appropriate to connect to those oceanographic features that really make these effective.

DR. WHITTLE: I would like you to transcribe that and put that in the policy.

MR. GEER: Have you got that, Roger? By noon.

MR. PUGLIESE: By noon.

MR. GEER: All right. Anything else? Wilson, you get the last word.

DR. LANEY: Not the last word, Pat, but I just wanted to make sure that I was crystal clear about what you all prefer. What I heard, after all that discussion, is that I will work with Dr. Havel and Dr. Collier, and you as the Chairman, to craft a request to go to the National Marine Fisheries Service, the PRD Division, and/or their Fisheries Division too, I suppose, to request an update, a substantive update, on their policies and positions and involvement with artificial reefs for the September council meeting. Did I get that?

MR. BOSTON: The only thing I heard different, Wilson, was the point that it needs to be an interactive discussion about the concerns that members might have about that at the commission level.

DR. LANEY: 10-4. Okay. I will make sure that I get that written down and work with Chip and Lisa and Pat to craft it.

MR. GEER: That sounds good. All right. I want to keep us on schedule, and we're already fifteen minutes behind, and so I want to start moving on. This is great discussion, and I know we're going to be having it more, and, if anybody -- I would like to say that we had the answer, but I think it was just, yay, it got done, and we don't know how it happened, but it gone done, but I will share whatever I have and whatever I can do, because I know that January took some great notes during all those conversations, and so let's move on to Brian. Brian is going to give us an update on BOEM and the renewable energy in the South Atlantic.

MR. HOOKER: Thanks, everyone. I can get us back on schedule. I can make this quick. This is just an opportunity to update you all on where we are with activities on the Atlantic, in regards to the Bureau of Ocean Energy Management, both the Office of Renewable Energy Programs and our Oil and Gas Program and our Marine Minerals Program, and those are our three program areas, with the concentration on the South Atlantic. I will also give a little update on some of our environmental studies as well.

Here is where we are. The far right panel is mainly the South Atlantic area that affects most of you at this table. The furthest south that we have leased, currently, is in the middle panel. Avangrid Renewables was the Kitty Hawk area, near the North Carolina/Virginia border, and that was just recently leased. Avangrid, if you're not familiar with them, actually operate an onshore wind facility near Elizabeth City, I think.

Anyway, this kind of goes through that a little bit further, and so that lease auction was held on March 16, and so very recently. That Kitty Hawk area is 122,405 acres, and it took in about $9 million. The remainder of the North Carolina areas, the Wilmington West and Wilmington East areas, are pending the coordination with the South Carolina wind energy area, and so, if you recall, there was a call for information regarding the South Carolina areas, and it was decided, because of the proximity and how they may interact wind-wise with the North Carolina areas, that we'll move forward with kind of all of those together, in evaluating them.

There is no current timeline on that next step, but the next step for the South Carolina areas would be the area identification, followed by an environmental assessment for leasing those areas off of South Carolina, and, again, that is these areas right there, the green areas, and these are the other two North Carolina areas, and you can see how proximate they are to the South Carolina areas.

Again, here is just a close-up of the area that was just leased, the Kitty Hawk area off of North Carolina, and you can see also -- It's really faint on the screen here, but this is the Virginia wind energy area up here, which the status of that is it's still on hold. They are still evaluating that facility, that area. Here is the close-up of the South Carolina, with the North Carolina areas in the blue outline. That is it for the renewable energy update.

On the oil and gas side, I think, in your briefing book is Secretarial Order 508, and it's fairly straightforward. There's not much more to add to it. It does say that we're supposed to immediately begin development of a new five-year program considering the Mid and South Atlantic planning areas and then also to work with the National Marine Fisheries Service on expediting G&G permitting. As I think all of you are aware, there was an EIS done for Atlantic oil and gas exploration, and it was actually all surveys, including Marine Minerals and the Renewable Energy Program and Oil and Gas Program.

That EIS is complete, but then there was the -- The past administration didn't move forward with actually approving any of the applications for oil and gas permitted activities. The biological opinion, I think, is being updated for that, as well as there is individual incidental harassment authorizations that would need to be issued under the Marine Mammal Protection Act, and so all of those things are still pending. It's not a unilateral action on the part of BOEM in any way. Regarding the new five-year program, it's my understanding, I think, that there will be a request for information, a Federal Register notice type of process, to gather information on the areas to be considered in the new five-year program at some point in the future.

I just wanted to highlight some recently posted studies, the "Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic". This doesn't go that far into the South Atlantic. The backbone of it is based upon the Northeast Region's fishing vessel trip reports and matching those to dealer reports, and that's a fairly robust process for the Northeast Region.

There was some work done for recreational and commercial down into -- All the way down into the North Carolina areas, including the Wilmington East and Wilmington West call areas, but the methodology was a little bit different for those areas, but that report is finally posted on our website, if you're interested in looking at the estimated amount of revenue generated for all of those wind energy areas from North Carolina to Massachusetts.

Also, recently -- This one, I think you're all well aware of, the "Benthic Habitat Mapping and Assessment in the Wilmington East Wind Energy Call Area", and that's been online for a little while. That was done in partnership with the National Ocean Service in Beaufort, North Carolina as well, but that report is on our website.

Ongoing studies, we have the Documenting Marine Soundscapes on Selected Reefs Within Onslow Bay, North Carolina. There is two parts to that. There is evaluating the existing state observations and then there was an opportunistic aspect of it that was done during the Langseth continental shelf survey, where they made some observations during the seismic surveys of that particular vessel, and that was an NSF-funded shelf observation survey.

The Atlantic Marine Assessment Program for Protected Species is Atlantic-wide, and that is still continuing. We are expecting a final report from the first phase, the first five years, coming soon, hopefully this year. The new five years is ongoing, and so that's an exciting program as well. There is also the Atlantic Deepwater Ecosystem Observatory Network. Again, I think it's more shelf break areas, looking at important canyon and shelf break habitats. Then the same thing for the Data Synthesis and Advanced Predictive Modeling of Deep Coral and Hard Bottom Habitats in the Southeast Atlantic. Then also a Deepwater Atlantic Habitats II: Continued Exploration of Coral, Canyon, and Seep Communities in the South Atlantic. Then there's the Ecological Function and Recovery of Biological Communities Within Dredged Ridge-Swale Habitats in the South Atlantic Bight.

That last one is from our Marine Minerals Program, and that is the work that is being done off of Canaveral Shoals, primarily, and some of those other ones, the deep work, our Oil and Gas Program in the Gulf of the Mexico is the lead on those studies. Again, I am very happy to point you to more information or if you have questions about any of the studies that are listed here. A couple of them are in the briefing book.

Future fisheries studies that we have ongoing, we are continuing to work at understanding fish auditory thresholds and masking. The primary species that we're looking at for that study are likely black sea bass and squid. We also have a new study that should be kicking off this year describing marine wildlife distribution and movement patterns in the South Atlantic OCS, and that will be basically aerial, high-definition surveys in the South Atlantic. That would be more inshore shelf, because that would be supporting the Renewable Energy Program.

Then, right now, we're also in the process of developing our fiscal year 2018 studies development plan, and there are several studies that we're evaluating in that regarding offshore wind and fishing as well. That's it. I think, the last time I was here, we had -- These are the state water Block Island Wind Facility photos. I think that was built last time we were talking, but now they are operational and providing electricity to the grid off of Block Island, Rhode Island. This is, again, a state waters demonstration project with five turbines, but it's there. Now I will just open it up for questions.

MR. GEER: Does anybody have any questions for Brian?

DR. ROSS: I had one comment, Brian. The canyons II study is going to be a five-year project, and that funding will be started this year, with the emphasis that it crosses both the Mid-Atlantic and South Atlantic Regions, but I had a question for you. Who is conducting the data synthesis and coral modeling project?

MR. HOOKER: I believe that is Rebecca Green is the BOEM point of contact. I can get more information for you on that particular one. I am not as familiar with some of these, because they're not out of my office.

DR. ROSS: Okay. I was curious about that, because NOAA was leading that effort with Brian Kinlan, and he is deceased, recently, and so that whole project and some of the manuscripts that were involved with that are sort of -- Their status is unclear, and so I was wondering -- I was just trying to get more detail on that particular effort.

MR. HOOKER: Thanks for jogging my memory on that one. NCCOS have said that they are able to continue that.

DR. ROSS: Okay. With somebody else leading in, and so NCCOS is taking the lead on that study in the South Atlantic?

MR. HOOKER: Yes, they're still primary on that, yes.

DR. ROSS: Thanks.

DR. COLLIER: Matt Poti is going to be the one that's following up on that project.

MR. BUSH: Just a very brief comment, sort of ancillary to this. I don't know that you all are tracking that the Mid-Atlantic Council, and this is, again, just to throw out there for general comment, but they voted to send a letter to the Secretary concerning their policies that they have in the region concerning seismic surveying and any oil and gas exploration. How that fits with this, but I'm just throwing it out there. Thank you.

MR. PUGLIESE: In addition to the studies that were provided, at least some of the ones that were highlighted and included in your briefing book, we did respond also. The South Atlantic Council responded in advance of the discussions about reopening OCS in the South Atlantic Region, because of all the work that was done by the advisory panel and by the council in setting the stage on the policy.

It directed, under I think it's Attachment 8, a letter directly to the Secretary on the position on all the entire energy position, and so we provided the statement and provided previous comments on seismic testing, et cetera, and so I think we actually weighed in in advance of the Mid-Atlantic, because we had done so much work in policy development and really setting the stage for what we were trying to protect in our region, and so that was included under Attachment 8. I think the Atlantic is, to some degree, in lockstep, in terms of what the positions are.

MR. GEER: Any other questions or comments for Brian?

MR. PUGLIESE: Brian, again, thank you so much, because I think one of the things that is really encouraging to me is that the renewable program is really kind of covering -- From the first discussions we had on this, in some of the beginning national workshops, the idea of covering everything from sound information to species to the entire gamut, habitat mapping, and all the appropriate things being done through the system, and, the more I see coming out of this, the socioeconomic impacts and the alternatives, it's really providing a really good opportunity to understand how to advance this effectively in the region with maintaining the important resources and the habitats and the fisheries that depend on those resources, and so that's been -- Thank you for keeping everybody abreast about how it's advancing and how we can keep those research efforts being done in our region, so we make sure we understand how to make it happen.

MR. HOOKER: Thanks, Roger. One thing I didn't mention -- I mean, we do have a solicitation. It's a fairly informal solicitation that we do every year, just asking for study ideas, and I would encourage the council and this committee to submit ideas that they think are appropriate for this region.

One thing that we do have kicking off this year is it is more focused on the North Atlantic, because we do have projects that are very close to submitting construction operations plans in that area, is working with the National Academy of Science. Their Ocean Studies Board has an ad hoc steering committee that they have empaneled, or are in the process of empaneling right now, that will give us additional areas where there are potentially some data gaps in that region and also post-construction, or even pre-construction, monitoring direction for the indices, and so you'll hear more about that, I think, in the coming months as well, when they're -- We will probably have two meetings this year, one in June and then one at the end of the year, and all of those meetings will be broadcast livestream by the National Academy.

MR. PUGLIESE: One last real quick comment is I think one of the things that I think I highlighted from the beginning -- While I state that is really advancing good, hopefully it continues on into the actual when you're looking at placement, when you're looking at development of these, that there's really opportunity to work with the industry to be able to, in designing some of these offshore systems, and, instead of necessarily just being a block of systems, opportunities to look at corridors and to look at enhancing artificial reef components of those.

I mean, just really trying to get even more of a -- I know it's really complicated, because of the leasing versus direction, but, where that can happen, that probably will become, again, more effective and also more support for the system and enhance the opportunity, as well as the habitats.

MR. GEER: Brian, I echo what Roger said. Thank you for all the work and all your involvement on this committee as well. I see your name popping up in a lot of places, and we greatly appreciate all your efforts. Wilson has a question.

DR. LANEY: Yes, just one quick question. Brian, and I should know the answer to it, but I don't. With regard to permitting and EIS on offshore facilities, are they addressing the decommissioning of the turbines that -- Presumably, at some point in time, they reach the end of their useful life, and I don't know what the design life is for those things, but is that part of the process as well?

MR. HOOKER: Correct. We do look at the entire life span of the structure. The leases are for about twenty-five years. That is the operational term of the lease, is about twenty-five years. At the end, they are required to be bonded to decommission, and so what they do, in the construction and operations plan, is submit basically a decommissioning concept.

Then, obviously, twenty-five years elapses, and probably a lot has happened since that decommissioning concept was first submitted, and so there is a separate decommissioning application that will occur, a year or two before the structures are actually decommissioned, and so it will be handled in both places, as part of the decommissioning concept in that initial EIS and then further down the road, when it's actually closer to the decommissioning time.

MS. DEATON: I just missed this, and if you could clarify, but did you say that Wilmington East and West was basically on hold, waiting for the South Carolina pieces? Could you explain that a little bit better?

MR. HOOKER: Sure. I think they just want to be evaluated, and so the next step is for the area identification for the South Carolina, and so I think, once the areas that are going to move forward for the environmental assessment for South Carolina -- Once those are done, then there will be a better idea of how to proceed with leasing the two North Carolina south of Cape Hatteras, and so, yes, there's nothing really happening with those until the South Carolina areas are completed for area identification and that EA is complete.

One last thing, and I don't have a lot of copies, but we have it online. The *BOEM Ocean Science* Magazine is out. I will put a couple out on the back table. There is this great article in the back, "Spotlight on a Scientist" that I encourage everyone to read. I will put a couple of these on the back table. We are also very close to sending out a Renewable-Energy-specific year in review as well, and I will try to make sure that the council gets some copies of that as well.

MR. GEER: Thank you very much, Brian. We greatly appreciate it. We are scheduled for a break, and we're a little behind schedule, and so let's plan on getting back here at -- Let's say 11:15. In the meantime, we'll get Dr. Wagner up here to get everything all set up, but, everyone, be back at 11:15.

(Whereupon, a recess was taken.)

MR. GEER: Welcome back, everybody. Moving on in the agenda, we have Dr. Daniel Wagner from NOAA's National Center for Coastal and Ocean Sciences, and he's going to talk to us about the Southeast Deep Coral Initiative. It's an ambitious project to map a lot of bottom, and I think the grant is from 2006 to 2019?

DR. WAGNER: 2016 to 2019.

MR. GEER: All right. You've got the floor, Dr. Wagner.

DR. WAGNER: Thank you so much. I really appreciate the invitation, Chip and Roger for reaching out to me, and so, today, I'm going to be talking about a four-year project from NOAA to study deep-sea coral ecosystems in the Southeast Region, and so this is a multiagency effort that includes several NOAA offices, and it's funded by the NOAA Deep-Sea Coral Research and Technology Program.

For those of you that are not familiar, this is part of NOAA Fisheries. It started in 2009, after the reauthorization of the Magnuson-Stevens Act, and the purpose of this program is to support science that addresses fishing and other threats to deep-sea corals, and, for their purposes, they are defining deep-sea corals as corals that are found below a depth of fifty meters and that are azooxanthellate, and so that don't contain the photosynthetic algae that you find in shallow-water corals.

In general, these deep-sea corals are really slow-growing and long-lived, and, as a result, they are particularly vulnerable to disturbance. Just to give you an idea, these species here to the right, the species on the bottom is a species of black coral, in the genus Leiopathes, and members of that species to be dated to be over 2,000 years old, and so very long-lived. On the other end of the spectrum, we have the Gorgonian, and that's been dated to several decades, and so they have a long range of longevity, but, in general, they are pretty slow-growing and long-lived.

The NOAA Deep-Sea Coral Research and Technology Program is somewhat unique within NOAA, in that it is really set up to try to integrate the expertise across multiple NOAA offices, and so we're really trying to bring the experts that have knowledge on deep-sea corals together. The deep-sea coral program does its work by providing funding for studies, as well as these major fieldwork initiatives, and that's what I am talking about to you today.

These major fieldwork initiatives are three to four-year efforts, focusing on a particular geographic area. They provide funding for research expeditions, and then, also, small amounts of money for small projects that are focused on data and sample analysis that are collected on research expeditions. Since the deep-sea coral program started, it's been basically all around the country. The first effort actually was here in the Southeast, in 2009. After that, it moved to the west coast and back to the Northeast. Then the Alaska, and, most recently, in the Pacific Islands, where we still have an expedition on right now.

Now, after this effort in the Pacific Islands, it's moving its focus back here to our neck of the woods, and, for this time around, for 2016 to 2019, they are defining the Southeast as containing the entire Gulf of Mexico, the South Atlantic Bight, and so from North Carolina down to the Florida Straits, and the entire U.S. Caribbean, and so this area actually includes the jurisdictions of three fishery management councils, the South Atlantic, the Caribbean, and Gulf of Mexico, and we really want to work closely together with the councils and ensure that whatever we do is relevant to the councils.

Our project, as Pat mentioned, is very ambitious, because we have an enormous area to cover. The area that we're working in is actually about twice the size of Texas, almost as big as the

Mediterranean Sea, and it's not just very large, but also very heterogeneous. There is different management issues, different threats. It includes places like the Gulf, where we have extensive oil and gas exploration, where we have a lot of bottom-contact fishing happening, and that includes places like the Caribbean, where the threats are completely different, where we have a small artisanal fishery for deepwater snappers and groupers, and we don't really understand whether it's impacting deep-sea corals, but we also have extensive submarine cables in that area, because the Caribbean is a major hub between South America and North America, and so how do you prioritize what you're going to do in this very large area?

We started this effort about a year ago, when we convened a large workshop, where we brought together experts from multiple NOAA offices, from all three fishery management councils, from the Bureau of Ocean Energy Management, the U.S. Geological Survey, several academic partners, and we brought them together for a few days and really asked the question of what are the most important management issues, what are the most important research questions, in this large area.

After that workshop, we conducted a series of surveys, one-on-one interviews, and a little bit of a literature review, because we really think that it's important to do an extensive review prior to starting any research effort. We want to really make sure that what we do is relevant to management, and that's why I really appreciate the invitation to talk to you folks. We want to make sure that we continuously review what's most important to managers, in particular to the councils and the sanctuaries.

After reviewing, which is what has happened in the last year or so, this year, we are actually going to start collecting data, and we have several expeditions lined up for later in this year, where we're going to be mapping these deepwater ecosystems and surveying them with submersibles and then also collecting samples. We realize the collection of data is not the end goal and that we really need to communicate that data, and that's, again, where I appreciate invitations like this, and I hope to, in the future, come back here and be able to talk to you as we progress through this initiative.

We do hold meetings internally with our group of NOAA scientists that is part of this, but we want to make an effort to come out to give seminars and talks like this to managers, and then we also want to make our data available publicly, and this is something that we all felt very strongly, is that we want to make sure that all the data that we collect ends up in repositories so it's widely available, and so that workshop I talked about -- We published a report of that, and that's available to anyone. We just, last month, published our science plan that is part of the online supplementary materials to this meeting, and so that is all the information about what we're planning to do in this initiative is in that publicly-available document.

All of our cruises have cruise reports that are publicly available. The mapping data we're going to collect is going to be made available through a publicly-available website. The samples we collect, all of them are going to be deposited at the Smithsonian, the Museum of Natural History, and so they're, again, available to anyone. Then records of deep-sea corals and sponges, and so anytime we record one and collect a sample or see them, they will be archived on this website here.

Again, we want to make sure that everything is transparent and that managers, scientists, the community at large, is aware of what data is collected, and this is really part of the process, and, again, what we're hoping to achieve is, at the end of this three-year effort, we want to be able to

make management recommendations and provide information to folks like you that are the resource managers. We really recognize that this is a coordinated approach, and it's not just a one-way street, and we hope to engage with you folks more over the coming years.

I talked about the science plan. Again, that's in your supplementary material. That states some of the most important management issues, some of the most important research questions, and what we have planned over the next several years, and I will summarize that quickly here.

For the U.S. Caribbean, what I'm showing here is just a map. The red is the U.S. Exclusive Economic Zone, and, in orange, are several protected areas. Currently, they have several protected areas, and there is no proposals to make any new ones at the moment. I was just out there last month and met with the council staff and several resource managers there, and they told me that their priority is really to get information on some of the deeper areas of many of these marine protected areas, because they have no clue of what is found there.

In the Gulf of Mexico, again, I'm showing here the U.S. Exclusive Economic Zone. In orange are the protected areas, including two sanctuaries, Flower Garden Banks and Florida Keys, and several habitat areas of particular concern. Now, in the Gulf of Mexico, there are several proposals to make new marine protected areas, including expansions for the Flower Garden Banks, as well as several new habitat areas of particular concern, here shown in purple, and so we're committed to provide data to help evaluate these proposals.

Then, for the South Atlantic, again here it's showing the protected areas, including three National Marine Sanctuaries, Monitor, Grays Reef, and Florida Keys, as well as several other deepwater marine protected areas in orange. As you all know, here in the South Atlantic, there is currently five proposals to establish new special management zones, here shown in green, and, again, what we want to do is provide data to you folks to help evaluate those proposals.

When we had our initial workshop and asked several of our academic partners, USGS partners, BOEM, what are some of the most important areas to target, these were some of the areas that came to the forefront, and, in particular, here off the Oculina Bank and then some places off of Florida.

I don't know if we have enough time today, but I will have my email here, and I really want this to be an open dialogue. If there are particular places where we need more information for your management efforts, we would love to hear it. Again, I realize this is a dynamic process, and so, if there are any places in particular here that you think have management relevance that we should be focusing on, we would love to hear from you.

Then our science plan also addresses or outlines some of the most important research questions that are identified, and so what you will see is that, for each one of these areas, there is kind of common theme -- In each one of these, you have some kind of more basic questions, in terms of what species are there, where are the ecosystems located, and this is in every single place we go, in particular in the Caribbean, where there is basically almost no previous research, but, even in the Gulf of Mexico and the South Atlantic, where we've done some research in the past, these deep-sea coral ecosystems are so extensive that most of it has never been surveyed before, and we need more baseline information.

Now, in the Gulf of Mexico and in the South Atlantic, we also have some questions that really try to get at the drivers. What are the oceanographic and evolutionary and phylogenetic patterns and drivers that might explain where you see these ecosystems and then, both in the South Atlantic and the Gulf of Mexico, we also have some research questions that really get at the management implications, and how do you use this biological information to make relevant management techniques.

Our strategy for the next three years is, everything we do, we want to make it relevant to managers, like you folks, and so we really want to make sure that it's relevant to management efforts. We also want to make sure that we address some of the research questions. Then, last, but definitely not least, we want to make sure that everything we do is achievable. We only have three years to do this, and a limited amount of money, and so it's in this kind of sweet spot where we've tried to identify some projects, and we have several projects that are just about to start, or are ongoing for this year.

I will just briefly talk about some of these right here. Data mining, this is something that we are committed to do. When you study the deep sea and you need ships and submersibles, that is very expensive. In many cases, or in every case, it's a lot cheaper to just review existing data before going out and collecting new data, and so we have identified several sources of previous research efforts in our region that we'll review over the next three years.

Harbor Branch has done a lot of work and several other institutions, and we're working through some of these archives. Every time deep-sea corals and sponges are seen on these archived videos, we upload that onto this database here, and that's an openly-accessible website, where everyone can go and find out more about where these corals and sponges have been recorded in the past.

We're also working on compiling a deep-sea species guide. In cases where samples have been taken in the past, and have since been identified by taxonomic authorities, we have been going and reviewing those photographs and then uploading all of them to a publicly-available website. This is the world register of deep-sea species.

Anyone can go to it, and we have about 200 species that we have uploaded since we started this effort, and that website is also linked to an app that works on your iPhone, on iPads, and computers. Again, it's a wonderful resource, and I think it's very important to develop these resources, for those folks who might be working on shallow-water systems or terrestrial systems. There is many books that you can go to try to identify what bird you're talking about. In the deep sea, we essentially have none of these, and we're trying to develop this. If any of you folks know of photographs or know of reports where there might be things that we can mine and use for this project, again, I would love to hear that.

Another project we're working on this year is compiling a geodatabase that compiles many archives that we are aware of that relate to past research in this area, and we hope that this will really help us plan our expeditions. We don't want to resurvey places that have already been surveyed, and so this is a GIS database that contains many layers, and so we have all the existing and proposed MPAs, and so the maps I showed you earlier, and it also includes where previous submersible dives have been performed in the area, several repositories, and where museum specimens and visual records of deep-sea corals have been found.

This habitat suitability, Dr. Ross asked a question about this earlier. In the past, there have been some efforts to create models where deep-sea corals and sponges might be able to -- We have compiled all of those previously-developed models. Where existing multibeam bathymetry is, we're still compiling it, but just where people have mapped, where we have satellite bathymetry, place names for underwater features, as well as where we have pipelines and other platforms, and that is particularly relevant in the Gulf.

This GIS database is already completed. We have a desktop version that we are happy to share with anyone. We hope to, at the end of the year, release a website, where all this data will be publicly available. Again, we feel very strongly that we don't just want to help our effort, but the larger community.

Another project we have for this year is a modeling support. I talked about these habitat suitability models, and so that was work that was started by Brian Kinlan several years ago, and he and his team at the National Center of Coastal Ocean Science, in essence, they correlated places where corals and sponges had been seen to a series of environmental factors, depth, temperature, current and others, and then they tried to predict where deep-sea corals are found. They did this for the South Atlantic and the Gulf of Mexico. As part of our effort, we're going to go to some of these places and then see, groundtruth, if these models really are predicting suitable habitat or not. Then, in the process, hopefully we'll refine these models and improve them.

In addition to those models, we're also going to be working on new models for the Caribbean, where these things have not been developed in the past, and this is -- As Brian mentioned in his earlier talk, this is a multiagency effort. BOEM is also involved and NOAA and USGS, and there's other partners involved. Then we also have a small project in the Gulf of Mexico. Randy Clark at NCCOS is looking at VMS data to look at where some of the heavily fished areas are. This is, of course, important to management, in particular when you're trying to evaluate new protections, and, again, they're focusing right now just on the Gulf of Mexico, where they have the best data, but this could, hopefully, be expanded into future areas, into also the South Atlantic.

We're also going to be doing a little bit of environmental monitoring, and so, in a few places that we're going to, and this is mostly in the Gulf and in the Flower Garden Banks area, we will be revisiting the several places. We're going to be deploying sensors and then collecting them after the years, to try to get a little bit of a handle of what the short variability of things like temperature and currents are, because that is -- In many of these deep-sea areas, we have essentially no information.

Then last, but definitely not least, we have a pilot study that's about to start, at the end of this month, and this is by Jen Schull at NOAA, in collaboration with Steve Smith at the University of Miami. They are working with about a dozen fishermen in Puerto Rico, where they are deploying these underwater cameras, GoPros, in housings that are rated to 300 meters. They're attaching them to fishing gear and then trying to find out what kind of ecosystems are people fishing in, and this is just a pilot study, and I think it might have applications to other places, like the Gulf and the South Atlantic. It's very cheap technology, and it might provide some information of what kind of environments are folks fishing in.

Then, for this year, we also have four expeditions lined up. There is going to be ten days in the Flower Garden Banks, and this is led by Emma Hickerson. They're going to be doing some

surveys using the ROV Mohawk in a lot of these places that are being considered for expansion of the Flower Garden Banks.

Then we have a thirteen-day cruise on the Nancy Foster, led by Peter Etnoyer, where we're going to be exploring some of these areas on the West Florida Shelf that are being considered for habitat areas of particular concern. After that, we have a five-day cruise, and this is going to be a mapping-only cruise on the Nancy Foster, and this is where we would love to hear from you folks, in terms of if there are particular areas that we need to map. Right now, we have targeted an area right off the Oculina Banks, where we don't have existing multibeam data, but, if there's other areas that we should focus on, we can do that as well. Then there will be another twelve-day cruise on the Pisces, led by Martha Nizinski, focusing on some of the canyons off of North Carolina.

That is just the beginning. For next year, we have several proposals submitted. We just heard last week that two proposals we submitted to the Okeanos Explorer were funded, and so we have about twenty-four days on the Okeanos Explorer, and we'll be spending it here in the South Atlantic, and, again, this is going to be a possibility for all you folks to identify places that we might want to map or we might want to dive on. They have a submersible, and they have a nice mapping system, and so that will provide a lot of data. Then we also have two proposals on the Nancy Foster, including one in the South Atlantic. We don't know yet if those will get funded, but we should hear within a month or so.

Last, but certainly not least, education and outreach is a big part of what we do. On many of these expeditions, we're bringing students and we're bringing teachers. On the Okeanos Explorer, for those of you who are not familiar with this vessel, they basically have this wonderful telepresence technology, and so, when they dive, when their submersibles are underwater, anyone that has an internet connection can see, in real time, what the scientists onboard are doing, and so, when they come to our neck of the woods here next year, we will be working very closely with the aquarium here, and with other schools and a lot of educational avenues, to try to disseminate this information broadly.

I would just like to acknowledge that this is really a big effort that includes many collaborators. We work very closely with many folks, and I just want to point out that this is certainly not a closed club. We are just starting. This is a ramp-up year, and we really want to engage as many people as possible. We really rely on partnerships to try to get a further reach, and, if I have time, I will be happy to take any questions. If not, I definitely want to leave my email address with you. I want to have an open dialogue with any of you. If you folks have ideas and have particular areas that we should focus on for these efforts, we would love to hear it. Thank you so much.

MR. GEER: Thank you, Daniel. That was great. I read through the whole thing, the whole document, and it's better to see the pictures, but, Roger, do you have a question, to start with?

MR. PUGLIESE: Just a couple of things. I assume, in building the information system, it's going to be easily connected to -- One of the things that I get concerned with in new online capabilities is linking it to things that are being used in management already. We've been building, in collaboration with FWRI, our online habitat and ecosystem atlas, which includes -- We have actively tried to put together as much of the multibeam mapping information and species information, and we're advancing that for fisheries operations and a lot of things, and so what I envision, at least from what you're saying, is that that system is going to be easily connected and

that we can populate and expand that system also, so that it can feed into the real opportunity, and it looks like you've done.

I have worked with Chip, in terms of looking at some of those prioritizations previously on habitats, core areas that you've identified on Oculina, and we have limited information on some of the newer designations, but one thing I did want to highlight is the opportunity, and I think it was probably raised, where it identifies, within the existing deepwater coral HAPC, the big, large Miami-Stetson area, the area north of the existing allowable gear areas is some of the unexplored habitats.

We had the real opportunity, a number of years ago, of being in the collaboration with the Okeanos Explorer, after talking and being able to get some of the deeper areas mapped in a transit mapping effort, as they were moving between their base camp in the Gulf, to get the really untouched areas, and I know that's always been kind of the focus.

If it's an exploration, a true exploration, there's going to be a lot more opportunity, and I think some of those areas, especially in that northern section -- I know there's some that you've highlighted in there, but I think there's a big chunk of habitat that really is undocumented in those areas that may be very useful for -- It's really as you work up along the northern portion of the Oculina Bank, I mean the Stetson-Miami, and so that northern portion right there along that edge up there and all the way down, and you can see where the -- We can provide the more detailed information, but there is -- Where it becomes obvious is when you look at some of the multibeam areas. There are some very large areas that have no information.

I think, when you highlighted the fact that integrating these and having those as priority, one of the first priorities, and I'm sure that Chip continues to identify that, is filling in the gaps of what we don't know within these systems, and so I think that's going to be really, again, those areas, but it's strategic, because you only have so much information, and so, between those two different cruise capabilities, the Okeanos being probably more on the exploratory components, but then, on some of those other areas, we can target some of these very needed information, and, like I said, the designation on some of those Oculina ones are critical to backfill the detailed information of what has already been put in place.

However, some of the other ones, I think, is some of the connectivity and understanding and some of the mapping areas and refining the work you're going to be doing on refining or re-reviewing the modeling activities, and we want to actively work with that, because that's also been done in inshore areas, and I think the opportunity is to take those model capabilities and connect those with some of the map information and begin to kind of cobble those together, so what you end up doing is you get the best representation of those distributions, and so, in the inshore areas, those ones exist.

I think that one thing that I'm hoping that you all can do is go beyond what Kinlan started, in terms of very coral-centric, and look at like a deepwater habitat component, so you could expand it beyond just lophelia and oculina and go into a combination of octocorals and what those habitats -- Because that's the way we manage. When you have those blocks, they are being managed, and the way that it gets reemphasized in the Southeast is not only are those coral habitat areas of particular concern or an MPA or a spawning SMZ, but we have also backfilled those designations

as essential fish habitat habitat area of particular concern, very specifically to understand the connectivity of all the different habitats in those systems.

When you look at -- What we don't want to do is have a model say this is only coral distribution that's actually in this big, protected zone. Well, it's a combination of all these different habitats working in unison to really be the system that is there, and so those are some key points that I just at least wanted to highlight, so that, where we can provide even more -- The other aspect is the opportunity to look at -- One of the things that we're advancing as part of this, the ecosystem plan process, is a South Atlantic mapping strategy.

When you look at the descriptions under the live hard bottom sections of the FMP, we talk about a tiering of different habitats, and what we're going to be doing is looking at what we know within those different bounds of the mapped areas, of the species utilization, and begin to ultimately have an online prioritization capability, so you could look within that boundary to look at how that can feed and work together with the system, and it also applies as we go further into the deep systems, too. That will be a real benefit to the management process and to the long-term kind of -- It sounds like there's a lot of real opportunity to make this happen.

The good thing is that it's in process and that it's going to happen over the next number of years, and so, strategically -- As you said, strategically placing those -- Refining maybe the way this is directed is going to be really important, and it also has significant implications as we move forward with some of the ecosystem modeling efforts that we're going to be doing, because some of the newest generation of ecosystem modeling -- We get a little touch of that tomorrow, and that's going to have the opportunity to integrate spatial information within the system and hopefully oceanographic model capabilities or information, and so how that unfolds is going to be really dependent on what's going to be available from models, from outputs, from better mapped information that we have.

DR. WAGNER: I appreciate that.

MR. PUGLIESE: I just wanted to make kind of a scope of what the benefits that we may be able to have.

DR. LANEY: Daniel, I know that you indicated that you all don't want to duplicate past work by mapping areas that have already been mapped, and one particular rationale though that I can think of for doing a certain amount of that would be to go back in areas that we know have been heavily impacted by bottom fishing activities in the past, to maybe resurvey some of those areas to see if there has been any additional damage, and that relates back to the council's stated intention to try and continue to monitor some of these areas, but also to look and see if there is any regrowth of areas that were damaged in the past.

I can think of at least those two important reasons to try and do some of that, but certainly I understand putting the primary focus on mapping areas that haven't been mapped already, but do you have plans or is there anywhere in the plan that would include at least some minimal revisitation of some of those areas?

DR. WAGNER: When I was talking about mapping, I was talking mostly about multibeam and just the hard bottom, of what kind of depths and if it's soft or hard bottom. In terms of revisting

areas, one thing in our science plan that was identified is trying to find out a little bit about exactly what you're talking about, recovery and age and growth, and we have identified a couple of places in the Gulf of Mexico. There is Viosca Knolls and some places that have been surveyed in the past that we might want to go back and see how fast these things are growing, and the Oculina Banks that were one of the first deepwater protections in the world.

That would be another place that would be particularly, for management at a large scale, to go back and see are these management efforts helping and to what extent. What kind of regrowth are we seeing? How fast are these things growing? Yes, that's definitely part of it as well, and so I appreciate that, Wilson.

DR. ROSS: Pat, I've got a few slides related to this that I think would encompass my comments, but also help guide some further discussion and questions, and is that appropriate to share those now?

MR. GEER: Sure.

DR. ROSS: I have already talked to Dan about that. I have a couple of details that I wanted to add, and this discussion overlaps, to some extent, with the Coral AP, which I am a member of, and also Chip Collier, and so I think both groups are related to this discussion. All multibeam data is not created equal. This summary chart on the right, if you can see it, these colored areas are the multibeam data collected, mostly since 2006.

That is probably the higher-quality multibeam data, and you can see a lot of work has been done in the Mid-Atlantic that's related to the Our Canyons Project and also USGS's geohazards project. They are trying to shift that emphasis to the south now, and there is strong interest in the new canyons project to map all of this region. We have mapped the coral areas off of North Carolina, and this little red blob is the Stetson Bank, and I want to talk about that a little bit more, the Jacksonville lithoherms and the Cape Canaveral coral banks, and there are some existing strips of multibeam that are here that I don't show on this larger map, but I am going to talk in a little bit more detail just about this Stetson area, which I think is of strong interest, and it has not been the focus of a lot of mapping effort or studies.

We have concentrated, in the last few years, most of our efforts, and I think everybody would agree, in the Florida area, for a lot of reasons. There is certainly a lot of coral there, and so, off the Jacksonville area, this is a little bit more detailed compilation of historical data from probably eight or ten different cruises combined into a mosaic, and some of it includes the U.S. Navy data that was collected largely in shallow water, but overlapping some of the coral areas. That data is not readily available.

Some of these, we have gotten it because we cooperated with them, but with great difficulty, and so some of these narrow strips are simply ships going north and south, where they have taken opportunistic passes, and that's been very effective, and we ought to continue trying to stress that, every time they go through this area, they can move over a kilometer and get a new strip. That effort doesn't seem to be consistent, and I think we ought to keep us some pressure there.

The models that everybody has mentioned have a lot of problems. They are becoming better and better, but they still tend to overpredict habitat, but one thing I wanted to emphasize is -- You can't

see these black circles very well, but this area of the Stetson Bank consistently shows up, for all the different coral taxa, as being an area of high potential habitat value for deep-sea corals, and so, if we look at a blow-up of this area, these are three-dimensional pictures, this one of this area and a 3-D shot of this area, all looking north.

I should have mentioned, and you can see these blue dots, but let's go back to the first one real quickly. These blue dots represent single-beam seismic surveys conducted by Pete Pappano, considerably long ago, the 1970s and 1980s, and a lot of those dots line up in tracks, because the ship ran straight-line tracks. Everywhere there was a blue triangle, Pete found a significant topographic high.

In places where we went back with submersibles, and these colored blocks here are multibeam sonar data, we found that there were extensive deep-sea coral habitats, and so skip back to the blow-up of this area. You can see there are only a few of these blue triangles that actually coincide with coral areas, and there is much more coral habitat than the original seismic survey showed. I suspect that this region has probably some of the highest density of coral habitat anywhere in the South Atlantic, including, perhaps, the areas off of east Florida, and so I would like to propose that this is an area that we consider as a high priority.

It's basically been out of the way, because it's much further offshore. We had a great deal of difficulty mapping this particular site. The data is not of the highest quality, because we had extremely bad weather, but there are also two different types of habitat here. In the northern part, this little segment is basically lophelia-built coral bioherms, and, somewhere between these areas, where we didn't map, it grades into an area of exposed hardground with coral bioherms and coral colonies on top of the hardgrounds. There is two entirely different types of coral hardgrounds, and, where this province ends and grades into strictly a sand zone is unknown, but that's at the northern end of the habitat area of particular concern.

There are several issues here that we could resolve with better mapping, and this area is extremely diverse biologically as well. It's a little bit deeper than the North Carolina coral mounds, and that has a lot of environmental implications, because the water temperatures tend to be more stable here than off of North Carolina, which is swept by the bottom of the Gulf Stream periodically, and so, anyway, just a couple of notes there that sort of are some details to add on to Dan's talk that I thought might be relevant. I will stop with that.

MR. GEER: Steve, do you want to make a recommendation for them to try to map some of those areas, if they can?

DR. ROSS: Yes, I would recommend that the Stetson Bank area is a high priority for mapping, a higher priority than other areas that we've looked at so far.

MR. GEER: Any discussion on that?

MR. PUGLIESE: I think one of the opportunities may be to link it with say that northern area that I was talking about within the Stetson-Miami Terrace. I mean, we're talking about the same protected zone. It's already within the bounds of the bank, or is this outside of the Stetson-Miami Terrace?

DR. ROSS: Those areas are within the protected area, and, for that reason, that's why we drew the boundaries there.

MR. PUGLIESE: Right. I mean, that's the whole point, but my point is that there may be the opportunity, and we can have additional discussion of especially a vessel like the Okeanos Explorer working on the edge of those undocumented distribution of habitats north of the coral area and swing over to Stetson-Miami, and that may be a natural progression of different habitats, kind of the integral component of the deeper section, and be able to cover both of those areas within a thing, but we can talk further. I think that's what Steve is identifying, is that may be some of the bigger concentration and distribution.

One of the things that I will say is we do have, that we had worked up on the early phases of the SEAMAP work, is Skidaway actually worked up all the Pappano information into some nice distributional maps of those habitats, at least based on that preliminary work, which it used to be directly on the atlas. If not, we can talk about at least being able to get that, because it's also a guideline, because of the things that became very obvious is that, wherever he had identified those, it was a pretty good indicator of distribution.

As Steve said, in most cases, it was an underestimate, because there was only so much they could do, but what they did is they did a nice geologic map based on those types of systems that we have integrated in the previous iterations of information, and we may be also able to help guide beyond that kind of footprint that you have here and maybe the connection between those systems.

MR. GEER: Daniel, there is only five days for sampling this year in that area?

DR. WAGNER: That's correct. This year, we only have a five-day cruise. Next year, we have twenty-four days on the Okeanos Explorer, and we hope to have another fourteen days or so on the Nancy Foster. This year, time is limited, unfortunately, and most of the resources this year are focusing on the Gulf. Next year, we're moving to the South Atlantic, and then hopefully, in 2019, we move to the Caribbean.

MR. GEER: Can you give me an estimate of how much area can be covered in a day?

DR. WAGNER: For mapping, it's really dependent on the depth, and so, the multibeam, the deeper it is, the more you cover. When you map in shallow waters, you really only map a little small piece. Now, the Nancy Foster is one of the few ships in the NOAA fleet that has a shallow-water mapping system, and so the Okeanos Explorer, they can map only deeper than 250 meters. The Nancy Foster can map below fifty meters, and so that's why we kind of decided that, for this year, for the five days, it might make sense to focus our efforts on some of the shallower systems that we will not be able to survey with other ships.

MR. PUGLIESE: That's where we ran into the issue, when Okeanos was running, that they shifted to that deeper area, and they covered a fairly huge swath when they did that. They were able to cover a lot, whereas, in that same amount of time on a shallow area, it would have probably been a ban, because we've got some of those in the historic work that has been done, where it literally is a line. As Nancy Foster is moving along the shelf edge or something, you get one line for X number of days, and that's all you can get out of that type of capability, but there are a lot of areas

on those northern components that I think would qualify, and it's just got to be a balance on what the best technology is for the depth that we're dealing with.

DR. WAGNER: Yes, and kind of relating to that is we have the Nancy Foster, and we have the Okeanos Explorer. Now we also, through this effort, are part of a bigger NOAA effort, so that, when there are any other priorities, we can give that to the entire NOAA fleet, in hopes that, if any ship is in the vicinity and they can opportunistically map that, and so, again, if there are particular areas that we need to focus on, we can try to address that or pass that information to the bigger NOAA fleet, to try to get that data for you.

MR. PUGLIESE: How are we going to provide -- Well, I mean, I think one of the opportunities I talked about is that, if we advance some of this online capability of showing, within those depth contours, what our priorities are, it's something you all will be able to go directly to that or pull that and integrate it, or however we want to do it, and then any vessel that's out there -- That's the intent of that.

DR. WAGNER: Correct.

MR. PUGLIESE: Any vessel that's out there can begin to see where the gaps are and what the priorities within those bounds are, and so, if they're operating in that depth contour, this is what we can do for that and contribute, and then you already have established networks on how that could get brought into the system, and so I think there is some real -- This advances what we're trying to do with some of these other ones, very specifically targeting what the longer-term priorities on all these different depths are going to be.

MR. GEER: Is there anything else for Daniel, any other comments?

MR. HOOKER: Ashley Chappell does that annual request for folks to go to SeaSketch and add your stuff in there too, and so, if it's not captured directly in this effort, make sure that -- You are probably forwarding stuff to that as well, I would imagine, but there is that larger effort of identifying all priority areas from different groups, and so I'm just putting that out there as well.

DR. WHITTLE: I am with Florida, and so I just wanted to say that I'm very excited about this.

MR. GEER: I have to ask this question, given our financial situation in this country, but it goes through 2019, and your funding is secure, or as secure as secure can be?

DR. WAGNER: You have said the right words. The answer is yes, and the ship time for next year is guaranteed. All the funding for this year has already been allocated, and it's as secure as it can be, yes.

MR. GEER: Anything else for Daniel?

MR. BUSH: This question is for Dr. Ross, mainly, a question or two. One of them is, this particular area, are there any potential threats that you see to it? I don't know if there is any activities that do take place in that area. That's the first question.

DR. ROSS: Not that I know of. It's offshore of the Charleston Bump, and it's a hundred miles or so offshore, and so most vessels avoid it, although there are potential commercial resources out there, but I don't think there is much utilization in that part.

MR. BUSH: Sure, and just a brief follow-up to that. Have you found alternate sources of mapping? I know that we mentioned about the shipping lanes, and do you all get much from commercial types that are going through that area, or are there ways that they could participate?

DR. ROSS: Most of them don't have multibeam sonar, which is really what is needed, and we have not gotten any cooperation from them, but they don't have the gear, or very few non-science or non-governmental vessels have multibeam sonar.

MR. PUGLIESE: Just a follow-up to that, and I know where you're going with that. The opportunities, I think -- The technology is getting to the point where there is some real opportunities for other vessels to be involved in some of this capability. Some of the newest Teledyne units are essentially -- You put them on the vessels, and you don't do anything, but it actually transmits and provides multibeam capabilities.

What I am hoping is that, in the not too distant future, that we have both some of our active fishery research vessels engaged with that, such as our SEAMAP and MARMAP and SEFIS activities, to get some of the newer technology, so that we begin to probably do more of the shelf and shelf edge and other multibeam -- Filling in the gaps that you talked about and going on different trajectories, but also looking at opportunities to maybe engage other partners in the fishery groups to be able to do some of these, and we've already had some of the discussions with our golden crab vessels or whatever, and so there may be some real opportunities with the advances in the way the technology operates, because, in the past, the big controlling factor was having an individual on the vessel that would have to be running, calibrating, continually working on this. If this technology gets further down the road, you have the capability of putting a fixed system on a vessel that could begin to add to the system.

The other opportunity is, and, again, it's probably going to be tested first with some of the fishery-independent systems, is the capability of getting autonomous vehicles that you could carry offshore. We already have engaged and discussed it with groups like Ocean Aero, about carrying one of these AUVs offshore and, while they're doing the work, allow that to map a piece and then move to another area and allow it to map a piece.

I think there is some real opportunities. There is more challenge in the deep system, because of the kind of capability you really need, but, again, I think those technologies that are advancing so far now that that's going to become a real system. It gets really interesting because, if somebody were really innovative, if you were able to put these on some commercial vessels, you could use the AIS system to actually transmit some of this data, because they're getting to the point where they're using that beyond just vessel tracking.

They're proposing that AIS system actually be a data network system that could provide information wherever, and so there is some real opportunities that may be coming down the road that really could add to the whole picture. We could be very focused on high-priority management and then fill in the gaps as we move forward, and I know Laurent has even better ideas about how we can go further with some of these, but I think my point was that technology advances are going

to provide some new opportunities to work together and collaborate even further in whatever you want to call it, citizen science or whatever.

DR. CHERUBIN: In regards to the area where you intend to do your surveys, as we know, a lot of the marine populations are connected beyond our borders, and so I was wondering, for instance, if you had other ideas or plans to explore some regions, such as the Mesoamerican region, which seems to be very much connected to the Florida Keys, for instance, or maybe other regions in the Gulf of Mexico, but also I know there is a huge effort in working in Cuba now. I know one of the NOAA expeditions is actually going there this month, and they have just started, with an ROV and all of that, and so I wonder if there is a plan to actually maybe explore further than our own boundaries.

DR. WAGNER: That's a great question, and so, for this effort, we are focusing our efforts, of course, in U.S. waters. Now, there are a couple of kind of collaborations. One is this Galway Agreement, and NOAA is a signatory to it, and it's the European Union, Canada, and the United States have agreed to do surveys in the larger Atlantic, including areas beyond national jurisdictions, and so that's a five-year effort, I believe, going to 2022, where they're going to be doing surveys mostly off of the Atlantic, but there are a few international collaborations happening, where we are providing data, but we're not providing basically the money to survey it.

MR. PUGLIESE: As a quick follow-up to that, one of the things that happened a number of years ago is -- There are still deliberations with the Bahamas, in terms of what the real boundary is on that, and, if you look at our atlas, we actually were provided multibeam mapping significantly outside the U.S. jurisdiction, along that entire area, because of those deliberations on what ultimately some of those boundary efforts are, and so, at least within the northern area of that system, they've gone outside the bounds, as you have that continued discussion on the law of the sea deliberations throughout the world, and specifically, in this case, with the Bahamas and how that advances, because of, again, the connectivity of those systems and ours was important, especially on the coral systems we're talking about right here.

DR. WAGNER: Just to add to that, there's an atlas project, and that's the European Union, the United States, and Canada. Then there's a sponges project with the same countries. Basically, these projects, the premise is that the animals don't care about the borders. They move across it, and, yes, we need to study it on a larger scale, and the deep sea is particularly interesting, because you have things that are widely dispersed, and you really have to study them internationally to really be able to understand what's happening.

MR. PUGLIESE: One last point on international activities. I think it's going to be really, really critical that we really understand especially the oceanographic characterization between the U.S. and Cuba and those areas, because -- You talk about some potential threats. If they really do crank up the oil and gas exploration in those zones, some of those trajectories could be -- We could be looking at it throughout everything we're looking at right now, and so that's going to be something that we at least need to be -- I think the U.S. is actually staged fairly well to have at least some of those discussions, but it's an important thing to reemphasize, I think.

MR. GEER: Okay. On that note, we're well into lunch at this point. Daniel, thank you very much. That was very interesting. We are into lunch right now. Let's break for lunch, and we will meet back here at 1:45.

(Whereupon, a recess was taken.)

MR. GEER: Okay. Pace, did you want to say something?

MR. WILBER: I just wanted to introduce Cynthia Cooksey, who is standing up in the back of the room. She is a new consultation biologist with us at the Southeast Regional Office. Over the next year or so, you will be seeing more and more of her, and less and less of me, until I completely disappear, and so Cindy says hi to everyone.

MR. GEER: All right. Let's move on. The first item on the agenda this afternoon is the FEP II Development, the Core Section. It's Attachments 11 through 18, and not all the attachments were there, as of yesterday. I think we were still missing 11 through 14, but I think Roger says they are up there now. I think Brittany and Brett are going to take the lead on this, and so --

MR. BOSTON: Roger is going to start with that map.

MR. GEER: All right. Roger is going to start with that nice map that I saw.

MR. PUGLIESE: Yes, and what I'm going to do is -- Let me just highlight kind of a broad overview of the Fishery Ecosystem Plan. The new generation of this creature really is intended to have core sections, as well as interactive and information that is available online. Why reinvent the wheel and not have the most timely information from other sources, or other aspects, of the system and work from that?

For the council meeting, we had laid this out to clarify some of the structure on the Fishery Ecosystem Plan. Essentially, the introduction to the area, and then the core sections are highlighted with the Food Web & Connectivity Section, as well as the Climate Variability & Fisheries. Those are some big drivers that really set the stage for the policy statements that this group has already provided to the council and the council has actually adopted and provided as part of the broader policy recommendations that are in it.

Habitat Sections, we're going to touch on those and walk through some of the core ones, which are really some of the benthic habitat components at this stage, and the other aspect is Managed Species, and we have a portion that shows an example of what's being done with the FEP descriptive managed species, but also it will get into the fact that a lot of the detailed information is actually going to be available online, through a collaborative system we've been building called EcoSpecies, and so you will be able to go and query detailed everything from life history to habitat to allowable catch limits to socioeconomic information and beyond.

Other Managed Species, one of the other aspects that is going to be a linkage is this is going to provide some connections to species that exist in our region, but are managed by Atlantic States Marine Fisheries Commission or by say the Mid-Atlantic Council. We can highlight the most recent information on those species and be able to have linkages to those, versus trying to reiterate what they've already provided, again creating a more living system.

On the Human Environment, one of the things we're going to do with that is Chapter 3 of the existing council amendments has the most recent information provided on the socioeconomic

system, and that is actually what is being connected and provided as the snapshot of those characteristics and the most updated for that individual species or species complex, and it will be -- Again, this provides a living capability, and so that can be updated as those are updated for existing FMPs.

The EFH components of this, a lot of this is already finalized with the EFH designations, which are highlighted and provided in the user guide that was finalized and advanced previously. We have the policy statements, the essential fish habitat policy statements, that have been updated and revised and added new statements, with us wrapping artificial reef up hopefully in September, and that can be the components.

We will highlight how, in this process, we've been addressing some of the EFH five-year review recommendations, and not some, but all, with actions that the council has taken to date and some of these new capabilities with highlighting detailed information on habitat or species in this system. The interactive systems we have online for managed areas is highlighting everything from what is provided in our habitat and ecosystem atlas to our digital dashboard and then a collaboration that you'll learn more about later, a precursor this afternoon and then really going into the workshop tomorrow, but the South Atlantic Landscape Conservation Blueprint that we're collaborating closely with in developing.

Then one of the bigger areas is our connection to research, and, as part of this, we have the council's ongoing research and monitoring priorities, which will be the most updated version, and the links to the system management plans for marine protected areas and for deepwater coral and for spawning special management zones, as well as any section-based research recommendations.

Individual sections have some of those, so we can build that connection also in there, and one of the biggest ones, I think, is our Southeast Area Monitoring and Assessment Program, the fishery-independent program in the Southeast, has a five-year plan that we just finalized, and it's really good, because it also highlights the connectivity of what is called the Southeast Reef Fish System, and it includes SEAMAP and the MARMAP system as well as SEFIS, which are all the fishery-independent, in combination, that provide core information for the region. This provides not only what is being done now, but into the future what the needs would be, to really enhance the council, state, and participant information needs for the region.

One thing I mentioned previously is we've been evolving what is going to be an online connection for a mapping strategy, which lays out different depth contours and then highlights what has been mapped in those and then identifies priorities, and that is ultimately going to help guide some of the previous discussions we had on deepwater as well as other mapping activities and the climate action plan that is done for the South Atlantic Region.

All of these parts, or at least most of these, I think were added as some of the attachments, the SEAMAP plan and the draft climate action plan, and some of the priority components were included as attachments, but this gives you the broader scope of the core components that the council has been advancing as well as all the linkages, and one of the other things is that this ultimately -- I mentioned the Ecospecies is an online information system that provides species detailed information.

We're investigating very specifically using that same system to do the Fishery Ecosystem Plan, so you can access the individual subsections, but then all the linkages to not only just information from other regions, but also the spatial information presented on the atlas, the information that is ongoing for some of the individual chapters of the socioeconomic information and our digital dashboard as well as, if we do it on the same platform as Ecospecies, it may very nicely work together, and so it becomes a truly living system that we can access the information, and all the partners can have it to enhance not only the council's activities, but the state activities and the broader conservation efforts that are intended and really feed into say the next stage of implementation of how do we advance some of these things on food web and climate and other things in our region.

I wanted to at least give that kind of foundation of where the structure is and then pass that over to where the core sections are being finalized that have fed into existing policies and some of the habitat components that are going to be advanced to the council with the next steps, because they're ready to go toward implementation, and this group is going to be tasked with helping advance some of those bigger points that will make some of these implementation things advance. With that, I will pass that over to Brittany.

MR. GEER: Anybody have any questions for Roger on this? I hear none. Roger, can you make sure this is in the folder as well? I got this from the presentation that I guess you gave at the Habitat Committee meeting.

MR. BOSTON: By the way, those little bullets, there is no magic -- Those were just lists of the handouts.

MR. GEER: The attachments.

MR. BOSTON: We have a previous version here. When we did that at the council, each of the handouts was listed. That's what that was.

MR. PUGLIESE: Yes, those were the attachments. Actually, those are the attachments that are in the briefing material for the last council's Habitat and Ecosystem Advisory Panel, and so it just ties directly to that, and those are all available there, at that version, many of which I have mentioned are already included in the materials we have, and I essentially could have done the same thing for what we have today.

MR. GEER: Okay. Any questions? I am hearing no questions for Roger, and we're going to move on. Brittany is going to come up and lead us through the core section completion part of this. In your documents, this is Attachments 9 through 14.

MR. PUGLIESE: As Brittany is getting ready, what I was going to just highlight is the fact that all of these sections have been building through Google Docs online, and so I think what she is going to do, for ease of transition of any recommendations or comments, is go directly to the actual Google Doc for these different ones and be able to integrate any of those comments and discussion as we move forward, and so the habitat sections are included -- We just need to highlight which attachments, and they were 11 through 14. Some of those were literally just loaded.

MR. BOSTON: So lessons learned in redoing FEP II. Number one, it was way too massive of a project. It was gigantic, and those of you that helped, a lot of folks in this room, thank you. A lot of sections, as we went through, were -- They just needed a little bit of buffing and updating. Mainly, what we saw was, in the sections that existed, was that -- In a couple of cases, it might have only been one state that has really participated heavily in that section previously.

In this round, our biggest Achilles heels was just our expertise being spread out over far too many sections at the same time, which was really challenging, and then there were times where we would have a really great team leader and we were off to a great start and they might get a job reassignment, and then finding a team leader that went, no, no, no, I'm already working on two of these, and so we had a pretty good participation though.

I think I did the count, and I can't remember, but I think there was about 150 scientists participating in this along the way, which was pretty impressive, and so what we're going to do is we're going to go through the documents with you. We're going to pull up the actual documents that are in the process of being edited, and so the handouts that you have look clean, because we took all of the comments and sidebars out, and you will actually see some commentary and some working notes in here, and so pay no attention to those. Those are the teams that are in process and are working, and so that's what you will see in there. Sorry about that.

Really, our intention is to walk through and ask for you guys to really say are there some big things missing, or are there some things we can wrap up in each of these sections, and we will take some notes and get with those team leaders and see what we can bring in for a landing, to just try to close down these sections as we go. I want to start with food webs. That is Handout 11.

MS. BOSTON: We are starting with the South Atlantic Food Web and Connectivity, and it's Attachment 11. This is the Google Document, and so I'm going to start with the Executive Summary, which we have already approved. We put those changes in that were approved by the council.

MR. BOSTON: The background on this is we have a policy that was approved. The introduction to that, this Executive Summary piece, is just a cut-and-paste from the approved Executive Summary of the council, and so you're looking at pretty much -- Don't burn too many calories on that one. We've already gotten it through.

MR. PUGLIESE: Also, I think the Executive Summary was the companion with the policy statement when we were reviewing the policy statement at the last advisory panel meeting that advanced to the council.

MS. BOSTON: This is the Ecopath model that was developed by Tom Okey.

MR. BOSTON: Tom will be with us in the morning. We will have him at the workshop tomorrow, and he will talk more. He can answer all your questions about Ecopath or Ecosim and any of the things around the modeling components, and so we'll have Tom tomorrow for three hours, and we'll have a chance to talk with him a little bit about the modeling systems that we're working on now.

My question is, as we look through the sections -- We'll give you a chance to kind of peek at that. If you have questions, or if there are big misses that are of concern, we certainly can get those and go back and talk with the team leaders on what those questions are or places that we might have big misses, just similar to the process we went through this morning with artificial reef, and so we will start at the top and move on through. Is there anything on the Description of the South Atlantic Food Webs, that first chunk there? Mr. Chairman, I am going to recommend that we move as quickly as the team wants, but sort of section-by-section, and have you got any preferences on that?

MR. GEER: No, as long as I don't hear any -- If I don't hear anybody speaking up, I'm assuming it's okay.

MR. BOSTON: All right. 1.2 is looking at the nearshore piece, and is there anything in there?

MS. DEATON: Is this the document that we worked on in Florida? Has it been changed much? You just incorporated the comments that the advisory panel members had?

MR. BOSTON: Yes, and you should see your comments in there and references and updates. Those kinds of things that were in there should have been incorporated, and so what we're looking for are any big misses between that version and this version that are of concern, and we'll just give everybody a chance to kind of go through that. If we tag anything, we certainly will get that corrected. Let's go to the Offshore Section and just give it a quick glance. Is there anything in there?

MR. HOOKER: Just noticing that it says baleen whales, and I'm not sure why there aren't any other whales or dolphins included in that.

MR. BOSTON: We'll add a comment on that. We'll just say why not just marine mammals in general or other whale species, right?

MR. HOOKER: Right. I mean, obviously, the large dolphins, I think, are -- Bottlenose dolphins are a pretty large predator.

MR. BOSTON: Yes. Okay.

DR. LANEY: Kind of along the lines of Brian's comment, Brett, I am looking for other categories of birds besides just diving birds. Not all of them dive, because you've got that whole group of petrels that are just pickers, surface pickers kind of, skimmers, and those should be included in there as well.

MR. BOSTON: Remember these are marine biologists, Wilson. So other birds too, and it's just broadening that category to skimmers, pickers, et cetera, and not just the diving birds. We will get that. Thanks.

MR. BUSH: I probably missed something obvious, but there is no pelagic species, either in the verbiage in 1.3 or on the chart, and was the purposeful or --

MR. BOSTON: They're in the bigger food web.

MR. PUGLIESE: Yes, and, I mean, if you look at the bigger marine food web component, I think that's -- What needs to be done is make sure you translate those that are comparable down through those different systems, because that really does -- The bigger picture is the more comprehensive that includes the pelagics and includes all the different trophic levels and all the different --

MR. BUSH: There is no mention of them in the verbiage offshore either though, and so it almost looks like --

MR. BOSTON: We need to strengthen the discussion on pelagics across the sections. Thank you, David. Good catch. By the way, it's so much easier for us to take the notes right in the document rather than trying to go back and pair them up, and so it will take a little bit longer.

MR. PARKER: I might be missing it, but I don't see any jellyfishes mentioned in here.

MR. BOSTON: It's in there. It's called what?

MR. GEER: Cnidarians.

MR. BOSTON: That is a -- You get all these scientists together, and sometimes it turns into Latin as opposed to English. Let's make a note that let's try to identify jellies in there. It's just Latin versus English.

DR. WHITTLE: But there's a lot of things that are cnidarians and not just jellyfish, and so, if you do spell it out, make sure you keep the other things, too.

MR. BOSTON: Yes, and so okay. Good. Thanks, Bill. All right. Looking through Species Interactions and Trophic Dynamics, that Section 1.4, and we'll back up if we're going too fast, but are we good there? Then 1.5, Life History Considerations.

MR. BUSH: A couple of different areas where this might be applicable, and, at the Atlantic States Commission, we just asked our science folks to really delve into the Hilborn paper, which has a lot of implications in an area like this, the species interactions and trophic dynamics, all the way down to 2.3 and 2.4, your pathway and food webs and all of that. I don't know that you need to specifically mention that paper in here, but just the fact that there is emerging ideas that may sort of be nonconventional that maybe needs to be taken into consideration.

MR. BOSTON: I don't mind mentioning it if you can give us the citation on it. I would be glad to put that in there, and we can put something in here about some other emerging ideas on the topic, and, boom, we can reference the paper down in the citations, and so, if you've got the cite for that, we'll take it and add it in. Thanks.

Scrolling along, Emerging Trends, there is a few things there, and this group did a really fabulous job, I think, of making it short and sweet, but the risk there is that, by keeping it short and accessible, sometimes, like you say, you leave some things out.

MR. PUGLIESE: Plus one of the other things is we're still looking at the introduction components of this, because I think there's a lot more detail on pelagics and other things that we touched on that didn't necessarily translate to some of the kind of the encapsulated frontend descriptions.

MR. BOSTON: Right. Moving past that, we're in 2.1 and 2.2, and so Basal Food Web Resources and Top-Down and Bottom-Up Control.

MR. GEER: David, that's where you would probably suggest putting the Hilborn reference, into 2.2?

MR. BUSH: Actually, there is probably a couple of different areas where it could be applicable, even in 2.3 or 2.4. It's just a matter of maybe a general mention of it somewhere in the paper, as far as research that maybe needs to be rolled into future, I guess, updates, and I'm not sure, because, at this point, I don't believe it's been very heavily peer reviewed yet, but it is something that we probably ought to read.

MR. BOSTON: Okay. Mr. Chairman, I think, if you don't mind, by your suggestion, we will tag it here in 2.2.

MR. GEER: Just to let you know, the Lenfest Report that came out several years ago, this Hilborn paper has some contrasting results, and so I think you have to consider them both, in some regards, because a lot of people have been citing that Lenfest paper, and I think it was from 2007, maybe. I think that's what year it was, but the Hilborn paper just came out, and they were saying -- A lot of the results were conflicting with the Lenfest, and, David, it has been peer reviewed, but it just hasn't been out in the public long enough, in the general scientific community long enough, for people to make an opinion of it, but the commission has just asked their technical committees to look at this as well, because a lot of people have been looking at that Lenfest as, okay, this is a very strong document, but now this is from another group of folks that are just as -- Their reputations are just as strong as the people from Lenfest, and they're finding very different results.

DR. LANEY: As Pat noted, it was discussed at the ASMFC Policy Board meeting and Menhaden Board, I guess, too, and there is a rebuttal to the Hilborn paper out there that also we can provide to you that was provided to us and a couple of other documents as well. Pikitch et al. are proposing a formal publication responding to the Hilborn et al. paper.

One other thing that's been noted about it all is that the Hilborn et al. study was paid for by a group of folks who harvest forage fishes for a living, and so there's been some question raised about how objective it might be, but certainly Pat is correct that there is an ongoing debate, and I think, if we're going to reference anything, we need to reference both sides of the issue and make sure it's covered.

MR. BOSTON: Thanks. If you will get us those cites, we'll put those in there as well. Thank you.

MR. BUSH: Certainly Pat and Wilson bring up good points as well. Again, it wasn't my intent to say that it hadn't been peer reviewed, but it hasn't been out in the public long enough to get the reviews and whatnot that we probably need to see to give it validity or whatever we need from it, and that's all.

MR. BOSTON: The debate is just beginning.

MR. BUSH: Exactly. Thank you.

MR. BOSTON: Great.

MR. PUGLIESE: A quick note. In our region, some of the more significant forage basis for our snapper grouper are tied to some of the other well-known species, and I think that's one of the things that is being investigated and being enhanced, and new research needs to be done beyond that, and some of the modeling efforts, I think, may advance those. They may have some different implications versus some of the more well-known and managed species that are being affected.

MR. HOOKER: On that same subject, it seems to me, like right above Section 2.5, at the very end of 2.4, there is a paragraph that talks about the high fluctuations in juvenile recruitment due to environmental variability.

MR. BOSTON: Yes.

MR. HOOKER: That would seem to be a good spot, I think, for the Hilborn paper, because I think that's what they were primarily driving at, was that aspect.

MR. BOSTON: Thanks, Brian, for -- It's just finding a home for it. Thank you. We'll put it there then. Emerging Trends, take a peek at that. They're much broader, if you will, but make sure we didn't miss anything big in there, Section 2.5. We are moving to 3, Connectivity Among Food Webs, and I am just looking at that Introduction, Section 3.1. Anything in there big that's missing or concerning? Then on to 3.2, that Benthic-Pelagic Coupling. Hearing nothing, okay. That's a big chunk, and I just want to give people a second. Now we'll go to 3.3, Inshore-Offshore Connections. This is completely invalid. There is a Sedberry citation again, and there can't be.

MR. GEER: It's a different one.

MR. BOSTON: It's a different one?

DR. SEDBERRY: It's the right one.

MR. BOSTON: Are we good? Then let's look at 3.4. Go ahead.

MR. BUSH: Did you guys catch what he was saying about Farmer et al.?

MR. BOSTON: No. Go ahead.

MR. BUSH: He said it was published, and so you can update that.

MR. BOSTON: Okay. That's up a little higher.

MR. PUGLIESE: It's right in the first sentence of 3.3.

MR. BOSTON: There it is. Not any more in prep, and so that's published? Okay. We'll make a note. Thank you. Now to 3.4. I will give you a second on 3.4. It's a big one.

MR. GEER: Is that the same Farmer reference, in the second paragraph, Farmer et al. 2013? Is that different?

MR. PUGLIESE: That's a different reference.

MR. GEER: That's a different reference, I'm assuming, since the other one was in prep.

MR. BOSTON: Different Farmers. All right. Seasonal Connectivity. Now we get fun. Section 3.6, Emerging Trends.

MR. GEER: Is there a reason why we're capitalizing all the species names?

DR. SEDBERRY: It's what American Fisheries Society has done for the last seven years.

MR. BOSTON: In all of the sections, we haven't done a -- You will see that the formatting that each team used was slightly different, depending on who was driving the edits. Now Impacts on Food Webs, anything under Section 4? You will see, for 4.1, we just --

DR. CHERUBIN: I am a little bit behind, but I want to go back to 3.5. You said that oceanographic studies of the Charleston Gyre indicate this feature facilitates -- Do you have any reference for these studies?

AP MEMBER: There are some references missing from that introductory section there, right there where it says "Govoni Bump and other papers". That needs to be filled in.

MR. BOSTON: We can add that. Thank you. We need to fill those in. I think there's actually a comment that you're not seeing that says that we need these references, and so got it. Thanks. Is that it, Laurent, just reference them?

DR. CHERUBIN: Yes.

MR. BOSTON: Thank you.

DR. LANEY: Brett, there is a -- I guess this would fit under the -- Maybe under Emerging Trends, and I'm not sure, but John Hare and his group at the Northeast Fisheries Science Center have done a lot of work looking at vulnerability assessments for different fish species, and I think they've done like eighty-some of them now, and some of those, I think, are in the South Atlantic, and so we might want to take a look at what they have done, in terms of conducting those vulnerability assessments, and see if that plugs in here. I am not sure whether it will or not.

MR. BOSTON: All right, and so we'll look for the --

MR. PUGLIESE: I've got that. I've got the paper. Actually, that is the Northeast vulnerability analysis. Some of the species occur, but they didn't do it for the Southeast. That is something that we are supposed to be -- That's one of the things that Bonnie had identified that they are advancing

for the Southeast Region. There are species that are in that group, and they have expanded when they started talking about some of the potential socioeconomic impacts, but the actual analysis -- Even though it's an informed analysis, it has not been done for the Southeast Region, but we do have those, and we can identify it at least alluding to what some of the implications are.

MR. BOSTON: So we want to allude to some implications, potentially, that are in this paper, and so it's not specific to us, is what Roger is saying there, Wilson, but we certainly can reference and allude to some of the implications.

DR. LANEY: Yes, that would be good, and Roger is right that we need to wait for the -- At least reference the fact that the work is going to be done for the Southeast, but, to the extent that some of those species in the group that John did may occur, in especially the northern part of the South Atlantic, we might be able to make some inferences.

MR. BOSTON: We will reference that the paper will be done for the South Atlantic, and we want to reference any implications that we can relative to species that are in the South Atlantic and just draw some implications, where possible. Did I get that right, Wilson? All right. Thanks.

MS. DEATON: This is just technical, but, in that Emerging Trends, that second sentence just doesn't -- It does read very well. It took me a while. The part about "and control or moderate CO2 concentrations" -- If you read that whole sentence, it's like -- I think it needs to be two sentences or something.

MR. BOSTON: Okay. It's just awkward. Got it. Thank you. That gets us through 3.6, and we'll go on to 4 now. I am always glad to back up, by the way. I don't mean to move too fast, but we just -- This 4.1, you can see it's kind of a new section. We didn't really have a lot to lean on for this section. This was written from scratch, and so there are just places where we had some holes. You see there is some work in progress here, and that's just a note for the team in italics on 4.1. Anything below that, in 4.2, there is a bunch of subs under 4.2, if you want to take a peek at those.

DR. LANEY: For 4.1, and maybe somebody else on the panel can help me remember the name of the principle author, but there was a report in *Science* a number of years ago, and for some reason 2011 comes to mind maybe, that looked at the historic changes, George, off the whole Atlantic coast, in terms of the reduction in the number of large predators and the big shifts in trophic regimes and everything. I will find it. I'm pretty sure I have it on my hard drive here somewhere, and so I will send that around.

DR. ROSS: Was that the paper related to sharks?

DR. LANEY: No, that's not the one. (The rest of the comment is not audible on the recording.)

DR. ROSS: Right. That was Pete Peterson and Ransom Myers were the authors on that. They used the long-term shark database from off of North Carolina to talk about predator reductions, but I don't remember the paper you're talking about.

DR. SEDBERRY: Aren't there some questions to even the results of that study? I think they just came out pretty recently, but I don't remember who wrote it.

MR. BOSTON: So there are papers, potentially, out there that could help us fill in some gaps here. That's good.

DR. ROSS: Yes.

MR. BOSTON: So two papers, and I will get those cites from you guys. Before we leave, I would like to get those citations, if you have it, Wilson or George, whoever has got it. That would be great. Thank you, because we were coming up short there, obviously, team-wise, and so looking at 4.2 now. Anything under the 4.2 or the subs?

MR. BUSH: I had a question for you on the 2011 U.S. National Bycatch Report. Is there any reason we're using that particular one, or is that the first one, or -- Because, I mean, there is obviously more recent ones, and I didn't know if that mattered.

MR. BOSTON: You're talking that 4.2.2?

MR. BUSH: Yes, that's correct.

MR. BOSTON: Make a note of why specifically 2011. Okay. I don't have the answer to that, but I will find out. Is there a more recent -- Thanks, David. We are moving to 4.3, Water Quality, or any of the subs under that, Nutrients, et cetera. Anything under 4.3?

MR. PUGLIESE: Brett was asking me a question, and one thing that I had raised, earlier on, is that work, I think, that was done, and Cynthia was involved directly with that, on some of the contaminant information systems for offshore areas, and that may be something we can cite in here, in terms of identifying what that is. I had raised it because I would like to see that get integrated into some of the discussions we're going to talk about later about indicators of condition offshore, et cetera, and so that's something that we can work with Cynthia to get that.

DR. LANEY: Okay. I found it. It's Jeremy Jackson et al and "Historical Overfishing and the Recent Collapse of Coastal Ecosystems" and it was that 2001 paper in *Science*. I will send it to you.

MR. BOSTON: Thank you. Okay. Got it.

DR. WHITTLE: They also have a more recent one for the Caribbean saying, Jeremy Jackson, and it was for corals, and whether their decline is due to fishing pressure or to climate change, and so I think that one is probably 2015. That might be another one.

MR. BOSTON: If you have got that reference, I would love it.

DR. WHITTLE: I will find it.

MR. BOSTON: Thank you.

DR. ROSS: In that case, since we're dumping those on you, the *Science* papers by Myers et al. on the coastal shark populations was Volume 315, 2007, in *Science*.

MR. BOSTON: Got it. We're going to come over and wrestle that out of you. If you can put it on a note for me, that would be great, and I'm asking you this just so we get them right when we type them in, as opposed to trying to do it on the fly. If you reference something, if you don't mind just making a quick note for me, we will get it in there, for sure. Anything else under 4? Let's go down to -- We were at Contaminants, and we'll keep scrolling down. Anything on Harmful Algal Blooms or Habitat Alteration? What about Invasives?

MR. HOOKER: In the Invasives, the next page, I think, there is a sentence that looks like it got truncated and attached to the next sentence. It says, "Fisheries management plans utilizing habitats" and I don't know any management plans that utilize habitat.

MR. BOSTON: Okay, and so something --

MR. HOOKER: It's at the bottom of -- It might be fixed in this version, but see the Figure Number and then that next sentence. It's got two sentences there, and I think it's supposed to "Invasive species having similar habitats to native reef fish", but it looks like part of a previous sentence got deleted and added to it.

MR. BOSTON: Yes, and we'll look at the -- We can trace the history and see if that got deleted inadvertently. That can happen.

MR. PARKER: Most invasive species discussions, at least to me, seem to revolve around fish and plants, but what about parasites, invasive parasites, with the invasive species? Wouldn't they bring along invasive parasites that could be like a pandemic in our marine environment?

MR. BOSTON: Thanks. I've got a note.

DR. LANEY: One that fits that, Bill, is the Japanese air bladder parasite of the American eels on the east coast of the U.S., and I think it's in the Gulf of Mexico too, but, since we're just talking east coast, it definitely fits that description here on the east coast. Now, it hasn't had as much impact on American eel populations as it apparently has had on European eel populations, but still that's a good question, and I don't know enough about parasitology to know whether there are other introduced parasites that are problematic as well, but that's something that we should certainly ask the question.

MR. BOSTON: We need one for lionfish pretty quick.

MR. PARKER: Please don't introduce one.

MR. BOSTON: All right. Climate Impacts, 4.6. You can see, under the combined effects there, we have those noted bullets outlined, but not filled in. If anybody has got any pieces that they can point to, in terms of under combined effects, if you know of anything on Antagonistic or Cumulative or any of those that you see there, it would be a great time to throw some literature our way for the team to consider, and so that whole 4.7 area and its subs in 4.8.

MR. BUSH: A brief note on that. The synergistic effects, what comes to mind, and it's not specific to this, but sort of overall, like the Invasive Species portion, where we have Atlantic sturgeon in our area, and, in this same area, we have an invasive blue catfish, and so, in response to the invasive

blue catfish, our gillnet fishermen started fishing for them and created a little market, and, forgetting the whole USDA issue with it, they could sell them and they could keep the populations down.

Now, however, the interactions with Atlantic sturgeon are causing them to pull their nets out, and so the Atlantic sturgeon are interrupting the ability for them to remove the invasive species, and, again, it's a negative synergistic impact, but I don't know -- There is not really anything out there yet, and I don't know how to even broach that subject in this, but that's just something to consider. Thank you.

MR. BOSTON: Thanks, David. If you had anything on those -- Let's go down to Food Web Models, and we'll start on 5.1, Models and Principles, and now we're getting into the modeling approaches specifically that the team has been considering and talking about. Any of you modelers that want to chime in, feel free. That's a big section, and so I will give you a second.

Anything in 5.1? Okay. 5.2, we thought it would be helpful to just put some case studies there. The team really thought that this will highlight some of the things that are there, and so that's what you're looking at. There are a few case studies, and you can take a peek. If there's others that you think we can reference, great. That's really what that section is about.

MR. PUGLIESE: Just a quick note actually under that. The South Atlantic Bight ecosystem model, the Ecopath model, is something that does a good job of highlighting how we've been collaborating since the first inception of our investigation in 2001, when we worked with Tom and the Sea Around Us Project, in building the first iteration of an investigation, really, to understand how much we didn't know in our region, and it's been evolving over time, with a couple of iterations, and, ultimately, the more recent forage, and all of those have helped feed into the next generation that we're working on right now and collaboration.

MR. BOSTON: We'll have updates tomorrow from Tom on that, and so anything there? That's just some -- Then we also had the -- If you look at the West Florida Shelf Reef Fish Ecopath model, that's another example. Let's go down to Food Web Indicators.

DR. LANEY: One other model that we might want to take a look at just popped into my head, and relative to David's comment about the blue catfish and the Atlantic sturgeon and fishery interactions, is Bill Pine, in his PhD dissertation, did an Ecopath model for the Lower Neuse River in North Carolina looking at flathead, and I think he may have put blue catfish in there too, but I know he did flathead catfish, and that's relevant, to the extent that some of our species do extend up, the lower ends anyway, of some of the river systems in the South Atlantic, and so we may want to take a look at Bill's dissertation. I have that, and I will send it to you as well.

MR. BOSTON: Good. Thanks. I appreciate that, Wilson. That's a good example. That's what we're looking for, those kinds of case studies, just as triggers and examples.

MR. PUGLIESE: Plus it would be real timely, because right now we have the Ecosystem Model Workgroup coming up next week, and so any of those additional connectivity components, I think, are going to be important to add to the discussion.

MR. BOSTON: All right, and so Food Web Indicators, I will give you a second to glance through there. There is a large table to kind of sort through. One of the things we'll be doing tomorrow is we will actually be looking at pretty high-level ecosystem indicators, and so, kind of tomorrow, as part of our workshop, we'll talk a little bit about indicators in the big picture of modeling and finding indicators that are practical.

That is, we have them throughout the range and they are regularly collected and there's a dataset in existence that indicates something other than themselves. I have seen indicators selected that -- They're really good at the indicator itself, and there are a lot of those present, but does it really indicate something other than itself, and then some of the socioeconomic components, perhaps, that we might want to look at, and so we'll be talking about indicators a lot more tomorrow, and, of course, next week at the modeling meeting, for sure.

How about Management Applications? We've just got the paragraph there, and is there anything, going down, of the 7, 7.1, in terms of Informing Stock Assessment, et cetera, and so this is where you should put on your hats of you are actually going to use food webs and some of the modeling here to do decision making with and policy and take a peek and say look at this wording and tell me if we got it right. For 7.3, we don't have those yet, and so we will start tomorrow.

MR. PUGLIESE: Yes, and I think one of the key points here is this is where you are seeing some jump-up, because the next stage is going to be looking at implementation and how do we advance some of the things, and that's going to require some of the analysis that's already been mentioned, some vulnerability analysis and different things, strategy evaluations, different things that are going to come with either additional work with National Marine Fisheries Service providing it or partners providing it or some of modeling activities, providing the foundation from which to advance, and how do you integrate ecosystem considerations into assessment and into our management and into our management and habitat conservation, and so that's the next stage we move into, and so this is the springboard.

MR. BOSTON: Then Number 8, just take a quick look through the Summary and Recommendations, that section there, kind of to make sure that we've -- This should be a cut-and-paste from the policy statement, and so it's not --

MR. CARTER: Could you give me an example of what you would think is an indicator?

MR. BOSTON: Roger and I were talking about that, just brainstorming, and it would probably be a combination of things. We were talking like water column, where you could say, in a given water column with a given bottom habitat, what kind of species variability was in that water column, and we were brainstorming some ideas.

MR. PUGLIESE: Well, species complexity and species diversity, some of the ones that have been traditionally looked at and some of the aspects. I think some of these things have not been developed or refined for our region yet, and this is the opportunity to advance some of those indications of condition, and so I think we'll be discussing exactly -- We will start some of that discussion now. As we advance that, this is the perfect timing to discuss if there are ones that seem more obvious than others, and this would be a good time to have that.

MR. BOSTON: We're just starting. The good news is, with time remaining this afternoon, I will introduce you to some of the high-level modeling and indicators that are already out there to talk about, and then, tomorrow, that workshop in the morning will refine a little bit more of that discussion.

MR. CARTER: If you have an indicator, and if the indicator gives you an indication, then does that not lead to the fact that now you have to take action, and is anyone going to take action? It's too hot in here and let's turn down the thermostat. Well, actually, it's not too hot in here, but is something like that going to be in the indicators? I mean, if I see this, then I should do this?

MR. BOSTON: That is what goes in -- Well, not really. I mean, what you have is you have models, and what models do is they point out that something might be wrong. Then it's up to management to interpret those models and work through and make the human dimension component of making the decision based on that, but what models do is provide you potential indicators to say, hey, yellow light that something might be going on here.

Then it's up to the decision makers and the scientists to really dig into is it just a seasonal variation or is it -- I mean, there could be a lot of reasons why that happened, but what indicators do is they should be calling attention to something might be going on well in advance of it being a catastrophe, and that, to me, is what a good indicator would do. It's, over time, start to say, hey, pay attention. Something might be happening here, and that's -- I think most indicators in most models are going to be very longitudinal. The variability shouldn't be monthly. It should be probably a little longer-scale than that.

MR. JONES: I would like to see where you -- I am back on 4.1, History of Change, and I would like to see if we could get a volunteer to help fill in on 4.1. What's there is too vague.

MR. BOSTON: Got it. I am going back there right now, to 4.1. Again, remember that we're still finishing up the text, and so that's --

MR. WILBER: I have some naïve questions about this chapter. Is there going to be any discussion of what food webs are in the South Atlantic and which are the three most common food webs and which are the ones most important to understand? Does the food web for a particular fishery change as you move from the northern part of the region to the southern part of the region? All this stuff seems to be a discussion of food web science and not about anything that's in the South Atlantic.

MR. BOSTON: So we'll make a note of specificity of the dominant -- In this case, the major energy in our food web is the Gulf, right, the Gulf of Mexico and the Gulf Stream, and so you're saying to point out much more specific examples of, like you said, either a or multiple key food webs and just some real hands-on, practical -- Let's talk about specific food webs and not food webs in general and here is the state-of-the-art of food web understanding.

MR. WILBER: Yes, that's part of it, but we get pressured all the time to make sure that we focus on prey species and not just managed species. Well, you've done all of this analysis of food webs, and which prey species do you want me to focus on the most? Does the answer change as you move from North Carolina to Florida? That is the kind of practical information that I would like as sort of the manager of a habitat conservation program, and I don't see any of that in here.

MR. BOSTON: Thank you. I appreciate it. We're getting that note in right now.

MR. WILBER: Also, along those lines, in one of the sections, we talk about habitats that are important to food webs, and talking about sand shoal complexes should definitely be in there.

MR. BOSTON: That was that fine line that the team had to do to say do we do food webs for every ecosystem or do the ecosystem sections themselves -- Habitat. I said ecosystem, but do the habitats themselves talk about the food complexity or the food web within that habitat, and this was that tradeoff that the group had about are we going to do every single section, every single type of habitat, and talk about the food web there, or are we going to have each of the habitat sections talk about any food web interactions within the habitat?

MR. WILBER: But you can defer the detailed description of the food web to the habitat section. That perfectly makes sense, but there should be some synthesis across habitats that would appear in this section, and so, I mean, we've talked about papers that have come out since at least 2001 that talk about global trends or broad ocean basin trends in food webs, and does any of that stuff apply to the South Atlantic? I mean, there is plenty of rules of thumb that are true globally that don't apply in the South Atlantic. If we looked at the conclusions in those broader papers, to see if they apply, is that what we're going to do ultimately?

MR. BOSTON: Got it. Thank you.

MR. WEBB: It's touched on, and it's a little bit more expansion on the last comments, but we look at these food webs, and we look at a lot of the natural and intentional and unintentional, but we don't -- At least it doesn't jump out at me that we talk about the actual management decisions being a variable themselves, and so, obviously, the whole concept of the food web is to make better management decisions, but we've already impacted the food web by the management decisions that have come before, and I think a lot of the criticisms of have we protected the goliath grouper to a point now where that's becoming a problem or have we protected certain sharks, where now they're starting to become a problem, and so I don't know where, when, or how, but, conceptually the --

MR. BOSTON: How does the impact of management decisions -- Got it. Thanks. We captured that note.

MR. PUGLIESE: I think a follow-up is, as we get into how to address this, the discussions on implementation, I think, are going to definitely start with some of those types of things, of where we are relative to that, and then how are those affecting the decisions that are already being made? I think that's going to be in the implementation side. It's going to be probably the springboard, the beginnings, of the process and get really kind of integrated more in that discussion, versus kind of the foundation position. We can allude to it in maybe adding some -- Again, that would lead directly into the next steps.

DR. LANEY: David, excellent point, and I think, somewhere in here, and maybe this might be the place to do it, but there is a controlling variable for how much you can produce in an ecosystem, which is the habitat quality and quantity, which is where we get the whole concept of habitat suitability index models from.

We don't know a whole lot about that for the South Atlantic, with the notable exception of penaeid shrimp, for which we do have a pretty good idea about the relationship between the biomass of that species and that acreage of intertidal marsh, vegetation, but the point David makes is an excellent one, about our management decisions altering the community composition, which is sort of another layer, I guess, the anthropogenic layer beyond the capability of the habitat to produce a certain amount. Then we decide, we humans decide, which species we prefer, and we really alter things.

A classic example is Atlantic migratory striped bass, which I have, somewhat tongue-and-cheek, said, in the past, that what we did, when we managed preferentially for that species, is we created a huge eating machine out there with some unintended consequences, possibly, on American lobsters and blue crabs and river herring.

Some of my colleagues have written some papers indicating that striped bass are responsible for the demise and decline of river herring and American shad in the Connecticut River, for example, and so those are certainly considerations that we need to factor in here somehow, and that's where I think the whole concept of ecosystem modeling comes into things, because you can do the what-if scenarios with those sort of models, and we can't really do that with traditional stock assessment models.

Now, ASMFC has moved in that direction, by creating a multispecies VPA, which looks at, again, a rather limited suite of species. It looks at bluefish and weakfish and striped bass and spiny dogfish and mostly menhaden, I think. Those are the five principle species in it, but, yes, somehow we need to work that in here.

MR. BOSTON: I think the modeling team has spent a tremendous amount of time talking about those species interactions, prey species interactions, et cetera, as being part of actually being in the model itself, and it's only when you have those levers -- Instead of a pen-and-paper exercise, you have those levers that you can see the interaction, and so that really is more of a question for will the model provide that and say you made this call and this is what you're going to get. The model is going to give us that feedback loop, hopefully prior to making the decision, so we can at least get some indicators that this might not be the decision that we think we should make, just based on the population modeling alone.

Right now, we have population dynamic models, in terms of species that we're managing with, and what about having some interactions in there, and that's what hopefully the ecosystem models that we'll have will give us, the frontend ability to do what-if, as Roger was saying, and so thanks, Wilson.

MR. HOOKER: I think it's an interesting discussion on why we make decisions, why we make management decisions, but the model could care less why we made the management decision. The impact-producing factor is the stressors are captured in here, and I think that's what is important. Why that particular decision was made is moot as far as the model is concerned, and so I think we've got all of that in here, but some discussion about why we got to that point may be appropriate somewhere, but I don't know if it's here.

MR. BOSTON: Well, I think the model will allow us to go forward, at least on the frontend, understanding better some of the system dynamics that we don't currently, when you manage for a particular species. The model will at least allow us to do some what-ifs on the frontend. It's not going to allow us to go back and say -- That rear-view mirror view won't be that valuable, David.

MR. WEBB: It wasn't a blame assessment, but if we're not cognizant that we've already created variations in the dynamics, because we pick winners and losers, we may not get to where we want to be as quickly as we could. That's all I was saying.

MR. BOSTON: I like that. We've got a note on that.

DR. LANEY: The Policy Board just touched on that, that whole discussion, last week again of what constitutes a quality fishery. That whole question about do we want to catch more fish or do we want to catch bigger fish enters into it as well. It would be nice to know what the best result is, and it all depends on your management goals and objectives.

If our management goal and objective in the South Atlantic, and, help me out here, Roger, but I can't remember exactly what we finally decided when we did the snapper grouper visioning process, but I think part of that whole process is we want a healthy and sustainable ecosystem with what amounts to healthy biodiversity. Again, that can be influenced by how you decide to manage individual species or groups of species, and so what's healthy is a question that certainly has been influenced by past management actions and will be influenced by future management actions, and I don't know that we could -- If we're pressed, can we really answer that question now, based on what we know today?

MR. BOSTON: Well, you know, I don't know if it's comforting for you guys to know, but the team has wrestled with these very issues. This discussion was part of clearly the food web team's dialogue around things, and so they certainly were well aware of that piece, for sure.

MR. PUGLIESE: Into the modeling discussion, I think they're trying to go as far as you can, in terms of looking at the broad scope. I think some of the feeding information going into say the last iteration of Ecopath, it actually was very strategic, and that's the great thing about a model. It's strategic in the way of cutting some of these species in half and then seeing what the response variable on those forage species would be.

That opportunity exists, and, actually, under the Ecosim component of Ecopath, Ecosim, Ecospace, you can actually go back in time on some of those, and so, if it has good enough input parameters on prey and predator interactions and core species and the largest amounts of biomass, you can actually -- I have seen some situations where they've had enough of it where they could actually track the pattern of how the fishery actually operated and can see some of the different actions.

I think one of the biggest things is that we're managing fisheries to produce maximum sustainable yields for every managed species, prey and predator and everything, and so I think the modeling efforts are going to provide some opportunity, and I understand that some of those dynamics may not be effective, because, if we start putting the true assessment information in there and understand where it is, you may not be able to put everything at that level, and you're going to have to have some ability to work within those different bounds.

That's the hope, is that we can do a better job of understanding all of that, but also have the ability to understand how the environmental components of it, how some of the habitat distribution changes, and we're really testing the newest generations of some of those modeling capabilities by doing what we're getting ready to accomplish on ecosystem modeling.

DR. CHERUBIN: I just want to add and also remind everyone of being cautious with models. Models are usually big approximations, right, and so, before you trust a model, you have to validate that model. Basically, you need to run it on an example or a case for which you already have the answer, and I know there is a study that was done in 2012 by Mandy Karnauskas at NOAA Southeast Fisheries Science Center.

She looked at basically the shift in the trophic chain in the Gulf of Mexico and found out that there was a strong shift that happened in maybe 2000, or something like that, where the forage fish species change versus the predators and all of that, and I think that would be, for instance, a case study that would be applicable here and maybe can be used as proof for one of those models that could be used to verify that the model is actually able to predict that kind of shift, based on the different parameters that you can put in the model.

She did that study just based on the landings, catch and landings by fishermen, and the model was able to identify these trends and the shift in the ecosystem in the Gulf of Mexico, and so I think there are some plausible and empirical data out there that can be used to support those models and validate those models that then can be trusted to make forecast and sensitivity studies, where you can modify the parameters to see what would be the response of your ecosystem in general.

MR. BOSTON: Thank you. If you've got that and if you can give that reference to Brittany, I would appreciate it.

MR. PUGLIESE: As one aspect of the entire discussion that we're having here, one of the things that we wanted to make sure, as we discussed these things, is that this wasn't a bunch of theoretical actions on modeling efforts, and so we have both our Chair and Former Chair of the SSC directly involved in the modeling efforts, so that, when we're looking at this, we're looking at practical applications of what the reality is really of how some of these can function and what they can provide our Scientific and Statistical Committee and what they can provide the council and really trying to get management-level capabilities on how we advance that, and so there's an eyes-wide-open approach on this management approach perspective that's going to be really critical.

MR. BOSTON: I guess, interpreting that, it's not modelers run amuck. You have Luiz and you have Marcel really guiding for what would be practical information that would be useable and that they know will stand up to questioning from the council itself, and so I think that that's a check that we have on this, is that this is going to be useful to our managers, actually. It's not just, wow, we have this really cool model and, look, it will do all these wonderful hand-stands.

MR. PUGLIESE: Also, it's not just them, and Marcel would whack me in the side of the head, because he would say that it's not just us. The key though is that this is evolving right now, and I think the opening is going to be at the next SSC meeting, that they're going to begin to introduce some of these advances on ecosystem modeling, so that it informs the entire SSC on how we're proceeding and where we go, and that will also take it to the next generation, in terms of

discussions on management strategy evaluation and use in assessments and validation of these different types of capabilities.

MR. BOSTON: Tom, going back, she missed your original comment. You said, on 4.1, make sure that this gets filled in?

MR. JONES: That's correct. I was looking to see if we could find a volunteer to help fill that in.

MR. BOSTON: Okay. So he just really is concerned that that not be left so generic and that we really fill that in. Thank you. That was the one that I missed there.

MR. HOOKER: Are we allowed to skip to Section 8 now?

MR. BOSTON: Yes, let's go to 8. Sorry. By the way, all of those notes that you gave us, we actually put in the online -- We captured all of that here, instead of trying to catch it in comments on the side there, and so down to 8, Brian.

MR. HOOKER: I was just looking at the agenda, and -- Actually, I thought we had a good segue into 8, with all the caveats about the modeling and everything. I thought Section 8 actually did a good job of capturing that. The only issues I had with that is that the section title is Summary and Recommendations, and it seems that there may be a couple of recommendations scattered in there, but, if you have a section titled "Recommendations", it seems like you should have those bulleted and separated very clearly what those recommendations are.

MR. BOSTON: So do a summary and put that there and then here are the recommendations and really flag those.

MR. HOOKER: Exactly. I mean, there seems -- It's very vague what the recommendations are, and the recommendations, to me, to be something you really want to try to get across. Then just the last thing is that the very last paragraph on -- It's a weird ending to the entire document, is that one paragraph on forage species. It seems, to me, that the previous four or five paragraphs talk about forage species adequately, and it just seems to kind of just be this weird add-on to the end. Maybe that's what you're trying to do, and I don't know, but --

MR. BOSTON: This was a cut-and-paste from the council. This is right out of the approved language from the policy.

MR. PUGLIESE: Actually, this was run by -- This is part of the policy that was approved by the advisory panel at the last meeting. It may not be in the same order though. That might be why.

MR. BOSTON: This is a cut-and-paste, but thank you. We've got that, but I'm just -- I wasn't justifying why it was that way or making excuses, but you're right that it is a strange ending.

MR. HOOKER: It is, and I guess you get to it, and you think you want a conclusion, and the previous paragraph, I thought, kind of does that. You're talking about how managers can use this and utilize this, and then it was like, but don't forget forage species.

MR. BOSTON: Well, we had some forage species advocates here.

MR. GEER: As I recall, that was the last thing we talked about when we were doing the policy statement at the last meeting. It was the very last thing, and so that's probably why it ended up there.

MR. BOSTON: We will make it even prettier, and so, if we actually moved it, but didn't change the wording, we're okay, maybe. Thanks. Anything else on 8? Are we good? I appreciate it, those of you that have references or any of those things that came up in the conversation, if you would just jot them down and we'll get them and get them in there. Do you want to take a ten-minute break?

MR. GEER: Let's do ten minutes. Let's be back by 3:25.

MR. BOSTON: Good, and then we'll do Climate Variability and Fisheries.

(Whereupon, a recess was taken.)

MR. PUGLIESE: What is provided on Managed Species is an introduction that highlights the fact that, for the Fishery Ecosystem Plan, the team, again led by Marcel and Luiz, provided summary snapshots of each managed species, and what is going on is that we are creating a very direct summarization that really doesn't change over time.

The idea is that there will be connections to the online Ecospecies system that has detailed life history and detailed fishery information and detailed economic information and habitat by life stage, really a broad variety of all different information, and so what's provided here is essentially a snapshot of a number of species where that summary -- There was very specific directions given on how to compile that information in very common terms, so it wasn't too complex, and, essentially, that could be maintained while the longer-term detailed information system and their Ecospecies evolved, as new information is updated and integrated and presented.

The online system actually has all the managed species, but it actually goes beyond that, to integrate many of the other components of the ecosystem, the whole idea of that being really providing detailed information across all prey and predator and components of the overall ecosystem. I think what Brittany is going to provide is how the layout is for some of these key species and what's been designed and developed and will ultimate constitute the section for managed species in the Fishery Ecosystem Plan.

MR. BOSTON: This group basically has a tool that it's filling in. FWRI has really done a fabulous job. We had just basically a digital librarian, some professional help, really go through and get all of the background materials and research for each species identified, and so we have all of that done, and we went with -- I think we started with black sea bass, and Grant Gilmore put together a format. Everybody talked about it, and we tweaked it, and we got agreement from the authors for each section that it was going to short and sweet. Detailed information would be linked in the bibliography and in the citations, but that basically it was going to be short and sweet.

We discussed naming conventions, and we discussed all of those issues, and so what you see are, I think, very short and useful descriptions of the species. We started with one and debated that. George, you were there. We had a pretty good discussion on how we wanted to format that, and

we kept it very short. It is now loaded into an online system at FWRI, and we are getting really -- We are meeting next week to kind of make some final tweaks on the system. We have two meetings with the FWRI team, who is doing a great job of getting the documentation ready, and I think we've got a pretty neat system there.

As Roger said earlier, we're also exploring if we can just use one tool to also do the FEP II sections and just encapsulate and link them within that tool as well, and so lots going on there, but let's start through this section here and just sort of look at the descriptions and understand that, while we have these sections written, actually they are loaded digitally, and there's a really nice, structured, digital online framework that has everything in it, easily searched and referenced.

MR. PUGLIESE: I think it's worth highlighting, within the description on the frontend, the aspects of what we're going to do from this. Then we provide the species summaries for the concise ecosystem plan, these individual summaries, and we also, in this process, operationalize the online system to link all aspects of the South Atlantic managed species, essential habitat, species life history, status, and assessment, input parameters, catch and management, and environmental limits and vulnerability, and I wanted to highlight that, because those are some new things that the librarian has actually been able to pull, where possible, some of the vulnerability information, and so hopefully that's actually going to feed into future overall South Atlantic vulnerability analyses.

Also, a direct link to species information, and this was a key, because this has been evolving, the Ecospecies part, for a while, to provide direct information for potentially stock assessments, and so, maybe during a data workshop, this could actually be something that could be literally accessed, to provide some of the more recent information on life history parameters or specific inputs that maybe need to be addressed at that point.

The key of that is that then it could actually, as the assessments are completed, provide an update to that, and so there would be kind of a two-way opportunity to provide the most recent information and backfill the individual species information in this system, so that, again, that living aspect of this system, the FEP as well as the Ecospecies, becomes really a functional aspect.

One of the other things is that we have a core group that was involved, but we have expanded that to the editor pool, to go beyond what the existing group involved, and that will evolve over time further, because, as I mentioned, there is a number of other species outside the bounds of the councils, and so we may be working with Lisa and others to tap in on the experts from the other species, to make sure that that system then can actually go beyond the capabilities of just the South Atlantic activities.

It will provide more of the real information, real-time information and more detailed information, queryable, at a level that isn't used in a static document, and it has very specific ties back to our essential fish habitat five-year review, saying that we needed to access more detailed information by life stage, and this is providing down to that level of information in an accessible and queryable and functional way online, which is far more useful than a hard piece of paper.

MR. BOSTON: So you're looking at what is, I hope, a consistent set of summaries about the species. The online tool itself has all of those details and background information and all the resources and all the citations, et cetera, and so there is depth behind this. When you look at this, it's really -- You go, well, so what, big deal, it's just a description of the species, and that's exactly

what it's supposed to be. The real tool is going to be the online tool, and it's about done. I mean, we're really close to having that fully populated and ready to go. Are there questions just on the methodology we used to do managed species or the toolset that we have for that? Other than that, you're really just reviewing these very specified, simply-designed species descriptions. Anything on this, just topically?

DR. LANEY: I haven't looked at it online, Brett. Did you all put all the references just in one section or are they organized by species?

MR. BOSTON: By species, and it's amazingly comprehensive. It seems like they're all either Gilmore or Sedberry, but it's an amazingly-comprehensive reference list there. Just kidding, George, but, yes, what we have is a full -- We had a librarian professional who actually puts every reference in there, and so it's really well done, Wilson, and so we didn't have to put that in this common description right here, because it's in the tool itself.

MR. PUGLIESE: Yes, and I think one of the keys too is that this is just a snapshot of kind of the frontend, and so it doesn't get into -- Pat was asking about the shrimp species, et cetera, and they're all in there, but it's just that I did a snapshot of a couple, just to give a foundation. We didn't lose that. That's all in hundred-plus pages of description.

MR. BOSTON: You can go through, and there is golden crab, lobster, spiny lobster, coral, sargassum. They're all there.

MR. PUGLIESE: There are some on coral and sargassum that I have to work with Chip on, and we're going to sort out kind of a direct representation of some that are -- It's a little bit different, but I think what we're going to do with those is draw directly from the existing information on the existing documentation.

MR. GEER: Any questions on that? I mean, we're meeting next week, and that should be finalized by next week.

MR. BOSTON: Yes, it will be. Then there will be a link to this. Do we want to put -- I guess, ultimately, once we finalize those toolsets, there will be a link for you guys, and you can go and actually use the online toolset, eventually.

MR. PUGLIESE: You mean the Ecospecies?

MR. BOSTON: Yes, the Ecospecies.

MR. PUGLIESE: Yes, and I mean there's going to be two aspects. This will be integrated into the document version of the FEP Managed Species Component, and, under each one of these, we'll probably have the linkage back to the Ecospecies, so you can go into the queryable, detailed location, whether it be on the frontend of the whole section or -- I think, individually, we may actually include that linkage, so you can look at a species and jump to the link, maybe jump to distribution maps, a number of things that we could -- We're going to have, literally, that discussion next Tuesday on how to kind of put a bow on this and wrap up the rest of the details on it.

MR. BOSTON: Mr. Chairman, are you ready to move to threats?

MR. GEER: Yes.

MS. BOSTON: This wasn't included in the attachments, but we wanted to go ahead and talk about this as the bigger part of the FEP picture. Pace put together ten threats, or the NMFS did, and so these threats are going to be covered in the habitat sections, which I probably won't have time today to show you the other habitat sections, but these all have a section in those habitats that cover these threats, and so, if we wanted to take a look at these and agree on these ten.

MR. BOSTON: This is -- Pace, you guys had this. NMFS did this list from -- Do you have the background on it?

MR. WILBER: I want to give credit to where credit is deserved, and so Jaclyn Daly is the one who put this list together, and she has moved on to a job in Protected Resources up in Silver Spring, and so I haven't looked at this list for like probably a year.

MR. PUGLIESE: She can go ahead and email it. What I will say is that, under Attachment 19, we have all of the policies, and I think what we want to do here is to identify the fact that what we are doing is essentially the policy statements that have been approved by the council have discussions on threats.

The sections on the habitat have discussions on threats, and we want to crosswalk between those, to highlight how these major areas have been addressed, and so it's going to be that kind of crosswalk between those to identify the threats that are addressed, and a number of these are fairly obvious, bundling together the energy policy addressing the last three and the seagrass policy addressing some of the inshore habitat activities and the sand and large-scale ocean engineering policy addresses beach renourishment and dredging issues, and so I think that alignment of those different components is what we just wanted to try to highlight, and then that's going to actually be a crosswalk to show where those threats are, how they've been addressed by the existing policies that have been developed and approved and updated by the advisory panel for the council.

MR. BOSTON: We blew them up a little bit, so you can see them, and we will certainly email those, but, as Roger said, these are crosscutting in almost all the sections, and everybody had to deal with threats in each of the sections. I guess what we're after here is really any big misses that you see on that list.

DR. WHITTLE: Marine debris?

MR. BOSTON: Yes, marine debris. Good catch.

DR. WHITTLE: I guess it would be marine debris. I was going to say marine pollution, but I guess --

MR. BOSTON: We've got pollution. Debris.

MR. PUGLIESE: One thing I do need to do is to dig back into the historic components of the council policy activities, because that was one of the first things that this council ever addressed,

was marine debris, and we had actually created some very specific wording, which I'm not sure if it got morphed into something else or not, but it's good to put it on the table, because that was something that we addressed, because that was a hot topic when we were first discussing some of the activities in the Southeast.

DR. WHITTLE: I just meant pollution because it has expanded, and, if you're looking at like corals, some of the personal care products, et cetera.

MR. BOSTON: We've got that in Number 6 there, hormones and pharmaceuticals. The personal care, you're also talking about perhaps the microbeads and --

DR. WHITTLE: Sunscreens.

MR. BOSTON: Yes, sunscreens.

MR. GEER: Marine debris and contaminants.

MR. BOSTON: And contaminants.

DR. WHITTLE: Usually, the other working groups just call it pollution and it includes contaminants and debris and all of the above.

MR. BOSTON: Pollution. In the front, call this whole section pollution?

MR. PUGLIESE: No, marine debris and pollution.

MR. BOSTON: All right.

MR. WILBER: I am remembering back how we got this list. We went to the original Fishery Ecosystem Plan, and the number of threats called out in the plan was --

MS. BOSTON: Thirty-two.

MR. WILBER: Thirty-two, and, as you went through that list, many of the things that were discussed -- We had a team of folks from the Fisheries Service, the Nature Conservancy, and a few other places, and, in our collective 120-plus years of doing coastal management work, we could not recall a single example of us ever having a project coming across our desks that matched that particular threat.

We considered those to be sort of theoretical threats, or at least threats that are outside the realm of our day-to-day kind of activities, and so we strove to identify, essentially, a top-ten list, and we had to come across it with some level of frequency in order to get to the top ten. There was no effort at all to be comprehensive in listing everything. In fact, we avoided, purposefully, that, because the outcome of that is pages and pages of stuff that has very short descriptions that are really of no value, because of their shortness, and it just takes up real estate inside the FEP, and so our goal was to come up with a top-ten list, and that's what we communicated to Roger and Brett.

DR. WHITTLE: I think you could put it under Number 6.

MR. BOSTON: What's that?

DR. WHITTLE: If you want to keep it ten, I think you could put it under Number 6.

MR. BOSTON: Under Number 6, marine debris? Yes. Thank you.

DR. HAVEL: I was just wondering if you talked about fishing gear impacts at all when coming up with the list.

MR. WILBER: We did, and we didn't consider it to be a top ten.

MR. PUGLIESE: The extensive threats discussion in the existing FEP, I think, covers virtually all of it, and the South Atlantic, to a great degree, in all the actions over time, have implemented so many regulations under the individual FMPs that there are really not a whole lot of directed fishing, especially gear impacts, still associated with the areas. With all the managed areas and with all the multiple layers of gear prohibitions in our region, they have addressed virtually everything, and I think there wasn't necessarily anything brand new that needed to be addressed.

DR. WHITTLE: I would disagree with that with coral reefs. Your habitats part obviously hasn't been updated from -- The chapter hasn't been updated, from the attachment you gave us, but, yes, coral reefs are a big problem, and there are policies that float around, but don't get traction, about how to decrease fishing gear debris on coral reefs.

MS. DEATON: On the fishing impacts, I think, for transparency, how others see it, I think you need at least a small section about it, even if it's to reference them over to other areas, because, to me, to not say anything about fishing gear, but to have aquaculture as implying a higher impact, it seems just out of balance.

Then my other comment is about, again, like the balance of these, and to clump nonpoint source pollution -- It affects all of these habitats, and it comes from so many sources, and yet it's one item compared to what I see as much smaller activities and impacts, and so nonpoint can be agriculture, which Pace would never really review those, but what about agricultural runoff? What about -- Well, you don't have point source discharges. That's a different kind of pollution. Forestry is runoff, and there is just things that probably don't come across in the permit world, like fishing gear, that might be worth having. That's all. It's the same thing with development. It's so big.

MR. PUGLIESE: Yes, and I think some of -- Those specific other areas are addressed in the historic FEP that we could actually identify at least those as part of the overall non -- Really, this was the non-fishing areas, because the way I looked at it is we were going to just reference the existing fishery impacts section that goes through gears and all those as a separate item relative to this activity, but I think what you're identifying are some of the other areas that have been addressed in the standing Fishery Ecosystem Plan, describing agriculture and all the other ones that are not necessarily in the top ten for review at the federal level, but are part of the --

MR. WILBER: That's correct, and so, again, the purpose for our top-ten list has morphed, and so it may be that the morphing makes the top-ten list not necessary anymore, but, when we first got into this -- Our complaint with the original FEP was that the descriptions of each threat were so

generic to be not useful, and so we also had a limited amount of time, and we recognized that any text we provide for a particular impact needed to be a couple of pages long, with current citations, a theme that we've heard about in other parts of the FEP.

In order for it really to be useful, and so the number of people involved had a limited amount of time to put into this, and so we basically said, okay, what are we going to focus on, recognizing that old FEP is not going away. It's not being deleted. If you want the one-paragraph discussion about how agriculture can affect coastal ecosystems, that is still there. We just didn't want to put any of our time into expanding that from a one paragraph into a three-page with current citation type of activity or write-up, and so that's how we kind of ran this triage system.

Now that we're kind of backing away from having these expanded write-ups and now just trying to make essentially what's been described to me as a table that lists all of the threats and what of the policy statements kind of apply to it, and now it's just basically checking boxes, and so it may be that a top-ten list isn't -- It's certainly not serving the purpose that it was originally crafted for, and so it may be to go back to that list of thirty-two or thirty-three that was in the original FEP and just say these are the policies that apply to these threats.

MR. PUGLIESE: I think that may be very direct that we can both blend specific areas that are not identified in here as well as the most updated information that's included in the habitat sections and in the policies, and so I think we can crosswalk and do that to get literally all of that information out that highlights out what the threats are, the non-fishing and fishing threats, and advances it so it's both the most recent information, but doesn't lose some of the other context of other threats that we know are --

MR. BOSTON: Yes, and, Pace, to your point, it's not an excuse, but we started out really trying to keep the FEP really, really short, and so that was part of the team's decision, is not to create an encyclopedia of threats, and so I will back you on that, but I think you're right. As we move toward a table approach, we can certainly go back to the thirty-two that we have listed, which will be that comprehensive list, and just find a way to reduce that within the table itself, in terms of those impacts.

MR. CARTER: If we're just going to work on fishing gear, then it should be under like human impacts, since repetitive scuba diving, recreational scuba diving, over and over and over in a particular place could be detrimental, but, no matter how long the list is, I think it's important that you list them in order of priority, from this is the worst one to flip-flops down at the bottom. I mean, you've got to have them -- You just can't have a shotgun list. You should have them in some order of priority, so that people know which ones to try to address first. When they get those done --

MR. BOSTON: So maybe something like a high, medium, and low impact or something like that, in terms of on the respective ecosystems?

MR. CARTER: Yes, something like that, a 1, 2, or 3 or something like that.

MR. BOSTON: Yes, and you want some sense of priority, in terms of current impact.

MR. CARTER: Right.

MR. BOSTON: Okay.

MR. HOOKER: I guess I kind of agree and kind of disagree with that. It seems to me that maybe in order of like data needs, like what has -- People could go back and forth about what's the worst impact, but I think everyone could agree with what needs the most research, right? I mean, would that be -- Is that not easier? Is it easier just to go --

MR. CARTER: I have a rebuttal to that. We can spend all of our lives collecting the information, until we think we know what we think we ought to know and find out we left something out and start again, but I think it's more important that -- I mean, I hope, to our learned colleagues and scientists, that they know at least what the top five are by now, and those should be the ones being addressed. Someone who writes one for his PhD thesis about throwing about litmus paper and the impact on the environment, that ought to be like Number 1015 on the list.

MR. WILBER: I am kind of with Mark in spirit on this, and you will see, in my presentation tomorrow, when I talk about just how the Habitat Conservation Program works in the South Atlantic, we have acreage numbers for everything on there, and we have them listed and prioritized by acreage, and so you will be able to see that. Now, if you want to agree whether a listing by acreage is consistent with your gut instincts as to what the most important ones are, that's a different discussion, but, if you're accepting acreage prioritization, it's available for that entire list.

MR. BOSTON: That will be great, and so, Mr. Chairman, one recommendation. Why not revisit that topic tomorrow, during Pace's presentation, so we can kind of see that and see that, well, maybe this kind of gets us there?

MR. GEER: The whole list or just the ten?

MS. DEATON: I have a question for Pace. How do you have acreage for nonpoint source pollution impacts? You have acres for how that impacts tidal creeks?

MR. WILBER: Depending upon which item on the list, you talk about that there are varying -- An acreage number is easier to get, and you have more confidence in it, and so there is that -- That changes too, and the same thing is true with dams. You count the entire downstream part, but this is where you have to kind of sync it up with your gut.

MR. BOSTON: Yes.

MR. BUSH: Maybe the acreage thing might work, but, if not, I think Brett's idea might be a little less -- I don't know if controversial might be it, but, if you're one of the folks who lives right downstream from one of these, that's number one to you, and maybe the high, medium, and low might be the way to go, and that's just a thought.

MR. BOSTON: One thought on this is let's see what Pace's presentation looks like tomorrow, and I think we can easily revisit and just see how you would like to see that presented. If it's high, medium, low, or we can do 1, 2, 3, as Mark said. We could do perhaps acres or some other easy metric, but I think it's just kind of important that we at least indicate that these are the things we

think have the greatest impact and these are the things that have an impact, but may be lesser, and that may be professional opinion.

MR. WILBER: Again, if you go back to the spirit of this top-ten list, we went from thirty-two to ten, and so that's already an indicator that everything here seemed to be a more important impact than the twenty-two that were not included on the list.

MR. BOSTON: I think thirty-three was litmus paper, and so I just --

MR. GEER: All right, and so we're going to revisit this tomorrow, after Pace's talk. What is next? We're going back to the climate.

MR. PUGLIESE: Yes, the Climate Variability and Fisheries.

MR. GEER: Which was which attachment?

MR. PUGLIESE: It's Attachment 12. Again, this is the detailed description, which includes both some of the summary information drawn that provided the executive summary as well as the policy statement that was advanced through the advisory panel at the last meeting.

MR. BOSTON: Okay, and so another new FEP section, not having the Food Webs and this section, and no -- We have one of our team leaders here, and so we can direct some questions your way. Lora is here, and she can answer probably your questions even better than we can, and so, Mr. Chairman, if that's okay -- Lora, if you want to join us over here, that would be a lot easier.

MR. GEER: She is more than welcome to the table.

MR. BOSTON: This is another one of those great sections. You've got to start somewhere, and so getting something in writing and engaging the quality level of the scientists that we got to participate in starting something from scratch as big as this was quite a challenge, and this team, like food webs, had nothing to start with, and so let's start through the introduction and answer questions or any issues or concerns you might have on the introduction piece.

MS. BOSTON: This section, the Policy Recommendations and the Executive Summary, were approved by the council. This introduction is different.

MR. BOSTON: It's different than the approved policy summary. Any concerns or comments on the introduction piece to this section? It's a big introduction, and so I'll give you a second, but that's what we're looking at. Can we move to Historical or do you need a second?

MR. BUSH: Just a quick question for you. I know I've been sitting through these meetings for the past few years, and we know that the climate isn't the same as it was a few years ago and a hundred years ago and so on and so forth, but we keep talking about resilient, climate-ready fisheries and so on and so forth, and what are we trying to say there? Are we trying to make the fish more resilient or are we trying to make the communities more resilient or are we trying to make those that dependent on the fishery more resilient?

I guess, when I read this, a lot of times, we're trying to create resiliency, but we don't really identify who we're trying to make more resilient and what impact we're trying to actually have.

MR. BOSTON: Typically, resilience is referring to the ecosystem and habitat.

MR. BUSH: I would follow up with a question. If the water temperature is increasing, and the fish are moving further and further north, are we trying to chill the water to bring them back? I know I'm being silly here, but I'm trying to get what you're getting out of this.

MR. PUGLIESE: Let me jump in there, and I will let Lora get into immediately after, but all I was going to say is that, number one, we were trying to characterize what the condition in the system is and that may be -- That's why it's very specifically variability in fisheries, because it is intended to understand what the implications for our region are and how -- One of the biggest things in our region is less of the necessarily increasing trend in temperature versus increasing episodic events is really going to be driving a lot of other things, where we have upwelling events that are effecting it and more rainfall events that are going to affect activities.

I think there's a lot of those that are bigger, and they're going to affect fisheries and how we address those and understand what the implications may be, and some of those are going to evolve as we consider what the implications may be, and I think that's what we're trying to do, is understand the system characteristics and understand what may be increasing, in terms of conditions, and then how we respond, in terms of understanding what is the distribution of habitats and what the distributions of species are and how the fisheries may respond or be even able to respond to those changes, and I will send that back to Lora, but I just wanted to touch on that, at least.

MS. CLARKE: No, I think that pretty much sums it up. I will add that we also added into the policy statement just language to sort of address that issue, just proactively working with other management bodies as these species shift, and so we can't control the change in distribution, but you can control that you're actively talking to the Mid-Atlantic Council or the Atlantic States Commission and those sort of things.

MR. BUSH: Thank you. I guess I understood the intent, but I just didn't maybe see it spelled out in some of the other documentation, and I'm going through this again, and, with what you've explained, it's making more sense. Thank you.

MR. BOSTON: Moving down, after the Introduction, and we can certainly back up, but, after the introduction, we started to talk about then the -- Let's go to Section 2 and start at the top there. Looking at the Historical and Current Oceanographic Conditions and Characterizations, there is Atmospheric Drivers and Climatology, and if we can just stick on that Number 2 right now, just anything in there of concern or issues or missing references, et cetera. That's a big chunk. If we get through 2.1 and down to 2.2, we'll talk about Oceanographic Drivers in a second. Does that look okay?

DR. CHERUBIN: Just a quick comment. I just sent that paper from Karnauskas to look at the shift in the ecosystem based on climate changes, and so, in addition to the North Atlantic association, I think you should maybe reference that paper and use some of that work in there. She

also talks about the Atlantic multidecadal oscillation, which is that, every ten years, you have a change in that system that also affects actually the trophic chain in the ocean.

MR. BOSTON: If you will be kind enough to give us that reference and maybe a --

DR. CHERUBIN: I just sent it by email.

MR. BOSTON: Great. Thanks, Laurent. All right. Let's go to 2.2, Oceanographic Drivers. Wilson, did you have something on 2.1?

DR. LANEY: Just to Laurent's point about that AMO, and it's in there, because I just --

MR. BOSTON: Yes, it was.

DR. LANEY: I just looked at it, but I don't know that -- I know there's been a number of papers looking at how the AMO affects recruitment, in particular the east coast estuaries and things like that, and so I may have some of those too that I can provide to you.

MR. BOSTON: Okay. Thanks. I appreciate. We're glad to make those references. Lora just said if you get those to us, we'll put them in there.

MR. PUGLIESE: Just as an intro to the other co-chair of this group was Ruoying He with North Carolina State University, and he does essentially some of the most critical oceanographic modeling efforts in here, and so there was a very specific reason we brought together the biologic plus the oceanographic, to really set the foundation for understanding some of these different things, and so that was really useful, and Ruoying has been a long-term partner that we've had, and he's provided inputs on when we were doing the characterization of say the spawning areas, the spawning special management zones, and we actually got footprints of the oceanographic character of those areas, if you go back into the historic information, and so that's a critical component, and we've understood that, and I think it's going to -- He is also involved directly in the modeling activities that we're advancing on Ecosim and Ecopath, and he has provided, I would assume, core inputs on the oceanographic drivers.

MR. BOSTON: Let's go to that 2.2 section and just take a quick peek through there, Oceanographic Drivers.

MR. PUGLIESE: As you're all reading, one of the other things -- We may be more unique, and the California current group is the same way, but we've identified oceanographic characteristics as essential habitat areas of particular concern, and so, the better we refine our understanding of the Gulf Stream and three dimensions and time, et cetera, we're going to really provide a better understanding of the system, the Charleston Gyre and associated spinoff eddy capabilities and what that has for influence, in terms of understanding how that affects our distribution of say species like gag grouper and larval transport to shelf areas. I think these are all critical connected habitat-related things that are also affected by this.

MR. BOSTON: So anything on 2.2? Okay. So 2.3, Hydrologic Drivers. We had south to north kind of impacts, and we're also looking at that coming east to west. Anything on 2.3? Are we

okay with that? Okay. 2.4, you've got the one paragraph there sort of wrapping, the Lower-Trophic-Level Ecosystem Properties.

We also have -- Roger, I will just mention that, in the modeling group, we have also looked at completely different models as well that weren't biological models, to talk about some of the temperatures, et cetera, and those impacts, and so there is some secondary modeling in the background that we have at least discussed for our modeling group that goes way beyond just the biological models that we're talking about in the Ecopath and Ecosim, and I just wanted to mention that, and so it gets at some of these things as well.

MR. PUGLIESE: Yes, and the implications there is in the Ecospace component of that whole suite of modeling components and the ability then to connect both distributions of habitat and species and as well as models characterizing temperature and currents, et cetera, and they may actually be able to, in the newest iteration, be input and consumed by these newer generations, and that's the intent, and that's why we have those direct collaborations between all these different sides.

MR. BOSTON: That will take us through page 12, just any input through page 12 right now. We will stop right at 3.2. Are we good? Can we get to Sea Level Rise, 3.2? Okay. I figure there will be some comments on this one.

DR. ROSS: I am not sure that I am finding this in here, but nutrient delivery driven by the Gulf Stream meanders is mentioned, and then nutrient delivery from onshore sources is mentioned, but it's not -- I don't see a discussion of which may be more important, and that has gone back and forth in the literature for a number of years, and I think, as far as at least the other shelf and slope were concerned, the Gulf Stream delivery of deepwater nutrients is more important, and so, reading down in these climate change parts, there is speculation about Gulf Stream shifts, which may then shift that upwelling, which would impact those nutrients, and I don't see that in here.

MS. CLARKE: I know we did talk about possible changes in the Gulf Stream. I don't know that that's directly linked in the text to nutrients though.

DR. ROSS: Well, but that would be a large impact, because some of those shifts are topographically driven, as well as wind driven, and, if the Gulf Stream position shifts, then that topography influence may shift, and there may not be any upwelling, or at least that's one possibility, and so it seems like there ought to be some mention of that somewhere as a possible outcome.

MS. CLARKE: Yes, we can easily --

DR. ROSS: Also the importance of the offshore delivery versus the inshore delivery.

MR. PUGLIESE: I think the upwelling was one that was very specifically identified. The question is, if it's specifically identified to the changes in the Gulf Stream as increasing the upwelling events, because I think that was something that has been highlighted a number of places, about how that is actually affecting production on the shelf off of Florida, especially with -- Even maybe influencing species distributions, such as black sea bass movement potentially south, with some of the more recent things, and even fishermen's observations, like Ben Hartig identifying when

those occur sequentially, will actually provide almost a barrier to movement of king mackerel in the region. I think it's there if it's connected directly to the stream as being the source of increase, the change, and --

MS. CLARKE: Yes, and I'm not sure that link is made, but we can --

MR. PUGLIESE: But the specific event, I think, is identified.

MS. CLARKE: Yes, but we can add that link in, if you feel it's important, and if you could send a reference or even a sentence or two.

MR. BOSTON: When you make a great point, just expect that you've got to back it with a reference and a sentence for us, and that's all. We're glad to add it. We're very collaborative here.

DR. ROSS: Just cite me.

MR. BOSTON: Okay.

MR. HOOKER: I guess just one thing on the last sentence in that second-to-last paragraph on page 12, and the rate of sea level rise will be too fast to be offset by stabilizing forces. This is a short section, and it seems to me like you did mention -- It was mentioned up there that it's going to be very different on local scales, and there is a lot of differentiation along the South Atlantic about what areas might be able to accrete and have wetlands actually accrete at a similar rate as the sea level rise, and so I am not totally up on all the literature on that, and so is there agreement around the table that that blanket statement is accurate, that, throughout the South Atlantic, the rate of rise will not be able to be absorbed by the accretion of new wetland at the same time, or is it very differential?

That's why I'm kind of throwing it out there. It's hard on these, when you're making these broad statements along a very large region. I mean, there may be some areas that could be a focus or that -- A lot of the references seem to be in Florida, but there may be some other areas that it's not as much of a threat, and maybe you want to highlight the areas where it is a greater threat than others, if that's the truth, but I am not as familiar with that.

MR. PUGLIESE: I think it's a great segue for some of the discussion we're having coming up, because some of the mechanisms to see some of that may be coming from our collaboration with the Landscape Conservation Cooperative, because some of the downscale models to be able to align what those changes may be, relative to the distribution of marsh, and the key, in so many of the areas, is the hardening rate on the upper ends of the rivers has -- I mean, that has happened, to a degree, where that migration further up may not be able to occur, because of how extensive that is, and that is almost a region-wide issue.

Heck, this came up when we did the habitat plan, even before the last iteration of the Fishery Ecosystem Plan, but I guess my point is that there may be a way to do that in a more regional scope with what we're working with them on the conservation blueprint, to be able to see where maybe the real focus areas are going to be the most significant and where there may be some areas that there is latitude.

What it gets to is the opportunity to look at strategies within that system that may be providing -- Capturing of some of those habitats in the area to allow for say migration into the future, and so I think that is something that is evolving with how we work with them, because the other key aspect is that that's definitely going to happen, because they are tied directly to the Climate Science Centers of the USGS, who are doing all the modeling efforts and collaborating with them, and that's one of the first things that I have been pushing, to try to get some of those types of things, where can look at a watershed level and where those changes, at different rates, may be the most significant in our region.

MR. BOSTON: From the blueprint that he is referring to that is there, the ability for marsh building behind -- As you talk about sea level rise, are we going to be able to develop marsh, and there are some critical places, but, as Roger says, the hardening along the coastline starts to limit that, and so, right now, it appears that it's a net loss and that we won't have that.

You basically have no place for ecosystems like maritime marine. Where are they going to migrate to? There is a road there, and so we have this hardening behind our marshes or along our beaches that really make it very difficult for any transitional stuff to happen. There are other places where that's going to happen, and fine. I just did all these workshops up and down the coast, and so listening to the experts along the coast talk about this.

You know, North Carolina, when you get up into that northeastern portions up there, they have got plenty of way to go up there, and we can see some good habitat migration inland, but that gets problematic in a lot of places along the coast, and so I think, generally speaking, tomorrow, when Rua is on the call, great question to ask him, because that's what they're trying to do along the coast, is be able to provide very specific places that are going to be critical for long-term -- Are we going to be able to have a migration of our ecosystem inland, should you get sea level rise, and, as Roger said, that's going to vary along the coast, but I think, right now, it's a net probably not.

MR. HOOKER: I think that's good. Thank you. I just didn't know if you wanted to capture that in this section, but --

MR. CARTER: While this doesn't happen around our ankles, what about saltwater intrusion, where it moves in? Is that in there? I didn't see that, where it moves into our aquifer and threatens our potable water sources?

MS. CLARKE: I think it's in there briefly, but it doesn't go into a lot of detail on that, but I think it's mentioned.

MR. BOSTON: There is a reference to it in there. We have a little bit. Is that something that you think is important to really highlight, because we certainly can do that.

MR. CARTER: I think that's up to the panel to decide that, but, living where I live in Florida, I can dig a hole three feet in some places and I can hit water.

MR. PUGLIESE: I mean, here, I can put a hose down ten feet and basically hit the Charleston aquifer.

MR. CARTER: That's just a question.

MS. DEATON: I was just going to add that it's not just the groundwater, intrusion groundwater, but up the rivers, and so there is already evidence that it's going to change fish distribution, and it already is, and dredging, dredge channels, has exasperated that and ditched wetlands, where it aids the saltwater intrusion, and there is information for North Carolina on that.

MR. BOSTON: I would be glad to reference that if you can just -- If you know where that is, that would be great to reference. I think that's a real important -- Again, that's an impact that some of our past work -- As people have done to the coastline, it's the same kind of thing. It's going to allow for much greater intrusion into those areas than would have occurred.

MR. GEER: Okay. Let's move on.

MR. BOSTON: Yes. Thanks. Temperature, Precipitation, and Hydrology, 3.3, anything in there? Then we get to the fun stuff in 4. 4.1 is Abundance and Distribution and Impacts.

MR. GEER: I know it's in the Northeast, but you might want to mention John Hare's work.

MS. CLARKE: The vulnerability assessment?

MR. GEER: Yes.

MS. CLARKE: I think that's in there too, further down.

MR. BOSTON: It's in here. I saw it, but we should reference it here though again, and so maybe something in that 4.1.

MR. GEER: You tend to see a shift northward, and his work has shown that.

MS. CLARKE: Okay.

MR. BOSTON: We will reference that in 4.1. 4.2 is Thermal Envelopes, and we can talk about that quick. Are we good? Does that look all right? Okay. Let's go to 4.3, Phenology. This is the fun one. This is back to that shifts as well, Mr. Chairman, that you were talking about. It's that new tarpon fishery in South Carolina.

MR. GEER: As long as I get spiny lobsters in Georgia.

MR. BUSH: I am not sure if there's a particular place for it, and it sort of addresses some general concepts here, phrenology as well as spawning and whatnot, but, for certain species, when the temperature changes, they may or may not move with the temperature, but their biological processes change, such as the flounders. They might shift from a 50/50 spawning ratio, male to female, to a 25/75 shifting in favor of the males, which can have huge impacts on the populations.

MS. CLARKE: That's a good point. We did talk about spawning and reproduction, but I don't think we got into details of sex ratios though.

MR. BOSTON: Do you guys think that we need to get into that, per David's comment, a little bit more, maybe add a --

MR. BUSH: At a minimum, like I say, addressing just the biological process for multiple fisheries can be impacted, such as sex ratios, X, Y, and Z or whatever, and, as far as specific fisheries and specific numbers, it may not be necessary, because those who manage them should already be aware of those possibilities.

MR. BOSTON: So just a couple of broad sentences on that captured in this right here? Okay. Is that all right?

MS. CLARKE: Yes.

MR. BOSTON: Okay. Thank you. How about Spawning, Dispersal, and Connectivity, 4.4?

MR. GEER: Is there something in there, and I haven't read through the whole thing yet, about disconnect with food source, larval food source?

MS. CLARKE: Yes, it does talk about changes in the mismatch found there, yes.

MR. BOSTON: Are we ready for 4.5? I know we're moving fast, and I want to give everybody -- So Trophic Interactions.

MR. BUSH: I will be the first guy that backs up, but I'm just trying to jump into 4.4 there, the Spawning and Dispersal. There is a lot of the species, especially in our area, that require certain temperatures, certain densities, and salinities, for their eggs to be brought back into our estuaries. While it's really addressing the predatory nature of whatever might be feeding on them here, given the right circumstances, they might not ever come back if they're not in the ideal conditions, and I don't know how, again, the biologic aspects might be brought into that, but I think it's something at least that needs a sentence or two, if you want to call it that.

MS. CLARKE: So a sentence about either hastening or slowing current velocities, depending on location, season, and ocean circulation, and so you want us to add some additional information there?

MR. BOSTON: That's that second sentence that starts with "For example" there, David, after "climate".

MR. BUSH: Yes, I see your sentence there, and, granted, that is directional types of things, but, again, if the density of the water is different, the eggs might just drop out. They might not even make it back. It depends, a lot of it, on multiple aspects, densities and temperatures and so on and so forth. Maybe that's good enough, but other factors need to be considered, I guess, as well.

MR. BOSTON: We will look at adding a sentence or two there, David, just to bring those points in. Good. Moving to 4.5. Anything on Trophic Interactions? Then 4.6 is Diseases and Parasites. We talked a little bit about diseases earlier, I recall, and parasites earlier. Then Invasive Species. How about this Age-Structure Truncation? Then Catchability. We're at 4.9.

DR. HAVEL: With the Catchability, would you maybe want to include a potential for more bycatch with that too, since fishermen might not be able to predict as well where the fish are?

MR. BOSTON: Yes, the wrong gear and the wrong time. Good. In that Catchability, we can add a piece on bycatch. Thanks. That's a good catch, so to speak. Then 4.10 and 4.11, Sea Level Rise and Socioeconomic Impacts. Anything in there for big, industry-wide impacts? Then we get down to kind of our Knowledge Gaps and Research Priorities Related to Management Needs.

DR. CHERUBIN: Back on Sea Level Rise, I think there would be a significant effect on estuarine systems, especially like Florida Bay and Biscayne Bay.

MR. BOSTON: The former Everglades?

DR. CHERUBIN: Yes, exactly. I think estuary systems are really vulnerable to sea level rise.

MR. BOSTON: She is capturing that under Sea Level Rise, to just talk about those estuarine systems will be heavily impacted. Okay. Got it. Particularly in Florida.

MR. JONES: There is a reference to a map, but the map is not active on my screen.

MR. BOSTON: Yes, it's not in this, and that's one of the things that -- My apologies, but we will get that in there, but, if you have questions about it --

MR. JONES: No, just to make sure that the full reference --

MR. BOSTON: Just make sure the map is there. Yes, I will. Thanks. There is a map. We will scroll down to -- We're just kind of taking it from there down through. We talked about impacts, and there is a piece here, down on Indicator Selection, and we'll just stop right there, and then we can talk about Indicator Selection in just a second. We asked a lot of the groups to talk about indicators in there. Anything in Research?

MR. PUGLIESE: Other than the fact that I think it gets to that discussion we had earlier about the Gulf Stream. It very specifically talks about the impacts and effecting the upwelling events, et cetera.

MR. BOSTON: Then there is an Implications for Management section there. There is Links to Management Decisions, under 6, and take a peek at that. It's at the bottom of page 26. This is back to, David, your point about the -- It's the bottom paragraph here, and this movement of species is really going to have a lot of management implications jurisdictionally. That is your resiliency, somewhat, in the system itself of just being prepared for the handoff moving north.

MR. BUSH: Brett, I think you got just ahead of me there. I was reading up a couple of paragraphs before you started 6, and I kept trying to figure out where it would be addressed at, but the paragraph that starts with "Overall", about two paragraphs above where 6 starts. Adaptive decisions processes in the South Atlantic that can respond to climate should evolve through increased dialogue between scientists and managers and through studies -- It might be important to have dialogue with the folks that are going to deal with the results of those management decisions.

MR. BOSTON: Yes, I think you're right, and we have left out a -- The impacted groups out to be a -- So it says, "scientists and managers and impacted stakeholders".

MR. PUGLIESE: As a matter of a fact, I've been involved in a couple of different iterations of proposals to develop some of those types of tools, and those specifically had engaged industry in the process of doing that. Now, whether they get funded or not, we'll see, down the road, but those are in process and very specifically engaged.

MR. BOSTON: The modeling team definitely has discussed making sure that there's an input stream for that as well.

MR. BUSH: Certainly, and thank you, and the reason why, when you made the comment you did about the moving fisheries -- Things are going to move, and we get that, and we have -- North Carolina has a big issue. We have a fishery that we have fished on for years, and, if it does and if is in fact moving, eventually something may change, but it really should be up to those folks that it's going to be changing from and to, and they should very heavily be involved in how that works and not just the folks up here in the vacuum telling them how it's going to work.

MR. BOSTON: Gotcha. That's noted, David. Anything in this Section 6? There are recommendations there, and so we'll look at Brian to make sure that they're clear and compelling. We didn't bullet them, Brian, and so we may need a quick bullet list. He made a point earlier, on Food Webs, that, in the recommendations, it's just nice if you have that bullet list, like here is the three things, just bulleted, and then cover them in the comments, in the recommendations section.

Then the last piece is -- Mr. Chairman, we're almost there. 7 is Literature Cited. Anything big that we missed there? It's a big, new section, and I know it's a lot of new issues that were developed, but this team worked really hard to come up with new and -- How do you cover this specifically to the fishery and try to make it relevant to those habitats and elements that are going to be impacting the council's work, just keeping it on target? Are we good?

MR. GEER: We're running late, and so, if you want to read through these tonight or send us some comments. If you have any additional comments or you find a glaring error, let us know. I know we skimmed over, and just let us know and we will get that updated.

MR. BOSTON: Thank you, Lora. Good job. Your team did a fabulous job.

MR. GEER: Thanks, Lora. Yes, it looks great. Did you want to go over like the quick preempt of what we're going to do tomorrow?

MR. PUGLIESE: Yes, real quick. I think what we're going to do is have Brett touch on the scope of the Landscape Conservation Cooperative Blueprint, so that we are ready for the workshop in the morning. We specifically requested and they held an entire suite of full-day workshops with the group here. I thought it would be excellent to have the opportunity to have one tailored to the advisory panel, so that we could have input on the marine component of the blueprint as it moves forward, and so we are going to work with Rua Mordecai, the Science Director with the Landscape Conservation Cooperative. He will be joining us remotely, and Brett and also Tom Okey, who we are directly with on the Ecopath/Ecosim/Ecospace modeling efforts, will provide some input on

how that is evolving too tomorrow. We wanted to just at least open up the issue, so that people understand what it is when go into it, and we can kind of dive feet first into the workshop in the morning.

MR. BOSTON: The blueprint is on southatlanticlcc.org, and they have a blueprint, and let's talk about what that is. The LCC has broken the nation into twenty-six ecoregions. This region takes us from the southern third of Virginia down to pretty much just below Jacksonville in Florida. It includes the ACF, the Apalachicola/Chattahoochee/Flint River system over into Alabama, and you can see that chunk there on the screen big, but what they did is they've put together layers upon layers upon layers upon layers of existing GIS data, but they didn't just layer it.

The way the process works is pretty interesting. You basically go through and you take that ecosystem that's there and you throw the indicators that have been selected by the scientific community against it on what is the most important thing, and then you go in and you find every pixel in the Southeast, and you find the pixel that is the least impacted, the one you can afford to throw away.

You grab these pixels, and they are basically HUC8 to HUC12 kind of level, and they're just throwing away pixels until you get down to the top 10 percent, the most important, ecosystem in the Southeast, based on a level of indicators and based on a level of data that is gone through and gone through and gone through, and so we've got lots and lots of data layers here.

What I wanted to show you guys is a quick look at the simple viewer, and, just by way of introduction, so that, tomorrow, when Rua is on the call, you guys will be able to see, and so I will go into about where we are now. Here we are in Charleston, and we can pick an area and click on it, and, for that area, we can look at the priorities within that area. We can look at the indicators that have been selected for that area. In this case, we have a maritime, beach dune, pine prairie, estuarine, and maritime forest area.

It tells you the percentages for any area that I pick. I can click on an upland area. This map does include sea level rise. This map does include saltwater intrusion, the salinity rises. All of those things are built in here, like temperature change and all of that. That is in this model, and you can pick any watershed or any -- We're at, right now, resolutions are we're at the 200-meter resolution, and I believe, by the fall, we'll be at somewhere like sixty-meter resolution on this, in terms of being able to apply an indicator to that kind of resolution on anywhere in the Southeast on the map.

The ocean, and I'm going to back out here real quickly, the South Atlantic has mapped out to 200 DMZ, and so the habitat work that we're doing, the ecosystem modeling, Ecosim modeling that we're doing, will all be integrated with the riverine systems and the estuarine indicators that we have on the terrestrial side of this model, and so what we're looking for is a comprehensive systems model that works from inland to 200 miles offshore.

That has been a real breakthrough. This is the only of the twenty-six LCCs that is doing that, and we're also working with the Peninsular Florida LCC, so that we can go along the east coast of Florida, all the way to Key West, to try to have that same kind of level of integration. We will have a model that will include from terrestrial to 200 DMZ, and so it's not just looking at these things in isolation, but it's making that connectivity.

As part of that, what we do need now is to start thinking about indicators that will be in the seascape of this model, and so we've got the terrestrial indicators on the landscape, but we need the seascape indicators. Earlier, the question was what would an indicator kind of look like, and, well, I don't know, and so I'm asking you guys that. Really, we need to start selecting and thinking about those indicators.

Next week, the modeling group is meeting in St. Pete, and they will be really taking a first cut at potential indicators that would serve us well as sort of that indication that there's change in the system and we need to pay attention. Kind of a "warning, Will Robinson". We're looking at development of those indicators. That is our next step, both in terms of the modeling side of this and then in integrating those with this large-scale model that we have here.

I just point this out. This is southatlanticlcc.org. You can go on and look at the simple viewer, and there is also the actual deep model that's there that is not the simple viewer, and you can go layer after layer. You can see every layer that is included in the model. I can tell you that the model itself, it has corridors automatically built in. There's a couple of different tools that Rua will talk about tomorrow in detail, but I can tell you that the model, from when they hit "run" to when it designates the priority habitats, is a month to run, and supercomputing does not speed it up, and so we've got a really complex model. That's how many data layers are in this model, and you can tease them apart, but, for any area on the map, you can select that area and you can see the indicators that are there.

Rua will talk about indicators tomorrow, but, basically, will give you the three rules for an indicator that they use. One is that it is an indicator that is region-wide. That is something is practical for us to get in use, and we are perfectly willing to use other people's indicators, whatever those are. It doesn't matter where they come from.

Number two is that the indicator indicates something other than itself. If we're talking about coastal condition, we're using sea turtle nesting, and you think, oh, that will be great. That will tell us a lot about beaches, and that will tell us a lot about the coastal habitat. Sea turtles will tell you about where sea turtles are, period, and so it's an indicator that indicates itself, but nothing else. It's not helping you with what could be around there.

Then the third component is the socioeconomic component of an indicator, and so they've got some rules for indication. They are using, and Rua will talk about this a little bit tomorrow, but they're using a -- The model for how they're developing this is very much based on a software model that talks about winning fast or losing fast, and so we pick an indicator and we run with it. We prove it out or we throw it away and we build a better one. If it works, great. If it doesn't, we throw it out, and so it's always modifying the indicators. Then is peer review and then actual onsite sampling to make sure that that indicator actually works.

We're picking a few indicators, and we're hoping that they will be broad indicators that we have data on, that we're going to be getting from SEAMAP, et cetera, wherever these indicators are coming from, and that it's region-wide and that it's easy. It's stuff we already have, and that it actually indicates something that is useful, in terms of understanding what is happening out there in our offshore habitat area, and so it's going to be a challenge, but that is our next steps. We're right on that cusp.

MR. CARTER: Very quickly, what does the low to high mean, the zero to 1? Is that like bad to good or -- Right there. What does that mean, the low to high? What is that?

MR. BOSTON: It's talking about our priorities, and so, if you look over on the blueprint, the colors there, and Rua will go into a lot more detail on this tomorrow, Mark, but it's telling you, of the section that I clicked on, how important is that as a priority, and it wasn't very important. It's really indicating that, if you look within this -- This place is not, and, in this place, these things are in pretty good shape and these things are in terrible shape.

MR. PUGLIESE: Plus, I think kind of we should have -- At the top of this, the idea of the overall effort is to look at where conservation across multiple levels, and so you're looking at everything that is looking at conservation for upland wildlife to birds to fish to water and trying to really do that at a big scale across all of these things, with connectivity between systems, and so input in the background are a lot of our habitat designations on the offshore areas, on distribution of --

MR. CARTER: It's a web.

MR. PUGLIESE: Yes, but, I mean, this is the first time, at that type of level, with that many different types of connections, that you really can crosswalk between everything, and this is -- Like Brett said, this is the only place in the region where we have tried to begin to advance that, and so it goes even beyond where we've had designations and conservation efforts to look at even like corridor building, from inshore to offshore, and all types of other opportunities.

The modeling effort, when he's talking about the model, this is the footprint for the blueprint modeling capability, and the ecosystem modeling will inform this even further in building that whole offshore component of this that connects to the inshore and nearshore model capabilities, because we're aligning the different experts with both the biological components of it, with the oceanographic components, and then even the individuals that are looking at characterizing the bay and sound and how you build the connectivity of those inshore estuarine components with the system.

MR. BOSTON: If we go to like Charleston, really quickly, and I will pick some areas here, but you can see that Charleston is so hardened that you're not going to see any high-priority, long-term habitat. It's just not going to be prioritized, in terms of essential long-term habitat, but, if we went upstream in here, and you pick an area. I am just going to show you this, but it tells you what indicators are in there. It tells you the existing makeup of the land cover right now, and it also tells you what partners are already in that area working, so you would know who to partner with on that, and it gives you an ownership of what is federal and private and state and/or in some kind of conservation easement, and so it tells us a lot about the terrestrial side.

We have yet to fill in at that kind of level, because of just our data levels. We have yet to fill in that kind of level on the ocean side, but we're getting there. It's just over time, and so I wanted to introduce you to that, just by way of saying, tomorrow, when Rua comes in, it won't be the first time that you've kind of at least started thinking about, oh my gosh, what are we looking at here.

AP MEMBER: I guess that's my question. What are we doing tomorrow?

MR. BOSTON: In the morning, we're going to do two things. We're actually going to do a workshop that we've just finished doing six of them around the Southeast to improve this model. What we'll be focused on for you guys tomorrow will be giving us input along the coastal region, in terms of where we think the model -- Rua is going to show you a different version of this model, and he's going to ask you where you think the model is overpredicting and underpredicting. Are there some specific threats that you see in some areas that you can point out to us, and he will show you that, and he will ask those questions, and so you'll be seeing an interactive model tomorrow.

It will be Version 2.2, and not this version, but it will be a new version, and he's going to ask you where you see threats and where is the model overpredicting and underpredicting, based on your expertise along the coastline, and so we'll have a chance to look at that.

Then we will get into a discussion about indicators, and you will get a chance to talk with Tom Okey, who will be there, and he will talk a little bit about the modeling work, and that will kind of feed our conversations for next week, because all of us that will be on that call, Tom and Rua, et cetera, we're all together next week, down in Florida, and we can pick up on the indicator discussion. We will get some input into the model, in terms of improvement, from a coastal standpoint. Your expertise on what's going on off the coast, with wind, et cetera, that's good stuff that we can feed into the model tomorrow, and so we're going to be gathering that expertise.

We did this all over the Southeast, and, essentially, we had a big map in the room, and we sat there with markers and drew circles and said here a threat that I know about. There is phosphate coming into this area, and we need to think about that. I think you're predicting priorities here in the Big Bend, and we have just bought 500,000 acres of land, and so it's going to be that kind of discussion along the coast. It will be a great -- I mean, it's a workshop that Roger custom ordered for this group.

MR. GEER: Yes, and I think one of the key things too is that moving into the -- We have tried to input as much as we can. There are other things that have been integrated in the offshore areas, such as the high-level marine mammal modeling efforts that have been done, things that are already fed into here. As the actual new generation of ecosystem modeling compiles all the other habitat distribution information and species distribution, a lot of those things are going to also inform this further.

This was an opportunity to kind of be one step in the middle of this, to set the stage for kind of the bigger picture and have that opportunity to look at that, in advance of even getting that next generation of say the modeling efforts that are going to compile even more of the detailed information that is going to come from fishery-independent surveys and from habitat distribution, et cetera.

MR. BOSTON: In Florida, those of you from Florida, you have had that CLIP 2060 model, and it became a baseline for a lot of the Forever Florida Lands that were purchased over the years with that funding, and so that model is being integrated into this overall model. In fact, we're actually building a full Southeast model that will go all the way out to Texas and Oklahoma, to kind of integrate including the Gulf side, and so that's underway now, too.

MR. GEER: All right. Great. So that's what we're doing in the morning. Now you have a quick briefing on what we'll be doing, and so, if you're all eager, go ahead and look at this tonight and

play around with it, if you want. Tomorrow morning, we're going to meet bright and early at 9:00 a.m., and we will start with this. We will be out of here by four o'clock tomorrow, because I've got to be on the road and be somewhere else by 7:00. We've got open shrimp season in Georgia, and so I have to do my real job tomorrow night. One of the meetings is tomorrow night. With that said, the meeting is adjourned for tonight, and we will see everybody in the morning.

(Whereupon, the meeting recessed on May 16, 2017.)

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MAY 17, 2017

WEDNESDAY MORNING SESSION

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The Habitat Protection and Ecosystem-Based Management Advisory Panel of the South Atlantic Fishery Management Council reconvened in the Town and Country Inn, Charleston, South Carolina, May 17, 2017, and was called to order at 9:00 o'clock a.m. by Chairman Pat Geer.

MR. GEER: Good morning. It's day two of the Habitat AP meeting. My name is Pat Geer, and I'm the Chairman of the committee. I just want to introduce some folks that are here today, or might have come in late yesterday, that we didn't get a chance to introduce who are at the table. We have Mel Bell, who is a council member from South Carolina and my counterpart. He is the Chief of Marine Fisheries in South Carolina. Andrew isn't here yet, but when he comes in -- Andrew Brumfield will be a giving a talk today, this afternoon, on sargassum and the work he's done on his thesis as well.

The first thing this morning is we are pleased to have Rua Mordecai from the South Atlantic Landscape Conservation Cooperative. He's going to be talking about the blueprint, and he's going to go through his presentation and ask us what we think and if there's anything we can do to help improve it, and so Rua is up in Raleigh. Through the technology that we hope doesn't fail on us, Rua, you have the floor.

DR. MORDECAI: Thanks, Pat. Sorry I couldn't make it there in person. It's always more fun to do that. Basically, the plan today is I'm going to give you a little bit of an intro to the South Atlantic Conservation blueprint, particularly some focuses on connections with the council and some marine conservation, and then we're going to have a little bit of a discussion and review of some of the spatial priorities coming out of the blueprint, which includes the sort of inland freshwater down to the ocean, and then also a little bit about the implementation strategy of how we're actually going to use that information to try to improve the ecosystems of the South Atlantic. I will probably punt over to Brett to lead some conversations and capture some stuff when we switch over to discussion mode.

Then we'll take a little bit of a break in the middle of the day, and then we're going to -- Me and Tom Okey are going to tag-team some updates on the South Atlantic ecosystem model and the sort of coupled Ecopath/Ecosim/Ecospace model, and so Tom is going to talk a little bit about the Ecopath side of things and Ecosim and functional groups, and then I'm going to talk a little bit

about some of the spatial aspects and progress so far, and so that is the plan for this morning. Any quick questions before I get started or any logistics that I need to worry about?

MR. BOSTON: No logistics that I know of, Rua.

DR. MORDECAI: All right. Awesome. I am going to get cranking and give you all a quick introduction to the cooperative itself, and so we're the South Atlantic Landscape Conservation Cooperative, LCC, and we're part of this larger network of cooperatives that cover all of the U.S. and parts of Canada, Mexico, the Caribbean, and the Pacific Islands. A number of the LCCs, including the South Atlantic and Caribbean, include the full marine environment. In fact, some go into international waters, like out in the Pacific Islands, and big thanks to a lot of folks on the Habitat Committee and Roger and others for providing the supports for the cooperative to fully include the marine region as well.

We're part of this larger network of cooperatives, and, also, we work really closely with a number of the other ecosystem partnerships that are happening throughout the cooperative to improve the systems of this region.

The governance, at basically the highest, highest level, we've got a steering committee of folks making some of the strategic decisions. The fishery management council has a seat at the steering committee, as well as a number of other non-profit, federal, and state organizations, but most of what happens, and a lot of the direction and decision-making and guidance, really kind of comes from the ground-up of folks that want to be part of moving things forward and part of making decisions about where the cooperative goes.

I know some folks in the room have been involved in some other, I believe the indicators and some of these other workshops, and so we really try, as much as possible -- Anyone that wants to help steer where this cooperative goes and what it does are really kind of what is shaping the direction.

What does your cooperative do in the South Atlantic? Our mission is now to facilitate conservation actions that sustain natural and cultural resources, guided by a shared adaptive blueprint. This is the last version. We're working on an update right now that we'll be looking at, but that's the sort of mission that actually facilitates some of those actions guided by a shared blueprint, and that blueprint is this living spatial plan prioritizing opportunities for shared conservation actions in the face of future change, and so let's roll up all of these changes in urban growth and climate change and ocean acidification and think about where are these places for shared conservation action in the face of future change.

That is the blueprint. It's been out for a few years, and so now we're wanting to give you a little bit of flavor of broad ways the blueprint is being used right now. That will be part of the discussion in a little bit, and so there's about three broad types of ways that the blueprint is being used. The first one is kind of to amplify the impact of existing efforts to bring in this larger landscape perspective to local actions.

In particular, a lot of it has been now to try to compete for conservation dollars and bring in new conservation funding to the region that wouldn't normally be coming here and trying to grow that conservation pie by making a more kind of compelling, data-driven argument for funds, and so one example we have, kind of one of our first examples of this, is related to prescribed fire funding,

and so most of the fire funding tends to go pretty much out west, and we had an opportunity, back a couple of years ago, basically to try to bring some money to habitat management in the South Atlantic, and so thanks to a lot of the stuff we'll talk about, the blueprint and the indicators and the state of the South Atlantic, according to people up nationally, was the big reason why we ended up getting pretty much any funds in the eastern U.S. for habitat management.

Now we're up to almost $2 million so far over the first two years, and we expect to continue getting similar -- About a $1 million a year in funds into the South Atlantic that wouldn't necessarily have been coming here for conservation, hopefully for the next eight-plus years or so, and so that's just sort of one example of using the power of the partnerships and some of the data to try to bring some funds that wouldn't normally be here, and I think there is some good opportunity to do some brainstorming, even out in the marine environment and coastal conservation resources, where we might be able to try to do something similar when you put some of these proposals in a bigger context. That is just kind of amplifying the impact of existing efforts. We're doing great work, and how do we elevate that?

Another one is anticipating and planning for change, and so major disasters like Hurricane Sandy or the Gulf of Mexico oil spill, those kinds of things, and here is an example. On the right, there is a prioritization that was done for the National Fish and Wildlife Foundation. That blueprint was the backbone of their prioritization, looking at priority HUCs in the face of major disasters, and so where do we need to focus? Where do we need to jump on quickly if there is another disaster out in the South Atlantic Region? It's already starting to be used by some different organizations in that way.

Also, a lot of adoption or interest in land protection planning, especially in some coastal areas. We've kind of got active users, blueprint users, we are supporting for multiple states now, non-profits and multiple federal agencies, trying to incorporate the blueprint into some of their land protection planning as well.

The last piece is being adaptive to change through conservation action, and so now working in a different place than you necessarily would be working, finding these new places, best places, to work and partner collaboratively, and so here is an example related to fish passage. This is one of the biologists that typically works in a fairly pristine area that ended up working a little bit closer down into the Piedmont and helped accelerate some fish passage projects down near Little River and Densons Creek, up in Troy, North Carolina.

He kind of looked at the blueprint and aligned a few other data layers and other prioritizations to say, wow, a lot of stuff is lining up around this place that normally wouldn't work, but it looks like there is some great opportunities, and so his involvement helped them move from just one kind of dam removal to a more system-wide approach and pulling out four different dams in that particular region, and so little -- Kind of larger-scale pieces, and also this bigger system level solution question, and I think this fits into some of the discussions that Roger and a bunch of folks involved in the council have kind of had about bringing in the impacts of some of these inland conservation actions, your instream flow and your habitat protection and your management actions, on the marine ecosystems and trying to incorporate that in things like landscape planning and thinking about some of these solutions at a systems level and using those to improve the ecosystems.

That is an example, and we've got a whole bunch of them right now. Here is a quick graph showing blueprint use by version, and so we've been releasing one about every year. The first version came out in 2014, and so the blue is showing uses that are done, kind of like the example that I was just giving you a few of, and the red is in progress. We are still not done with Version 2.1, which came out in 2016. We're in the middle of updating it, and so there's a lot of stuff in the works that you can see in that red column. I think we're probably up to about thirty now different folks that are working on using the blueprint in different ways that we're supporting.

It's kind of increasing, and it's increasing over time, as the blueprint gets better and better, and it's better in some areas than others, but a lot of this is just due to some folks in the room that have been involved in the process and have helped steer it to fixing the most important things and spending the time on what is most valuable for conservation in this region.

That is use so far by version, and now I'm just going to go quickly into the steps in the blueprint, these different pieces, but, because -- Since we're in a group, I'm going to pause a few times just for some questions as we're going, and so any questions so far, before I go into more of the details about how it comes together?

MR. GEER: Any questions for Rua?

DR. LANEY: Just real quickly, Roger had indicated, when we were talking yesterday, I think, about the fact that you all will be working with the Peninsular Florida LCC to take a look at the ocean and make things seamless with regard to that, and so do you want to just say a word about that?

DR. MORDECAI: Yes, and thanks. I was going to mention that a little later, but that works. I can mention that now as well. Basically, the South Atlantic, we are only going a little bit south of Jacksonville, but we already in fact have met with some of the staff in person, who came up to the Charleston blueprint meeting. Sarah and a few of us were chatting, and, basically, we're working with our equivalent cooperative in peninsular Florida so we can come up with the seamless kind of blueprint prioritization that runs all the way throughout the full council area and then wraps back around the Gulf, too.

Yes, we're working on combining this seamlessly, and so some of the stuff I'm going to show is not going to go all the way down, and I know we've got someone from Key West and some of those places, and some of the stuff in the early part of this, in the blueprint that I'm going to show, doesn't go all the way down there, but, in this later talk, the Ecospace and Ecopath model is the full council region, and so it goes all the way down into peninsular Florida, and so we're basically working on seaming up the data layers.

They're using some of the stuff that we've already developed in the South Atlantic, and then we're folding in some of the information from Florida in there as well. Yes, the intent is something that is seamless that can cover the full council area and then some, and so excellent question.

MR. GEER: Any other questions for Rua? Seeing none, okay, Rua.

DR. MORDECAI: All right. I will keep rolling. Three big steps in the blueprint are indicators, kind of some shared measures of success. Then the state of the South Atlantic and what are they

telling us about the ecosystems? Then the blueprint itself. How do we get it in the condition we want these ecosystems to be?

The first one is our ecosystem indicators. They revolve around two things, the integrity of the natural resources and then the integrity of the cultural resources, and so, on the natural resource side, it's about sort of the processes, the critters, the functions of the ecosystems themselves. Sometimes they're species and sometimes they're habitat features or sometimes they're processes, and then, on the cultural resource side, it's really about how people in history fit into the landscape, and so we have some components of things like urban open space and these sort of low urban historic areas, where you can experience a sort of historic context of some places. That is more about the people and actually starting to bleed into some of the recreation opportunities as well that we're trying to bring into the cultural resource components.

We have those indicators. They're around sort of broad ecosystem types, and, actually, I was going to show you real quick, just to give you a sense of where you can find some of these information, and normally we would have handouts, but we're doing this virtually, and so this is the South Atlantic Conservation Planning Atlas, which I think Brett already sent a link out to, but, if you want to view any of the individual layers, here are the indicators, so you can see the different ecosystems, estuarine, beaches and dunes, marine.

For the marine ecosystem right now, that's one of the ones we're working on the hardest to improve some of the indicators, and so, right now, we have them on marine birds, marine mammals, and hard bottom conditions, indicators right now in the marine environment, and we're working on some more. For any of these things, pretty much for all the different layers, we try to make sure that you can dive in deep and keep going and download the information. Up here, we've got all the mapping steps, where all the data come from, known issues, where things are underpredicting, and those kinds of things, and so I just wanted to step out to a little level of detail in the indicators right now for the marine environment. It's marine birds, marine mammals, and potential hard bottom conditions.

Those are the indicators we have, and, for the indicators, we kind of have three major types of criteria for selecting them. The first one is ecological. They have to actually indicate other things. We have to be able to -- These are all testable things, so we can decide whether they are going to work, and so we have to make sure they're actually indicating other key components of the ecosystem.

Then we have these practical criteria, which is we have to be able to monitor and model them across the entire region, and so that's the entire council area, or, for the South Atlantic, the entire South Atlantic, going 200 miles out to the EEZ, and so those are both hardline indicators. All indicators have to actually function as indicators, and we have to be able to model them and monitor them across the whole area, and so this, of course, makes it a little more tricky, because there's a lot of stuff that we have missing data on or we have amazing stuff for two states, but we don't have the equivalent across states, but, if we want to prioritize across those areas, we need to be able to compare apples to apples.

Then the last one, which is not necessarily an all indicators have to, but more of kind of bonus points, is the social criteria and how well they resonate with private land and water managers and how well it resonates with the American public and connects to economic values, and so those are

kind of bonus points. All things being equal, you want to pick some indicators that resonate with people, and so those are the criteria.

One question we get a lot relates to indicator testing, because we do -- Sometimes they end up like models or remote-sensing pieces, and so we do test these different indicators to make sure that they are indicating other things, based on sampling data. Here is an example of our riparian buffers indicator, as we were improving it, and we tested it with the EPA rivers and streams dataset, and so point-level sampling of stream invertebrates, and we used that to make sure the riparian buffer is actually capturing some of the components, the key components, the water quality.

Here is another example, and I just updated this one based on the last draft of the blueprint. We don't have good sea turtle data for the entire region, but here is an example, and so the green is showing kind of the highest, the top 30 percent, density of spring sea turtle sightings per unit effort, and it's overlaid on this latest version of the blueprint, and they overlay pretty much perfectly for a lot of those blocks, and so the priority areas in the blueprint are capturing these high densities of sea turtle sightings even if we don't include a sea turtle layer directly. Those empty squares are where they actually had some kind of surveys, and so, as you all know, the farther you get offshore, the more holes you have in sighting data, and so that's another example of testing the indicators themselves. Next is what are those indicators telling us about the ecosystems, but, before I go on, I will stop again, if anyone has got any burning questions about the indicators.

MS. DEATON: I was just curious how -- You said you have hard bottom condition as an indicator, and how do you -- What data are you using to determine hard bottom condition?

DR. MORDECAI: Right now, it's not the best way in the world. Basically, it's we're looking at the stressors. Basically, there is kind of three classes. There is the ones that are heavily exposed to stressors, and so, if you're right at or near major shipping ports and shipping lanes, it's sedimentation risk. You get lower, and, if you have some kind of formal protection, and that either means you are getting to be in better condition or are likely to be in better condition, then you get a higher rating, but, in general, in practice, it's fairly rough on the hard bottom condition piece, if that answer the question.

MS. DEATON: Yes, that answered it. Thank you.

MR. WILBER: Rua, I want to follow up on Anne's question. A while back, when you were proposing just to use the amount of hard bottom as an ecological indicator, there was a lot of pushback from your working group that the amount of hard bottom really wasn't going to change, and so it didn't really have much of a power to indicate anything. Now that you have kind of morphed that into hard bottom condition, is that really going to change enough, based upon the data streams that are available, that it really will indicate something?

DR. MORDECAI: I think it will once we can get a little more nuanced in some of the condition pieces. I think, right now, and you will see when we start talking about some of the drivers, I think, in the Ecopath and Ecospace component, that that piece, I think, will -- That will help get us some kind of change. I think the way it's cast in the models right now, it is not quite living up to where it could be, but I think that will eventually get us to something that we can actually change, but it's going to take a few more improvements in some of the inputs, but I think starting

off from -- As you mentioned, Pace, that was a big reason why we, instead of just said hard bottom, period, why we tried to do a first cut at condition, so things could actually go up or go down.

Really, we had hard bottom condition, and, ideally, we would also be capturing impairments in other substrates too, and, now that we're getting some better data on that, I think there is some good opportunities for going beyond just the sort of hard bottom components, but, yes, it's a good point, and I think it's only realizing probably 5 percent of what it could into the future.

MR. GEER: Any other questions? Okay. Moving on.

DR. MORDECAI: Okay. State of the South Atlantic, and, actually, to your point, Pace, we're going to be doing a new update of the State of the South Atlantic next year, and so that will be a good opportunity for improving some of those and seeing how well some of the conditions are working.

State of the South Atlantic, what are the indicators telling us about the system, and this is where we're actually scoring these different sub-regions of the cooperative. It's completely data driven and based on the indicators themselves, and so our last one was 2015. I mentioned that we're going to be doing another one, releasing another one, next year.

MR. BOSTON: Rua, just so you know, your slide is completely bleeding out on the screen. We just see the chart basically, and so I'm just letting you know that. We're going to try and adjust it, but none of the text is showing up or any of the little charts. I guess we can see two of the little tiny bars, but we have no perspective besides the sea, and so I'm just telling you that.

DR. MORDECAI: That is interesting. Well, we'll do what we can do.

MR. BOSTON: We're going to try the lights. Give us one second, Rua, and we'll see if the lights will help it. There we go. That's helping a lot. Go ahead, Rua. Sorry about that.

DR. MORDECAI: Basically, what this is doing is it's scoring the different regions and then scoring each of the indicators, based on sort of thresholds and percent in good condition, and so it goes back to the sort of state of -- This actually ends up being something that we end up using a lot in trying to make proposals more competitive, using them to line up coastal wetlands grants and land/water conservation funds and other things. It's sort of here is the condition of the ecosystem, and, in that prescribed fire example that I had, one of the big things that helped sell it was that ability to predict that, okay, if we do these actions, here is -- We think we can increase the grade of this place by this much, and so they were just tickled by that, and that has helped quite a lot.

Basically, we've got our kind of conceptual model of the system and some scores for each of the indicators. Then, at the top right, we basically sort of have these cellphone bars to represent confidence. It's trying, as much as possible, in every different level, to be very explicit that, yes, these things aren't perfect and they all have their issues, and so, with the State of the South Atlantic, we have our mostly sort of qualitative confidence bars in how close we think the score really is, based on the information we have, but also, in all the different layers, indicators in the blueprint, we try to document the known issues of each of the indicators and keep that fairly transparent, and so it's like there are a lot of issues here and here's what they are.

That's the State of the South Atlantic, and then there is the conservation blueprint itself, and so these are the latest priorities for the update. We're actually going to be working on some improvements based on the workshops we just came from, but here is what the latest priorities look like. The differences you will see, like if Brett was showing you the simple viewer, which has the older version, there is a lot of refinement in the marine environment, thanks to the new marine bird indicator. That has got a little finer resolution, and it has fixed some stuff off the coast of Georgia, which is important for sea turtles and right whales and some other components there.

This is that sort of latest version of the South Atlantic blueprint. Also, as Wilson mentioned, we're working to extend this all the way down, coordinating with Peninsular Florida, which is the cooperative just south of us, so we can go all the way around Florida as well.

How does this come together? Basically, we have a series of different ecosystems, and each of them has their own indicators associated with them, and so marine and estuarine and those kinds of pieces, and then the first big step we do is we basically try to identify what are the key priority areas to maintain ecosystem integrity across these different indicators within the ecosystem, and so, at the highest level, what we do is we are combining those indicator layers to get to priority places within each ecosystem. Then we put them all together and roll them up with some connectivity and then we get to our shared actions, and so that's the very simple version.

Of course, it's a little more nuanced than that, and so here is one step-down in how we put this information together, and so here's how we combine those layers, because the conservation planning a few decades ago, the best, most amazing, fanciest stuff, was basically kind of hotspot analysis, where you compile these different layers and then you stack them up and you said, all right, we've got seven over here and we've got two over here that overlap and, all right, let's put our effort over here where we've got seven things overlapping.

That was the state-of-the-art, but things have changed quite a bit, and it's a little bit more nuanced approach to conservation planning than just kind of looking for hotspots and saying that those are our priorities, and so zonation and the way that we combine layers is part of that next generation of conservation planning that is a little bit more nuanced in how you think about things. Then it's also -- The great thing about zonation, and the reason we picked it, is it is extensively used not just inland planning and urban planning, but also in marine conservation planning as well.

The cool thing about zonation is, basically, its objective here is to conserve high-quality representations of all the indicators, and so even if some things are unique and aren't overlapping with other indicators. It wants to make sure it gives you the sort of -- It sort of preserves the high-quality representation of everything.

What it's doing is it is iteratively removing pixels that will do the least harm to the full set of the indicators, and so, essentially, it goes in and says, all right, I've got this -- Let's look across the entire South Atlantic marine environment, and it's going to say, all right, what is one pixel out of here that I can remove that will do the least harm to the full set of indicators, and it's going to pull that one out, and then it's going to keep going and going and going and going and going.

Then, the very last pixel it's holding onto, the very last pixel, is basically your highest priority, because you just can't get that anywhere else. There is so many features that are so important that

it's a lynchpin in the system. Then that very first pixel you threw out, the one that did the least harm, that's your lowest priority, and so that's how zonation works, and the algorithms we're using in it -- The cool thing about it is that it functions based upon four pretty straightforward rules. They are not too crazy and complicated.

How they work, in practice, it spatially takes a lot of computation. It takes us like more than a month to run our models, but, in practice, the rules are not hard, and so here is the four rules. The first thing is, if all else is equal, remove pixels from layers that are closer to the edge.

Let's say you've got to give up something. Here you are, and you're looking across the area, and that blue is your sort of indicator that you care about. It's not in any of the white ones, and you've got to pull a pixel out, and so you're going to remove that yellow pixel, because it's closer to the edge. Basic landscape ecology is, if you've got a really major, important hotspot, say like some big, amazing marine protected area, if you're going to give up on something, you're not going to want to have huge impacts go right in the center of that area, and so closer to the edge.

The next one is, okay, all else being equal, you're going to want to remove a pixel from something that has lower value, and so each of these indicators -- I mentioned riparian buffers, and that's continuous. You have really good condition and you have really poor condition, and so, all else being equal, you're going to want to remove a pixel from something that has the lower value, and so the darker color is the higher value and the lighter is lower, and yellow is -- We're going to remove something from the lower value. There you go. That's two so far.

Now things get fun. You've got to do tradeoffs across indicators, and so let's say they're not overlapping. All else being equal, now I've got two indicators, and you're going to pull from the one that has a larger distribution. In this case, I will give you -- Let's say we're thinking about something like a kind of a widely-distributed species, we're thinking about like bottlenose dolphin, as a simple example, or we'll go for the marine mammal indicators there.

You've got the marine mammal index and then you've got your hard bottom condition, and there's not really a ton of hard bottom out there, and there's a lot more habitat out for a lot of these marine mammals, and so, if all else is equal, you're going to pull something out of the marine mammal indicator before you're going to pull something out of your hard bottom indicator, because there just isn't that much, and so, all else being equal, the larger distributions.

Then the final rule is less loss, and so let's say you've really been pulling a lot of pixels out of -- You're kind of hammering your marine mammal index now, and now they're starting to get closer in size. All else being equal, now you're going to start taking things out of the hard bottom condition, and so that's basically how it works on the four rules, and so, through that, what it's doing is making sure that you've got really good representation from all the different indicators, regardless of whether it's part of a hotspot.

Here is an example in practice, a marine example in practice, of what that means. Here is the draft of the Blueprint 2.2 priorities, and I just wanted to zoom in on this little section right here, which is actually a deepwater canyon, and I think it's called Hatteras Canyon or something like that, but it has priority in it, and the reason that priority is coming out is because of some of the sperm whales, over a few months of the year, that they're out there, and so it's not necessarily coming out as a priority for hard bottom condition, and it's not necessarily coming out for the marine birds,

and the marine birds aren't going to dive that deep, but it ended up being important on the marine mammal side, at least during certain months of the year, and so that's just an example of some of the things.

In practice, the no-brainer hotspots, the obvious places where lots of stuff show up end up as a priority anyway, because, of course, there is a lot of stuff overlapping, and so this approach captures the hotspots, but it also captures some of these places that are kind of key lynchpins that wouldn't be captured in the hotspot analysis.

Then we merge the other ecosystems together to get our combined integrity, and that's when we bring in -- We use a program called Linkage Mapper to do a connectivity analysis, which is basically taking hubs throughout the area and saying, okay, what is the shortest distance between each of these key hubs of priority that goes through as much blueprint priority as possible, and so you want to go through as much blueprint stuff as possible, but you want to do it in the shortest possible path, and so that's where we get the blueprint priorities.

Then the classes, and so the colors represent these set amounts of the South Atlantic area, and so it's kind of basically standardized within each ecosystem type, and they all come from the literature and planning documents that seek to balance the conservation and human use, and so all the thresholds of -- This is a visual on the right, just to see how much it is. The highest priority is 10 percent of the area, and high is 15 percent. That is where it comes from, and that is drawn from plans from states and counties, but also literature reviews, including some literature reviews looking at balancing sort of human use and fishing versus conservation, and so we kind of pull from all of those to come up with these different threshold percentages.

That is where we get to the latest version of the blueprint itself. I am going to stop real quick for any questions so far, and then I'm going to talk about issues, and then we're going to start getting into some more specific discussion.

DR. LANEY: One question with regard to connectivity, and I will ask Dr. Sedberry and Roger Pugliese and anybody else to weigh in as well, but one thing that's important in the marine system is the current patterns.

DR. MORDECAI: Yes.

DR. LANEY: Whereas I know, in the terrestrial system, the way the connectivity piece works is it looks for the shortest distance between two points, and do you know whether, either now in the future, we would be able to take the oceanographic layer, basically the roadmap for larval and eggs in the ocean, and then somehow incorporate that into the connectivity piece, and I think Roger wants to speak to that.

MR. PUGLIESE: I will let Rua step beyond that, but I think, as part of the modeling team, we have Ruoying He, with North Carolina State University, that does produce the oceanographic models for the system. The intent of this effort is to, as we see the capabilities of Ecopath and Ecospace, the ability to integrate those model outputs into the system, so we can have both habitat distribution and species distribution, as well as current patterns, to get -- Some of that literally is investigation of the capabilities of the latest generation, because some of those are not even -- I

mean, we're really getting into kind of the cutting edge of what can be done, but that's the intent, exactly the intent, of that, and I will let Rua pick up on that type of discussion on connectivity.

DR. MORDECAI: Ruoying and I had worked, even before this, for a while, to try to get some of the current data even directly in the blueprint before. One of the things that slowed us down, and the challenge so far, is that more of the data management side of things, where a lot of -- The current models, and the way the information is right now, it's very now-cast, kind of like what's going with the currents right now.

We just had trouble actually smooshing that into a plausible current layer that worked with all of that ridiculous amounts of data, and so that is -- Like Roger said, it's something we're working on. That's a layer that we're going to be working on through the Ecopath and Ecospace stuff that can fold back into the blueprint as well, and so, yes, the current piece could be better than it is right now.

Another interesting thing is, on the coast, in some of these places, one of the things I did test -- What you see across some of these capes is almost like these wicks of priorities that are coming off of these areas, and those are actually areas of sort of higher current flow, and so it was interesting to see that the marine mammals and marine bird indicators were capturing some of those components of high current movement, part of those super highways. I think there is definitely some improvements that could be made in some of the connections and corridors, but, yes, we're trying to bring in the currents.

Right now, the other thing that happens, that you can't quite see here, is that, for the hubs on the marine environment, basically every like major estuary becomes a hub, because of how important going between them and going from those -- In different life stages, going from the estuaries back out to the deeper ocean is so important, but, yes, the connectivity stuff, especially on the marine, I think it's got a lot of room to grow, and I think, with the stuff going on with the Ecopath and Ecospace stuff, I think that will help give us the foundation to do that.

DR. LANEY: Just one follow-up comment. In addition to the connectivity through currents, and Bill Kelly may want to weigh in here on this one, the council, I think ultimately, would need to take into account sources and sinks for larval and juvenile recruitment for species under its jurisdiction, and one of those, spiny lobster, we already know, based on work done, and, Bill, please correct me if I misstate, but a lot of the recruitment for the Florida Keys comes from Central America, I think, somewhere, and so, at some point -- Again, I know you guys haven't worked it into this iteration, but at some point in the future, I guess, we would need to consider those sorts of questions, especially for species that are council jurisdiction and are being managed by the council, but which are being recruited, to some greater or lesser degree, from outside, and so that, I guess, is something that would have to be worked into the Ecopath model, Roger, I guess.

DR. MORDECAI: It's also something that -- I have talked a lot with the folks at the Caribbean LCC on that, because we have that pattern of recruitment that goes into -- The feeding of a lot of those juveniles is coming from farther south than even Florida, into the Caribbean, and so that's something that I have been trying to work with folks from the Caribbean LCC on, and they're really interested in -- Right now, they have a smaller footprint, but they're actually really interested in and actively kind of working to expand their footprint, so it butts up against Peninsular Florida's and covers the full Caribbean.

They are kind of becoming more international. Mostly, they have sort of been the Virgin Islands and Puerto Rico so far, but, especially with their new coordinator and some movements, they have been traveling a lot to Haiti and the Dominican Republic and Cuba and other places, and so I think -- They have a big interest in the marine conservation side of things too, and so I think there is some good opportunities to build in the recruitment stuff in what we're doing, but also try to hook in with that cooperative that is working on issues, going to be working on marine issues, hopefully throughout the full bigger Caribbean area, which will be cool.

MR. GEER: Any other questions or comments?

MR. PUGLIESE: Just a real quick question back to the issue on currents and flow, and I think the issue that Rua had brought up about identifying some of these high-profile nearshore areas is really important, as well as offshore, in terms of those trajectory areas, those key areas for distribution. Those nearshore areas are some of the key spawning locations for species like red drum, et cetera, and so this is one of the first times and the most unique situation to be able to capture kind of the connectivity of all of these different systems, especially when you integrate these different current capabilities or oceanographic features.

DR. CHERUBIN: I just want to add, when we talk about connectivity and dispersal by current, we have to also account for the larval behavior, the pelagic larval duration, and all of that has a strong control on actually the corridors that those larvae follow, and so it may not be simply the current pathways, but it's also the combination of the larval behavior and the current that leads to a specific pathway that will take them back to their nursery grounds, and so I think it's a more complex, actually, approach, and we have to go into finer details to get better pathways, more accurate ones.

DR. MORDECAI: Yes, definitely. That really hits on the -- It would be so valuable to bring some of that stuff, and hopefully I think we can start to do that. I think, through the Ecopath modeling stuff and others, we will be able to start getting at some of those kind of more mechanistic movement rates, like you said, because obviously -- Especially if you're going from the estuaries out to -- For a lot of these life stages, they're not just non-modal dumb things just moving in the current. Lobsters, I guess, that's different dispersal, but some of the nearshore stuff is definitely more nuanced.

MR. GEER: Okay. Anything else? Okay.

DR. MORDECAI: All right. Moving on, we try to document some of the major known issues of the blueprint itself. I highlighted a few at the workshop, and these aren't -- I am not going to go through all of these different ones right now, but I would say, most specifically -- I would actually just back up to this latest one.

We already talked about some of the major known issues on the marine side. As far as capturing some of those, we don't have even an indicator for the fish just yet, at this point. We kind of have some of these proxies, and we talked through some of the connectivity questions, some of the current components, and another issue we have, which is more of a practical issue that has come out, particularly at the workshop, that we're trying to work on is one of the challenges of the way the marine environment is stratified right now is it's sort of all one big marine environment, and

so you end up with really high priority -- Pretty much the entire area off of Georgia, you end up with these areas where it's all important.

Well, if you're prioritizing across that entire ocean, that may be helpful, but, if you're trying to do some state-level -- If you're trying to use this in a state-level version, then you want a little bit more resolution than just, yes, it's all a priority, and so we've got a couple of things we're working on, either rebalancing or also -- This is fully continuous, and so we can actually go down and, even though this sort of looks like one big block of highest priority in the top 10 percent, we can then go to like the top 1 percent or 0.01 percent, and so there is abilities to go back in here, but we're still working on that sort of issue of, as you see, like the entire coast is a priority, and so that's another known issue.

I think we've hit a lot of the major ones, and so, as the review is coming out, and for this latest version of the blueprint, we try to make sure that we're documenting those in the different layers and put them prominently on the website for folks.

The major known issues, these are some of the inland ones and other ones that come up as well, but, as a cooperative, we basically take this sort of Lean startup approach that we stole from tech companies like Snapchat and Uber and Facebook and Google, where we're really trying to -- Just like adaptive management, but we're trying to minimize the total time through the loop, and so it's trying to generate iterative products. Like I mentioned before, we've been releasing the blueprint every year, and so recognizing that things aren't perfect, but try to speed up the learning cycle and get something tangible, instead of waiting five or ten years to try to get something perfect, knowing full well that it won't be.

We tend to move pretty fast and try to fix things and come up with something usable, in certain cases, and so here is a couple of bigger things that are improvements in the works. Finer resolution stuff, in the marine environment, that's a little bit trickier than on the inland side. Some of the corridor feasibility, this is more inland stuff, but the third one is better models connecting actions and indicators, and I think that fits well with essentially what we're going to be talking about with the Ecopath and Ecospace, which is improving our abilities to look at different types of actions we might take and how that impacts the ecosystems and the indicators.

That includes the direct Ecopath stuff of questions that the council is wrestling with and policy things that you might do, but also trying to look at the impact of things like economic incentives or policies or land protection happening inland or around estuaries and how those kind of conservation actions might then propagate itself out into the different fisheries stocks that the council is interested in as well. It's not just here's where things are right now, but what might you get if we do certain types of things, and we're also working on a few other components.

Then improving indicators, I mentioned estuarine and marine ecosystems, which we talked about a little bit, and urban areas and historic and cultural landscapes and also improving and using targets, and so like, okay, what are we trying to get to in the next five to ten years, and so that's trying to step those down into some doable chunks that we can use as sort of a rallying point as a way to try to kind of help communicate the importance of action at some of these larger national scales and kind of trying to make the South Atlantic the next big sort of Chesapeake Bay, as far as funding and efforts.

Those are just a few things in the works, and I think it sounds like Brett already mentioned some of the data access stuff. I showed you the Conservation Planning Atlas. That's where we have at least the draft version stuff here, and then the simple viewer, which we'll update with the latest update of the blueprint once it's final later this year, and so that's accessing the data.

Then the last thing, and Wilson sort of already tipped this a little bit, but there is this effort called the Southeast Conservation Adaptation Strategy, which is basically trying to glue together the equivalent blueprints across the full south, and now there is momentum actually nationally, because there is equivalent efforts kind of in the Northeast, the Midwest, and now into the West, and so this was Version 1. It was requested by the state directors for the Southeast Association of Fish and Wildlife Agencies and the twelve federal agencies from the Southeast Natural Resource Leadership Group, and so this is one of the ways that we work together across all these different boundaries to try to glue together these layers.

There will be a new version, an updated version, in the fall that will have the next version of the South Atlantic blueprint, and then, in the near future, we will see it may -- It probably won't be ready for this next update, but we'll be completing the rest of Florida in the near future as well, and then hopefully the Caribbean and moving on. We're talking about the South Atlantic, but doing it in a way that nests and hooks and connects into something that is Southeast U.S.-wide, but then, possibly, in the next few years, something that covers the entire U.S., and so that's pretty cool.

That is the bigger stuff that Wilson and a few people already tipped, but just a kind of heads-up on some of the other folks that had been at some of the other in-person workshops, and this is just kind of to just give you a flavor of -- We had more than 150 folks from more than sixty different organizations, and we met six different places across the geography. It was like Richmond, Chapel Hill, Charleston, Columbia, Tallahassee, and Atlanta, and this will kind of give you a flavor of not too bad of a balance across non-profit, state, and federal folks. There were some local government folks and planners and some private industry folks, partnerships, and universities, and so that's some of the folks we had at the bigger, kind of full-day, dive-in and map-circling activities kind of things. All right. That's that. Before I just jump us into a quick discussion on the latest spatial priorities, are there any questions about anything that I've covered so far?

MR. GEER: Any questions from anybody?

MR. PUGLIESE: Just a quick comment. Rua, one thing that we've been trying to keep in line with the discussions on SECAS and -- If they do present that map area, one of the things I think -- It's tracked in the Landscape Conservation Cooperative's priority components, but if it presents it with protected areas, I think it's going to be important to highlight how much of the area in the Southeast actually is in our marine protected areas, deepwater coral HAPCs, and some of those, if it gets put into that type of a format, if that is what is intended with the representation through SECAS, and so that's something I think that may be important to show, because those layers are more extensive than say some of the priorities in the conservation.

DR. MORDECAI: Yes.

MR. WILBER: I have two questions, and I will start with the simplest first. The South Atlantic LCC on land dips into the Florida Panhandle, but it does not extend out into the Gulf of Mexico in those adjacent areas, and is there any plan to do that?

DR. MORDECAI: As part of that collaboration with Peninsular Florida, that's where we're going to do that section of the Gulf, and so, basically, the reason why I didn't go into that wedge of around the Big Bend and Apalachicola/Chattahoochee/Flint and into the waters there was it was such a small component, and there was so much stuff going on with sort of Gulf conservation planning and Gulf planning that we didn't want to start in on something with such a small footprint and then have to basically go back and do something else.

We were hoping that there would be a larger body that would kind of convene around something larger than that small section, but now it looks like -- I think Peninsular Florida is going to be working on that, and so we'll kind of -- It will be more of a special integration zone, and so, once some of those data layers and folks that are involved in those discussions come to a point that they're starting to move on those priority resources and get their layers together, then we're going to kind of have a, as a cooperative, a way of adopting some of those layers and pieces into it, so it folds in, and so we will have that part of the South Atlantic, the sort of marine section, covered as well.

MR. WILBER: My second question is, as you have moved from the first version of the blueprint up to the current version, the amount of area that is assigned one of your priority designations seems to be pretty similar as you move from one version to the next, and particularly if you're going to be assigning those priorities based upon percentage of the pixels and things like that, but so that kind of leads to, as you move from one version of the blueprint to the next, the distribution of those priorities is changing a little bit, and so some areas that are high priority are presumably going down to less than high, and some areas that were less than high are now moving up to high priority, and so have you looked at the change analysis between the different versions of the blueprint, and can you comment on exactly what is going on with these slight geographic changes that might be occurring?

DR. MORDECAI: Yes, and, in fact, I actually have a slide, and I should have saved it, but I have a slide that kind of shows each one, and it's actually pretty cool, as you see some of the refinement. You start really coarse, and so the first version is very coarse and blocky, and you remember, Pace, sort of like some of it was not totally data driven, but the patterns you see, the major places that you would expect, keep coming out. Then you start getting more and more -- The changes are smaller and smaller, but some of the shifts -- Some of the bigger shifts so far have been once we were able to incorporate imperiled aquatic species, because those patterns track -- They're kind of a unique pattern across the geography that weren't just totally conditioned.

That brought a little more focus on some of the active river areas and some more stuff in the Piedmont, but, in general, what's happening with each update is, especially on the land, is the changes are getting smaller and smaller, and the places that -- Like you mentioned, the places that end up really high priority are pretty much -- They're still a priority, but they just may shift classes a little bit, and then some of the parts that go back and forth are the medium priority, some of these restoration opportunities pieces, but, yes, if we've got a little bit of time, I can try to dig up the change analysis, because we did go through those different pieces.

The hope, and the reason of getting this sort of reviewed as things improve, is that we're getting better and better at where those -- The areas that are blinking out as priorities or were kind of medium or lower priority, but then end up not priority, we're getting better and better at capturing these sort of realistic areas that should and shouldn't be in there, but we are -- Basically, the way we track a lot of it is with some of these comments and issues where people are like I don't think this should be here or why is this place missing, and so, for example, on the aquatics, we had a long list of about twelve places that were major focuses of conservation, particularly for imperiled aquatics, that in Blueprint 2.0 weren't really well captured.

Then, in the next update, every single one of those very specific locations was then captured, just with improved methods and improved data, and so, yes, if we've got a little time, I will try to shuffle it through, so you can see it visually. It's kind of interesting. The marine one is the one that has visually changed the most, because the data are so coarse and sparse.

I mean, the basic stuff about the -- If you squint your eyes, the basic stuff is kind of the same, some of the same patterns. Of course, along the shelf break and near the coast and where the major current intersections happen, that is still there, but I think that has changed the most, just because there is kind of the least data out in that area right now.

MR. WILBER: I would just add that Broad River Basin, which was pretty miniscule in the early versions of the blueprint, is definitely showing up more than it used to, which is good.

DR. MORDECAI: Good. That's good to hear.

MR. PUGLIESE: Just as a follow-up to your comments, Rua, I think the refinement in the inshore areas, as that information gets expanded and refined, you're seeing that actually playing out in the evolution of the blueprint. On the marine side, some of the newer information on the marine mammal modeling and sea turtles and all of those things have also helped influence kind of the priority areas or component areas, and my point was that, as we move into the next generation of some of the modeling efforts, the idea is that the rest of the habitat information and some of the current -- All those types of things are also going to hopefully refine and expand the blueprint even better, as we get those types of information on species distribution, et cetera, integrated into this further.

DR. MORDECAI: You've got it, and that's good to hear, Pace. I think the approach to integrating the terrestrial and aquatics really improved a lot from Version 2 to 2.1, and it's getting better and better. It was very kind of hacked together the way it was before, but, once we got the active river area and then put them together in a way that's much more ecologically reasonable, that has helped a lot, and so that's good to hear, and I wrote that down, that you thought that that was good and that's coming out better.

We always try to keep all of those notes, and we have all the workshop -- We're not doing the map-circling activity, but we actually have all the stuff digitized now, so when people comment on specific places, even if it was like a historic fish spawning area or something like that, we can overlay those in GIS now when we're testing different approaches to see if it does better or worse.

MR. HOOKER: Going back to the corridor thing, after we had all of that discussion, so am I clear that you still plan to have, when you release 2.2, is to have that corridor layer as a part of that, or am I misunderstanding?

DR. MORDECAI: Yes, we've got the corridor layer in there, these kinds of coarse corridors that are really just sort of based on these sort of hubs. The corridors are underneath here, connecting sort of these big hubs. They're not great right now. They're sort of coarse and blocky, and there is a lot of improvements, but there is definitely some discussion in the team, in the steering committee, about including them, even though they're not the best depictions of the corridors that we would like to have, but more on a conceptual just -- I remember at least Roger and a few other folks felt it was really important that -- Even if the corridor depiction wasn't great in the marine environment right now, they felt pretty strongly that they wanted to incorporate it, just to sort of show that intent, and does that capture I think some of what you're thinking, Roger and any other folks on that discussion?

MR. PUGLIESE: Yes, and it was really important, because when we kind of just used some of the other datasets, it lost some of the -- Some of these corridors were identified in some of the preliminary discussions, but then, when we looked at just the marine sets that included marine mammals and other things, it actually lost some of that connectivity, because of it being driven more by those model efforts, and it was very specific that we wanted to include those linkages from inshore to offshore and generating those based at least on some of the initial discussions and presentations that were provided, as a first step to do that, and the intent is to refine these further as we evolve the blueprint. That was to make sure that we did not lose that connectivity from inshore to offshore and habitat distributions.

DR. MORDECAI: It doesn't show it here, but we're doing some work for all the corridors and also the priorities, to sort of show categories of priorities, and so, basically, if you're looking at that top-right corridor here, that's more of a marine mammal corridor, moving from one feeding area to another within similar seasons.

I think there is some stuff we can do to kind of capture why they came and, and the same thing with the priorities, the blueprint priorities, themselves. I didn't show it, because we didn't really have time, but we've got ways of showing what is it contributing to the blueprint and what's its sort of role, because some things may be really just -- What's the story here? This may be mostly a marine mammal thing, or this could be a whole lot of different things intersecting, and so we're working on that too, but, yes, they're okay, and they're in there mostly as a conceptual, take it as you need, but, hopefully in the next iteration, we'll be making some big improvements in those corridors.

MR. HOOKER: Then a quick follow-up to that then. I think it should be caveated pretty heavily in how it's displayed on there, because, especially that one you just showed, that could be just -- That's just interannual variability, probably. One year they're offshore and one year they're inshore, and there is no actual going back and forth between those two feeding areas, potentially.

I am just guessing really, but it seems to show some kind of connectivity where there may not actually be connectivity and it may just be interannual variability on where the prey base is for that particular year, but I understand what Roger is trying to say, is that there is inshore/offshore migration for some species that you want to capture, and so, not knowing what the driver is for

those areas, it may, I think, misrepresent what it is you're trying to capture, and so I just would -- I would argue that having some kind of ability to caveat that in some way for this marine component would be good.

DR. MORDECAI: Yes, and that's something we will put into the known issues with this latest version fairly explicitly, and I think we're trying to do something similar to even the inland corridors, where there are some that come out from the methods, but, when people reviewed it, they were -- A lot of these inland corridors are coming out pretty good and make sense for most people, but, every once in a while, there's a few that are like, yes, the data may look like they are, but there is really nothing moving across these areas. Like I've been here on the ground and we've sampled it and there is nothing.

That's actually one of the categories we were looking at, even within the corridors, in addition to the caveats, of having these sort of classes of, okay, here are ones that are sort of verified corridors, that we actually have data of things moving between here and here and we have confidence in them, and here are some ones that are like not validated and use at your own risk kind of stuff, and so that's good reinforcement on I think both of those, the heavy caveat in general on the marine corridors, but also if we try to do the breaks. We did run into that issue in a few of the inland corridors too, and so that's a good one to mention.

MR. HOOKER: Yes, I would support the way you just described it, having kind of almost sub-categories there.

DR. LANEY: I was just going to comment that we all have heard it before. All models are wrong, and some are useful, and I think this one is more useful than not, but certainly I agree with Brian, and I think Laurent already made the point that it's not simply a question of passive transport following the currents and there is more involved in it than that. It is behavior.

Mark and I were having a sidebar earlier about penaeid shrimp post-larvae and how they don't have very tremendous swimming abilities, but they can migrate vertically, and they go up and down to take advantage of tidal transport into the estuaries, and I'm sure the marine mammals are engaging in far more complex behaviors that we don't yet understand.

Hopefully, in the future, folks like Andy Read and Doug Nowacek at Duke can help to enlighten us all with regard to what motivates them to use certain areas at certain periods of time, and so it would enable us to continue to refine that Ecopath with Ecosim with Ecospace, whatever it's called, the spatial component of it, and just continue to refine it and continue to address Pace's point about what is priority, what is really the Tier 1 priority for conservation purposes.

DR. MORDECAI: Yes, I think that's the -- I think I would just agree that there is a lot of opportunity and a lot of improvement to be made, and the goal here is really being transparent about where the issues are, where things are stronger and where they're not, and then focusing on what we need to improve most.

MR. PUGLIESE: Just another quick point to what we're going to be in the middle of now, and it gets to some of this discussion on, I think, both connectivity as well as corridors. As we integrate more of the species-specific information and habitat-specific information, I think, hopefully, that's going to begin to inform what some of the patterns are of understanding where a species may be

staging, from especially some of the estuarine-dependent species, like gag, from inshore to nearshore to shelf and then even north and south.

As we get that into this process, which is literally what we're going to be doing, that will help do that, as well as the environmental parameters. That's going to be a whole other component of that that are driving those at different times, and so that's where we're heading, and hopefully, as we get more of it, that's going to inform and really refine this.

MS. DEATON: I was just going to say that I have looked at the data, the earlier versions, and I think adding more in the estuarine indicators would be really helpful, and I think there is information there, and so I know one limiting factor is you need the data to be available for the whole region, and is that right, Rua?

DR. MORDECAI: Yes, and that's actually the -- Especially the open water part of the estuaries is actually one of the highest priority things to improve and actually -- Simeon is on the line as well, and he's been working on some of the saltmarsh and estuary, and we're even going to be working on some open water, and so, yes, that is definitely the -- The estuaries and the saltmarsh, but particularly the open water part of the estuaries, is one of the highest priority ones for fixing, because of probably some of the stuff you're noticing, but, yes, that's the challenge, is we need some kind of apples-to-apples thing we can use across the whole geography. Then, often, when we have better, more detailed state-level stuff, we can use that for validation, to see whether this bigger regional -- How well does this bigger kind of regional approach capture the information, if we had really good stuff?

MS. DEATON: Okay. In North Carolina, we're doing this strategic habitat area analysis, and it's very similar. It's a different modeling tool, but at a more detailed level within the estuaries, because of the smaller water bodies, and so, if there was a way to incorporate state aquatic priorities, which basically that's what they are, that would be probably really helpful, and so they might be determined differently by the different states, but they're a priority, for whatever reason it is, that they have data on.

DR. MORDECAI: Yes, and that's also really good for figuring out things you can extrapolate out, because you generally -- When you do those priorities, you are trying to capture those key resources that matter in the ecosystem, and trying to learn from that in a way that we could mimic some of the inputs in a way that would cut across state lines, because the problem, when you pull a priority layer, at least we've found before when we have tried to do that, is that there are so many differences in how folks do the priorities that you end up kind of comparing -- Especially the percentage coverage and how things are paired.

Then everyone wants to know, well, okay, how did you do this, and it's, well, over here it was like this and over here it was like this, and then, pretty much, what usually happens with the state stuff -- Because we do use some state-level data for certain habitat types and others, where there's an equivalent, but usually it's like one state is what happens. Like we're missing it for South Carolina or we have it everywhere but Georgia or we have it everywhere but North Carolina, and it's, oh, that would be great, but we're missing this one state.

I was going to check back in on the prioritization, and maybe you've got something you could send. I heard a little bit about some of the stuff, but I've got to check back in on the layers you all

are using and see how well we can kind of use that in improving the estuarine indicators in a way that covers the whole area, because, if we can get to pretty much very similar results, or even the same results, that you all have coming out of that exercise, but in a way that we can use it across multiple states, that would be great.

DR. LANEY: A question for Anne and Pat and Priscilla, at least, and for Rua. Do the priorities, as specified by the states in the state wildlife action plans, provide any utility? I think they used a common process for designating Tier 1 maybe, or for designating a priority. I know the highest priority in the North Carolina plan anyway is the Tier 1, and so I don't know whether, Anne, that would speak to maybe the existence of at least a common process and a suite of priorities from those state wildlife action plans that might have some utility, Rua, for the conservation blueprint. I don't know, but that just popped into my head to ask that question.

DR. MORDECAI: I would say there is two ways that those wildlife action plans, but also even coastal management plans and other stuff, come in. I think there's the first one, which is the indicators themselves, which originally -- Wilson, you were part of that, and we started synthesizing all those different -- Those kind of priority resources and species and things like that from the existing plans as a starting point. You definitely don't want to redo the good work of others kind of thing, and so there is that foundation of capturing those resources and then using them in the planning.

Then a second component of that is the, which I haven't quite gotten onto, which is the sort of blueprint implementation strategy, which is the next component, and that is where we've been synthesizing some of the actions from the action plans, coastal management plans and other ones, and then folding those in by sub-region into a sort of draft blueprint implementation plan as well, and so rolling up those kind of priority actions in places, especially some of the very specific ones, and then folding it up into a larger umbrella across the region.

That's a couple of ways, both at the very beginning, when you talk about those sort of Tier 1 and Tier 2 resources, using those for the indicators, or testing the indicators to make sure they capture them, and then all the way at the other end, which is the action parts of the action plan and trying to roll those pieces in as well.

MR. BOSTON: Rua, I also recall, in our Charleston meeting it came up, that in fact SEAFWA is looking, in 2020, to actually have a fully integrated -- Where the swaps and the blueprints, as it gets throughout that SECAS modeling, and that would be an integrated piece, and so we're a few years from there, but I know that that's part of what SEAFWA is looking at, the Southeastern states at least, is to make that an integrated part of the overall big picture of the Southeast that Rua showed earlier, the SECAS model, if you will.

DR. MORDECAI: I think it's just going to be a matter of figuring out how to -- Figuring out the best way to put all of these things together and have them complement and integrate with each other, and so not just the state wildlife action plans, the equivalent coastal management plans and other things, depending on the state, if you have a different department or something like that, or the bigger ecosystem partnership plans, yes.

MS. DEATON: I was just going to answer. Wilson, from what I know about North Carolina's wildlife action plan, it really just dealt with the freshwater species and habitats, and they kind of

like stopped with the estuarine and refer over to the coastal habitat plan, and so they don't really have estuarine priorities, as far as I know, and I don't know if South Carolina and Georgia is the same.

MS. WENDT: I honestly don't know a whole lot about our wildlife action plan, but I believe it does include estuarine species, but I don't know what the criteria were for determining priorities. I think there is just a whole long laundry list of estuarine species and a lot of benthic species, but I can't really speak to how they established priorities.

MR. GEER: As far as Georgia is concerned, we just added our first estuarine species in the last few years. It was almost exclusively freshwater until recently.

MR. WILBER: Something you might want to consider is this problem of identifying priority estuarine areas is not that dissimilar from just mapping the HAPCs that are in estuaries that we've done with Roger, and so the HAPC designations are state-identified nursery areas. If you're willing to let identified nursery areas be at least your first cut at the priority estuaries, you have GIS data and rules in both Florida, South Carolina, and North Carolina that designate those areas by rule, and so there's not any ambiguity, really, about where they're located, and you have GIS data to back those up. Georgia is the only state that doesn't have a specific designation that you can tie back to that state-designated nursery area function, but, again, in the spirit of Lean startup, it might be good enough for now.

DR. MORDECAI: To follow up on that, Pace, so the state-identified priority nursery areas, is there an equivalent in Georgia layer that would be a proxy for that?

MR. WILBER: No, there's not, but maybe, if you strong-arm Pat Geer, we could approximate it.

DR. MORDECAI: Yes, because that might be something to -- Again, I mentioned high priority, especially the open-water component, which I think those would capture it, and, again, that highlights the issue, right? It's like all the states except for Georgia or except for -- But I will put that as a follow-up, to maybe pull some of those from the other states, again, just as a progress way forward.

I mean, we have one indicator for sort of amphibians and reptiles that has some similarities to that, although it was done regionally, those sort of priority amphibian and reptile conservation areas that we use, because we don't have very good data on some of these ephemeral wetlands and restoration opportunities, and so that's one of our measures that we use.

I think those priority nursery areas, like you mentioned, especially if there is some consistency in what they're capturing and how they come together, yes, that could be something that we might be able to incorporate in the -- In fact, we may -- Well, many things may have to align, but it's quite possible that, if we can get that together in time, we might even be able to get that into this Blueprint 2.2 update.

MR. GEER: I've got the wheel spinning, and so I will hit some people up in the office.

DR. LANEY: I was just going to follow up on Pace's comment and say that might be a good topic for the next steering committee meeting, is to -- The fact that Georgia might be able to come up

with something that was functionally equivalent to what the other three states already have, that could be great if that could happen.

MR. HOOKER: This is a quick reminder to myself, and so 2.1 was just a hard bottom condition and marine mammals, and 2.2 is -- Is it still those two indicators? You highlighted that at the beginning, and now I can't recall if you added a third indicator.

DR. MORDECAI: Right now, this is marine birds, marine mammals, and hard bottom.

MR. HOOKER: Okay, and so you added birds to it from 2.1.

DR. MORDECAI: Yes, this has birds. Then, before, we also had some depth zones in there, just because of some other issues, and this doesn't include the depth zones anymore. It wasn't really working very well, but, yes, that's basically those three, and each of the indicators uses the sort of monthly or seasonal inputs for each of those for all the different species, but, yes, those are the three layers that produce that.

MR. HOOKER: Again, I think it goes back to that connectivity issue. Of those species, none of them are really doing inshore/offshore migrations. They're mostly doing north/south migrations, and so anyway.

DR. LANEY: To that point, some of them do, some of the fish species, but, of course, none of those are indicators at the moment, but they do onshore/offshore, and maybe we can, at some point in the future, incorporate some of those, but, again, it was a data issue, but I don't know how deeply, Roger, we have delved into the SEAMAP database and, of course, we would have the NEMAP database and the NMFS trawl survey as well to look into some of those questions, as to whether or not there is some common data, or common species, that transcends the whole council area of jurisdiction that might fit the requirements for an indicator. I don't know, but --

DR. MORDECAI: Let's hold off on that one. I think there's a good time for that discussion a little bit later, and so I would say let's hold off on that particular topic, but I do want to highlight one thing, and this is always a tricky thing. We are using these as indicators of condition, and so I showed before like we don't have sea turtles in here, but we're really using a lot of these as proxies for highly productive areas of the marine ecosystem, a lot of those, and so your seabirds and your mammals are really about production and it's not just about the individuals.

Yes, definitely that's a point well taken on some of the movements of some of these things and how you do it, but the intent is to not sort of -- If you have an indicator, it's to not have a model for every single species and every single thing, but try to have them capture the key components of the system, and so that one other caveat on that point, and so sorry to cut you off on the data indicator stuff, Wilson, but I do think, when we talk Ecospace a little bit later, that will be a perfect time to start talking about that again.

MR. HOOKER: Just a quick follow-up. I saw you did sea turtle sightings, but I think Duke also modeled the sea turtle densities similarly to marine mammals, and you looked at that, but then decided that it wasn't worth doing?

DR. MORDECAI: It's because it only covers the inshore stuff and doesn't go -- It kind of has a huge no-data area, and so that's one of the challenges that we have a lot with coverage, is that you can have some really great stuff that's only part of it, but then, if we throw that into the prioritization, sometimes there is high-density or important areas, especially around sargassum or other things, that are farther outside of the nearshore, and, if we just throw that in, into the prioritization, then we're undervaluing places that weren't part of that assessment.

I was very bummed, because I was very excited to see that Duke was doing the turtle stuff and then seeing that it didn't really cover the full region and it was more inshore, at least the version that I had seen, and so that was problematic. I have tested it though, and it does predict some very similar things to what we saw when we tested the sightings piece. I was hoping we would be able to use the sea turtles thing until like literally the second I saw the dataset, but it just didn't extend far enough out.

MR. GEER: Along those same lines, Rua, what about -- I mean, all the states have sea turtle nesting programs, I'm assuming.

DR. MORDECAI: Yes.

MR. GEER: You're saying you didn't have full coverage, but I think every state has -- Their staff is recording nesting, number of nests, on each beach, and I'm assuming each state has that, and that would be a comprehensive survey that's done up and down the coast to look at --

DR. MORDECAI: You're talking about the beach side instead of the in-water turtle component?

MR. GEER: The turtles are coming ashore to lay their eggs, and so, for each nest, they know one turtle came ashore. They are using that as an indicator of -- The more nests they have, the more productivity they're having.

MS. DEATON: I was just going to comment. Remember that was one of our indicators when we were in those groups with Mary Connolly, and we had these common indicators, and I think that information was given to the South Atlantic LCC. We had all the habitats, and it included things like nesting turtles.

MR. BOSTON: Rua, remember you had the sea turtle nest indicator early on, and you guys tossed that one out, and do you want to address that?

DR. MORDECAI: Yes, and, if we're talking about on the beach side, that was a really interesting one. That was one of the early indicators of the beaches and dunes kind of health, and that was actually one of the interesting discussions we had, and so we had productivity, basically of sort of sea turtles, as an indicator of beach health. Then, when we tested it against some other components -- We thought that would be a good proxy of sort of nest predation and other stressors that are happening on the beach, like how healthy the beach is.

Then, what we found, when we actually tested it, is that it had the opposite relationship in a number of places, and, when we dug into the data and talked to a bunch of state turtle biologists and folks, what happens is that a few of the states -- There is so much management around those sea turtles, and they have such site fidelity, that, basically, the productivity is so artificially inflated by people

moving just about every nest, in some states, and putting predator guards on everything, that you end up with a lot of high-productivity beaches that are pretty poor from an everything else ecosystem perspective, but are so heavily managed for sea turtles that they're not really telling you a lot about the beach system. They're just telling you a lot about sea turtle productivity.

That was one of the indicators early on, as we were testing, and we had sea turtle biologists from each state kind of give the consensus thumbs-up on removing sea turtles as an indicator for that reason, and so it was one of those things where pre-testing or not using it -- Conceptually, it sounds like the most logical obvious indicator of sea turtle productivity, at least for beach health, but, in practice, they are so heavily managed that they're not really good indicators of what the rest of the system is doing in a number of the different states, because they are so heavily managed. That, we ended up removing that on the beaches and dunes side, but I think there's huge potential for in-water turtles out in the marine environment. I think that's a whole other story, and that's more of just a data mapping kind of limitation. Does that answer your question about the beach side of things?

MR. GEER: It answers my question. Okay. Because I know we're doing a report card that -- It looked very similar to our report card in nesting turtles as one of the indicators.

DR. MORDECAI: Yes. All right. Basically, we did the first discussion/activity that I figured we would want to do already, which was going into this sort of just general talk about the priorities, and so, real quick, I wanted to see if there was any other major issues that we have talked spatially in the marine prioritization that sort of jumped out at you. You can send me an email later, or, if you have something you want to sort of bring -- Places specifically to look a little bit closer at, other than what we've already talked about, feel free to jump in on that.

MR. PUGLIESE: Rua, real quick, I think I raised the issue when we were discussing this in the context of other information and conditions, threats, et cetera, and contaminants information, inshore, I assume has been integrated. If not, is that a layer? That's something that I know Cynthia Cooksey, who is now working under Pace, when she was working with NCCOS, had done a lot of the coastal condition analysis, but also had -- I know there was work done on the offshore areas, with a broader scale, and so at least there may be a perspective, regional, and it may be something that could also be integrated into this.

DR. MORDECAI: Yes, I've got a couple of good layers. I'm working on some progress on using some even more detailed state data on some of the estuary side and nearshore, and I do have some ocean contaminant stuff we can use in some of the other models, in a few other ways, and so, yes, I'm working on that piece. If there is some other layers or stuff we might be able to use, I'm always up for learning about those.

Think about other stuff, and that's all good. You can mention that as well, and so, actually, what I think I'm going to do, because I think we're getting close to about break time, I'm assuming about 10:30, is we're going to talk a little bit more about -- Originally, I was going to talk a little more about sort of implementation and fundraising and how we might use the blueprint and talking about a little prioritization on kind of what things the cooperative should focus on, but we've been digging so deep into the data, and I think particularly with this group, that might be the right approach, and so I am thinking, right now, after we've done the spatial priorities, that we should take a break and then come back and then dive a little bit more into the Ecopath and Ecospace

stuff, because I think it will flow naturally to what we were talking about in the morning. Does that sound reasonable?

MR. GEER: It sounds reasonable to me. All right. We will take a break now, and we will be back at 10:45.

(Whereupon, a recess was taken.)

MR. BOSTON: We're live, Tom. Go ahead.

DR. OKEY: Good morning, everybody. This morning, I am going to -- First of all, I just wanted to check in a little bit with the audience. I think most of the folks in the audience know about Ecopath and Ecosim and may have heard me present it last October and otherwise know about it, but there is probably a few people in the room who don't know much, if anything, about it.

MR. BOSTON: I think a quick review, and then we'll plow forward.

DR. OKEY: Okay. I didn't want to dwell too much on going really into a Ecopath with Ecosim talk, a normal one, but I wanted to just do a quick review, for those who aren't oriented. My focus this morning is really going to be on the nuts and bolts of the Ecopath part of the modeling, which is the static description of trophic flows, which then feeds into the Ecosim part, which is a temporal dynamic simulation, and, of course, Ecospace, which we're all interested in here in this region and to integrate as well the Ecosim and --

MR. BOSTON: Tom, if you're moving around, you're okay audio, but it sounds like you're moving back and forth from the mic a little bit, and so if you can kind of put your head in a brace there and just stay near that mic, it will be good.

DR. OKEY: I've got a new headset here. How's that sound?

MR. BOSTON: Better. Thanks.

DR. OKEY: Excellent. Essentially, the fundamental idea is that the reason we do this whole food web trophic dynamic modeling is, as you know, no fish is an island. In other words, the stocks are all connected to each other, and the species are interacting, and we know this, but this metaphor is useful in a broader sense as well, because, essentially, this kind of approach enables whole communities, like whole scientific communities, to come together and contribute information and really integrate the information that we have.

In our project here, we, as Rua was saying, we're going to be able to do something very cutting-edge, in terms of the information that we have, and so I think that the South Atlantic setting is really ideal for putting together something that really hasn't been done before, because the space approach, over the last couple of years, have advanced to the point where it's possible to do some really exciting things.

MR. BOSTON: Tom, your audio is killing us. Is there any way that you can just come off your headset and talk phone-to-phone?

DR. OKEY: Sorry about that. I am talking into my screen now. These Ecopath models have been constructed around the world, and I won't dwell on that either, but so there is really a lot of -- It's an accessible approach, and so there is variability, in terms of how they've been expressed and manifested in various parts of the world, but, again, it is accessible, and there are some pluses and minuses with that. There is some dangers with that.

Anyway, just to -- This is really just a depiction of the three parts of the overall approach. On the left is the Ecopath approach, and that's just the static description of the food web and the fisheries. Then, in the center here, this just depicts the temporal dynamics, and, over to the right is the spatial dynamics. The right two parts, these two dynamic approaches, really are integrated in Ecospace, and so Ecospace enables us to ask questions that are spatial and do management simulations and policy simulations to find out what the effect of changes in fisheries management or other kinds of human interactions would be and also now the effects of climate change, and we try to integrate all of those.

This is the compartment model that -- This is the 2014 iteration of the South Atlantic Bight Model, which we were calling it, and now we might call it the South Atlantic Region Model, because it might start a little bit further down, around the Keys, but, anyway, this is a highly-articulated model.

I think our discussion this morning really is going to focus on that articulation of functional groups, because that is going to really affect the kinds of questions that we were already discussing when Rua was presenting regarding capturing some of the dynamics of early life stages and so forth, and so there are some tradeoffs in how you want to aggregate or disaggregate or articulate the system, and so this is kind of the boring part of the overall approach, but it's a fundamentally important part, and so I'm just going to talk about some of the progress there.

This is a little bit of a history. We started back in 2001, when Roger really promoted working together with me on putting together a first forty-eight-box strawman model, and then, as I said, there's been a couple of iterations since then, rearticulating or re-aggregating based on different questions, such as the most recent focus on forage fishes, two or three years ago. Initially, there were a lot of contributors to the model. You recognize a lot of these names, I'm sure, but there are many others as well, and here is just a list of some of the secondary contributors, and this is just the original version of the model, back in 2001 and 2002.

This is some of the things that we're hoping, ultimately, will happen. Obviously Rua has talked about some of this. We're going to advance and refine the LCC conservation blueprint and support the fishery management council's move to ecosystem-based management and integrate the various models, which we were already discussing a little bit. Again, I won't dwell on that, but looking at different types of disturbances, like climate change, oil spills, red tides, upwelling, changes in fisheries management, et cetera.

There is a little bit of a reference here to advection. The Ecospace has had advection in it at various times through Ecospace's history, over the last actually fifteen years, but, really, most of the really exciting advancements, I think, have just been emerging, and so the advection layers are the latest thing that's being worked on Ecospace, and so, again, we might be really in forefront of what we might be able to do.

Anyway, the reason I am going to talk about -- Because the discussion this morning is really about the reconstruction of the model in a way that will make the most sense to us, I need to reference some of the basic parameters, and, really, this slide illustrates that it's a mass balance or mass continuity model, at its foundation, and so just a quick idea of that is that, for any given functional group, the overall production of the group has to equal all of the sources of change or consumption or mortality of that group.

Basically, these are the parameters here that we have to focus on to refine and construct the model, and so I'm just going to show you what I am doing with putting those together and really thinking about how to expand some of the groups that we are interested in and that are the focus of management that have assessments, et cetera, now.

Diet composition is a real foundation of these models, and, as we go through the different and collect information to populate the model with estimates of these various parameters for each group, we want to do it in a really smart and systematic way. If diet composition is a good, really important foundation for the model, we need to go through -- First of all, we need to have good diet data, and I was just looking yesterday at the really awesome database from Lisa's group, and, essentially, I was looking at gag, for example, and, when you go through the diet composition, first of all, you need -- It's best to have the articulation of the model, in terms of all of the new groups broken out first. Then, as you go through the overall diet composition, you learn more about what might be missing from the model, in terms of articulated groups.

Just yesterday, I realized that there is -- We don't have an explicit Syngnathids group, and that is a relatively high portion of the gut contents in gag, at least for the Gulf of Mexico, within that particular database, and so then we had to consider adding a new group, and so it's an iterative process, because, if you add that new group, and if you've gone far through the diet composition, in terms of parameterizing the diets, each time you add a new group, then you really have to go through the entire -- Technically, you have to go through the entire diet composition again, to make sure that that particular group is represented. In other words, I am just trying to give you an impression of -- Because it's such an interconnected model, especially when you have a highly-articulated model, it can get pretty complex, in terms of when you're putting together the models.

Anyway, this is the forage fish groups that were added to what became the ninety-nine-box model in 2014, and so, again, I went through a whole process, once we decided -- First, of deciding on how to articulate the forage fishes, and these were just forage fishes that were added to other more general forage fish categories and broken out from them, and so, once we added those -- Again, you have to go through the whole model and make sure that you have all the parameters, not just for the diet composition, but for the other parameters as well and the fisheries data as well, which I will mention.

Really, you need to go through this whole process before you do the queries for the fisheries landings for each of the functional groups from each of the gear types. Then, of course, you have to make sure that you have the gear types articulated the way you want it as well.

This is before this particular current iteration. This is the ninety-nine-box model with all the functional groups in it, and so that's a pretty big model for an Ecopath model. Just, up until a few years ago, two or three years ago, ninety-nine was the limit. Obviously, the more groups you add, especially in a spatial context, then you get into some computational limitations in the model, but,

because everything is advancing, they have sort of taken off that -- We don't have that limit of a hundred functional groups.

What we have done now, at least so far -- This is just a few of the predatory groups of particular value in the South Atlantic Bight Ecosystem Model that we focused on in an analysis that we did, and that same analysis we did about three years ago, but, of course, as you know, there is a whole suite of snapper and grouper and other species that are important that folks want to have explicitly articulated in the model, and so, in this latest iteration, this is the new 128-box model, and these are all of the groups that are newly articulated.

Essentially, as a guide, I used the stock status information from your region, but these aren't necessarily all of the groups that have assessments, and so, essentially, what I did is I went through that stock status information and basically, as a very rough guide, as an initial cut, I went through and essentially just plotted the ABC values for all of these species that are managed, and then there are some, like these highlighted ones here, that I have not broken out yet as articulated functional groups, essentially, on this approach, because there were such low ABC values.

Of course, ABC values don't necessarily represent the ecological or the socioeconomic importance of each species, and so I was just using it as a very rough cut, because it might be useful to go through each one of these and really think about whether or not they should be excluded from the model, but all the rest of these are deemed to be relatively more important, if you will, and, therefore, they were included in this list here, but it would be good to have feedback on the overall functional approach. I can just show you the model itself, and I'm assuming you can see this, and so this is the Ecopath model that I am working with.

MR. BOSTON: Tom, one second. Those of you that have a screen up, you can see it better. There is a big screen right here if you want to take a peek at it as we go through.

DR. OKEY: So you're saying this isn't coming through with most people?

MR. BOSTON: It looks great on our computer screens. The main projection screen, it's the same problem that Rua was having. It just kind of washes out the colorations, et cetera.

MR. PUGLIESE: One thing that I tend to do at all of these meetings is this is all being projected online, and so you can easily go in and log in and just be watching it on your screen while it's being presented, and I do that at council meetings and at advisory panels. Just log into the online link, and you can watch it. Then you can see the more detailed screen, versus having to rely on the overall screen.

MR. GEER: If you want to do that, go to the council website, go to Meetings, and our AP meeting will be there. Click on today's date and fill in your name and email address, and just keep going through it. It takes about a minute-and-a-half, and this will come up on the screen.

MR. BOSTON: Sorry, Tom, but we just wanted to get everybody up, and, just so you know, a lot of folks have it on their laptops that are watching the presentation, Tom, but our projector just doesn't have the throw weight to get the color definition in some of the stuff, but just keeping plowing. You're good.

DR. OKEY: Okay. Fair enough. It's really just some general points anyway, and you don't have to see any particular numbers, and so this is essentially a basic input interface for the Ecopath model. There is 128 functional groups, and what we can do is we can take a look -- If we're getting too many functional groups, we can take a look at some of the groups in the model and decide to actually aggregate those groups and, thus, make the model smaller, depending on what our priorities are.

In a previous iteration, there were number of bird groups, and these are -- From 85 to 91 here are all different bird groups, and so bird people will like this, and other people will think it's maybe not necessary, depending on what our questions are for the model, but I myself have tended to have highly-aggregated models, especially in a setting where the questions aren't really even identified yet, and so the model will be useful for a lot of different questions that come up, because it's a lot easier to aggregate a model than to disaggregate one. When you disaggregate it and need a lot more groups, it's a much bigger process.

I always start by erring on the side of what articulated these models, and that has worked out pretty well, but, nevertheless, we can take a critical look at some of the functional groups, the lower trophic levels, many of the benthic invertebrate groups, and determine whether or not we are going to have questions about those, because I know that, in this region, a lot -- Well, almost everywhere, people are really focused on the fishery-targeted fish species and some invertebrate groups. Of course, you also don't want to completely miss the important flows that link the benthic productivity and the benthic ecology to the demersal and the pelagic parts of the system.

Other considerations about aggregation relate to explicit articulation of sub-systems, spatial sub-systems, which we have focused on before, in let's say the Prince William Sound Model. We had nearshore groups and offshore groups that we split up, and that turned out to be pretty useful, in terms of looking at the dynamics, but that was very early days for Ecospace, and so there is less of need, oftentimes, to explicitly articulate spatial nearshore and offshore groups, because you can express them in space much more explicitly anyway, even when they are just single groups, if you get my drift.

Another really important consideration, which relates to our earlier conversation today, is regarding ontogenetic stages and whether we're going to -- The extent to which we're going to use stage-based modeling for some of the groups that you want to use it for, but, when you have a system that is -- What that means is that you can link -- You can define and link juvenile groups, let's say two or three groups in a system for a particular species that are let's say the small, medium, and large.

Let's say the larval, or the really small juvenile groups, are affected more by things like advection, or it might have different diet compositions all together, but, if we actually had let's say stage-based linking like that, these are like population models within the overall food web. If you had the stage-based modeling for all of the groups that are managed, that would be way too big of a model, and so some feedback might be useful about the extent to which people are interested in having stage-based modeling for various functional groups, but that kind of discussion should happen sooner rather than later, because that also affects all the work that is putting into finalizing and then balancing a finalized model, and so that's why we have to decide -- Always decide as soon as possible about what the list of groups is going to be.

This is just a diet composition matrix of the whole system, and, like I said, I was looking at gag, which is 47 here, and just adding information on gag. I am beginning to add information for that diet composition and then finding out that there are a couple of categories that aren't even in this big model, the Syngnathids for example. Then having to make decisions about how to add that.

Then we have information about our fisheries, and so, currently, we have eleven fleets defined, and, again, it would be great to get feedback, updated feedback, on whether to articulate these particular groups. Dave Chagaris had actually four recreational categories. We only have one recreational category here, and then this matters -- All of these things matter when we try to do our query to estimate the landings for each of the gear types for each of the functional groups in the system, and so this is all the landings and tons per square kilometer for the gear.

Recently, putting together a new iteration of the Prince William Sound in Alaska Model, once we decided on the new articulation of the group and all of the new gear types, then it was actually pretty quick work for Steve Kaspersky of the Northwest Fisheries Science Center to query the NOAA/NMFS database on fisheries landings and get a pretty complete output of fishery landings for that particular area, and I know it might be -- for the South Atlantic Bight area that we need to look at to do those queries, but it was pretty integrated in the NMFS database that Steve had his hands on. We need to have the model -- We don't want to go and re-jig the model, rearticulate the model, after we do a query like that, and so it's a -- kind of thing.

Then, of course, there is discard estimates, and so this is a whole additional sheet for discards as well, but we have to account for all of the flows. Sometimes the discards is a lot more difficult to estimate, as you know, and so this was -- This sheet here, and this is just an Excel spreadsheet that I'm putting up now, and this was basically all of the new functional groups that we added to the model, and I think I've shown you those before, but it's showing here that we were really breaking out the grouper and the snapper groups and a couple of porgies and a couple of triggerfish and so forth, and a couple of other groups that we didn't have, cobia, Atlantic spadefish, hogfish, et cetera.

Again, it would be good to get feedback from this group about these approaches that we've been using and maybe possibly taking a final look at all of these -- These highlighted groups here, this is from the most recent stock status, and, again, these highlighted groups are not articulated in the model, because they rated low here with ABC, but, again, that's a really rough -- Maybe some of you say that wouldn't be the best approach, but it's a screening level approach to identify groups to break out, and so, again, the ones in white here are the ones that we did add or articulate and break out of the groups, and, for these, we didn't dis-articulate, and what I mean by that is that is that -- This was the original spreadsheet here of all of the membership of species in all of the functional groups that we had.

You can see names here, in this Column E, of all these people you know, and these are all your friends and colleagues who have focused on particular functional groups and made sure that the membership was proper, and so all of the groups, all of the fish in the whole system, are included in the model, but most of them, in this earliest version, were really highly articulated within these particular functional groups, and so this one is called pelagic oceanic piscivores and pelagic coastal piscivores, and you can see the challenge of working in a system like your system, like the South Atlantic Region system, with such high diversity of fish species, unlike a place like Prince William Sound with a much lower diversity of fish species.

Essentially, what I'm saying that we did is, when we added a group, we -- What that means is we essentially moved that group out of demersal coastal omnivores or out of whatever functional group it was, and so then obviously, yes, this implies that the overall integrated values -- You can imagine how much work might go into estimating the parameters, just basic parameters, for a really highly-articulated group, because what you need to do is you need to identify parameters for all the species, theoretically all the species in the articulated group, and then come up with representative values for those articulated groups, and so I sense it's easier to have individual species and parameterize those species, but, of course, you can't do that for a whole system with such a diverse assemblage.

Back to just basic input of the model here, and this relates to when we -- One of the parameters that is really important is the estimate of the biomass in the overall region or the area in tons per square kilometers, and, as you see, as I've added all of these groups, I have, for the moment, left these biomass blank and essentially added a placeholder ecotrophic efficiency value so that the model will -- For the moment, for the time being, for the interim, it will estimate the biomass of those new functional groups until we can go through all of the assessments and make sure that we have the most updated estimates for each of those functional groups.

If we put placeholder values for the biomass in here first, then essentially we have to -- When we balance the model, like a strawman model, in an interim sense, then we would have to adjust other parameters, such as diet composition and production of biomass, which we don't want to do if we have high confidence in the diet composition and the production of biomass. It's all interconnected, and we have to do it the smartest way possible as we go forward and put higher weight on those values that we have high confidence in and to just make sure that we don't mess up the values in the model and identify the low-confidence values to adjust when we're trying to thermodynamically balance the model.

A general theme is that -- What I have found is that, and this is heartening, and it sort of makes sense, that the more values, the more data and information you can put into your model, especially when you have high confidence in those data, the closer the fit is, which you would expect, but it still sometimes amazes me, because it indicates that sometimes the data are relatively good, and we want to learn those things, but, ultimately, once we put this together, we're going to be able to -- Someone said earlier today the old adage of all models are wrong, but some are useful, and that is true, obviously, but it's amazing actually how much insight you can get, and hopefully it is insight, instead of being fooled, but the insight you can get from these models once they are put together.

I think Carl Walters has said that he has been amazed as well, at times, how robust they can be in answering some questions, but, of course, this is a complement to the bread-and-butter kinds of stock modeling that goes on, and hopefully it will add value to that. Anyway, now I'm babbling a little bit, but I think that I wanted to kind of stick with this nuts-and-bolts discussion, but Rua, I think, is going to discuss what progress he's been making a little bit with exploring some of the parameterization of the Ecospace approach, but I should stop, for a second at least anyway, and just take any questions that you might have.

DR. LANEY: Tom, you may have said it and I may have missed it, but are you all trying to update the data layers as new stock assessments come out, especially with new discard estimates in them, because I know that, even though they weren't accepted for peer review, the recent ASMFC stock

assessments on Atlantic croaker and spot have greatly improved the discard estimates in them for those two species, especially in the South Atlantic shrimp fishery, and so I just wanted to, one, make you aware that those exist, and, two, ask you if you were doing that on a routine basis as new stock assessments come out for each species.

DR. OKEY: Thanks, Wilson, and that is our goal with this model, that we are going to parameterize, and especially look at especially each of these important new functional groups and bring the best and latest information that we have with them and actually never think of this model as a finished product, if you will.

Obviously we do want to -- We want to finish it, in the sense of having a working and operational model that we can all use, but, as we move forward in time, it has to always be able to accommodate all the new information that we have, and one thing I should mention is that we can rank the quality of -- There is an interface in Ecopath, which is called Pedigree, and so we can rank the pedigree of the data for each -- Not just each functional group, but each category of parameter within each functional group so that we can keep track of -- Then obviously we can have explicit notes within each parameter so that we can know exactly how each parameter was developed and what the source is, so that we can always update it, but, yes, our goal is to have all of the latest stock assessment information, relevant stock assessment information, within the model and then to have it be updated, so that we can continue to make it better over time. The general answer is, yes, we want to do that.

MR. GEER: Any other questions for Tom at this point? I don't see any hands going up. Okay, Tom.

DR. OKEY: I guess we're -- Rua is there, and I guess we're going to switch over to Rua.

DR. MORDECAI: Yes, and so, if you want to switch over, I will do the quick Ecospace and catch up. I will hit real quick on -- I think Tom did a good job on the general Ecopath and the functional groups and some of the other data. I am going to hit real quick on the sort of spatial component, and so I will provide a little background, which I think sits very much into the discussion we had in the morning about some of these different spatial components.

From an Ecospace perspective, now we're taking a lot of the stuff of these different functional groups and things that Tom was talking about and making it spatially explicit, and so getting at some of these densities, and so now you see the obvious intersection with the spatial prioritization and the blueprint itself.

Ecospace is your sort of spatial temporal component, but then basically what it's doing is it's simulating within each of these different cells in the grid, and so there is some extra inputs, extra information, things like movement and habitat and fishing and the environment, and so then you have basically these different groups and the fleets kind of trying to move around to try to get near optimal conditions, and so you can get some really -- Now you can expand and ask some really interesting spatial questions, and Tom hit some of those ones about -- There is definitely sort of policy and where it goes, and there is things about oil spills and algal blooms and all kinds of other questions that you can start asking.

Here is sort of an example from another -- It's just to kind of give you a flavor of some of the general types of sort of habitat aggregations that we might be breaking down, and so here is some different fisheries on one side. This is the fishery spatial component. Then, on the top, you basically have these different habitat components of different depths and substrate types, but, also, in this case, a marine protected area, and so now you sort of can basically have the fleets and the functional groups operating in different ways based on the questions you want to ask.

That is very cool for some of those interactions, and then, from there, you can actually get some of these predictions under different scenarios and simulations of basically things like relative biomass and effort and catch across all the different functional groups that Tom was just talking about, and so this is an example from some other models, just to give you a flavor of once stuff is fully pulled together.

Here is some of your common uses, which fit fairly well, distributions in marine species and fishing impacts, spatial impacts of fishing in different places, management options, and then also the environmental change, which is a big one that we'll talk about, and some of the improvements now give us a chance to start forcing some interesting questions related to sort of coastal conservation and contaminants, and even things as far as living shorelines and stuff that we may be able to then think about how some of those environmental changes, like acidification and temperature change, we might be able to then propagate it through the system.

A lot of this is building up the foundation for us to start asking some really interesting, nuanced questions. There are a couple of big, new developments, and so Ecospace is still growing. It's still got some improvements, as far as how much it can handle, as far as resolution and things, but now there are some really good -- Especially the environmental effects on species, kind of the why are the species where they are, and that really opened up a lot of different opportunities to start changing things, like changing a temperature layer or changing a contaminant layer or changing some of the habitat layers based on future changes or actions and then have the species move in response to that, instead of just sort of being static habitat that stays that way forever. That gives us a lot of new flexibilities.

I think kind of the big component here, the two pieces we're working on, on the space, when you get outside of the fleets, is thinking about these functional groups and thinking about where are they and why are they where they are. We're kind of setting up this -- Here is an example showing this habitat foraging capacity model, and this is to give you kind of a vision of where we can start going into the future.

This is a fairly simple one, just showing a few of the groups, and, in this case, there are two components. There is that kind of habitat levels, which are just sort of more static habitat, and it just sort of sits where it is, and then there is these environmental responses, where you're using some of these variables, things like temperature and salinity, and then actually predicting what the capacity is going to be like based on specific kinds of models and relationships to them.

You basically need some -- Not surprisingly, we need some environmental input maps for those different pieces, and so typically things like depth and temperature and whatever components we're going to be putting in here, and so these are the environmental inputs, but things like temperature, for example, will drive capacity. We can change that and then see how that might then change the dynamics of the system.

Then you get basically some of these more spatial components of the map, and so we have basically kind of taken the simulations and then run the model across a whole bunch of different pixels across the geography. Probably, from the testing, and I don't know yet, but the testing I've done is it's probably going to be something like ten-kilometer-square pixels, maybe. So far, I've been able to get stuff in there without Ecospace choking. If I try to get more finer resolution, it's not happy about that just yet, and so we'll see. I'm guessing that's about the resolution that we would be able to do the South Atlantic at, but we'll see as we start putting the functional groups in.

We start populating some of these parameters, and you can start bringing in currents and bringing in some of these other components and then define these response curves of, okay, so how, from a foraging perspective, how are these different functional groups going to respond to these different spatial layers, and so, essentially, what's nice about some of these is that you don't have to just make it a complete 0 or 1, they're here or they're not, and you can start having more nuanced habitat relationships across these different drivers.

From that, basically then you can break out the individual groups, the various drivers and responses, and so we'll be keeping things really simple at the beginning, just to kind of get things functioning, but I think the key part here is that there's a lot of really interesting nuances and room to grow as we kind of start trying to build more and more complexity into the model.

Here again, basically we're parameterizing these different inputs, and so this is setting up a run. You've got, in some cases, environmental drivers. In this case, depth, temperature, distance from coast in some of these, and habitat foraging components. Then you basically come up with this density model for each of these different groups, and so then here is sort of a hotspot example showing some these density models, and I'm not going to go through this full Mediterranean one, but I just want to give you just a quick flavor of these pieces, and so here's an example in the Mediterranean.

They brought in some environmental drivers, primary production, salinity, temperature, depth, and so some of these things that -- Some of which can actually change and vary, but are driving where the species are. They pulled a lot of the responses back in from AquaMaps, which we can pull some of those basic habitat relationships from. I have not played with this plug-in yet, but that's one of the things that's on my list, to kind of grab some of those ranges from.

Then, basically, they kind of assigned the relationships to each of those different functional groups to give these basically habitat capacity input layers, and so now you have the whole functioning food web component going, but now the capacity and the relationships and the density is now allocated across this space, and so they're going to be playing back and forth with the fishing fleets in those dynamics, but they have a bigger approach to their capacity. Here is another sort of example on the Western sardine. You've got more of the capacity up near the coast there. Then, when you end up with runs, you end up with, again, the spatially-explicit predictions for all your different groups.

These are basically some of the components, in general, that we can do in Ecospace. Advection is one that's kind of in the works, but, for some of these existing driver layers, we can bring in primary production, habitat, fishing costs, marine protected areas, contaminants, migration, this computed foraging capacity based on a few different input layers to kind of create your own habitat

models, and so there's a lot of flexibility eventually for us to do some fancy stuff, but, for right now, we're really just kind of starting off with the most basic of the basic. Let's get some basic drivers and habitats maps for these functional groups and then get the simplest model running.

Some input, I have been digging into input data layers, looking at ones that will cover the whole region and then looking at ones that are a little more kind of better resolution. One of the things that I've been working with a lot is some of the -- I think it was Anne or something else mentioned earlier the South Atlantic Marine Bight Assessment. That synthesized a lot of information on things, including substrate and depth zones, and so this does not cover the whole council area, but it does cover a lot of those kind of key species that are focused in on.

I started digging into some of that, and it should work for a lot of the different groups for sort of habitat and a few of these layers, but then, also, I pulled in some other datasets that go outside of that South Atlantic Marine Bight Assessment to cover the full area as we start getting into the deeper water pelagic species and others, and so other equivalent bottom layers, and so it will extend to other datasets for groups that need it, but here's just a quick visual here, from a data coverage perspective.

The dark black outline is the council boundaries, unless somebody tells me that I'm totally wrong, but that's stuff I pulled off the site, and then here is an example showing the different substrate types, and I know a few of the folks in the room were involved in that South Atlantic Bight Marine Assessment stuff, and so some of this should be familiar to you, but that was some of the best substrate information that could be helpful for a number of these different models that I found.

They're still coarse categories, and, as you start going further outside of that ecoregion, then it's a little rougher, the datasets, but I'm working on cross-walking that to get close equivalents. That shows you an example for some of the substrate types, and then there's also already some spatially-depicted depth zones that came from some of the integrated bathymetry, and so those were ones that came out of that effort that is sort of based on the different species that were found, and so that's what I have been starting on, just kind of using those stock depth zones as a starting point, break zones, and I know there's a million other different depth zones one. I know the council has experimented with some too, but these are already depicted in GIS, and so that was a good starting point for pulling those layers.

Then, just to give you a quick visual, grouping together -- I think, before, the triggerfish were in one group, and so I think they're split now, but just a quick, simple example, a very quick-and-dirty version of that. You've got something like your triggerfish and pulling in a couple of different depth zones where they seem to occur and then sampling it down by substrate to your more hard bottom types, and you can start getting a little bit more specific details on where those core areas will be.

Basically, right now, just grabbing some of the data and getting the core base layers to do environmental envelopes and start filtering down some places that will work for the Ecospace component of it.

Then, just kind of like Tom was showing before, the next step is basically kind of building up that spreadsheet to filter these different functional groups based on those habitat variables, just kind of aligning them to these different zones of habitat of where they're going to be, and so that would

be something -- We're going to get a start on it, based on what we have right now for existing information and get some of the models to function. Then that would be another thing that we would get out to the larger group, for you all to sort of take a look at, and then just kind of skim and make sure that those functional groups seem to be assigned to the right depth zones and substrates and things like that.

We should be able to pull that information from some of the existing sources, and so, that way, when you all are looking at it, it will be more of just sort of any information that was missing or errors and that kind of thing, but that is the plan on the Ecospace side, and so I know that was a -- We've been going for a while, and so I gave you the quick, whirlwind ecospatial component of that, and so any questions, in general, about that sort of approach of just getting the base GIS layers and attaching them broadly to functional groups?

DR. LANEY: Rua, for the birds and the spatial dimension, obviously the currents are going to be an important element in that with regard to convergent zones and preferred feeding locations and things like that, and do we think that we have enough data, distributional data, maybe from John Stanton and working with the Service's seabird group, to be able to come up with something spatially useful for the bird groups as well?

DR. MORDECAI: Yes, we have -- Thanks to that Duke -- What you're seeing right now is this is avian abundance for all the species, normalized across the geography, and so white is higher and then black is lower, but we can -- Because of those species layers, we can break them out in those different subsets, and so I think the answer is, yes, I think we have a reasonable full coverage. This is about two-kilometer pixels right here that we can filter in, and so basically the plan -- One of the challenges still is that it doesn't totally extend all the way down to the full section of the council.

I'm still working on the best way of dealing with -- It doesn't go that full section out, the Dry Tortugas beyond Key West, but the plan right now is to take the fisheries stuff and then take the marine mammal models that came out of Duke and the seabird models that give us density for those different groups and then use that for the seabirds, use the marine mammals for the mammal components, and then, for the fish components, basically just use their habitat relationships for those predictions.

DR. LANEY: One follow-up, Rua. My perception is, based on what you and Tom have told us thus far, is that the model wouldn't have as much utility -- Say, if we wanted to look at a single species, for example black-capped petrel comes to mind, or Bermuda petrel, and so is it even conceivable to think that, at some point in the future, we might be able to use it for a single species application, or is that just beyond the realm of possibility?

DR. MORDECAI: You could definitely -- Tom, correct me if I'm wrong, but there is no reason -- Some of the groups are just single species that are broken out, and so it's a balance of -- Anytime you break out any species, there's a lot of care and feeding and balancing to do, but a lot of those are broken out in different places, and that does actually -- For some of the council species, there is some of those components that were broken out specifically for -- Because you wanted to ask a question about them and there was enough information, and so I think that's a very good question about something like a -- When we think about the functional groups from a bird perspective, that is something to visit, is do we want to actually break out the black-capped petrel or one or two very specific species that we might want to use this model for.

There's nothing -- I mean, it's really only the data, your ability to kind of have a reasonable proxy based on the data, that gets in the way of individual species stuff, and just a lot of care and feeding, but I think that's a good question, and so maybe that would be a good follow-up on if we want to break out -- Kind of pick one bird-related question, or kind of one or two species that may -- Look and think about that as a functional group. Any thoughts on that, Tom?

DR. OKEY: Yes, and I would just add to what you were saying, and I agree with what you were saying. Once the model is put together, and, as you see, there are a lot of individual species which are their own functional group, if you will, then we -- You can really explore any question you have with -- Well, many questions with those individual groups.

I think an important point is that we're going to be able to get a good idea and tell what the model is telling us about those particular species. For some particular species, the model won't be as useful as it is for others, but, just because of issues of scale relative to what that particular species does, but we're going to know what the limits are of what this particular model is telling us about that particular species, and we can obviously -- If we have questions about a particular species, as Rua was saying, we can really structure the model differently or design it in ways that can give us more skill in learning something about those species, and obviously we can -- In addition to whatever other approaches you have to focus on that species.

Yes, there are single-species approaches that are useful, but then, of course, there is an advantage to this whole food-web approach, because there is other things with predators and prey and competitors that affect the species, and so it's just part of a comprehensive approach, even if your focus is one particular species.

DR. MORDECAI: It's certainly something worth exploring if we've got the right hooks and pieces, because that's the interesting thing, about how pressing on one part of the ecosystem, either through its sort of fleet policy or environmental drivers or things like that, how does it cascade through the rest of the system and doing some what-if scenarios. I think that's the strength. When you do that, then you could make an inference about what that might mean for all these different species, and so, through the bycatch, through the policy, through climate change, there is a lot of hooks in there, and so it's certainly worth exploring.

DR. OKEY: One last point is some people, because of our culture of the way we think of these models and understanding the models, because of this famous paper *Models and Muddles* by Joel Hedgpeth -- That really influenced our culture about the way we think about models, but I don't think we're in any danger, because, again, we're going to know what the limits of the model are, and obviously you always have to understand what it's telling you in order to be responsible with the interpretation of the model and everything, but we can -- It's transparent. We can see what the limits are, and so there's not a huge danger, in my mind.

MR. PUGLIESE: Just a comment. I think a lot of these specific discussions are going to happen next week. We have the modeling workgroup and re-looking at where we've gotten to this point, to look at how that aligns with say some of the depth contour and components that we've been working with, to look at supporting kind of the broader mapping strategy and how that may be able to also affect the way we look at species distributions for managed species, look at the habitat distributions that we have and what may be the best representations of some of those, and I think

those are going to be all key to defining how this evolves even further and very specifically toward council needs on species-specific questions and what's going to be the best avenue.

I know there's been that ongoing discussion about, well, if you collapse some of these different groups, is that going to make the model operate more efficiently? Can you address the specific questions for species-specific questions better, and I think some of that discussion will occur next week, because I think there's a real desire to make sure that there's not going to be some limitations by doing that, and I think the modeling capability has evolved a lot further than before, where you really did try to focus almost exclusively on a very limited number of groups, so that you could address specific questions.

If it's not doing that, then maybe that broader model that has even that detail at the bird level, because I've already had comments from some of the participants about we should just collapse these in the core models so that it functions faster or has the capability, and so those are some of the discussions that I think we need to make sure that we have, because we have our SSC Chair and Vice Chair directly involved on that, and they're going to want to make sure that it can produce and provide some of the capability and the best representation and some of the best tools as we evolve the model into the future.

DR. MORDECAI: The plan right now is to basically try to move quickly towards prototyping this stuff out and getting things functional and getting things so we can figure out where the rough edges are and where we can do what we can.

MR. GEER: Is there anything else for Rua or Tom, any comments or questions?

DR. LANEY: This is one that Mark, sitting next to me, asked me this morning. Rua, what is the budget looking like for the -- I think we're in pretty good shape for the rest of this year, because of the continuing resolution. Any comments at all or thoughts about what the budget looks like for next year, and I am asking that from the perspective of the council having a very intense interest in seeing this work completed and this model being gotten to a point where it will have a high degree of utility for the council, and so I would hate to see anything happen that would slow the process down or adversely impact the ability to get it completed, and so that's where I'm coming from.

DR. MORDECAI: I would say mostly giant question marks. I mean, no one knows. I think, as far as core capacity for the cooperatives and functioning, I think that we seem to be in pretty reasonably good shape for that. Basically, even if there's a big -- I think we're good on staff capacity on the cooperative and being able to continue to help out, kind of like I've been helping out with stuff, and I think we're good. We've got the project right now to get us to a good, reasonable, kind of usable version, with Tom and everyone else, and so there's still carryover for a little while.

Yes, as far as for the next steps, we're trying to read the tea leaves. It's anyone's guess, right? You never know. Congress goes wherever Congress goes, and, other funding sources, I think there's like Pew and foundations and non-profits and state sources, and so it's pretty hard to tell what it's going to mean for federal investments and what it's going to mean for non-profit investments or state investments or other things. It's a tough guess. The only thing I can say is

that at least having a -- As far as capacity of myself and some folks on the cooperative to be able to help out as staff with this, it seems pretty sure for the near future.

MR. PUGLIESE: Just the fact that this is actually a two-year funded project that does have integration of not only the core Ecopath/Ecosim/Ecospace, but also the beginning of integration of oceanographic modeling capability and even participation on how you refine and connect to the estuarine modeling capacity, there are those built into this frontend project already, and so I think the fact that -- I think both Rua and Tom have elaborated on the fact that so much other work has been done since say the forage model, in terms of all the stock assessments that have been accomplished, the diet information, the habitat distributional, the new functionality of Ecospace.

Those are all going to really provide the foundation that, when we get to the end of this project effort right here, it's going to actually provide something far beyond anything that has existed in the past and have some of the capabilities of moving toward even providing management strategy evaluation, because that's actually a backend component of the Ecopath and Ecospace system.

That is the hope, and hopefully we keep on having the support from the committee and advance forward, and that's one of the biggest things that I push, as the participant directly in the LCC, is to keep these types of things, and it's going to inform the overall blueprint in the whole system, and so I think it's a critical part to really define how the marine system works and how the connectivity is, and so hopefully that's going to be enough to make sure that the first iteration advances and then it's backfilled even beyond that. It's too critical, at the stage I see.

MR. GEER: Okay. Seeing that it's almost lunchtime, you guys planned that perfectly. I've got 11:59, and that was perfect timing. Tom, on behalf of the panel, I want to thank you very much for your time this morning. This was very informative, and it was great information, and we look forward -- We wish everybody the best of luck with their funding, first of all, and we're looking forward to seeing this continue and seeing the connection between the ocean and the land get better and better, and we're seeing that already, and so, with that, I want to thank you both very, very much. We will get these presentations, and we'll be able to get that to the whole AP. With that, we will break for lunch and be back here exactly at 1:30 and no later. Thanks again, guys.

(Whereupon, a recess was taken.)

MR. GEER: Everyone is giving me requests to finish early, and I will do my very best, but some of those are just unreasonable requests. I am going to do my very best, but 2:15 is not reasonable. All right. Welcome back, and the first person this afternoon is going to be Pace. Pace is going to be talking to us about the Frying Pan Shoals project in North Carolina and some issues with that, and so, Pace, you have the floor.

MR. WILBER: Before I get into Frying Pan Shoals, I'm going to do sort of a brief overview on the execution of our Habitat Conservation Program in the South Atlantic. That is something that Roger has often put on the agenda and, in the pressure to get out early on the last day of the meeting, has often been kind of lopped off, and so I'm going to actually do it this time.

For those of you who don't know, the Southeast Regional Office of NOAA Fisheries -- This map quickly shows how our Habitat Conservation Division is distributed across the South Atlantic. I do want to remind folks that the Habitat Conservation Division goes from Texas to North Carolina

and out to the Caribbean. I am just showing the Caribbean in the South Atlantic part, and that's the branch that I lead.

We have field offices in Beaufort, North Carolina, Charleston, West Palm Beach, San Juan, and St. Croix, and we formerly had an office in St. Augustine. The folks listed there are staffing those offices. We have twelve full-time folks and two folks that are highly tied to very ephemeral money sources.

In the past couple of years, we have lost seven of the twelve permanent positions, but we've been able to hire back four of those folks, and we have, on the staffing plan, one of the other remaining three that we feel pretty confident that we're going to be able to hire back, and so part of sort of the lack of productivity from our group is really tied to the fact that we were just caught in a bad place, between retirements and folks, for family reasons, moving to other locations and so on.

Our Habitat Conservation Program is rooted in three acts passed by Congress. There is other acts from Congress that affect our habitat program, but, in our view, they more affect how we execute it, as opposed to the underlying authorities. The oldest is the Fish and Wildlife Coordination Act, which traces back to 1934, and, under the predecessors in the federal government, it ultimately morphed into the National Marine Fisheries Service. Those predecessors were commenting from the mountains to the coast and out, eventually, to the EEZ on all sorts of activities that affected fish and wildlife, through either licenses from the federal government or actions by the federal government.

The Federal Power Act from 1935 also gave the predecessors to the National Marine Fisheries Service the authority to issue fishway prescriptions and make flow recommendations at hydropower facilities. That is a big, long story, and I'm not going to talk about that today, because, if I get down to that, I will go off into a twenty-minute sidebar and we won't get out early.

The last act I want to mention is the Magnuson-Stevens Act. That was authorized back in the 1970s and reauthorized in 1996, and the 1996 reauthorization introduced the concept of essential fish habitat. Now, one thing that we always try to stress, especially when we're talking to our headquarters, is that the Magnuson-Stevens Act reauthorization did not add to or subtract from our authorities under the Fish and Wildlife Coordination Act and the Federal Power Act.

What it did was it gave us a very clear message about what part of the geography we should be focusing on and how that focus should relate to fisheries management. A lot of what stemmed from all of that was the whole idea of which areas are most important to supporting the nation's fisheries and what actions should we be taking to support our nation's fisheries through habitat conservation and what are the obligations of the agencies that receive our EFH conservation recommendations.

This is a quick map, and I will admit that this is an FY14 map, and I need to update it, but this shows the consultation load within the branch, exclusive of the Caribbean. We receive roughly 900 to 1,000 consultations a year, and there is a couple of things to note here. First is that there's an extreme focus literally right on the coastline. There is very few consultation requests that we get that are out in the ocean in federal waters, and there is relatively few consultations that we get inland, well away from the coast.

Now, the sidebar story to that is that, under the Corps of Engineers permitting process, most of the development that occurs inland occurs through a nationwide permit or a programmatic general permit or something else that is sort of already pre-triaged to not result in an individual permit public notice and doesn't end up on our particular list. If I showed you, for example, for Georgia, what the nationwide permit distribution looks like, almost the entire State of Georgia would be covered with little dots here, but, again, for the larger projects that get individual permits from the Corps of Engineers, there's an extreme focus literally on the coast.

The other thing to note too is, if you look at -- Maybe you can't see it up there on the screen, but the black dots are the ones that we call no-staffing responses, or no-staffing letters, and so those are the consultation requests that we receive and we determine that we don't have sufficient staffing to respond to, and we send a no-staffing letter, or a no-staffing response, back to the Army Corps of Engineers or to the other federal agency that initiated the consultation. If you rack it all up and count them, of the 900 to 1,000 consultation requests we get in a year, typically 55 to 60 percent receive a no-staffing response.

Because so many get no-staffing responses, there is a lot of worry on our part and pressure from other people on us to really kind of determine what's really our 100 percent requirement. I mean, how many of these consultations do we really need to respond to in order to faithfully execute our habitat conservation mission? I am going to talk about a couple of things that we've done to try to get a better handle on that and sort of finish with some conclusions about how we're moving forward.

What this donut does here is it takes two years' worth of data, and this is actually Fiscal Year 2013 and 2014, and so we're talking almost 2,000 consultation requests are captured in this donut here, and it divides them up by the type of activity that was the focus of that particular public notice, and you will see that, by far, the most frequent consultation request that we receive in the South Atlantic Branch, across our geography, is somebody wants to build a dock or modify their dock, 52 percent, and so, out of 2,000 in two years, we're talking over 1,000 dock things come in over the transom.

The next most common type of activity we get is development, some sort of development, whether it's a large residential complex or a commercial development or a municipal development or some sort of mixed use. The next most frequent kind of request we get is tied to our nation's ports and navigation system, at 9 percent, and then, lastly, to finish out the top four, is 8 percent is some sort of transportation project, almost always a highway, but sometimes it will include like a railway or some other form of transportation. So you can see that this is well over 80 percent of the stuff that comes in that falls into one of these four categories.

Another way to look at this is acres, and so we spend a lot of time working on how to move from this simple tally into acres, and we actually had an interim, Zachary Steinkoenig, who worked with us for a year-and-a-half before we went off to the Philippines to design MPAs, and so most of the acreage data that I'm going to talk about is really attributable to him, but this is how it looks in terms of acres, and so the most common, terms of acres, is beach nourishment, accounting for 38 percent of the acres that came in.

Second is navigation and ports dredging and third is development projects, and I'm going to skip over the Everglades for a second and go to transportation, which is 7 percent. Now, just real

quickly, my sidebar on the Everglades is those are part of the South Florida Ecosystem Restoration Project, and those are projects that we either no-staff or sometimes sign a very simple no-objection letter for, but those projects are hundreds and hundreds of acres when they come in, and so it only really takes a response to one or two of those projects in order for the acreage tally to get really high. They're also very well coordinated with other offices in NOAA, and so we don't really kind of dabble much in those areas. The question that people always ask is what happened to that 52 percent that was dock projects, and the answer is 0.02 percent of the acres involve dock projects.

Another way to kind of look at this acres thing is we took a typical year, and, again, this FY 2014, and we just sort of took all of the public notices that came in from all the various agencies and assigned an acreage to them, and then we just listed them from the smallest one to the biggest one, and so this is an accumulation curve here, and so the cumulative number of acres represented by the cumulative number of consultations.

You can already see a couple of things that are pretty obvious here. One is that, first off, I am quite shocked that we do over 26,000 acres of potential conservation through our public notice consultation process each year. It turned out that this FY14 number was kind of anomalously high. A typical number is more around 18,000 acres, but, still, an impressive number of acres do come into the office each year to review.

The second thing is that the top 10 percent of the projects account for 90 percent of the acres, or actually 94 percent of the acres, and so we only really need to work on 80 projects if we want to cover 94 percent of the acres that come into the office, and, if we kind of took that triage quite literally and just stuck to it, what we would end up doing is focusing on beach nourishment projects, the navigation and port expansions, the large commercial development projects, and the transportation projects. The others would just fall through the cracks because of their small size.

One of the things we did was then, okay, we go back to our 600 or so no-staffing letters that we do in a typical year and how well are we doing as far as implementing this basic triage process, and this graph we are using to do that check, and it shows the percent projects reviewed by the states in the South Atlantic, with the idea that north Florida was broken up into NF, and south Florida, which is West Palm Beach, and then the Caribbean is lumped together with Puerto Rico.

The first check to see is, if we really are using EFH as a good tool, rather than focusing on everything available to us under the Fish and Wildlife Coordination Act, it's that the blue bars should be higher than the red bars in this particular graph, and you can see that's generally true. There is only one real exception there, and that is the hatched red bar for acres in West Palm Beach, and that was due to the anomalous effect of one of those South Florida Everglades Restoration projects that came in through the door.

The other part of this triage check is that, if we're really using acres well to triage our work, compared to numbers, then the hatched bars should be higher than the corresponding solid bars for both the EFH work and for the Fish and Wildlife Coordination Act work, and, again, you can see, in almost every case, the hatched bar is equal to or higher than the corresponding solid bar. There is a couple of exceptions in Georgia, where there are some -- The low number of projects can kind of lead to some anomalous kinds of results, but, basically, we're generally using type of project and acreage as well as a triage process.

Another thing that we're beginning to pull the data together to do is triage by proximity, and this goes back to our three enabling legislations, and the whole idea is that we want to still focus on Fish and Wildlife Coordination Act projects, non-EFH projects, if we believe their position in the landscape is such that they will affect EFH. If you have a development project in a freshwater wetland and immediately adjacent to those freshwater wetlands is saltmarsh, that makes that project a high priority for us to look at. A similar-sized freshwater wetland impact that's well away from EFH, we're probably not going to look at it, unless it's extremely large.

Another way to look at that too is with the Federal Power Act. We put a lot of effort into restoring passage for diadromous fish across the rivers in the South Atlantic, prescribing fish passage and making flow recommendations and so on, and so any sort of public notice project that comes in and proposes development immediately adjacent to one of those waterways is also something else that we try to make sure that we have an opportunity to comment on. We're, again, just pulling the data together this year to sort of evaluate ourselves, to see how well we're actually implementing this proximity check.

One of the things that Rua talked about earlier this morning was how the habitat blueprint can be used to amplify other conservation activities within other agencies, and so we also will be using his blueprint to see how well our natural triage process is sort of reinforcing what are the high-priority conservation areas identified by the blueprint, and, if that's not the case, then we will see if we can make some tweaks to make that happen.

Another point, kind of related to how we triage the workload, is how do we spend our time, and, from FY10 through FY12, our branch kept some pretty meticulous records about how we spent our time, and so we can literally take each person and put them into a pie chart as to how they spent their year, and we did that for three years and got some satisfaction with the consistency of the results from year to year.

This is basically how that pie chart looks, and 35 percent of our time is dealing with consultations, most that come from the Army Corps of Engineers, but not exclusively. 30 percent of our time is dealing with either defending those consultations, negotiating permit conditions, or, more importantly, implementing the adaptive management that is tied to the authorization that sprung from that initial consultation.

You will hear me whine a little bit again about this in a minute or two, but, more and more in the last ten years, and the other regulators in the room may nod their head, but really contentious consultations are not resolving the contentious issues during the consultation process itself. Instead, the pressure is to defer those contentious issues into an adaptive management program later on.

If you kind of total up all of the commitments that are made during those kinds of processes -- In my branch, with twelve people, easily I could spend three people doing nothing but following up on those adaptive management commitments that are made. Unfortunately, the federal system has not yet proven to be resilient enough to actually track what those commitments are, to monitor whether we're making good on those commitments, and to somehow award or spank the groups that are unable to meet those commitments or exceed those commitments.

Another big hunk of our time, outside of the consultation world, is providing technical assistance to folks. That is helping folks like Roger and helping the Atlantic States Commission and helping the South Atlantic LCC, all sorts of groups that have a conservation mission, or at least a piece of a conservation mission that we feel we can contribute to productively, and we do spend a fair amount of time actually helping those other folks out. The remainder parts of this pie are just the little things in life that all groups sort of have to do.

Now, one thing that I want to note is what kind of pressures are on our time and how those pressures relate to our current pie chart of labor division. Every time we meet with a senior manager from NOAA or the National Marine Fisheries Service, they always tell us that you need to be doing more technical assistance. 25 percent is great, but you really need to be doing more.

I already mentioned post-consultations and how they relate to adaptive management and how much time that should take, and so we have a lot of pressure to increase the post-consultation work. We have a lot of pressure to increase the technical assistance work. The basic running the office kind of stuff stays the same, and so what's left? It's a zero-sum game, and so that means we have to spend less time doing regular consultations. That number is going to get smaller and smaller every year. We already noted that it's somewhere between 55 and 60 percent, and it's going to get smaller. There is no signal in our system that tells us that we need to reverse that. That's just where we're headed.

The other big pressure on our time are sort of the political pressures, and the simplest way for us to kind of talk about this is in ports. President Obama had what we called the We Can't Wait Infrastructure Projects, and, when you boil that down to the subset that involves our nation's ports, there were five We Can't Wait Ports. Four of those five We Can't Wait Ports, nationwide, were in the South Atlantic, and, just parenthetically, the fifth one was the Port of New York and New Jersey, which, the luck of my office, is several of our staff in the office used to have former jobs that had them mapping habitats in the Ports of New York and New Jersey, and so we couldn't even escape that project. We were still getting called for datasets and maps and interpretations and so on.

The other thing I want to note too is that, while there are five We Can't Wait Projects, the most dangerous project out there is the one that thinks it should be on the We Can't Wait five, but isn't. That's the project that wants to be constantly shovel-ready, so it can jump in the first time that one of the anointed five drops, and, in our region, that is Port Everglades, and so it's almost like we have five projects just within our region, and three just within Florida.

I can go on and on about all the time that we've put into those four projects, plus Port Everglades, in the South Atlantic. I have actually done briefings to this group on both the Port of Miami and Port Everglades and Savannah in recent memory, and so we won't kind of recap that now.

Again, coming back to where are we headed in the future, as to what our priorities are going to be, it's going to be beach nourishment, the large development projects, the navigation port projects, and transportation. That is just where momentum is taking us.

One other thing that's more of a sidebar is, last May, in Annapolis, Maryland, there was what was called the EFH Summit, where the fishery management councils and the Habitat Conservation Divisions and other interested parties all got together to talk about the really hot EFH issues, with

more of a headquarters kind of an audience, and I agreed to give a presentation on what was going on in the South Atlantic. Roger also agreed to give three presentations, I think, at that meeting and then left after the first day, and so you know who ended up giving Roger's other two presentations.

While I got a big pat on my back for stepping up and helping Roger out and everyone telling me that I did a great job, they also told me that I didn't do nearly as good of a job as Roger would have done, and so that was a fun meeting, but one of the things that we showed at that meeting that has gotten a lot of traction in headquarters, and we're hoping to continue to maintain, is a web service that's now available through the South Atlantic Council, where you can see essential fish habitat in the South Atlantic. You have our data there, and that's actually FY15 public notices, and they're all kind of colored up by the nature of the response that we made.

The one thing you can do is you can now click on those dots and bring up these little boxes that explain some basic background information about that particular project, and there is even a link inside those boxes. From that link, you can get our EFH conservation recommendation letter, and so this is, by far, the tightest partnership across the country between an HCD and its corresponding fishery management council for getting EFH information out there, and I have already got the FY16 letters ready to be shipped to Roger and Tina Udouj for uploading into the system, and we're working on ways to get this kind of done on a quarterly basis rather than on an annual basis. Before I get into Frying Pan Shoals and the Village of Bald Head Island, are there any questions about sort of the overview?

DR. LANEY: Pace, this one popped into my head, especially when I was looking at your cumulative acreage curve graph there. You know, some of you may recall a paper, many, many years ago, by one Bill Odom that talked about the environmental tyranny of small decision-making. I think it was somewhat -- That title is a paraphrase, but have you considered at all the local impact of reductions in biodiversity and reductions in habitat diversity that occur through those little tiny projects that none of us feel like we have the time and energy to expend?

We certainly don't have the staff resources to deal with those, and yet those impacts are continuing to occur, and I know we all tend to focus our energy on the big ones, because that's where the biggest payoff is and where we feel like we have no choice but to obligate staff resources to, but it still bothers me that those little ones are out there and lead, in some respects, to the death of a thousand cuts, which Bill sort of alluded to in that paper.

Do you see any sort of way of addressing those at all, other than just continuing to focus on mitigation banks and other administrative constructs, which I contend we come up with just to make ourselves feel better and really don't effectively yield to mitigate, because just about every follow-up study that I have ever read has said that there is no way we can create a saltmarsh that will come close to being as productive as a natural one in the first place, and so it gets us back to the avoid and minimize, which is not always possible.

MR. WILBER: Yes, we have put some time into that, and, while that cumulative acreage curve looks kind of cool, it's a simple one to present, and what we really try to do, at the operational level, is think about in terms of habitat, and so like seagrass and what constitutes a big impact for seagrass is different than what constitutes a big impact for saltmarsh or a mudflat or something like that, and so we do kind of temper that acreage triage with some knowledge of the kind of

habitat that's involved there, but we do get this death by a thousand cuts of argument kind of thrown at us a lot.

If you do the math, we're not talking death by a thousand cuts. We're talking death by 50,000 cuts, because you need 50,000 wins in the dock arena in order to offset the win you might have in one large port dredging project or something like that, and so the math is really pretty much pointing us towards the big projects, but I will note that we do temper it with the recognition that oysters, corals, and seagrass need to be looked at a little differently.

MR. PUGLIESE: One of the things that I am hoping is that our continued collaboration with the Landscape Conservation Cooperative and expansion of the mapping information, especially on estuarine habitats, is it provides an opportunity to look at say watershed levels on distribution of various habitats and maybe, over time, be able to see, if we don't necessarily have the connection to the actual permitting activities, be able to see if there is change within there of what the baselines are and then, ultimately, what the trend is in those different areas, so we can understand how much seagrass, saltmarsh, et cetera, within a watershed is either passed or existing at this point.

Hopefully we can get further in being able to do that and some of the climate, downscale climate models, are attacking some of those types of things, long-term changes, et cetera, in those things, and so hopefully we can -- At least that may be a way to get to this without necessarily looking at the individual permit activity.

MR. WILBER: There is definitely some progress to be made in that way, but we've also kind of started doing some overlaps between the conservation blueprint and our consultation activity, and the consultation -- The blueprint tends to emphasize areas that have not very many people there. Those are the areas that are identified in high-priority conservation. Because there aren't very many people there, there is not a lot of proposed development activity, and so I don't have much of an opportunity, through my consultation process, to steer what happens there.

If I'm really going to steer what happens there, it's going to be outside of my consultation arena, and you can almost kind of see that in a map like this, that you can see -- In North Carolina, it's the southern part of the state where everything is happening, and it's really Wilmington and Morehead City where things are happening in North Carolina. The rest of the state is pretty quiet, in terms of the consultation load.

The Albemarle Sound area, in particular, yes, it's a wonderful spot, and everything that can be done to protect it should be done, but you're not going to get very many of those opportunities if you're tied to commenting on Corps of Engineers public notices. Are there any more questions or do you want to go on to Bald Head Island?

MR. GEER: Bill Kelly had a question.

MR. KELLY: I am rather surprised at the volume of dock consultations that you have. In the past couple of weeks, I've had a couple of queries regarding that. What is the average time to clear a dock consultation?

MR. WILBER: That's difficult. It's an easy question if you're asking me, because, if you're asking me, I am just talking about my piece of a dock consultation, and it typically would take us,

cumulatively, a day of labor to do it. Now, that day of labor would be distributed across several weeks or months, or maybe even a year. It takes about half of a day to prepare the administrative record and send the recommendations to the Army Corps of Engineers. Then it will take us about a half a day to respond back.

Now, that time period between when we send something and when we receive a response back, that's up to the Army Corps of Engineers. It's up to the applicant and so on. Now, very rarely do you have an applicant, an Army Corps of Engineers project manager, who is going to send you that response back within thirty days or forty days. More typically, in Florida, it's twelve to fourteen months before you get a response back.

Moving on to Bald Head Island, we're just giving a status briefing on this. We're not really looking for -- There is no real big story here yet. We're sort of in the middle of the story, but Bald Head Island, for those of you not from North Carolina, is on the eastern shore of the mouth of the Cape Fear River in Wilmington, North Carolina, and it's accessible only by ferry. Like most places accessible only by ferry, the housing is pretty expensive, because that reflects the income of the people who live in those houses. In this particular picture here, this is the Cape Fear River is going up here to Wilmington.

Now, in this particular picture, we have now kind of tilted it a little bit, and so the Cape Fear River is here now, going in this direction, and they have a permit now to nourish their beach and to build a terminal groin, and the source for that beach nourishment and for the fill that is associated with that terminal groin come from three sources: the Federal Navigation Project; a place called Jay Bird Shoals, which on the western side of the mouth of the Cape Fear River; and Bald Head Creek, which is a creek that's on the backside of Bald Head Island.

There is a lot of agreements tied to who gets their fair share of the sand that comes from the Federal Navigation Project. The Village of Bald Head Island doesn't get 100 percent of it, as much as they think they should. They have to share that with others, and the Army Corps does its best to distribute the sand fairly. The amount of material they need to supplement their beach nourishment projects come from Jay Bird Shoals and Bald Head Creek.

When they got their permit, they also listed Frying Pan Shoals as a potential source of sand. All of the agencies back then, and this was a few years ago, said, heck, no, to Frying Pan Shoals. In order to get their permit, they essentially withdrew that part of the permit from the application, and the permit went through with the focus on the navigation channel, Jay Bird Shoals, and Bald Head Creek. Here we are about two years later, and now they want to modify their permit to include Frying Pan Shoals, and Frying Pan Shoals is a long-established seascape feature.

MS. MERRITT: Pace, did they give a reason for why they want to mine Frying Pan? Is it because they don't want to share or it's cheaper or --

MR. WILBER: They're not getting enough sand from their current sources and the current allocation from the Federal Navigation Channel to meet their needs. It's close, but it's not quite there, and so they want Frying Pan Shoals as sort of the bottomless source of sand, in case they need to use it, and so there's a lot -- We'll talk again, in a couple of seconds, about Frying Pan Shoals and its value, but it's also a great place. Lots of fish hang out there and so on.

This is the actual dredging plan. This big red blob here is the actual shoal complex, or at least what we're approximately it to be, and there is a little-bitty box right here that, although it's itty-bitty, is actually 460 acres in size, and that's where they want to dredge, in order to get the material. We kind of zoom in on that itty-bitty box a little bit more here, and the idea is that they're going to focus on what they believe to be is the down-drift side of Frying Pan Shoals, so that -- There is some geomorphological reasons to believe that the down-drift side of the shoal will accumulate sand more rapidly after a hole is dug there than if you dug elsewhere on the shoal or you completely obliterated a shoal within the shoal complex.

The amount of material that they need to remove from here depends on how much they get from the Federal Navigation Channel, but, over the planning life of this project, they need five to eight million cubic yards, and they get five million cubic yards if they dredge like that 460 acres down, I think, two yards, and they get eight million if they dredge down three yards, and so they're talking about a very broad, deep-ish kind of hole here.

Sometimes, when you see beach nourishment projects and they talk about 500 or 600-acre borrow sites, they're not really intending to dredge every square centimeter of that borrow site, but they're just, somewhere in that site, going to dig really seriously deep, but, in this particular project, they are literally proposing to dredge every square foot of that 460-acre area.

Just where we are status-wise, we received the public notice for this permit on February 8, 2017, this year, and the National Marine Fisheries Service was aware that that public notice was coming in, and so we were kind of prepared for it, and we already had approval from our leadership to initiate an elevation process.

Now, this elevation process is tied to the Clean Water Act, and, in 1992, there was an MOA between the Department of Defense, representing the Army Corps of Engineers, and the Department of Commerce, representing the National Marine Fisheries Service. In that MOA, there is a tiered or graduated process for disputing permit decisions that the Army Corps makes, as far up to the Assistant Secretary of the Army.

Now, in the South Atlantic, this is not a process that we use often, or treat cavalierly. In North Carolina, we have only used it one time before this project, and that was for the PCS Phosphate Mine. It's only been used one time in South Carolina, and that was for the expansion of the Port of Charleston, at the former naval base. It has never been used in Georgia, and, in Florida, it's been used probably close to fifteen times in the last twenty years, and almost every one of those involves a beach nourishment project on top of a coral reef somewhere in southeast Florida. Nationwide, this elevation process also is not used very much.

It's a two-step process in the beginning, and we did the first step, called a 3A letter, and that's in your package, on March 9, and we did the second step, called the 3B letter, on March 30. Basically, the March 9 letter describes the staff evaluation of why that project should not move forward, and the March 30 letter is a very short one from Dr. Crabtree, and he basically says, yes, I have read what my staff did and I believe they did the right thing and we hope the Army Corps will work with us to avoid further elevation of the project.

Just a few days before we completed the second step, we got the council to send in its comment letter. That was on March 23, and this is one of the things that, every couple of years, we ask the

council to do, to affirm or provide support for a position that we've taken, and it's been really great. We've gotten their affirmation every time we've taken it, and, while there is a little bit of chaos when those things come in, because they always come in suddenly, we always get them out on time, and it has always worked really, really well.

Since that March letter, the Army Corps has provided us back a detailed EFH assessment, and our comments on that assessment are due on May 31, and we're really still in the middle of just digesting that assessment and seeing what it is we're going to do, but this slide here just basically summarizes the four issues that both us and the council raised in our comment letters, and it all sort of focuses on the importance of that shoal complex to the feeding of federally-managed fisheries species and the lack of information about what would happen should a 460-acre piece of that shoal literally be dredged up.

We got our EFH assessment back, and these are the points that the Army Corps and the Village of Bald Head Island made in that EFH assessment. They're basically saying that they've done a lot to try and locate the borrow hole on the part of the shoal that is most likely to fill in rapidly, and they don't believe there are any direct impacts to fish, because the fish are mobile, and that they will adhere to an environmental window from April 1 to November 31, in order to avoid impacting fish during their sensitive life history stages.

We're in the process now of evaluating whether or not these assertions by the Corps are correct and whether or not they're sufficient for us to back down and withdraw our elevation letter, and we should have an answer to that by the end of the month, and so that's where we're at with that project.

MR. GEER: Any questions or comments for Pace on this?

DR. LANEY: Not a question, but a comment. Just to let everybody know that the Fish and Wildlife Service also sent a letter in on it on February 27, and it basically indicated to the Corps, and I don't know where our process stands right now, but it basically indicated to the Corps that if they went forward with what we essentially considered to be a new project on this one that they would have to reinitiate consultation with us as well on the sea turtle aspect of it and piping plover too, I think.

MR. GEER: Anything else?

MR. PUGLIESE: Just a quick note. As Pace has indicated, this process is really what we have tried to strive for, and, as part of the comment letter, we were able to provide the policy statement that was developed that supports the activities, and I think that's why we go down these roads of building these statements, so that they can rapidly be added into and provide additional support for both National Marine Fisheries Service and the council comments.

MR. GEER: Thank you very much, Pace. I am glad we got to finally see that, because it was really good information about the structure of your organization and how much -- I wish I could do that in my group. Now, sticking with the theme of people we've been trying to get in here to have a discussion with, the sargassum group -- We have been trying to have several discussions dealing with sargassum over the last couple of years, and we keep running out of time, and so we're fortunate enough to have Andrew Brumfield from North Carolina State University here

today and Dr. David Freestone, who is the Executive Director of the Sargassum Sea Commission, to give us some information on sargassum, and so, Andrew, you have the floor.

MR. BRUMFIELD: Thank you very much. It's a pleasure to be here. Thank you for inviting me. My name is Andrew Brumfield, and I'm from North Carolina. I recently graduated from Elizabeth City State University with a master's in mathematics, with a concentration in remote sensing, and I also got my undergraduate degree in engineering technology, mechanical and automation, and so it's a pleasure to be here.

I am going to be presenting my thesis work that I conducted for the university and that hopefully will produce new methods on conducting remote sensing on the Sargasso Sea. It is very important, and that I have learned over the two years that I've been studying it, and there must be a better way to do it, but, to move on, I want to talk about the Sargasso Sea. That is a marine life habitat for many, many species out in the Atlantic Ocean. Most importantly, like you guys have mentioned, your indicator is the sea turtles. They go off and lay their eggs, and they go right back out into the Sargasso Sea and consume what other animals are out there and also some of the Sargasso Sea as well.

It floats around, and it travels on the Gulf Stream out of the Gulf of Mexico, and it is very prominent out there, and, also, it sometimes washes up onto the beaches as well, which, at first, I called it just seaweed, but the technical term is "sargassum". There is also two different species of it that you can find in the Sargasso Sea, which is natans and fluitans. They have pneumatcysts, that allow it to float, and, whenever they start to die, they start to sink to the bottom of the ocean, but it's very important we have these, and it's also surrounded by four currents, which kind of makes it like the washing machine of vegetation in the ocean, and it's pretty cool stuff.

We also use it as an indicator of ocean acidification, since some of the CO2 is being absorbed into the ocean, and so we want to make sure that it's flourishing out in the Atlantic Ocean, because, if it doesn't, then we start losing some of our food that we like to catch as well, and I know we're regulating it so that we can make sure that we have food for the future, since most of our populations live off the coast, and it's very important to keep this as sustainable as possible.

I would like to talk about the methods of conducting remote sensing on this ocean feature, which is kind of tough with the stuff that we have available free at the university, and so I went ahead and used the USGS library of Landsat images, since they had a resolution of thirty-meters-by-thirty-meters. The publications that I reviewed used MODIS data, which have a resolution of 500 meters, but, because of the characteristics of sargassum in the Atlantic Ocean, I wanted to use thirty-by-thirty-meter resolution, which can be interpolated into fifteen-by-fifteen-meter resolution with a panchromatic channel. That way, we can have a better view of it as well.

Here are the indexes that were going to be used in my research. The main one is the Floating Algae Index, which is FAI, which was used by Hu in 2008 in the Yellow Sea of China. It was a lot better than NDVI or EVI, because it seemed to go through a lot of the aerosol or thin clouds that can be found in the atmosphere, but NDVI was used as well, as a double check or a truth of what vegetation is in the area.

Here is just a quick chart of the bandwidth lengths that are on these satellite payloads, because the bands are different from MODIS than they are from Landsat, and so those had to be interpolated

as well throughout my research. Just to give you an example of the different type of bands that we have here, broadband and multispectral, but it's the hyperspectral and the ultraspectral that we really need to use on this feature, because of -- We'll have a greater way to estimate which is actually sargassum or which is just a sea turtle, because they're both sometimes the same color, and so they can always bounce back and say, hey, this is sargassum, when it's probably just a big, big snapping turtle.

The USGS, mostly my image selection was from Landsat 7, because that one was the most clear and the most present, even though there is some degradation on their imagery, but the timeline is between early spring and the beginning of fall, because that's the time when most sargassum comes out of the Gulf of Mexico and through the Gulf Stream and up past Cape Hatteras, which is my area of interest, but I did expand out into the ocean a little bit, but I'm mostly going to be dealing with the image that is right off the coast, so that you can see the difference, and we'll talk about some obstructions as well later.

ENVI was the software processing that I used. It's a GIS processing tool that you can use to import any type of product, even LIDAR, which is an active remote sensing as well, but we used this, and we have band math and other enhancement tools that we can use to help visualize what we're looking at.

Here is a quick video of how to produce the products of the Floating Algae Index and the RGB and NDVI products. Of course, a little bit on how to download these passes from the internet, just so that you can see how it has been conducted, and so what I did was that I also set parameters and conditions on the type of imagery that I want to get. Due to cloud cover being an issue, I wanted to make sure that I only received images that had cloud cover lower than 30 percent, so that we have a very clear visual of the area of interest that we're looking for.

Here, I am loading in geoTIFs, and each one of those images there are the separate bandwidths that I showed you on the charts of the image, and so it's the same image, but at a different wavelength set, and so here, of course, just to start off, we'll make a red, blue, and green with bands 1, 2, and 3. That way, you can see -- Obviously, what's green is green, what is the dirt is the dirt, and what is blue is the wonderful water that we can see.

Next, what I am going to do is -- Also, one issue that came up in my research was why I wasn't getting indexes the first time, is that I had to do a correction for radiance, because reflectance is the amount of light that is reflected from an objection, and radiance is the amount of energy of light at that area, and so that's what had to be done with band 3 and band 5, since those are the shortwave infrared and red channel. I had to do that for both of those.

After we have all three of those bands created, we can do band math, which the bottom one that I just clicked on was the equation for a vegetation index, which will give us an index between zero and one, zero meaning literally a desert and one to -- This is a tropical forest. We want to usually look for values above 0.4 and higher as vegetation.

Once I made this wonderful image, here is our image that is produced with the band math, and we can load that as well with the RGB that I already have, and this comes out in plain black and white through the 256 variables of that, and then also I can load up the Floating Algae Index as well, and so I will have three views here.

Now, with this completed, with the three views opened, what I was attempting to do is to obviously correlate what is vegetation, which is the green and the red and blue and green, with the vegetation index, and what I can do there is link each of the displays so that it will show, and, here, you can see this is a piece of the Outer Banks. The middle one is the NDVI vegetation index, and on the right is the Floating Algae Index, which is where most of the issue is.

What I am thinking is that, because of the research that was done in the Yellow Sea, it was a different atmosphere or that the depth of the lake was a lot different from the depth of the ocean, and so they're getting different reflectance values or radiance values, in that sense, but I can check each one of these values, which you will see here with the mouse here. I have each one of the displays, and I can go to a location and check the values there.

Obviously, there is the red and blue and green, and then here is the vegetation index and the Floating Algae Index. As you see, the Floating Algae Index is really, really, really, really small, which is kind of tough when you really want clear values that you can make judgments based off of, and so, with linking those displays, you can see here that we had values that were too low for evaluations or to make classification of groups, because this is vegetation that's traveling as well, and it's not like a phytoplankton bloom, where it goes up and then it gets eaten and it's gone. This stuff travels.

As you can see, this is the red and blue and green, in a bigger sense, the Normalized Vegetation Index, and the Floating Algae Index. We're seeing a lot more brighter values in these shallow areas, which is my assumption of the difference between it being used in the ocean and being used in the Yellow Sea.

Some of the issues we're having is that cloud cover and aerosol can be messing or giving us a false value with the shortwave infrared, because some of those values and some of that energy is being bounced off of clouds and being scattered in the atmosphere, and also another issue for good quantification of how much is on the western wall, near the coast, is that repeat coverage is an issue. Repeat coverage is a big issue, especially when we want images that are only at 30 percent less cloud cover, and then also another issue is our resolution.

We really want resolution at the one-meter, because of how lengthy and how scattered some of these patches are, and usually we're dealing with the fifteen to thirty-meter resolution, which you can usually find, but you have to pay money for that one, and Landsat is wonderfully free, and here is the resolution in fifteen-by-fifteen.

I was wondering, how are we going to get one-meter resolution also with the large cover area that we are granted by satellites? Well, my suggestion is that we need to start producing a network of drone systems to monitor what's out in the Sargasso Sea, because not only do we have acidification going on, but we also have harvesting from industries that want to use sargassum as feed, for chemical production, for pharmaceuticals, and, also, we have beaches that have tourism. They don't want sargassum just floating onto their beaches, and then they have to scurry and pull people together to get the sargassum off the beach, and, also, they use some of the sargassum to fertilize their beach heads.

This would be a system not only to help them know when sargassum is coming or see if some commercial fishermen are kind of not fishing underneath it, but going above and just collecting everything, and this is a good way to know in those certain areas.

Now, of course, one drone cannot fly high enough to cover most of the coast area or the western wall of the Sargasso Sea, and so this buoy/drone combination would probably be scattered in an area where each one of these drones can fly a transect, but not only fly a transect, but go up a certain height and take an image and do ground-truthing for satellites, and so this system can also complement satellite information, because, for us, as humans, we have to get in a boat and take a ride out to the Sargasso Sea and see what's there and take pictures and do ground-truthing of the item and then come back home.

With this system, we can have it done for us, and, at the same time, sending better algorithm or multispectral information to the satellite, so that we can calibrate the new systems that are going up, such as some of the new European satellites that are going up, the Sentinel series that are going up, and, when that information starts becoming public, we can start adding more algorithms that are specified just to sargassum in the Atlantic Ocean.

Now, the cool thing about this drone right here that I found on GrabCAD is that it's really small, and it's actually really simple to put together, actually. These fins, they just kind of like snap on, and so it's like the motors and then the battery is inside there, and the camera is actually on this side, but we can probably put a sensor on this side as well, because this one can fly up, and then it can also fly linearly very fast. These are actually the type of drones that they use in the flight competitions or the races and stuff like that, and so it has a very high speed of travel, which can pretty much set up for transects along the path of sargassum traveling from the Gulf of Mexico on the Gulf Stream.

With more repeat or more information coming through, we can have a better visualization of what's going on, not only day to day, but hour to hour, and I'm not going to get into seconds, but hour to hour would help a lot better. With that, I would like to take any questions about my suggestions.

MR. GEER: Any questions for Andrew?

MR. HOOKER: So it's GOES-16 or is it GOES-17, the new one? Is GOES-16 offering any additional views that you could use for the remote sensing, or you would still need to calibrate?

MR. BRUMFIELD: For GOES, I would have to come back to you on that, especially with the new one. I actually haven't gone through the specifications of its resolution, but GOES-East and GOES-West, their resolution is 1,000 kilometers per pixel, and so usually you will just get back a this is water kind of message back from that satellite, but I would have to revisit with you on the new one that's up in the air, but thank you. That was a good question.

MR. WILBER: My understanding is that, in most of the U.S., you have to -- The pilot of the drone has to maintain line of sight contact with it, and so that kind of creates some problems, but I don't know how far out into the ocean actually that requirement goes.

MR. PUGLIESE: I don't think it applies in the ocean.

MR. GEER: That's just over land.

MR. BRUMFIELD: Yes, and these are international waters, pretty much, and so we're not dealing with FAA regulations at that point, and also we can have this system automated. We can usually have a few of them pilot-operated, usually for ground-truthing, because you have to get real close and then conduct the multispectral analysis that way, but, other than that, most of these drones in an array would just do their scheduled flight and then send their information to the buoy, and the buoy will send it to the next carrying bird and then on to the scientists.

MR. WILBER: Given the limitation on how far the drone can travel, how -- These drones aren't going to be launched from land, are they? They would have to be launched from a boat somewhere?

MR. BRUMFIELD: Yes, and the plan is to have the buoy system and drone system together. That way, they can charge off the buoy and transmit from the buoy and then probably have a spare drone, just in case that one goes bad. That way, probably once or twice a month, we go out there and conduct maintenance and gather data and wipe off the moisture, because there is still storms out there, and see if we can improve the method, kind of make these our honeybees of the ocean.

MR. GEER: Anyone else?

MR. KELLY: Have you ever done any analyses on sargassum that has washed ashore, to determine the percentages of animals that may have vacated that before it came ashore? A typical sargassum has got dozens of crabs and shrimp and juvenile fish, and are they vacating that stuff before it comes ashore, or have you ever compared the animal population of sargassum onshore as compared to healthy sargassum out in deep water?

MR. BRUMFIELD: No, I haven't done any fieldwork myself. I have been on the technical side of the remote sensing part and methods, and so I have visited the new lab, somewhere close to the Outer Banks, and they do fieldwork on it as well, but I have no experience with going to see any washed up or any animals that have missed escape from it.

MR. KELLY: Do you know if there's any reports available addressing that issue?

MR. BRUMFIELD: That's a good question. I probably should get back to you on that.

DR. FREESTONE: Thank you. That was very interesting. I am going to talk a little bit about some of what we're doing with NASA as well, and obviously linking with the MODIS perception as well as Dr. Chuanmin Hu from South Florida has been doing a lot of work, and we have sponsored a grant from NASA to actually help him with ground-truthing, and so I'm going to say a little bit about that, but I can also answer that question.

Certainly the experience in Bermuda, which is right in the center, is that, once the sargassum comes in over the reef, then all the guys leave it, and so, by the time it comes in, there is very little left, but, where you haven't got a fringing reef and someone -- A friend of mine was holiday in the Gulf, and the sargassum was coming in, and the kids were finding little seahorses and shrimp and things like that. Somebody actually posted a video on our site, which actually shows, I think,

something like 1,500 organisms in a slice smaller than this table, and so it's a very highly-productive system, and I will show some pictures of it.

MR. GEER: That brings up a question you had. You said it sinks to the bottom, and is it still acting as the same -- Is it selecting as the same level of habitat as it sinks to the bottom?

MR. BRUMFIELD: That is another good question that I will have to go and --

MR. GEER: I guess I'm asking both of you.

DR. FREESTONE: I can sort of answer that, but the suggestion is that the Sargasso Sea, the kind of core area in the Sargasso Sea that has been there for thousands of years, and so it has actually sunk to the bottom, and you can actually attract deep-sea benthic fish by dropping sargassum on a weight, and they will come and eat it, and so they're used to having it there, but I don't think it that it maintains any -- There is no evidence that we have that it maintains kind of like an ecosystem as it starts to go down, but it's part of the whole kind of benthic system.

MR. PUGLIESE: To that, I think one of the things that have been -- As we've gone down the road in earlier deliberations on it, is the actual, probably, contribution of sargassum to the deep ocean in terms of nutrient production in there. I know we've had discussions with some of our golden crab fishermen pulling up muck off the bottom, which essentially is degraded sargassum, and so the nutrient flow from sargassum, it may be a significant production of nutrients into the deep systems.

MR. HOOKER: I just want to echo what Pace said. I know we've had trouble with, if you're looking for federal funders, getting the authorization to have the drones remote. There is no process, from what I understand, yet in order to do that. I think you have to maintain full line of sight, as Pace said. However, if you're out there on your own, I don't know what rules apply, but the other thing is you reminded me that NASA has, on several occasions, offered -- They have their drones that they are certified to use in doing this exact type of work.

You might be able to just reach out to NASA and see if they have some of this calibration or the ability to, when they're doing calibrations for other trips, to do some of your calibration, because I think -- You seem to be getting at a real-time monitoring by using the drones, versus going back to using the satellites, and it seems to me like the satellite version is probably the most cost-effective and the easiest way to do it, if you can calibrate it to actually detect sargassum, which seems to be worth pursuing a little bit further before going the drone route.

DR. FREESTONE: We've got a new grant from NASA for a series of workshops, one of which is going to be pulling together everybody who is interested in sargassum, and so we'll invite Andrew, which is actually trying to use the definition of -- The data is not as good as the MODIS, and so they are pretty keen to try and import data from the other satellite systems in order to kind of upgrade what they can offer, and they're doing a kind of management tool for us, which is going to, hopefully, carry ground-truthing and actually have the sargassum itself. It was just approved by CEOS in Paris last month, which is the committee on ocean and Earth observation satellites, and so that means we hope to have data from all the other international space agencies as well, and so good project.

MR. GEER: Anything else for Andrew? Andrew, I have to say that the video that you showed up there, I know the amount of work that must have gone into that video, and I thought it was a very novel way of showing the countless hours of work in a minute-and-a-half, and I thought that was quite impressive, and thank you very much.

Next, we have Dr. David Freestone, and he's the Executive Director for the Sargasso Sea Commission, and he's going to talk to us about the commission's activities and an innovative approach for conservation areas.

DR. FREESTONE: Thank you very much indeed. It's a great pleasure to come down here, and thank you again to Roger and Chip for facilitating it, and I'm delighted to have the opportunity to talk to you. This is quite an interesting project. I am a lawyer, and so it's a kind of mixed, hybrid project which has a fairly high international law content.

What I want to talk about today is to say something about the background of the Sargasso Sea project itself, why we actually embarked on it, and it's led by the Government of Bermuda. I will say something about the Sargasso Sea Commission, and I've got a lot of slides, and so I will just go through it quickly, because we have a fairly comprehensive, fairly wide, program. Then I want to pay tribute to the work of the South Atlantic Fishery Management Council, which is one of the first to really put this on the international agenda prior to us.

You can detect from my accent, that, although I live in D.C., I am not actually a native, and so, when it comes to the South Atlantic fisheries, it really blew my mind. We have problems with Argentina and those places where I come from, and so it's a delight, and so certainly the work that you've done has been really, really important, I think. Then I will have a few conclusions and a couple of asks, actually.

There we've seen this, and this is a legal map rather than a geographical map, and it's actually put together by the Duke Marine Ecology Laboratory, and it shows what we call the core area of the Sargasso Sea. It doesn't actually go over to the Azores, but we have kept it to the Western Basin, our core definition, and so the Western Basin on the west of the Mid-Atlantic Ridge here, and so you can see the various currents that Andrew talked about.

This is the edge of the Exclusive Economic Zone of the U.S. and the Dominican Republic and the Bahamas and then the U.S. This area is high seas, and so there were some comments about you can do what you like once you're in the high seas, and that's not entirely true, actually, but it is very much an area which is in regards to something like the final frontier. It's the area of a bit of a wild west, and, for the last ten years or more, the United Nations General Assembly has been discussing whether we should have a new, supplementary treaty to the Law of the Sea Convention which deals with conservation and sustainable use of biodiversity in areas beyond the national jurisdiction.

You can imagine the strongest support has not been the U.S., which is not a party to the Law of the Sea Convention, although I think it should be, and I think most people seem to think that it should be, and so the U.S. has been a bit ambivalent about that, although it's coming around, but the idea of that treaty was that it would be able to, for example, establish protected areas in the high seas, which is traditionally a very difficult thing to do. There are a few, but they're slightly controversial.

This project was started really -- It was led by the Government of Bermuda, in about 2010, by the Government of Bermuda, because it's right in the middle of the Sargasso Sea. We wanted to get some international recognition of the importance of it. Everybody had heard of it, but even the Director General of IUCN, which is the office I work in, took me aside and said, where is it, David? Of course, that was the first project that we had. It's actually quite difficult to define it. You can put it broadly where it is.

Then it's to work with the existing organizations, international and sectoral organizations, and that's fisheries, maritime transport, seabed mining, to get protection of the Sargasso Sea, but in accordance with the Law of the Sea Convention, and so not a new convention, but just trying to see whether we can actually do it within the existing system and then use this as an example for these negotiations going on in New York.

Why is it important? Well, we already heard that, and I've just got some nice pictures. This was actually taken by Sylvia Earle. There was no sargassum in the Sargasso Sea last year. There were three cruises through it, and nobody saw any at all. It's back this year, but it comes and goes in very large areas, and so seeing mats of this size is unusual, and, as we've heard, it's a really important ecosystem.

It's a holopelagic algae, and so it doesn't touch the land at any point, and it's mostly in the high seas. It's important for the life history of a lot of species, which we've heard about, and we've got a few pictures. I will talk about eels in a minute, but turtles, certainly, and the tuna and billfish, the sort of things that you're interested in, and certainly the International Convention for the Conservation of Atlantic Tunas as well.

There are a number of endemics, particularly -- There is actually about 145 species endemic, but these are the kind of best known, the sargassum fish, et cetera, which are marked in a particular way, and then I actually said endangered species, and the Norwegians pulled me out, because I had a picture of a whale. You can see I've got a picture of a sperm whale, and so iconic species, but certainly marlins, turtles, tunas, et cetera.

Then, as we've heard, it is an essential fish habitat, and it's a very important nursery and feeding area. That picture is actually of flyingfish eggs, which have little tendrils, which are attached to the sargassum, and you probably know this stuff, but it always fascinates me.

Then, from our point of view, really interesting is the position of the European eel and the American eel, because both species spawn in the Sargasso Sea, and so they're catadromous. They're the opposite of salmon, and so they live in brackish and fresh water. They migrate 2,000 or 3,000 miles, to the south of Bermuda, this area just south of Bermuda, where they spawn and die. It's never been witnessed.

The European eel is now at something like 10 percent of its historical maximum, and the American eel has plummeted, but it's actual stable. It's probably more stable than the European eel at the moment, and the only way that they've been able to actually sort out where this happens is by catching the little guys, the leptocephali, and these are lines which show the size of the leptocephali they catch, and so we have identified this kind of hotspot here is where the spawning takes place. It's one of the great wonders of the world that has never been witnessed, and nobody knows why

they do it. Why do they go to the Sargasso Sea? We're not even sure that it has anything to do with the sargassum. It might just be they've been doing this for millions of years, and it might actually be continental drift, that this used to be a river and it's now become a wide ocean.

What are the threats? These are the threats that we're interested in. They're fairly normal ones, the garbage and the pollution and the plastics and pollution discharges from ships. Fishing can be certainly -- There is extraneous gear. Harvesting of sargassum, and, because it's a high seas area, there is actually no control over sargassum, and this is where your council has already been taking an amazing lead on that.

Introduction of exotics, and we heard about climate change and ocean acidification, and maybe seabed mining, which is now really starting to get going. The Seabed Authority in Jamaica is now doing the mining regulations, or they have started to. They've certainly done a lot of work in the South Pacific, in the zone south of Hawaii, and they're looking at some of the sites on the Mid-Atlantic Ridge. A seabed mining plume through the Sargasso Sea at the time the eels are spawning could be like a group wipeout. Then cables is less of an issue, I think.

After quite a lot of preliminary work, we actually called a meeting in Bermuda in 2014, and this has been going on for about three or four years, and a large number of governments came. On the basis that we're going to work through the international organizations, we needed to have, we thought, government representatives who are prepared to stand up and speak on our behalf. Initially, we had five governments: the Azores, which is autonomous, although it's part of Portugal; Bermuda; Monaco; the United Kingdom; and the United States.

Since then, we've had the Bahamas that have joined, the British Virgin Islands, Canada last year, and the Cayman Islands, and we have a lot of fellow travelers. The EU has had some issues with whether this is an issue which they have competence over, and so the Netherlands and Sweden have actually been supporting us in many ways, although they haven't signed a declaration. South Africa and others have also been, and so we've got a number of other governments that are interested in it, and so nine governments and a few others. It's fairly light structure we set up, a meeting of signatories.

We just had our third meeting of the signatories in the Azores last week, the week before last, courtesy of the Azores government, and we have a commission, which is six volunteers, and so expert volunteers, and we have a small secretariat, based in Washington, and I say lean and mean, and I'm certainly not the lean one, and then we have a financial mechanism, both in the U.S. and in Bermuda.

Our current commission, we had a South African who resigned for pressure of work, head of the Plymouth Marine Lab, Stephen de Mora, and Howard Roe, and he's the former head of the National Oceanographic Center in South Hampton. Dr. Tammy Trott is the Senior Marine Resource Officer in Bermuda, and many of you know Billy Causey, of course, from NOAA. Mark Spaulding is head of the Ocean Foundation, and we have an Azorean, Ricardo Santos, and so that's our current.

What we're actually trying to do is to move forward on a large number -- With limited resources, but we're trying to move forward on a large number of things, and so I'm going to go through these fairly quickly. These are the sort of things we're looking at: the international recognition of

its importance, and we're looking at protection of fisheries, fisheries habitat conservation, impacts of shipping, impacts on the seafloor, conservation of migratory species, and data.

Now, not all of those have we advanced with quite such success as some others. We started off with doing -- I brought some copies of the Summary Science Case, which I should have put out and I will put out now, and this is a big report that we did in 2011. It's on our website, and this was a pretty basic baseline study that we undertook.

Then our first success, the Convention on Biological Diversity, has been seeking to identify high seas areas which it calls ecologically or biologically significant, EBSAs, and they've held a series of twelve international seminars around the world, and one of the earlier ones was actually in Recife, in Brazil, and the Bermuda government put forward the Sargasso Sea as an EBSA. It has no legal significance, but what it means is that it's a science-driven process intended to push all the other management bodies that have authority in the high seas to actually take particular attention of these areas, and so this is a great success for us.

This area was the first -- It's two million square miles, that area, actually, which is the biggest at that point that had been described, and it was then approved by the parties at the conference. Every year, we have actually had governments, put forward initially by the U.S., but also with the support of others, the Bahamas and South Africa, this wording. Every year, the United Nations General Assembly has a resolution on oceans and law of the sea, and so they note the efforts of the Sargasso Sea Alliance, which is what we were when we started in 2010, led by the Government of Bermuda to raise awareness of the ecological significance of the Sargasso Sea.

That is what we put forward in 2012, thinking that we would be able to update it each year, and we ran into some problems with one particular government which thinks that there shouldn't be regional initiatives of this kind and it should be done only through the U.N., and that was Argentina actually, and so they have actually vetoed any changes to this wording. Even last year, the U.S. tried to change Sargasso Sea Alliance to Sargasso Sea Commission, and they vetoed it, and so this is one of the issues of working with the United Nations.

Anyway, that's five years we've had it in this wording in the resolution, and so I think we're getting somewhere with this. Last year, the U.N. produced the first World Ocean Assessment, and you're probably aware of this, and we are the only named ecosystem to actually be in it, and so Chapter 50 is on the Sargasso Sea. There are chapters on coral reefs and seagrass beds, et cetera, but this is the only named system. We're very proud of that.

We have worked with NAFO, and with the support of our signatories, and so that's the U.S. and the EU, and they actually have -- This is the seamount area in the south of -- This is Bermuda, and they weren't actually aware that Bermuda should have been invited to join NAFO, but that's our EBSA, and this is our biologically significant area, and these are the seamounts with that. Last year, they actually banned all the fishing on the seamounts until 2020, in what was called the Sargasso Sea Package, and they have also stopped midwater trawling for alfonsino with using gear that could touch the bottom, and so it's quite a success there, I think. It's a limited area, but that's our first legally-binding instrument.

We have much less success with what the WWF calls the international conspiracy to catch all tunas, and this is a real problem to us. We've been going regularly since 2011. The delegation is

headed by the Government of Bermuda, which is a UK overseas territory, and I will come into the details of that, but we have commissioned that study on the right-hand side actually from the University of British Columbia, which shows that there isn't much fishing.

This is, I think, the U.S. swordfish fleet, and so that's high-density fishing and no commercial fishing, allegedly, within the Bermuda EEZ, but we think this little bit is actually IUU misreported fishing on the outside, but, in the eastern part, very little actual fishing takes place, and we've been arguing with the Japanese, who have been the most opponent to any action taken for the conservation areas. They seem to be opposed, in principle, to any form of closed area. It doesn't have to be temporarily closed or for particular reasons, and so argument is that, for symbolic reasons, it would be really important to classify the Sargasso Sea as being an area of particular concern, perhaps with no-fishing areas, and not displacing any fishing, to which the Japanese response has been, so why do you want to do it if nobody is fishing there? We are into a kind of vicious circle on this debate.

The other area, of course, we're interested in is IMO, International Maritime Organization. This is one month's fishing. This is from AIS data, one month's traffic, and you will see that main route, which is actually coming down, probably to the Panama Canal, goes through that area that I showed you where the eels are, where they spawn every year, and so there are issues which we have been debating with IMO. It's a more difficult organization to work with, but a little bit more receptive than ICCAT, but it's still a fairly slow-moving operation. Those are the sorts of things that we are talking about: routeing, mandatory reporting, discharges of ballast water.

We had a fantastic relationship with the cable industry, and we had a workshop two years ago, three years ago now, where we actually identified these cables, and we determined where the sites are through to Bermuda through the Sargasso Sea, and there are eighteen separate systems, and we determined that really -- If any of you have seen an underwater communication cable -- I remember the first thing their legal advisor said to me. It was, have you ever seen one? How big are they? I said, I don't know, about this big? He got one out of his pocket, and they're like the size of a fountain pen. They are unbelievable, and they just lie there on the bottom. The impact is minimal. There are impacts, but they're minimal. Then we've been observers to -- This is my colleague, Christina, and we've been granted observer status at the International Seabed Authority, and we've been going for the last three years.

Then our success story so far then is the Convention on Migratory Species, which covers, of course, eels. We actually submitted, with the support of one of our signatories, a proposal for the Anguilla anguilla, the European eel, to be listed under Appendix II of the convention, which means that it's identified as a species which conservation status would benefit greatly from international collaboration, and so that was agreed, three years ago.

At the end of last year, we had a meeting, actually in Ireland, of the European range states, and they are agreeing to the idea of an international instrument which would codify rules on reporting of -- It's basically a management of the eels within the parties, within the governments of the states which would be party to it, but, most important, actually, is to look at protection of its migratory stage and maybe of its areas where it spawns, and so this is possible to protect, so far as it's possible under international law, those areas like the Sargasso Sea where the eels spawn, and so that's ongoing. We are going to the conference of the parties this year again for a mandate to do that,

and we're very positive about that, and so that's been a great success, and that's our meeting that we had in Galway.

Then back to this massive project, which I mentioned. We use the word "coverage", Andrew, and, well, actually, this is the name they -- This is one of these things that you have to have a PhD to understand what the acronym even stands for, but it's called Coverage. It's basically a satellite map product of the Sargasso Sea, drawing on the satellite, the NASA satellite, data, but then using that to input data on species migration, on hopefully ground-truthing of sargassum mats, et cetera.

Then, to use it, now that they've got the approval of CEOS, they want to upgrade to a real-time project, and so we could use it hopefully for management purposes, to show like vessel migration, fishing activities and shipping activities, et cetera, and so this has been a tremendous -- We're hoping to have a meeting later this year and make sure that we invite Andrew and others of you who are interested, particularly if you've got data that we could actually mine to put in this.

Just when I thought that I was getting somewhere with sargassum, it let me down. This is about 2012, when we had these huge mats being washed up in Sierra Leone on the west coast of Africa and on the beaches in the Caribbean. There is a picture of a guy standing to the right of this, and this isn't captured, and this is a PDF that I copied, but these mats on the right are like six feet high, these piles, and it gives off sulfur dioxide and hydrogen sulfide, and so it's highly corrosive and extremely unpleasant.

As Andrew was saying, the Caribbean countries want to get this stuff off of their beaches, for the tourism issues, and, once you develop the technology to start to make it into something useful, then we're worried that they'll start looking for other places to -- If there isn't any washing up this year, then we'll go and get it, and so it's like a two-edged sword, but this has prompted a lot of work, which we've been doing, and, as I mentioned, Dr. Chuanmin Hu at the University of South Florida -- He is doing a ground-truthing project, where he's actually using the members of the Sea Keepers Association to report on sargassum mats that they see.

You mentioned there are two types of sargassum, natans and fluitans, and the stuff up in the Caribbean is actually natans-8, which is a variety of natans, which suggests that it doesn't come from the Sargasso Sea, but probably from a circulation area just off the coast of Brazil, and we'll talk about that later, and so we have actually made a number of our lessons known to that, and so we have a publication on that.

Then I wanted to pay tribute. I've got just a few more slides to pay tribute to the work of your committee. I am conscious of the fact that I am putting this together, and you guys are the experts, but November of 2002 was this revised fishery management plan for pelagic sargassum habitat, and I know this is very hard for -- I talked to Roger about it earlier, but you guys are really way out in front of us, and this is well before we had even drawn breath.

Then there was the decision of 2002 to declare it an essential fish habitat under the Magnuson-Stevens Act. This is too small to see, but those are the main actions. Even that's a bit small, but the things that I wanted to draw attention to are the provision that says, "Because of the importance of the extra-jurisdictional pelagic sargassum occurring in the Sargasso Sea outside the EEZ, the United States should pursue all other options under the Magnuson-Stevens Act and other laws to

protect sargassum in international waters. I would like us to have a little chat about that, if we may, as to how this might be something that we might be able to do. I've got some ideas.

Then, of course, you also recommended the prohibition of the catching of sargassum and have actually limited the total allowable catch to 5,000 pounds, and this is from 2002. Then, on the basis of this, and this is taking it now into the mouth of the beast, on a proposal by the U.S., ICCAT was requested by these contracting parties to provide to its science body, which is called the SCRS, the Standing Committee on Research and Statistics, information and data on activities that impact pelagic sargassum in the convention area on the high seas, directly or indirectly, with particular emphasis on the Sargasso Sea.

That was a really important proposal put forward to ICCAT and approved, and nothing happened, unfortunately, because, in 2006, the committee said there was no information on this issue and recommended that scientists provide available information to the sub-committee, which could facilitate giving a response, because they didn't have any data, and, because nobody responded, and this was prior to our establishment, the issue just kind of dropped.

In 2011, when we started to engage with ICCAT, the Government of Bermuda introduced the project, our project and its objectives, and it proposed, and this is the second bullet there, that the SCRS examine the data compiled on the Sargasso Sea and the impacts of fishing activities on tuna and tuna-like species and on the area's ecosystem and consider the viability of establishing special conservation and management measures within the Sargasso Sea.

This was taken as a declaration of war by Japan. In retrospect, we should have perhaps termed it differently, but I don't regret too much, but what we ended up with was this. The SCRS will examine the available data and information concerning the Sargasso Sea and its ecological importance to tuna and tuna-like species and its ecologically-associated species and provide an update on the progress of its work in 2014 and report back in 2015.

We then produced a series of reports, actually six in total, on the importance of the Sargasso Sea to tuna and tuna-like species. We did an inventory, and we did a food web, and we did analysis of catches over the last twenty years. We haven't been able to make much progress since. The next proposal we put forward was actually vetoed by Japan, when it was in the Chair, and so the State Department actually made an official complaint that Japan is behaving in an inappropriate way, and so it's not just me that feels this way about the Japanese delegation.

What we have at the moment is, as part of advancing the work of ecosystem-based fisheries management, again, the Japanese delegation refused to accept a resolution that had the Sargasso Sea in its title. It's now "Ecosystems that are Important and Unique for ICCAT Species". What is the problem with that, they say, and isn't the Sargasso Sea one? Well, yes, but there are a lot of others as well, and so it's kind of diluting the agenda, and that's part of the work we're doing here. The U.S. has been very supportive of this, and so has Canada and South Africa.

As part of advancing the work of ecosystem-based fisheries management, the SCRS will examine the available information on the trophic ecology of pelagic ecosystems that are important and unique for ICCAT species and report back in 2018. I mean, this is a major task, and so I don't know that we can actually produce a large number -- We've done about seven papers already for them, and we will produce a couple more for the next meeting.

Then we're down to the meat of the ask, right at the end, and so we talked about this in the commission itself, when I was coming here, and we wondered whether you might be minded, given that it's now fifteen years since you passed that resolution relating to the total allowable catch, to actually consider setting the total allowable catch at zero.

5,000 pounds, I know, was very carefully chosen, because it's completely uneconomic to do it for 5,000 pounds, but whether this would be -- It was, in a sense, symbolic, and whether this might be something that you might consider making a recommendation to the council. That's the first ask, as it were, and I would be delighted to hear your views on it.

The second one is running with this idea that I read out earlier. Because of the importance of the extra-jurisdictional pelagic sargassum occurring in the Sargasso Sea outside the U.S. EEZ, do you have any advice on the ways in which we could pursue those other options? For example, as I understand it, Magnuson-Stevens applies geographically to your EEZ, but also to U.S. fishermen applying outside. Certainly U.S. law applies to U.S. fishermen fishing outside the EEZ, and so some discussion of that and ideas would be most welcome. Thank you very much indeed.

MR. GEER: Thank you very much. Does anyone have any questions or comments?

DR. CHERUBIN: My first question is do you have any data on how much sargassum is collected every year out of the ocean?

DR. FREESTONE: Harvested? None at all, and, so far as we know, there isn't any. It was only in the U.S. where somebody started an operation which was actually doing it commercially, and they have been effectively put out of business by your decision, but there is nothing to stop it happening. There is no international prohibition on the harvesting of sargassum outside the U.S. EEZ, for example.

MR. PUGLIESE: Yes, and I think one of the reasons this is also timely for, at least the discussion, is what has happened is, with some of this occurrence in other regions and actually pushing into some of the island nations and different things, there's a lot of interest in using sargassum for biofuels.

It's one thing to utilize the material that may be brought up on the beach. It's another thing if you create an industry, and this is kind of the same scenario that you had before. You create the industry, and then, all of a sudden, the opportunity to, at high seas or wherever, begin to harvest, with trawls or whatever, large amounts of sargassum, and that may be really detrimental, and so at least keeping the issue on the table about the importance in the Atlantic.

I know most of the focus on the Sargasso Sea Commission's analysis is based on the highly migratory species, et cetera, but, when we did our work with the sargassum in the U.S., it was -- That detailed information we had really showed how complex this system is for not only the pelagics, from the billfish to sharks to other highly-migratory species, tunas, et cetera, but also some of our key snapper grouper species for transport.

In some of those early analyses, species like red porgy and others were actually using this for transport along the Gulf Stream areas and then moving off and settling into the areas, and, of

course, the turtle information is heavily included into our system, about it staging onto sargassum as they're moving offshore, and so the importance, from our region, has been important, and to keep that understood, about how important these systems are, and, as I mentioned, even the idea that some of this is providing habitats and nutrients into the different systems, the deep ocean and nearshore oceans, is a significant part of why this plan was put in place and continues, and it even further emphasizes the concern.

There was a lot of discussion earlier on too about if the Japanese went into a large-scale production, and I actually saw a proposal that was put together by a Japanese firm that was going to grow sargassum offshore for biofuel production, about four or five years ago during an ocean observing meeting, and they were looking at the balances of where the values, production values, were good enough, and it was very specifically on an offshore production capability of sargassum for biofuels.

The idea that with -- Keeping a view of how important this habitat is for the South Atlantic Region, as part of the bigger system, is of significant interest to our council and to all the different fisheries and the habitats and everything that we manage.

DR. FREESTONE: Thanks. Could I just add to that? We have a number of endangered species, like turtles, for example, and so it's -- This is the famous lost years of the juvenile turtles that they actually spend in the sargassum, and, when the sargassum is in closer, it's quite evident that the survival rate is higher, and so survival of some of those endangered species.

MR. VITOLS: At the beginning of your presentation, and I don't know if I heard you correctly, but you said that there were several cruises through this area, and they actually found no weeds, and is that correct? If that was the case, where did it go? I thought there was a constant supply of weeds out there.

DR. FREESTONE: This is really bizarre. Last year was an El Nino, and so the Sea Education Association has this sailboat, which it has about twenty-four students, and they sail through twice a year, every year. Last year, they didn't see any sargassum, nothing bigger than a table. There were no big mats, and, when we talked to the scientists, the NASA people, and we had a meeting in Key West at the beginning of the last year, and the guys from Woods Hole said that didn't surprise them, because it's an El Nino year.

The winds are different, and there has been quite a lot of -- They said when the salinity in the Sargasso Sea goes up, that means you're going to have storms in the Midwest apparently, and so that's why the salinity is -- There is all this interrelationship between the Earth's weather system and this big gyre, and it's actually quite complicated, and we don't really know that much about it, but that is -- There is this phenomenon of a lot and then none and then a lot is quite common, apparently.

MR. VITOLS: Do they know how fast this grass regenerates?

DR. FREESTONE: It seems to come through from the Gulf, and so it goes through the Straits of Miami. It comes from the Gulf through and then up into the Gulf Stream, and it does regenerate as it goes, but nobody has done huge surveys that we're aware of on it, no.

DR. CHERUBIN: To follow up on your question, what happened in the recent years and what has been some of the -- There has been a change in the general circulation in the Atlantic, and that's why, in 2011 or 2012, they started seeing sargassum coming into Sierra Leone on the other side of the Atlantic Ocean that they had never seen before, and so those changes are one of the possible explanations for the absence of sargassum in the Sargasso Sea, but it doesn't mean that it's not somewhere else in the ocean.

The point I wanted to raise earlier is, because of the excessive blooms that they've seen in the Atlantic, there are actually some organizations in the Caribbean that belong to the United Nations that came together to address the issue of beach pollution, basically, by sargassum and how sargassum can be used, basically reprocessed, in order to be used as fertilizer or other applications, because people didn't know what to do with that amount of sargassum on the beaches, and so there's been a lot of work done, actually, by those organizations to find ways to develop methods, such as anaerobic digestion, and even economic studies, to see how those fertilizers extracted from that could be used locally for agricultural applications and stuff like that.

DR. FREESTONE: In Bermuda, it's used very widely, and we're part of that project, which is the United Nations Environment Program. The Caribbean Regional Coordinating Unit in Jamaica has a project, and I think the French have been supporting that, and I think it's in Guadeloupe, and so it's a Basecamp project, where there is an exchange of information.

We have been supporting that, but it's not really our core interest. Our core interest is when it's in the high seas rather than when it's washing up on the shores, but we get a lot of email letters complaining to me that I am not keeping the Sargasso Sea under control, and so we're getting a lot of bad publicity, and so let's try and add to this, but you're right, and that's why I mentioned this is a two-edged sword.

If we think we are going to encourage the Caribbean countries to actually develop the technology to process all these -- You saw these stinking piles of sargassum up on the beach, and, once it's on the shore, it's terrible. It's not actually. If we didn't live there, it would be fine. I mean, it would help the beach strengthen, but, because people have houses nearby and hotels, the smell of it is really bad, and so it's a real problem for the tourism trade, and so, because of that, they need to do something about it.

MS. DEATON: I just had a question. Since the sargassum accumulates, because of the way the currents are spinning around there, does it also accumulate in trash?

DR. FREESTONE: Yes, and, because it's a gyre, there is plastic there, but, having said that, there was a cruise the middle of last year, and the thing about plastic is it mostly breaks down, and so they called it the dismal soup, I think it was called, the title of this thing, and so it's basically you dive and you can see it in the water, and so it's not big bits. There are big bits, but, mostly, it's just this degraded, small pieces that fish eat, thinking that it looks -- It has a horrific effect on it, but it's not -- People have thought of it as being like piles of trash in the middle of the gyre, and it isn't really like that, but we have found -- There is quite a lot of evidence of -- Because most of it is from land-based sources. We have found evidence of ship vessel discarded rubbish, which is actually sticking into the mats, but, mostly, it's these smaller parts.

MR. GEER: Any other questions? Okay. Dr. Freestone, thank you very much. We greatly appreciate you being here today. Now we're moving on to Other Business, and we had Wilson wanted to bring up the Yakama partnership.

DR. LANEY: I think Roger distributed, or Kimberly or somebody distributed, the -- There are two items. One is the proposal, which is ultimately going to come from the North Carolina Wildlife Resources Commission, and it's a proposal, under the National Coastal Wetlands Conservation Grant Program, and I have worked on a couple of these before.

Usually what happens is I will get a call. The first time was from Susan Shipman from Georgia, who had a couple of coastal wetland grants that the State of Georgia was working on, and she asked me to take a look at the fisheries section of those and help them to edit those, and the same thing happened this time. I got a call from our coastal program coordinator, Mike Wicker, in the Raleigh office, and he asked me to take a look at this one and do the same thing, on behalf of the two primary partners for this one, which are the North Carolina Coastal Land Trust and the North Carolina Wildlife Resources Commission.

You have the detailed proposal there, from which the budget information has been redacted, for reasons of confidentiality, until the project is completed. There is also a map, and I don't know whether Roger can project that or not, but it's not 100 percent necessary. You can all pull it up on your laptop screens if you wish, but what we're talking about is a 3,000-acre riparian forested tract, which lies adjacent to seven-and-a-half miles of the Yakama River. It's up inside North Carolina, and it's at about River Mile 120 to 130 or so.

There were some questions initially about its eligibility, because our folks in headquarters were saying, well, wait a minute, this is like 130 miles from the ocean, and I said, yes, but it's fifteen air miles from the Atlantic Ocean, and the Yakama River parallels, for most of its length, the shoreline, and so the whole watershed is in a coastal plain setting. It also is important habitat for American shad and Atlantic sturgeon, and possibly shortnose sturgeon, and I need to talk some more to Bill Post of South Carolina DNR about that, but clearly a very important tract on a coastal river that provides spawning and nursery habitat for several anadromous species of importance to the Atlantic States Marine Fisheries Commission and the South Atlantic Council.

My question to the advisory panel is whether or not you all would like to pursue the council sending a letter of support and/or endorsement for the project. The Coastal Federation and the Wildlife Resources Commission have put together the vast majority of the funding that they need to do this. It's about a $6 million total project, and I think they're applying for about $1 million from the Coastal Wetland Grant Program.

I think it's a good project. I think it's one that certainly would be consistent with council policies and goals and objectives, in terms of protecting especially riparian habitat within a coastal river system here, and so, if you have any questions, I will be happy to attempt to answer those, and I will also just mention that Lisa is working with me and our chairperson of the Atlantic Coastal Fish Habitat Partnership, Kent Smith.

You have all heard that Lisa will be heading off on her honeymoon as of tomorrow, and so she's not going to be here, but Kent and I will be birddogging this one. I have submitted an endorsement application to the Atlantic Coastal Fish Habitat Partnership, and that sub-committee will be

convened and asked to consider endorsing the project as well, and so hopefully they would decide positively with regard to that question and would agree to send a letter of endorsement also, and so I feel like, the more letters we can get, the more competitive the project becomes. From my perspective, it's a really good project, and it's one that I would like to see the council support.

MR. KELLY: **Based on my faith in Dr. Laney, I would make a motion that the AP and the South Atlantic Council consider a letter of endorsement for the acquisition of the Yakama property.**

MS. DEATON: I second that.

MR. GEER: Any discussion on the motion? **Any opposition to the motion? Hearing none, the motion carries.**

Let's talk about the process, Wilson, and how we do this. We as an AP have endorsed this project. Then my understanding is that the council's Habitat Committee would have to do the same. Is that correct, so that a letter could be drafted to be signed by Dr. Duval, who is the Chairman of the council?

DR. LANEY: I am going to defer to Roger on that point, as to the exact process that needs to be followed from this point forward.

MR. PUGLIESE: For a project support, I'm not sure -- What we can do is have the specific recommendation in the report from the Habitat Advisory Panel, and a letter of support can be drafted on Michelle's or on even the Executive Director or even staff level, and so there is -- We can proceed with this, I think, in a fairly straightforward method with supporting this.

DR. LANEY: Janice had indicated to me that it would be her desire that we try and get letters to them by the end of the month. However, I noticed that, on the front page of the proposal, the submittal deadline is not until June the 29th, and the council meets the 12th through the 15th or the 17th, and so it seems, to me, that there would be enough time to go through the regular process of bringing it up at the Habitat Committee level and then make a recommendation to the Full Council and still provide it to Janice and to the Wildlife Resources Commission in a timely enough manner that they could submit it with the whole package, or at least that's what it looks like to me, and I will verify that by talking to Janice.

MR. PUGLIESE: That would be the most straightforward process, if it comes as a recommendation from the AP in the report and advances to the committee and the committee recommends to the council and we just have a draft ready to follow up on.

MR. GEER: That's what I would suggest, because we report back to the Habitat Committee, and so I would feel much more comfortable if they're endorsing it as well. What name is actually signed at the bottom or who the letter -- As long as it's endorsed from them and the council as a whole, I would feel more comfortable with that.

DR. LANEY: Thanks to Bill and Anne for making the motion and the AP for approving that. I appreciate it, and I think this -- I was remiss, I think, before, when Susan Shipman asked me about the two previous Georgia grants, and I can't remember the timing on that. I think it was probably

something that happened in between council meetings, but I should have suggested to Susan, especially since she's a past council chairman, that we should have sought SAFMC endorsement for those two as well, but, now that I realize that this program exists and there may be additional opportunities, I think this is something we should pay attention to and keep a lookout for. Any time we have the opportunity to endorse one of these, especially given that it doesn't cost us a whole lot, except for a letter, to go ahead and do those.

MR. GEER: Any other comments on that? Hearing none, the last thing I had, and I mentioned this earlier in the meeting, is I have been chairman of this committee for it will be four years at the end of this year, and that's a long time to be chairman of a committee, at least committees I have sat on in the past, and I've been on this committee for fifteen years.

We are having a change of administration in December, and so I don't know what my role is going to be after that. I know, starting the new year, I'm going to be chairman again of the South Atlantic Board for the commission, which I'm going to have to take up the cobia issue, and so I would like, at the next meeting, if somebody is interested, for somebody to step up and want to be chairman.

I would also maybe recommend, if we could, to have a Vice Chair as well, in case somebody couldn't make it. Vice Chair doesn't really have to do that much, but they know they're in the hopper, and they can start to learn things, and so I'm not going to put anybody on the spot now. I was put on the spot four years ago, and I won't say by who, and I think I got the short end of that stick, but that's okay.

I have enjoyed doing it, and I have been on this committee for fifteen years, and so I enjoy doing it, but, knowing what is coming down the pipe, and I think it's probably time that I step away from being chairman of this, and so just think about that for the next meeting, and I will probably be talking to some folks, so that we come in and it's kind of a seamless thing. We've already kind of talked and somebody has agreed to do it, and so I'm looking around the room at names right now, and everybody is kind of being real quiet and not talking to me.

MR. PUGLIESE: I will follow up with Pat too and have some discussions, because there is some ways to make it seamless. We're going to be meeting November 14 and 15 in St. Petersburg, and so, just for everybody, that's our next stage, and so, in advance of that, we will make a nice, easy transition.

MR. GEER: Yes, and I will do that one too, but it's just moving forward. Before we leave, the only thing I had was the artificial reef policy statement, and get your comments -- Since we're not going to the council until September, give us a date. When do you want them by?

DR. HAVEL: A month from now?

MR. BOSTON: Mid-June?

MR. GEER: Let's go June 15. Any comments or any literature you want to add, June 15. That gives you a whole month to get it to them. Then basically the next version of it will be out.

MR. BOSTON: June 16 is a Friday.

MR. GEER: The 16th. We want the next version out by August 1 to people to review, and is that reasonable?

MR. BOSTON: Yes.

MR. GEER: So that we can look at it one last time before it goes to the council.

MS. DEATON: So is that same group updating the artificial reef chapter that also was in our briefing materials, because we were talking about how those references had not been updated either, and so it's almost like both documents have to be done.

MR. BOSTON: It's both.

MR. GEER: Yes, and the policy statement will be -- We could do that, but I think, right now, the policy statement is what is moving forward for the next meeting. What's going in the FEP, that chapter, we've got time on that, but they do need to coincide. They need to be similar, but, if we're going to move -- We decided to delay the policy statement so we can get more information in there and get it correct, and so it's -- They kind of go hand-in-hand.

MR. PUGLIESE: I think that's the key, is that some of those changes are going to track between those, because some of the wording was pulled directly from that, and so, if it gets updated in the policy, it will track back into the section, and so we should accomplish, hopefully, all of that.

MR. GEER: I will send those dates out to everybody again, so they remember. I am going to send a draft letter to Doug Haymans and Wilson Laney, who are the chairpersons of the Habitat Committee, requested that NOAA Protected Resources come to the September meeting to address comments on artificial reefs, and so we're going to get that on the agenda. That will be perfect timing, the policy statement along with that, and we can bring these things up.

All the presentations will be loaded on the website, and I guess one of us will send you the link, if you don't know where that is, because several people asked me for the presentations today, but they will all be on the website, so we can get those. Hearing anything else from anybody? Any other comments? Hearing none, the meeting is adjourned.

(Whereupon, the meeting adjourned on May 17, 2017)

Certified By: _____ Date: _____

Transcribed By:
Amanda Thomas
June 1, 2017

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