SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

HABITAT PROTECTION AND ECOSYSTEM-BASED MANAGEMENT COMMITTEE

DoubleTree by Hilton Atlantic Beach Oceanfront
Atlantic Beach, NC

December 5, 2016

SUMMARY MINUTES

Committee Members:

Doug Haymans, Co-Chair
Dr. Wilson Laney, Co-Chair
Mel Bell
Chester Brewer
Tim Griner
Lt. Tara Pray

Council Members:

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Charlie Phillips
Anna Beckwith
Zack Bowen
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Observers/Participants:

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Erica Burgess
Rick DeVictor
Monica Smit-Brunello
Dr. Bonnie Ponwith
Dr. Jessica Stephen
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Patricia Bennett
Tracy Dunn
Dr. Felicia Coleman
Dr. Phil Levin
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Additional Observers/Participants attached.

The Habitat Protection and Ecosystem-Based Management Committee of the South Atlantic Fishery Management Council convened at the DoubleTree by Hilton Atlantic Beach Oceanfront, Atlantic Beach, North Carolina, Monday afternoon, December 5, 2016, and was called to order by Chairman Doug Haymans.

MR. HAYMANS: I will call the meeting of the Habitat Protection and Ecosystem-Based Management Committee to order. As a reminder of the committee membership, Wilson Laney is Co-Chair, and then Mel Bell, Chester Brewer, Tim Griner, Lieutenant Prey, and Bob Beal. The agenda, are there any additions to the agenda? Seeing none, we will take the agenda as presented. Then the Approval of the September 2016 minutes, are there any additions or corrections to the September 2016 minutes? Seeing none, we will accept those minutes as presented.

Now we have several presentations, starting with Pat Geer, who is the Chair of the AP. He is going to walk us through the AP reports and then through the current status of a couple of FEP II segments, and so, Pat, it's yours.

MR. GEER: Thank you very much, Mr. Chairman. First of all, Attachment 1 is the summary of our meeting. It says in the documents that we met in May in Charleston, and it should be November 14 and 15 at FWRI in St. Petersburg, just to clarify that. We were presented and reviewed and discussed two draft policy statements that were provided by Roger Pugliese of the council staff and the facilitator, Brett Boston, of Group Solutions, Inc.

The first one was the South Atlantic Climate Variability and Fisheries EFH Policy Statement, and it's marked as Number 2 in your documents, but it's Number 4 on the agenda. The second one was the South Atlantic Food Webs and Connectivity EFH Policy Statement, and that is reversed. That is marked as Number 4 on the documents, but it's Number 2 on the agenda.

With the food webs, we had a very lively discussion on trying to define what a forage species is. The Mid-Atlantic, we found out the Mid-Atlantic defines a forage species as anything that's not managed. That presents a problem to us, especially in the South Atlantic, when you consider things like penaeid shrimp. They're a vitally important commercial species, but also very important to food web and trophic interactions.

We listed to a webinar by Kendrick Osgood, who is the Chief of NOAA's Marine Ecosystem Division at the Office of Science and Technology, on the Service's Ecosystem-Based Fisheries Management Policy Roadmap. That presentation, the link is provided in the summary. Dr. Marcel Reichert from South Carolina DNR provided a review of the regional research program and data needs, and then we broke out into state panels to talk about identifying the data needs in support of ecosystem-based fisheries management. Within that, we had four main themes that we were looking at of research, data needs, monitoring and observing, and partnerships and leverage.

Some of the themes that kept coming up over and over again, under research, were maintaining long-term monitoring programs and secure funding and also have staff for the analysis. We're collecting a lot of data, but a lot of these people, because of budget cuts, they don't have the time, always, to analyze the data that they're collecting. There was, also under research, talk about artificial reefs and their relevance in connectivity to natural habitats and develop new models that include environmental data that can be used in assessments.

Under data needs, more mapping information, specifically for bathymetric and habitat information. Under the monitoring and observing themes, we talked about some of the overarching ones of long-term water quality monitoring, probably from buoys, and having that kind of information, and using remote sampling, such as with acoustic tagging and things like that. We talked about using our partnerships and using that for leverage as well, and we tried to identify new partners. We have a lot of partners already that we're working with, some more than others, but one of the groups that came up is the Citizen Science and how we can use citizens better in collecting some of this information.

Then we had a presentation by Louise Vaughn from the South Atlantic Landscape Conservation Cooperative on the Regional Conservation Blueprint. Roger and Tina Udouj provided an overview of the council's and South Atlantic's GIS mapping strategy. Then, finally, we talked about our South Atlantic Artificial Reef EFH Policy Statement. That kind of has come to a screeching halt, because of a lot of staff change, not just with the states, but also with the commission, and so we're getting that back up and running, and some of the council staff and the AP, along with myself, Roger, Brett Boston, and Brian Hooker, are going to meet at the commission's Artificial Reef Committee meeting in Jacksonville in February and try to work out the details of that policy statement. I believe that's all I have, as far as the summary report, Mr. Chairman.

MR. HAYMANS: How far behind do you think the artificial reef portion will be?

MR. GEER: I think they're starting today, believe it or not. They're having a conference call right now. They would have to present it to us in May.

MR. PUGLIESE: Just quickly, the intent is to have -- They are getting it back up and going, and to have probably the lion's share of the core of that developed in advance of that meeting in February, and so the intent is to have that pretty far along and then refine it at that meeting and then be able to advance it.

Now, we have the March council meeting, and what I was thinking is the possibility of having the preliminary draft maybe available at the committee, but what you want to do -- We have been running this through the advisory panel, to actually advance that as an essential fish habitat policy, and so what it really was going to do is go to the May meeting, the May AP meeting, for then finalization, to be brought back to the council in June, and so that's kind of the timeframe, because of the AP meeting. We have scheduled the AP now for May 16 and 17 of this year, the first spring meeting, but that's pretty much the timeline.

MR. HAYMANS: Thank you. Are there any other questions or discussion? Madam Chair.

DR. DUVAL: Thank you, Mr. Chairman. I am curious. Roger or Pat, can either of you give a sense of like what would be in this artificial reef policy statement? I am just trying to think of is this a policy statement that artificial reefs are great and that they enhance our natural -- I mean, I am just curious to know what the direction of the policy statement would be, only because there has been a pretty good division, I would say, within the scientific literature with regard to artificial reefs, that's all.

MR. GEER: I will take a whack at that. I think a lot of the policy statements, to date, have been shall and should not type of things, like the don't, versus I think the artificial reef policy statement

is highlighting what we're doing and making sure that we're continuing doing it in the right way, and it's basically providing the right type of resources, the right type of material, and so it's just a general guideline for continuing what they're doing and having similar policies among the states.

DR. DUVAL: So more of like maybe a best practices type of thing?

MR. PUGLIESE: Yes, I think it's going to be relating back to the essential fish habitat and habitat area of particular concern designations, and so the idea is to look at things such as the best practices that have been -- That's one of the reasons that we wanted to engage the Artificial Reef Committee also, because some of those things are done, and they can tailor it specifically to the South Atlantic, and also highlighting research that has been accomplished in those areas.

I think it will provide other information that enhances activities of the council, the fact that we have the SMZ designation capability for artificial reefs and identifying it as an additional tool and capability, and I think the whole idea is to just capture that in our council's context as well as specifically as it relates to our EFH and HAPC designations.

DR. DUVAL: My final follow-up and then I will shut up, but does this mean that we're considering like all of the state artificial reefs as potentially EFH?

MR. PUGLIESE: The artificial reefs are EFH, but the only SMZ designation -- The SMZs provide the HAPC designation side, under the way that you've structured it now, and so this isn't changing any of the considerations, but it's just acknowledging what this council has identified as the value of artificial reefs as essential habitat and then that tier up as HAPCs when designating SMZs, and then also the discussion about its potential use, such as the spawning SMZ capabilities, et cetera, and so it's acknowledging what this council has already been building and also its connections, very specifically, into essential habitat.

DR. DUVAL: I'm sorry that I have had so many questions, but I just wanted to make sure that I guess, as we move down this road, that the reason that those reefs are put out there was to allow for fishing opportunities and that that would not be removed as a result of this policy and that's all.

MR. PUGLIESE: Yes, and that's not the intent. I think what it really is, is it's trying to highlight the value of the use of artificial reef systems in the states. It's building on the state efforts and then how the council has taken that and used that in the policy and how it is acknowledging the values of essential fish habitat and areas of particular concern, where maybe other regions really don't acknowledge that.

MR. HAYMANS: I was sort of hoping, when we first started talking about a policy for artificial reefs, without directing its outcome, that it would be positive enough that we could use it as pressure to NMFS to put some funding into artificial reefs. Right now, we're using Fish and Wildlife Service dollars for artificial reefs. Anyway, Ben, did you have something?

MR. HARTIG: Yes, I did, just to expand a little bit on the artificial reef and the SMZ concept. I mean, we have some information now, from videos that Mel has provided to me from the last cruise, that a pretty substantial number of warsaw groupers use that South Carolina Wreck, and a number of other species as well. I was surprised, to be honest with you, at that depth, the number

of mid-shelf species that were on there as well as the deepwater complex. I was amazed to see the diversity of species on that piece of bottom. The other thing is tying that to the Snowy Wreck and the biomass of snowy, of species in a rebuilding plan, some kind of context to bring that together into the importance of this SMZ and possible artificial reef incorporated into that and the importance of that.

MR. PHILLIPS: I'm not on the committee, but was there -- I guess I have a question and a comment. Was there any talk of bang for your buck when you're trying to put out artificial reefs, because of the cost of an artificial reef and what you might get there, as far as recruitment, and which species you may be trying to target, that one species may need some more help than another?

I will follow that up. When I was at the Gulf, I think I was looking at some of their artificial reef numbers and habitat and area, versus hard bottom versus sand bottom, and I forgot what the numbers were, but I remember the artificial reefs including, I think, the oil rigs. They were like 0.0006 percent. It was miniscule, and we have a lot of support, especially from recreational sectors that want to build artificial reefs, and so was there some talk on what to build and where to build and how to get the best bang for your buck?

MR. GEER: We haven't gotten to that point yet. Like I said, there has been some turnover with staff at the commission and also on the states that were going to help with this, and so we're pretty much starting over again, but there was a little bit of talk about what methods could be used to identify the usage, how can we do that effectively. Can we use satellite imagery? Can we use drones and those kinds of things? I sit on the Gray's Reef Committee, and they have the exact same problem. It's like, who is using the resource and how often is it being used, and they really have no idea. There is some thought of how we can approach that, to see what the relevance of these artificial reefs are.

MR. BELL: To Michelle's point, yes indeed the reefs are built for people to fish, and that's traditionally, for fifty years now, at least in South Carolina, that's what we've done, but what is new is what Ben was talking about, is now we're exploring the use of reefs, artificial reefs, as a tool in a different capacity, and that would be the two, Area 51 and Area 53, that we've proposed as spawning SMZs and then the deepwater MPA reef.

It's a slightly different use of the tool, and so I think it's good to maybe capture that, and we've incorporated that into our state reef management plan, is the ability to do that, if and when we choose to do it and can pay to do it and those sorts of things, but that is one new thing that has kind of come along in the world of artificial reefs, I guess, is the concept of using them in a slightly different capacity for the benefit of the stocks.

DR. LANEY: We did discuss that, Mel. I was there at the Habitat AP meeting, and so we pointed out that you all have sort of pioneered that new use, and so I think that will be considered in the policy when it's drafted.

MR. HAYMANS: Okay. That's good discussion over a policy that hasn't gotten started yet. Let's get to the two that have. Go ahead, Pat.

MR. GEER: I'm assuming we've already done C then, 2C.

MR. HAYMANS: Yes.

MR. GEER: Okay. I will check that one off. Roger and I are going to tag-team the next two, the plans, and, in the attachments, I think they're backwards on here. Do you want to do climate first? Climate was the easy one to address.

MR. PUGLIESE: Just quick, Attachment 2 is actually the climate policy. Attachment 3 was the executive summary that supported the discussion for that, but Attachment 2 is the result of the development of the section on climate variability in fisheries, through our writing team, led by Lora Clarke and Ruoying He. They provided the foundational information on some policy guidance discussion. The council responded to that at the last meeting, and the Habitat and Ecosystem Advisory Panel built on that and came up with what you see today as the iteration of a policy consideration document, EFH policy statement, for the council's consideration, which incorporated your comments as well as built on and added to some of the specific recommendations through the panel.

The way these are laid out is the introduction is on essential habitat, and the impacts are pretty much core between both this as well as the food web policy. It provides the context with the existing linkages back to the habitat plan, back to the essential fish habitat amendment, and then the fishery ecosystem plan is providing a lot of the essential fish habitat information and also some of the additional updates that were integrated in the Comprehensive Ecosystem-Based Amendment 1, as well as Ecosystem-Based Amendment 2, as background information on the introduction for this. It also acknowledges the essential fish habitat and habitat areas of particular concern, as they relate to the climate variability and change, and then it goes directly into the policy considerations section of this, and I think I will bump that to Pat to walk us through the rest of this.

MR. GEER: The policy considerations, we talked about -- The introductory paragraph there is just giving some background on the considerations to take into account for climate change. It's giving some background information as well. I don't know if you want me to go through every single line and read this entire thing, but I'm going to go right to the threats, if you don't mind, instead of having to go through the basic text. It's the top.

We defined some of the threats, some of the threats that we thought might occur as a result, and they're in the table that is for the different EFH, and that's in the attached table that's in the back of the document. Then we basically talked about general policies that we wanted to come up with, as far as, as species expand and shift their distributions, due to changing ocean conditions and market demands, it's the council's policy that the South Atlantic Fishery Management Council will be proactive with various state agencies and other councils and NOAA Fisheries to manage species that span multiple jurisdictions, and I heard that discussion this morning with Law Enforcement, the South Atlantic Landscape Conservation Cooperative and NOAA RISAs, the Southeast Climate Science Center, and other multi-organizational partnerships. Also, the fishing industries and fishing communities and other interested civil stakeholders.

Number 2 is the priority list of climate indicators, coming up with climate indicators, should be developed or selected that likely track ecological, social, and economic trends and status. This goes back to the AP talked about, when we said we need folks that can analyze the existing data, and so, to come up with these indicators, we're going to need some help with folks being able to use the existing data and get it analyzed. The council requests annual summaries of these

indicators, species likely to be influenced, and fisheries trends that appear to be due to changing ocean environmental conditions in the South Atlantic ecosystem.

Climate change requires the consideration of tradeoffs, as we all know. Changing ocean conditions necessitate responses ranging from increasing buffers, due to a higher level of uncertainty, to adjusting quotas upward or downward to account for predicted and realized increases in productivity. We are seeing this a lot with the Atlantic States Marine Fisheries Commission, and Atlantic lobster is a very good example, changing quotas and changing distributions of species and how it's going to affect those quotas. We don't know how that's going to affect us in the Southeast, but it's already being seen in the New England states.

Given the uncertainty of climate impacts, the precautionary principle should be invoked as possible for future management decisions on issues that can be influenced by climate change. One of my favorite is new fisheries that can develop before managers are able to adequately monitor or control them. In particular, the cannonball jellyfish was brought up, which is primarily my state. One avenue to avoid uncontrolled removal where species have no limits is to include them in an aggregate bag limit. You can't have a bag limit with jellyballs, but that's just one species, but that's the example that we had. It came up several times.

Number 6 is careful scientific and management evaluation should be undertaken as new fisheries develop, including consideration of how to avoid harmful impacts on essential fish habitat. Then we listed the research needs, which were a conglomerate of what the state workgroups talked about, including scientific research and collection of data to further understand the impacts of climate variability on the ecosystem, and fish productivity must be prioritized. This includes species vulnerabilities, in terms of distribution, habitat, reproduction, recruitment, growth, survival, and predator-prey interactions.

As appropriate, climate data and the effects of climate variability should be integrated into stock assessments. Some of this is being done already. Climate impacts could also be a focus of the new proposed stock assessment research cycle. More three-dimensional ocean observations of ocean conditions are needed to characterize the coastal-estuarine-ocean habitats. Management strategy evaluations are desired to allow the council to analyze potential regional climate scenarios and determine whether current harvest strategies are robust to future changes. Greater understanding of the socioeconomic impacts and fisheries responses to climate variability is needed. Greater understanding of the social impacts and fisheries responses to climate variability is also needed, and characterization of the offshore ocean habitats used by estuarine dependent diadromous species, which may be useful in developing ecosystem models.

This goes not to just diadromous species, but we talked about the interactions between the inshore waters and the offshore waters. A lot of the species that are found offshore also have an estuarine component as well, and so understanding those linkages is very important.

MR. HAYMANS: Chester, did you have a question about jellyballs?

MR. BREWER: I do. I don't understand that. Most of this, I can understand it very well and agree with 100 percent, but I don't understand the thing about, if you've got a newly-developing fishery that you somehow or another aggregate it with others, and I don't understand that a bit.

MR. GEER: I think that's a remnant of -- Roger, that was in there, and we discussed that, and I think that may have come from a council member who wanted that in there.

MR. PUGLIESE: Originally, there was some discussion about trying to do some of this analysis in advance of that. That was very clear at the last council meeting, that that was not going to be incorporated in here. What this was, it was somewhat of a remnant, saying that one of the avenues or opportunities you have to deal with this in a different way would be potentially, if there is a developing fishery, potentially incorporate it under existing bag limits, if it's a non-targeted species, but that was used as more of an example.

I mean, this is a developing product, and so, if this is even inappropriate to keep in here -- I think all it was saying was that it was trying to maybe at least provide a foundation from which to, as new things develop, begin to do the research to analyze those and advance it. If it's not appropriate in this one, we can remove that now, and, if using an example confuses it, but I think the intent is just to try to highlight that there are other avenues to address some of these implications that are already standing, such as incorporating it into say bag limits or other different capabilities.

MR. BREWER: If what you're really saying is to proactively deal with new, developing fisheries, if that's what you're saying, then maybe this could say that. Again, I agree with that 100 percent.

MR. BELL: Part of my issue with Number 5 is just the wording, I think. It just sounds, just the way it's -- New fisheries can develop before managers are able to adequately monitor or control them, and that just doesn't seem good to have that down that like, and it seems like -- I get the whole thing with jellyballs, because we're right there with you, sort of, but it seems like you could just take 5 out and 6 kind of covers what needs to be said about that, is that careful scientific and management evaluations should be undertaken as new fisheries develop.

Number 5 just seems to put us in kind of an awkward spot, and I kind of figured that the aggregate bag thing was related to maybe close other species or something, but then, if you get something that is entirely new, like maybe it's sea cucumbers now or something, or something else, whatever you can imagine might change range or something, or availability, but I would, personally, just get rid of Number 5 and lean on 6.

MR. HAYMANS: I like that suggestion, and it sounds reasonable. Do we need a motion for that, or is direction okay for you, Roger? Direction is okay. Go ahead, Jessica.

MS. MCCAWLEY: I was going to say something along those lines. This was one of the areas that I brought up the last time we talked about this, and so I feel like this is a re-word from that, although I don't think it's a significant improvement. I think it's odd that there is such a directive in here about management, is what it seems like. It doesn't really seem like an example, and so I think that we could just remove Number 5 and stand with Number 6.

MR. HAYMANS: That's three, and I think that's good. So we'll take Number 5 out.

MR. PUGLIESE: I think that was -- We just need to do it, because Number 6 accomplished, I think, what we were trying to get to, and we just need to cut it out.

MR. GEER: Yes, and the AP was -- They were a little concerned. That's a very specific management action, and there was a lot of talk, and I think what it is, it's just a remnant. I think, as Mel said, if you basically just take Number 5 and 6 combine them, that serves the same function, and so I don't think anybody is going to have any problems with removing that at all.

MR. HAYMANS: Any other questions regarding the climate variability policy statement?

MS. MCCAWLEY: I have a number of small changes that I would like to see in there. In the introduction part, if you want to go back to that, the bottom of the second paragraph of the introduction talks about how this guidance can be revised, and it gives three possible ways. They are very specific. I was wondering if we could also add a fourth that maybe said something like "as deemed appropriate by the council", because I guess we don't fully know what's going to play out with climate variability in the future, and I think that there ought to be a more open-ended way in which we can revise this guidance.

MR. HAYMANS: Isn't that what Number 1 does? It says the council, in response to changes and conditions.

MS. MCCAWLEY: To me, not exactly. To me, it's a little bit different. There could be -- What if there is an invasive species or -- I think that there are some things that maybe go beyond this a little bit, but I don't know. I'm not on your committee.

MR. HAYMANS: I have no objection. Anybody have -- Roger, do you know what she is --

MR. PUGLIESE: Yes, I see exactly, and it is different. The introduction is just really kind of laying a timeline and connection, and this is a very specific latitude to the council on how to approach it.

DR. DUVAL: I'm not on the committee, but I like the Number 2, the priority list of climate indicators, and having some annual summaries on that, but it seems like, Pat, given what you've outlined, it's going to be a while before we would get some indicators, based on staff challenges and what you've been saying, and so it's -- I like it, but I just am concerned that it might take a while to get there that's all, and it might actually require some communication, potentially, with the SSC.

MR. PUGLIESE: Yes, and I think it may be good to have these, because one of the things that is part of the Climate Regional Action Plan was to advance some of these. Also, there are some proposals that have been submitted under S-K and another to begin to try to facilitate that as a third-party and do that, and so different timelines. This is talking about an annual, and it was requested to be an annual, because of some of the concern about how frequent, but there are some proposals, potentially, that even have quarterly reports that, if funded, could provide it through additional partners in the region. There are things that are going to be advancing. I guess what -- Was your concern about keeping it in here that it may divert resources or -- Does that help any, in terms of what's moving?

DR. DUVAL: Yes, I think it's entirely appropriate. That's exactly, I think, what we want, but it's just having the resources to get there and not wanting to create, I guess, like a false expectation,

because, when I read this, I think we're going to do this right now, and so it's good to hear that there are some efforts being made to actually get the resources to do it.

MR. HAYMANS: Thank you, Michelle. Jessica, did you have something additional?

MS. MCCAWLEY: Yes, and, along those same lines, do we need to tell whoever is going to give us this that they need to give it to us? In other words, do we need to put NOAA or somebody on notice that they need to be providing this, because it doesn't say who is going to provide that.

MR. PUGLIESE: Let me pull up a list to see something. What we did do -- We had this discussion at the AP, because there was a comment about maybe these should be very specifically tasked, and, truthfully, under the action plan, some of those, under the broader scope of the implementation, these are supposed to be products in the roadmap that NOAA is to provide, and one of the things we did is went back to the council's comment on the roadmap, and I was going to bring those up when we got into the food web and connectivity, but they specifically say -- Let me open that right now. They specifically say that NOAA would provide -- Here, it's talking about NOAA to develop and evaluate a suite of products and ecosystem-level risk assessments and coordinate -- These are directly from the council's comments on the Regional Action Plan.

Develop ecosystem-level reference points, and so it's getting to a number of other ecosystem indicators, but this would be essentially the same thing, but insert, potentially, NOAA. Now, the only reason that I think some of these weren't done is because, if there's opportunity to have third-party partners partner on it, then we want to -- Maybe NOAA and other regional partners or something like that may get to that.

MR. HAYMANS: But you're comfortable with what she is asking, to change that or to at least add to the list?

MR. PUGLIESE: Essentially, under 2, integrate NOAA and other regional partners to develop a priority list of climate indicators.

MR. HAYMANS: Do you want continue, Jessica?

MS. MCCAWLEY: Okay. Roger, I found some verb tense issues and other things, and so I will give you this document at the end, but two other things that I wanted to point out were on the top of page 2, in that paragraph about black sea bass being caught further south, off of Florida, do we have a citation for that?

MR. PUGLIESE: We need to get one if we don't. If we don't, then we can remove it.

MS. MCCAWLEY: Okay. Then the last full paragraph on that page, that starts with "Changing ocean conditions", that first sentence talks about new fisheries in different regions, and can we add "and in the South Atlantic region"?

MR. PUGLIESE: Yes.

MS. MCCAWLEY: Then I will give you the rest of the document with the other little commas and verb tense things.

MR. PUGLIESE: Okay. Are there any other comments or specific recommendations?

MR. HAYMANS: You're going to provide those comments to him in written form? Okay.

MR. PUGLIESE: She's going to provide those, and we'll update those. It would be the prerogative of the committee to approve this to the council.

MR. HAYMANS: Sure, at the next meeting, right.

MR. PUGLIESE: At the next meeting or now?

MR. HAYMANS: I'm sorry, but are you going to have them ready now?

MR. PUGLIESE: I was going to update those by Full Council. I mean, it's not a lot of --

MR. HAYMANS: Sure, by Full Council. That's fine. Thank you. Anything else on the climate variability policy statement? Seeing nothing, let's move to the connectivity, the food web connectivity.

MR. PUGLIESE: Just to touch on it again, I think, the introduction and the beginnings of this are essentially the same. I think the edits that were made on the front-end would apply also, especially in Paragraph 2 of this, and so we can just carry that right over into here. That would directly move it then into the policy considerations, and I will, again, bounce it to Pat.

This was developed in cooperation and building on the policy with Tracy Smart from South Carolina DNR and Dave Chagaris with Florida that provided the co-sharing of the development of the section and provided foundational recommendations on policy consideration. The council responded, and the AP has provided this recommendation that I will send back to Pat now.

MR. GEER: Thanks, Roger. The first thing that I want you all to look at is Figure 1, and you can look at the spider web that we have there of the trophic interactions in the Southeast. It's much more complex than in some of the other areas, like the North Pacific or even New England states, and so we've got our work cut out for us, because it is quite complex.

Moving down through the policy, the general policy is, as I mentioned earlier, we had some -- We're trying to define forage species and forage fisheries, and managers should consider forage fish stock abundance and dynamics and their impact on predator productivity when setting catch limits to promote ecosystem sustainability.

When we're talking about forage species, the one that comes to mind right away is Atlantic menhaden, but there may be others. To do so, more science and monitoring information is needed to improve our understanding of the role of forage fish in the ecosystem. This information should be included in stock assessments, ecosystem models, and other fishery management tools and processes in order to support the development of sustainable harvest strategies that incorporate ecosystem considerations and tradeoffs. As I said earlier, the definition of the forage species, we have it in Appendix A at the end of the document.

There is a list of species from the coastal trawl survey of SEAMAP. It's the top fifty species, and we took the liberty of highlighting species that are on there in gray that can be considered forage species, and I think it's open for discussion of what is a forage species and what is not, but it's just a starting point of saying we feel those species are. As I said earlier, the Mid-Atlantic just said, if it's not managed, it's a forage species, and we can have some problems with that.

Food web connectivity, separate food webs exist in the South Atlantic, and, like I said earlier, inshore versus offshore, north and south, and benthic and pelagic, but they are connected by species that migrate between them, such that loss of connectivity could have impacts on other components of the ecosystem that would otherwise appear unrelated and must be accounted for.

Trophic pathways, managers should aim to understand how fisheries production is driven either by bottom-up or top-down forcing and attempt to maintain diverse energy pathways to promote overall food web stability.

Number 4 is food web models. Food web models can provide useful information to inform stock assessments, screen policy options for unintended consequences, examine ecological and economic tradeoffs, and evaluate performance of management actions under alternative ecosystem states. Food web indicators, we talked about that a little bit earlier, as far as climate indicators, but the same as food web indicators have been employed to summarize the state of knowledge of an ecosystem or food web and could serve as ecological benchmarks to inform future actions.

Invasive species, somebody mentioned the invasive species a few minutes ago, most notably the lionfish and how they're known to have a negative impact ecologically and on economically-important reef fish species, through predation and competition, and those effects should be accounted for in management actions. Contaminants, bioaccumulation of contaminants in food webs and how they can be sub-lethal in marine fish, mammals, and birds, and it is also a concern for human seafood consumption.

Again, the research needs are coming out from the state breakout groups, and Number 1 was scientific research and collection of data to further understand the impacts of climate variability on the South Atlantic ecosystem, and fish productivity must be prioritized. We're combining both the climate and the fish productivity there. This includes species distribution, habitat, reproduction, recruitment, growth, survival, predator-prey interactions, and vulnerability.

Number 2 is the characterization of offshore ocean habitats used by estuarine dependent diadromous species, and that was similar to the one as before, but we can also look at other species as well. Scientific research and monitoring to improve our understanding of the role of forage species in the ecosystem, in particular abundance dynamics and habitat use. Then there's just the table that shows the different species and the habitat, EFH, that may be of concern because of various concerns with food web interactions.

MR. PUGLIESE: Just two quick points before we get into discussion. One of the things that we did do, and we've been kind of merging this, is, under threats, in advance of the policy discussion, that really provided the individual EFH and HAPC designations that tied to the species or fisheries, and that was drawn directly from a user guide that I've been working with Pace Wilber and NOAA to generate an EFH user guide for the South Atlantic.

We formalized it and have tied it directly to the policy. Instead of including a lot of the detailed information in here, it's actually available directly online, and you can see more of the details, and so what we've done is cross-walked between that, and that's something that they have wanted to be able to highlight for the region for a while anyway, and so this was a good opportunity to use it and connect it into the policy itself.

The other thing was, under the research needs, I had identified those other specific items that were included in the council's response on NOAA's ecosystem roadmap for possible inclusion under what potentially could be research and monitoring needs, and this is specifically where it got into, and I don't know if we want to walk through these different ones, talking about -- I will just read these quickly, but the basic data is the foundation of ecosystem-based fisheries management. Fixing existing data gaps in the South Atlantic must be addressed to build a successful framework for this approach in the South Atlantic. NOAA develop and evaluate an initial suite of products, at an ecosystem level, to help prioritize the management and scientific needs in the South Atlantic region and take a systematic approach to identify overarching common risks across all habitats, taxa, ecosystem functions, fishery participants, and dependent coastal communities.

NOAA develop risk assessments to evaluate the vulnerability of South Atlantic species, with respect to their exposure and sensitivity to ecological and environmental factors affecting their populations. NOAA Fisheries coordinate with ongoing regional modeling and tool development efforts to ensure that ecosystem MSEs and linked to multispecies and single species MSEs, inclusive of economic, social, cultural, and habitat conservation measures.

NOAA develop ecosystem-level reference points and thresholds as an important step to informing statutorily-required reference points and helping to identify key dynamics, emergent ecosystem properties, or major ecosystem-wide issues that impact multiple species, stocks, and fisheries. Addressing basic data collection gaps is critical to successful development of ELRPs.

Continued support of South Atlantic efforts to refine EFH and HAPCs is essential to protect important ecological functions for multiple species and species groups in the face of climate change, and the idea would be, potentially, to roll these under the research and monitoring section of the policy. They are based on, as I said, the council's position that was provided to NOAA Fisheries in the response to the roadmap, the ecosystem roadmap.

MR. HAYMANS: Everybody okay with bringing these in under research needs? Okay. Any questions or discussion or comments?

MS. MCCAWLEY: As we just mentioned, and Roger talked about it in the introduction, I would like to see that same change we made on the climate one added here. There is a sentence, under policy considerations, that is a little bit concerning to me. It's the second sentence that says "This is crucial because of the high likelihood that fishing may lead to unintended and unforeseen consequences on the ecosystem." That seems a little negative, to me, indicating that fishing in the South Atlantic region has done almost irreparable damage here to the ecosystem, and I would like to see the sentence changed.

MR. HAYMANS: If you have an issue with it, you have to have the solution. What's the new change?

MS. MCCAWLEY: I don't have something written out, but I could work with Roger between now and Full Council.

MR. HAYMANS: That would be great. Go ahead.

MS. MCCAWLEY: Then I had a question about the threats portion. I guess I don't really understand how changes in South Atlantic food webs is affecting EFH and HAPCs for managed species.

MR. PUGLIESE: For example, impacts on near-shore hard-bottom systems may affect juvenile grunts and snappers that are managed, and that potentially could affect the connectivity. That's a direct connectivity, and so you may have a bottleneck that you're addressing. All this is trying to do is to begin to highlight those types of linkages, and many of those that we were talking about, we should be going in there and citing very specific areas, et cetera, and, at this stage, what's been done to date, the best we have was some of the work that we did when we had that climate workshop, where we began to talk about, well, they're estuarine dependent and so they may have this, and so it's trying to hit it at a high level on connectivity, on effect on food webs, and specific species that may be the most vulnerable. That's all this is trying to begin to do.

MS. MCCAWLEY: It seems like what you're saying is that this is written backwards. You're saying if you change the food web, you're affecting the habitat. Aren't you saying if you change the habitat that you're affecting -- Maybe it's backwards.

MR. BELL: You were just asking for comments, and this is just an observation. When we went through the research needs and all, any time we touch on ecosystem-based management or ecosystem-based anything, it just shows the amount of work that needs to be done, and we say NOAA Fisheries will do this and NOAA will do this, and I just keep thinking that the poor NOAA wagon is -- It's like more bricks in the wagon, and we're going to kill the mule at some point. It can be overwhelming sometimes. I get that that needs to be done, but it's a lot of work.

MR. PUGLIESE: I think it was intentional to try to pin down some of those, because I think what the bottom line is, when you're looking at what they're saying -- What they have adopted as policy and as roadmap is saying that these different benchmarks are going to be provided by NOAA to support this. As we all know, a lot of these things have not been done in the South Atlantic, but I think it's also been balanced a little bit with trying to talk about how -- Basically, you don't want to rob Peter to pay Paul on these types of things, because the last thing we want to do is to gut our fishery-independent surveys and remove assessment capabilities and all those things that could compromise what we're doing. However, that is the direction, and, if that's the case, then they need to either find resources or other partner capabilities that provide that to the council.

MR. BELL: Right, and so they're loading their own wagon, so to speak.

MR. HAYMANS: Just in the last climate workshop, the last habitat workshop I went to, it was just very in your face how we're all competing for the same pot. Within the federal system, within NOAA and their Habitat Group, they're all begging for money, and I guess we're all competing with each other. Roger, I do have a favor to ask. As you prepare these changes, would you provide it to us in a strike-through, underline version, so we can see the changes that went into it at Full Council?

MR. PUGLIESE: Sure.

MR. HAYMANS: Thank you.

MR. PHILLIPS: Roger, just so I'm clear, and I know how this is very, very complicated, but, when you're talking about the food web connectivity, I don't see anything where calico scallops or any of the shellfish are mentioned in any place, and I know it's probably too much to get into, but they are definitely going to be part of that food web.

MR. PUGLIESE: Yes, and I think about the only real connection within the policy would be when you look at the overall list of habitats. It talks about shell habitat, and it's making somewhat of a stretch, but I think, in the detailed sections they get into probably more of the specific connections of all the different parts of the foundation of the food web in the South Atlantic. Trying to craft it directly into this iteration with limited information was a little bit more of a challenge, and so there is a place where it does come out under the designations, connected in there, but that's about as far as it's gone right now.

MR. HAYMANS: Anyone else? Okay. That takes care of Item Number 2. Roger, you're going to move into an Update on Habitat and Ecosystem Tools?

MR. PUGLIESE: Yes, and, very briefly, I wanted to at least acknowledge, under the modeling side, and to some degree why the different parts of the policy are pointed on things to be provided is, with the collaboration we've had with the South Atlantic LCC, we are advancing with the modeling effort. The first iteration is building the Ecopath and Ecosim. Very importantly, for our capabilities, is going to be Ecospace capabilities.

We have already been advancing and crafting a combination of the structure that is based on the most recent work, the forage component that was supported recently, previous work, but also advancing and drawing from things such as the gag modeling that was done in the Gulf of Mexico for understanding some structure, as well as trying to look at the realistic way that the councils manage species or species are being managed and the layouts and divisions of those to support the creation of the structure of the fleets, et cetera, for the South Atlantic.

That is happening right now, literally. One of the very important sides is, and I mentioned it, is the Ecospace, and we've been collaborating with the consortium, which is now based in Spain, and we have been working directly with how we can advance getting the most recent capability, to be able to integrate the spatial information, which is really important at this stage. That will provide the mechanism to advance integration of oceanographic models and integration of habitat information and more detailed species information. A lot of it we really don't understand, because they have created it, but we want to see how that applies, and so that's going to take actually a relatively small amount of resources, but we want to engage that consortium input directly into this process.

What I'm hoping we can do is to be able to get NOAA to maybe pitch in some resources to provide resources to contract with them to be able to advance this, so that, as we design this beginning for an end, all those types of concurrently-developing tools, such as the oceanographic models, are going to be able to be brought into the system, and so that's an important side of what's going on

with ecosystem modeling right now, and so I'm hoping we will be able to figure out how to make sure that happens.

We will find a way, one way or another. Hopefully NOAA can step up, and we're going to have some coordination meetings directly with Jason Link, et cetera, with the Beaufort Lab, I think, upcoming in the first part of next year and some of the very key parts of modeling are going to be highlighted. I think they brought the modeler from originally the Chesapeake Bay as now the head of the modeling program for NOAA on that ecosystem modeling, and so hopefully, with that aspect, they may be able to provide some input, because it's all being funded outside of NOAA right now, and so that's going to be critical.

The good thing is we are advancing. Those are developing. Tom Okey is at the forefront of developing that component for the front-end, and it will connect in all these other different models, and so I anticipate having a modeling team meeting the first part of next year, very soon, to be able to advance the next generation on how we structure it, but it's going to be important to get the Ecospace view right in the front-end. That was the Ecospace or ecosystem modeling activity.

The only other one that I wanted to touch on, quickly, was the connectivity with the Landscape Conservation Cooperative, with the blueprint, as well as the developing Southeast Connectivity efforts. There is, again, opportunity to cross between especially our connections between inshore and offshore habitats with the work they're doing there. There's a lot of horsepower on what's going on there in resources, and so, again, we may be drawing and connecting into those different systems, as that proceeds into the future, and that's one of the reasons we had the update at the Habitat and Ecosystem AP, was to advance how -- That is moving forward, and it is intended to be connected very closely with the Fishery Ecosystem Plan, and it may provide resources that we may not be able to get anywhere else. Those were two.

There was one last one, and it was connected directly to a follow-up meeting from the Habitat Advisory Panel. Ecospecies online species information system is being refined further, and it's probably going to play more of a connected role with the fishery ecosystem plan than anticipated. In the past, we had mostly focused on managed species discussions, at this last meeting, but really crafted what the next generation of that online system, and so, really, it's going to be able to provide what's not going to be in that focused FEP document, a lot of the detailed information, from everything from ACLs to histories of management to basically everything on species, all the essential fish habitat updated information, et cetera.

That is developing, and I am anticipating at least getting that a little clearer for the council to probably deliberate on in March, about how that's advancing, and so those were three pretty significant parts of tools or information that are going to support the Fishery Ecosystem Plan and modeling efforts and ecosystem-based management. That's it.

MR. HAYMANS: Thank you, Roger.

DR. DUVAL: Roger, just back to the first update on this consortium modeling and everything, is this something that -- Is this a tool that the council is going to be able to use to manipulate things, to look at the impacts of certain types of changes within the ecosystem, to help inform some of our discussions and decision making?

MR. PUGLIESE: Yes, and one of the reasons that it's going to definitely do that is part of the team for the modeling effort is we have Marcel directly involved, and so some of the first iterations on the development of that is integration of the fishery-independent information directly into the first structuring of some of the information, and so the idea that this is going to provide the model capabilities and then tools that will ultimately be usable by the SSC or the council in evaluating -- I mean, that's kind of front-end loaded on where this is ultimately going to go, and then also, potentially, integration or incorporation into stock assessments, and so, yes, that's the intent of it.

We just have to advance it further and also collaborate on how some of these tools are anticipated by NOAA. Hopefully they can be able to utilize or connect in with how this is advancing, so that we have that capability that it can cross between and provide that kind of tool capability, because that's exactly what the intent of this is.

MR. HAYMANS: Anybody else? Okay. Pat, thank you for making the trip. We appreciate the report. We have heard about rabbits today and mules today. I can't wait to hear what's next. In all of the discussion about models, when I was a kid, models had a whole different term. The glue was the best part about modeling when I was a kid. I know it's not cookie time yet, but we are going to take a very short break. We're going to reconvene at ten to three, to allow time for setup for the next presentation. We'll take a fourteen-minute break.

(Whereupon, a recess was taken.)

MR. HAYMANS: We're back in session. Roger is going to introduce our speaker.

MR. PUGLIESE: Our agenda item today is to look at the Lenfest Report on the Ecosystem Task Force, and I think what I'm going to do is actually pass this over to Chairman Duval, who is going to actually set the stage for the presentation.

DR. DUVAL: Thank you, Roger. I think some folks sitting around the table know that I've been privileged enough to serve on the advisory panel for the Lenfest Fishery Ecosystem Task Force, over the last year-and-a-half or so. The launch of the report was actually the week before Thanksgiving and, if you all recall, Dr. Phil Levin, who is a task force co-chair actually, came to this meeting in December of last year and provided us sort of an interim update on the task force's activities and what they were looking towards.

Unfortunately, the cross-country travel just didn't work out for him, with some of the prior commitments that he had already scheduled, but Dr. Felicia Coleman with Florida State University is here, who is a member of the task force, and I was just a member of the advisory panel, and she's going to be providing the presentation.

I had asked Phil if he might be available via webinar, just to talk about some of the big-picture goals of the task force and where this fits into NOAA Fisheries Ecosystem-Based Fishery Management Blueprint and how he sees that moving forward and also to help answer any questions, along with Dr. Coleman, about I think in particular what I think might be of most interest to the council, is the implementation volume, which is really the tools to sort of operationalize ecosystem-based fishery management. I just wanted to have the opportunity to address Phil. We can see him. He's got a nice picture right here, and so I just wanted to turn things over to Phil, so that he could speak to that and introduce Felicia. Thank you.

DR. LEVIN: Thank you again for engaging us with this. We really appreciate the opportunity to speak with you today, as we did last year. It's always helpful to get feedback, and it just helps shape our thinking, and we hope this product is going to be useful to you. Just to review, a few years ago, the Lenfest Ocean Program, and I think some of the folks are there in the room, spent a huge effort looking around the country and interviewing lots of people and trying to determine where they might best invest some of their funds.

What they realized was, despite the fact that we all recognize that ecosystem management is important and that we have really important interconnections between fishing and fish species and humans and community wellbeing, we seem to be having a hard time getting going with ecosystem-based fisheries management. I don't know if it's because it's a rabbit, or maybe it's a mule, or maybe it's because people think it's Pegasus and too lofty and too fictitious to even pursue, but there really wasn't a clear path to implementation.

What Lenfest did was to put together this team of scientists, a task force, and our charge was to create a practical blueprint that councils could use to really make EBFM operational, and so the process, and Felicia will talk a little bit about this, I think, was to really go around the country and interact with councils and stakeholders and NOAA scientists and academic scientists and put together a list of recommendations and, again, this sort of blueprint that allows us to hopefully help people craft the second generation of fishery ecosystem plans that will be most useful to you folks in your region.

Then Michelle asked me to speak a little bit about where this fits into the NOAA roadmap, and so NOAA has, as you know, the EBFM Roadmap that was just released, as Roger alluded to, and, because I was at NOAA Fisheries while we were writing this, I in fact contributed to the roadmap, and so we were fortunate in that we were able to interact directly with NOAA and ensure that this report, which you have, interfaces very well with that report.

Essentially, what NOAA did, if you look at the roadmap, is they don't provide very much detail on FEPs at all. FEPs are part of the roadmap, but they essentially punted and left the details to us, and so, in a sense, we are an extension of a specific element within that NOAA roadmap. I think I will stop there and mute myself, but I am available for any questions or whatever as we go through, but I will just sit here.

MR. HAYMANS: Thank you very much. Go ahead, Felicia.

DR. COLEMAN: Okay. Thanks. Thanks, Phil. I wish you were here, but I'm very excited about talking to you all about the Lenfest Task Force on developing a fishery ecosystem plan, which is really a step beyond the fishery management plans that the councils are already doing. Just to give you a little bit of background about me, I am an academic scientist. Most of my research has been on species interactions and the reproductive behavior of reef fishes in the Gulf of Mexico. I am also very interested in how they interact with habitat.

A number of years ago, I was on the Gulf of Mexico Fishery Management Council. Whenever they needed somebody to come to the South Atlantic meetings, I came, because it was friendlier, but I have tried to stay connected in a number of ways. I have been on a number of National Academy committees, looking at like best available science for fisheries and marine reserves and

habitat protected areas. That was right at the beginning of the avalanche of stuff, and then I have also organized fishery-related symposia for the last fifteen years on whatever seemed like the cutting-edge thing at the time. Anyway, Phil is helping me out here today. Basically, I will take the puff questions at the end, and he will take the tough ones, and let's just move on through this.

Fishery ecosystem plans, it's not a new idea. It's actually been around probably for a couple of decades. It came out of a report to Congress by the Ecosystem Principles Advisory Panel, which contained two people that were on this panel, me and Ed Houde from the University of Maryland, and so there is a little bit of carryover.

Basically, there were a number of reports that followed, including reports from Pew, the *Ecological Effects of Fishing*, the *American Living Oceans*, and *An Ocean Blueprint*, and all of these reports supported the idea of recommending adopting an ecosystem approach in fisheries management, but all of you already know how well that's gone, and it's been a while.

The Lenfest Task Force came together, thanks to funding from the Lenfest Group, and it was led by Tim Essington and Phil Levin, both at the University of Washington, and then all the rest of us came from a number of different disciplines. It ranged from anthropology to ecology and from ecosystem modeling to economics, and people from all over the United States and from Europe and Australia and I think somewhere else, but I can't remember where. Canada.

As Phil mentioned, we went around the country and held workshops. We were talking with council staff, with academic and NOAA scientists, and any stakeholders that had been invited, a number of people who were deeply engaged in fishery management, and we essentially asked them two questions. What are the things that you would like to achieve and you're having a hard time doing? The second question was what are some of the barriers to progress that we might be able to resolve in the deliberations of the task force?

We wanted to take a closer look at the existing fishery ecosystem plans, to create the next generation of FEPs, and the motivation for this developed as we moved across the country, because, essentially, what we learned is that there are a lot of very extensive documents with details, a lot of details, about the fishery systems, but there were few actionable approaches in any of the plans.

Our fundamental charge became to take the principles and turn them into action, and so we offer it, if you will, and Phil mentioned it, a blueprint for moving forward that puts the principles into practice rather than a cookbook. Based on the differences among the regions, there was no point in trying to develop something like that.

Let me mention these two people, these two scientists, Kristin Marshall and Laura Koehn, both at the University of Washington. They are the project management team, and we literally could not have done this without their help. They gathered the information together that we wanted, and they put it in a format that even we could understand, and they did lots of cat-herding. It was an enormous task, and they did a really exceptional job.

Let's move on to the main findings and recommendations, and so this idea of going from principles to actions really can't be done without a structured planning process specifically leading to action. We can use existing tools that the councils already use in single-species management, and that's

the good news, and we can start this afternoon, if you want to, or tomorrow, but after I leave, please.

The fishery ecosystem plan calls for integrating socioeconomic and ecological goals, and it promotes transparency and decision-making and identifying tradeoffs, and, most importantly, prioritizing those objectives of what do you think you can really accomplish and recognizing what the tradeoffs are, because, a lot of the times, when you know what those are, you realize that some of them can't be done. They certainly can't be done with more science or different tools.

This is a broad view of ecosystem-based fishery management, and so it's not just about protecting the environment, but, instead, it's providing a frame of reference for decision-making that considers linkages among components of the ecosystem from the biophysical, and that could be climate, looking at species interactions, at habitat or any type of forcing mechanisms, to the human entity, and those are the fisheries communities and the people that depend on them, the processors and incorporating cultural values, and governance. Sometimes that can be very simple and linear, but, other times, it can involve state and federal and tribal jurisdictions, which makes it far more complex.

All of these things basically have to be considered. Now, the task force, in making the recommendations and looking at these components of the ecosystem were completely cognizant of three important things. One, that is that the council staff is already busy. They are overloaded, and I don't think there's any question about that, and we don't want to simply add more work, because that's a recipe for disaster. That's Thing 1.

Thing 2 is ecosystems are incredibly complex. This, as you all know, is a food web for fisheries in South Africa. It's got everything from the bottom up, from bacteria and phytoplankton and detritus to I would just point out anchovies and birds, because I'm going to give you an example of that, but there are lots of moving parts when we start looking at fisheries systems, and so the dynamics in them are constantly changing, and a perturbation in one place you can't really predict what the outcome is going to be. You basically kind of don't know until it happens.

I just want to give you an example. This is looking in South Africa at these small pelagic fish that are harvested in the South Benguela Current. It oscillates between anchovies and sardines in a healthy system. As the sardines are driven down, the anchovies bloom up. When the anchovies are driven down, the sardines build up, and it goes along like that.

In the Northern Benguela, there is overfishing and hypoxia, and so you have a driver that's really affecting the system in profound ways, and what happens is, essentially, is a crash of both of these energy-rich species that serve not only for the fishery, but also are prey for a number of organisms that are in that complex web that I showed you. Most notably what happens is that the high-energy prey are replaced by things that don't have high energy, like bearded gobies and jellyfish, and the species that depend on them, that have to shift to accommodate, end up having very spectacular reproductive failures. Cape gannets had declines of 94 percent and African penguins of 72 percent, and I don't know what happened to any of the predatory fish in the system, but this just shows you the type of thing that happens from that sort of perturbation that you can't predict.

Thing 3 is we made sure that our guidance is consistent with statutes concerning fisheries regulations. That is a really important thing, and so here are the steps of developing a fishery

ecosystem plan. The first is asking the question of where are we now? You figure that out and you develop a conceptual model and select and calculate the indicators and take an inventory of all the threats, whether it's climate change, habitat loss, overfishing, whatever the things are that are stressors that you have to deal with in the system.

What we found, when we looked across all the councils, from all of our travels, was that everybody is doing a very good job at this. Systems are very well described, and I would say that the calculators and the threats you are very aware of, and you know what some of the repercussions are.

The next step is, once you understand what the system is, you ask the question of where do we want to go? Like any planning process, what has to happen is you have to articulate a kind of high-level strategic vision and then move from there to develop the objectives and analyze them and prioritize them and then develop operational objectives, what are the things that you actually think you can achieve.

Then the next question, now that you know what you want to get done, is how you're going to do it. There are a lot of important activities that are aligned with this step, and that's identifying performance measures and potential management strategies and evaluating alternatives and selecting the strategies that you want to use.

The next step is implementing the plan, and that is developing a working plan, figuring out what resources you need, and, more importantly, that we heard about a little bit earlier today, what resources you actually have to work with, because that's going to determine how you can proceed, and then you want to develop what kind of outputs you will have and a timeline.

Finally, ask the question of did we make it, did we actually affect some -- Did we do what we set out to do? This is evaluating the effectiveness and adapting accordingly, and so you're taking information that you've learned and you're using adaptive management. You're using what you've learned to adjust the system, and, basically, you're kind of doing it on the fly, but it requires that there's a lot of flexibility to do that sort of thing.

We take these five not-so-easy pieces and put them together into a fisheries ecosystem loop, and the idea is to go around and actually do these in this kind of structured order, figuring out where you are and where are you going and so forth and so on, and so there are two time scales that are relevant. One is over the life of the plan, which can be ten years, or even longer, and the other is within the life of the plan, and then you have these feedback loops in between that are part of the adjustments that you make as you learn what works and what doesn't.

We strongly feel that this approach overcomes many of the problems that haven't allowed the councils to move forward with a fishery ecosystem plan, because we've identified the challenges, those being complexity, which genders uncertainty about what the management approach or what the outcome is going to be from the regulation, and the cost, and it helps define clear objectives, and so all the solutions we've already been over, and so I won't belabor that point.

There are some key things that we learned while going through this process. One is that stakeholder engagement is absolutely critical throughout that whole loop system, because, basically, the stakeholders tell you -- It's how those objectives are revealed, how performance

measures are selected, how different strategies are identified, and how likely the performances are assessed. A second lesson that we took is that we already have the tools in place. You already are using a lot of these tools in single-species management. They're there, and you can achieve these kinds of things.

We're also looking at the policy tools, and those are available there to reach the goals, but it may be that you're using novel combinations of those tools, in order to have this system work, and so it sounds great, but is it achievable? One of the things we did is we looked at what's already happening around the world and in the United States by looking at case studies, menhaden in the Atlantic and Alaskan groundfish and gag in the Gulf of Mexico, all of those sorts of things, and what we see is that this provided us with clear, cross-cutting linkages that require an ecosystem approach.

We use this to identify barriers to adoption, but mostly what kinds of solutions are being used, and, basically, what these reveal, and don't worry about the -- The top is just a list of what the case studies were, and going down the side are the components of the fishery ecosystem plan. The little checks just represent, in each case, what we are defining as a new type of approach that is already being used. What we learned is that, in aggregate, each step has been used somewhere, each step of what we have proposed that's in the fishery ecosystem loop, but no single case study has done the entire thing, and none has explicitly prioritized the objectives or the tradeoffs, and so that indicates that ecosystem-based fishery management has been relatively piecemeal so far.

That doesn't have to stay that way. We really think this is a significant change in the approach, but I think one of the good things about it is using the tools that we already have, and so why have fishery ecosystem plans? One thing, the way that we've defined it, is you're moving from the principles that have been developed, and I think we've all acknowledged and accepted for quite a number of years, and it moves those things into actionable things. We can do it. We have the tools already to do it, perhaps applying them in some sorts of novel ways, particularly in the policy component.

The triple bottom line, basically what that means is we recognize the need for improving decision-making by providing a means for considering all components of the ecosystem, the ecological, the social, and the economic, across all fisheries operations in the system. That represents the triple bottom line, looking across species, across fisheries, and across jurisdictions, and that is considering the system as a whole in an ecosystem-based fishery management approach, and then choosing among the trade-offs.

We all know that there are trade-offs from any type of strategy that we propose, and we're going to have to decide which ones we can live with, because you can't -- There is nothing that you can do to equally put your effort in trying to address those tradeoffs, and that is it, I think, and, from here, ask Phil all the hard questions. Thank you.

MR. HAYMANS: Thank you very much for that presentation. That's a lot to digest, but, then again, it's not quite as much as it could have been, and so thank you for the brevity. Are there questions or comments? Michelle.

DR. DUVAL: Thank you, Mr. Chairman. I think one of the things that struck me, and I think some of the conversation that we had during the report launch, was the conversation about tradeoffs

and how do you do that, and I was asked to give an example. One of the ones that I brought up was the initial coral habitat areas of particular concern, where we carved out the allowable golden crab fishing areas and the allowable rock shrimp fishing areas.

While everybody might not have been completely satisfied with the output, everybody came away with something, and it felt like people were at least satisfied with that process, that their concerns were heard and that everybody got a little bit of something out of that, and so I mean we do have the ability to evaluate tradeoffs. Probably the question I would have is, in terms of the implementation volume or the tools that you all looked at, we're fairly data-limited in many of our species here in the South Atlantic. Are there some tools that would be particularly useful for data-limited species that you all discussed?

I think one of the things I said was the North Pacific was given as sort of an example of where they've been able to check almost all of those boxes, and not every place is the North Pacific, especially not us in the opposite corner of our North American globe here, but are there particular tools that would be more appropriate for helping us to really move from thought into action for data-limited species?

DR. COLEMAN: Phil may be able to answer this better, but my sense is that you go through the same -- Even in a data-limited fishery, you can work within this fishery ecosystem circle to address those problems, and so you may not have all of the information that you want, but, if you go through the same process, I think it still works. Phil, do you have a --

DR. LEVIN: It's easy to think of the North Pacific as data-rich, but, in some aspects of their system and their fisheries system, they're not so data-rich, and let me give you an example. For example, the connection of different fishing strategies or climate scenarios to cultural attributes that are very important in that region.

Although they do have a fair amount of diet information, and that could be used to put together like an Ecosim model or whatever, there is a lot that they don't have, and so, whether you're there or in the South Atlantic or the Caribbean, I think there's lots of different tools that people are beginning to employ and that can help us understand us both, as Felicia was talking about, some of the indirect effects that we might not anticipate as well as the tradeoffs.

One example of that that we've used in the California current is called loop analysis. I really like loop analysis, because it is a very participatory process that you can bring in fishermen and other stakeholders and everybody can participate in co-creating a model which, in a data-limited area, is likely to be just as good as an Ecosim model, in my opinion, and so what you would do, in that situation, is use the best knowledge, best expert opinion, that you have. You also identify key uncertainties while you do that, and so you're able to look at where you're certain and where you're uncertain, and you are co-creating it. In the end, you get something very much like a tradeoff, where, if you do this versus that, what is the outcomes. It helps you get an intuition about some of the indirect effects, so there is fewer surprises down the road, and it really identifies some of those key data gaps and allows you to prioritize.

The key thing there is to sort of limit the scope and have objectives, and that's another thing that Felicia emphasized. Roger showed some horrible food web, and it's super complex and everything like that, and that's really hard to tackle and to really tease out in a way that's operational, but, if

you have a really clear objective, like at this particular timeframe I'm interested in X, then you can develop one of these models fairly quickly and put that in practice, and so it's an approach that I would actually recommend, as a first step.

The other thing I would say is that there is sort of an -- For a long time, and I was one of these people, we were out building giant ecosystem models like Ecosim or another one called Atlantis, and Howard Townsend, who Roger mentioned that you guys will be working with, has built an Atlantis for the Chesapeake, and so these are huge models. People like them, because they have everything in them, and so there's like almost nothing that you can think of that you can't address with those models, but, of course, they require a huge amount of data and they're really hard to build. They take a long time and so on and so forth.

The trend now has been to, again, focus and, for example, in California, we have issues around sardines and their predators, and there is conflict between sardine fishermen and groundfish fishermen and pelagic fishermen about what is the appropriate catch for sardines, a forage fish, given our other objectives. Instead of building a big model for that case, what we did was build what's called a MICE model. MICE stands for -- I am just adding to the rabbits and the donkeys here, but the MICE model is a Model of Intermediate Complexity for Ecosystem assessment. It's like a five-species model.

It says we're interested in sardines and we have an endangered species that eats them, the pelican, and we have salmon, which eats them, and groundfish, and that's what we're concerned about in that particular model. Rather than trying to build a huge model, we have built a targeted, multispecies model, and it's actually the sort of model that is easier to bring, I think, into the council process, because the properties of those models are very similar to a stock assessment model. I will probably stop there. I feel like I'm talking to my computer screen.

MR. BELL: This has been very informative. I have had this question for a number of years, and I guess maybe my approach is too simple or something, but I am trying to envision how this would work, operationally. The council of the future, twenty-five years from now, we've got the funding and we've got these multispecies models and all, and so what does our -- What does the council's life look like, in terms of the decisions that we make and the processes that we follow?

Right now, species-by-species, we are kind of into that routine. Given the National Standards, we're trying to achieve OY, but how would this be -- I am trying to envision the decisions, the process, the outcomes when you're kind of juggling these multiple things, and I assume that Magnuson would have to change or something would have to occur, because we sort of live and die by the stock assessments and the condition of these individually-managed species within the different plans, and so I'm just trying to figure out what this would -- Have you ever sort of table-topped or envisioned what an operational council would look like using ecosystem-based management? Where are the switches and the dials and the knobs and the controls? How would that look?

DR. COLEMAN: That's an incredibly tough question. For starters, what is proposed is not to replace what has already been done, but what I would envision is sort of what Phil just described about developing simple ecosystem models, because we've already started doing that kind of thing, when red tide had an impact on red grouper, for instance. I mean, you put that into the model and you could see what kind of impact the red tide had in the years that it occurred.

I just see starting very simply, but you still have to go through all of these components and identifying what are you actually trying to achieve. What I would like to see not happening is collecting a lot of data that is not really going to help that. For simple models, I see looking at different functional groups and how they're interacting in a system and trying to make decisions that way, and so I think these simpler models are going to be really helpful for that, but the single-species model just -- There's got to be a way to bring in these sort of climate-forcing things, things like hypoxia or hurricanes or anything else, climate change or sea-level rise, all the things that are going to affect habitat. You can make predictions based on that kind of input, I think.

DR. LEVIN: Just to add that I think that, piling on Felicia, that I think this is a really good point, and we are where we are, and we're not going to suddenly get tons more resources, and councils aren't going to suddenly have a whole lot of extra time, and so we have to work within these constraints, and I think this is why we emphasized so much in the plan this idea of really setting clear objectives and being strategic about what those objectives are.

In other words, there has got to be some serious prioritization that takes place in saying, you know what, this is what we're going to tackle. Then, given that, we're not really suggesting that much new or different. Magnuson and NEPA and ESA really have all the authority you need in order to implement ecosystem-based fisheries management, and you mentioned OY. We're looking at MSY, but taking into consideration the ecological and economic and social considerations, and so those in fact are the tradeoffs that we're talking about.

Similarly, when we think about National Standard 8, where we're talking about communities, we want to ensure that we can do, within the context of an FEP, analyses that allow us to really address National Standard 8, and National Standard 4, for that matter, where we're thinking about equity, particularly with climate change. I sort of feel like we're still talking about implementing management through FMPs, but we might need to think about tradeoffs and adjust harvest control rules or whatever in a way that allows us to achieve objectives that maybe we weren't considering explicitly before.

MR. HAYMANS: This is big-brain stuff, Mel. Just, in a microcosm, we have tried to -- When we manage single species, we have thought about what happens to seasons of other species and where we're going to apply pressure, and so that's a small example of kind of looking at multiple species, but it's nowhere near what we're really looking at here with applying everything else that comes along with it. The climate change alone, I can't get around it either.

MR. BELL: Just thinking of the complexity of this, now, when we do a stock assessment or we have an ACL that we're working with, and we know the condition of a particular species, and we say you can have this much, and we're interacting with the fisheries and we divide that into recreational or commercial or whatever, and so now we might be adding a component though where we say, okay, well, given the conditions and environmental factors or whatever, we're going to be precautionary here and we're going to -- Normally, we would say here is the pie and you guys can split the pie up. Now we're going to say, well, you know, we're going to hold back half of that pie, because this may happen or we've modeled that this is likely to happen.

That will just be interesting, in terms of interacting with the users or the folks in the fisheries, by saying, hey, there's not really that much pie here. There looks like there's that much pie, but,

really, we're going to need to cut that pie in half and put some aside, because it looks like this will happen or this could happen, and that will just be an interesting kind of dynamic to work into managing, compared to what we do now.

MR. BREWER: Dr. Coleman, I am Chester Brewer. We met years ago. You came down to talk with us at the West Palm Beach Fishing Club, and it was a very nice luncheon meeting. It's nice to see you again. First, a statement and then a question. With regard to your case studies, there is another one that happened about twenty years ago in the State of Florida, and that was the net limitation statute.

It was crude. It was a meat-cleaver approach, but it was a group of recreational fishermen who saw the interaction between forage species, mullet primarily, and prey species. They saw that that was going out of balance and that there was a problem, and so, like I said, it was crude, but it was a couple of decades ago too, but the thought and the thinking at the time incorporates some, some, of what you're talking about here.

The question that I have, and this is something that kind of hit me like a ton of bricks this morning when Tony mentioned it, is we are seeing, and I don't think there is any question about it, we are seeing the fish that we manage either expand northward or move northward, and we can talk about why that's happening and we can debate climate change. I don't think it's debatable, but we could have that debate, but the fact is they're moving.

Fisheries that we primarily manage may be moving to the Mid-Atlantic to manage or be primarily responsible for, and I'm wondering if FEPs can be used to help us with the objective of how we most effectively adapt our management to recognize that reality and to help us to effectively manage the fisheries that are our charge.

DR. COLEMAN: I actually think it really is a good way for doing it, because you're taking into account something that is causing a change in the environment that is precipitating a change in the behavior of the fish, and it's going to completely change all the interactions that those species have, when they move into an area where they're encountering predators they've never met before or prey they've never met before.

From a management perspective, it will be really -- It's a tough nut to crack, but, if you go -- Again, you have to set up the objectives, and so what's happening with the fishery? Are those species really moving out of your area and into another area or what's going on? I guess what I would see is that, again, following this approach, you have to identify what you're trying to accomplish. Are you trying to accomplish how your fishery is going to change over time or if the fishery disappears entirely and moves into another area? Of course, if you have fish that are moving north, there are also fish coming from the south that are moving up into your area.

One of the things that is really difficult to address is how those species interact with each other, and, to me, that's one of the hardest questions, particularly about changes like that, but I think it's going to be part of the same thing. What are the objectives? What are the tradeoffs, as you see these new species arrive? This is where you come back to the single-species approach, because you need to be able to look at the dynamics of the species and how they're changing over time and try to identify if it's because of that kind of a force or whether it's climate change or something

else. For the net ban stuff, that was a -- I guess everybody in the area around here knows that that was a constitutional amendment and not a fisheries management plan at all.

MR. BREWER: Agreed, but the idea behind it was the same ideas of recognizing the relationship between prey and predator.

DR. COLEMAN: Yes.

MR. HARTIG: Thanks, Felicia. I appreciate the presentation. It's good to see you again as well. I got through most of it, through most of Chapter 3. What is a little bit hard to rectify, in my mind -- The first thing though is I want to commend you on -- The human element is just as important as everything else going down the line in this process. Now, saying that for federal ecosystem plans versus the fishery management plans that we do now, that's not a consideration, if your fishery is overfished. There is no human consideration any longer in that part of it.

I look at the flexibility that you're trying to be able to use in this plan versus the no flexibility we have in current management, and, to me, it's a little bit hard to rectify the complexities of ecosystems themselves versus the simplicities of the way you're moving forward with this plan. The data we have is so limited. We're one step above the Caribbean. We have a lot less information than the Gulf has.

Some of the species that are of still pretty significant importance have yet to be assessed. Red snapper has undergone three MSY changes and ended up in an order of magnitude change in the last three assessments, and so where we are and where we want to get to is a pretty tough question to ask, based on what we're facing from an assessment perspective, and so it's going to be tough for me. It's hard for me, like I say, to wrap my brain around looking at what you guys have put forward.

You've got the Nike process of just go for it. Really, that's exactly what it is. Start simple, with simple models, and move ahead and adapt as needed, which is really the way management should be done anyway, but it's not right now, but I compliment you on the process. I still need to wrap my head around it more than I have now and looking at examples. That's how my mind works. If I can see an example moving forward of something in the South Atlantic, then I will have more confidence that this is a way that we can move forward with the data in hand, but we'll see.

DR. COLEMAN: Ben, I think that one of the things that I find a strength of this type of approach is that, instead of just operating on sort of the ups and downs of population and how the age structure is changing over time and so forth and so on, you're taking into account a lot of other influences, and they're not just ocean influences. They are terrestrial influences that impinge on the habitat, and the habitat loss is probably one of the biggest problems that we have, especially for coastal species that are depending on that habitat for some portion of their life history.

I think it helps address the challenges of the sorts of things like that are happening in the St. Johns River in your backyard and things like that, and so I think it's got a lot of promise, and having the -- There are still going to be things that people aren't happy about when you develop this plan, and so, when you're talking about how there is this -- I think the gentleman over there mentioned it, too.

You have this pie that is getting divided up between recreational and commercial fishermen, and, all of a sudden, we're saying, well, there are other aspects of that that have to be taken into consideration and how do these other events that are pollution events that are largely predictable, in some cases -- We could have predicted what was going to happen in the St. Johns was going to happen at some time. It reached a tipping point, and that was it and there it goes, but I think this really offers a lot of potential for dealing with that, or at least incorporating it in a way that we haven't done in the past.

DR. LEVIN: Also, just if I can pipe in, and thanks for that question and comment, because I do think you're right. Things are complex, and, in some ways, we are proposing a fairly simple solution, and I think part of the reason for that is because it seems to be working fairly well with single-species management.

Really, what we're proposing is not so different than extending the process for single-species management to include multiple objectives across human communities as well as ecological communities, and I think that, yes, the ecosystem is complex, but just to, again, sort of emphasize this idea of prioritization and identifying areas where you do feel like you have information and the threats are significant enough to consider those in a formal planning process.

There is a lot of stuff in the ecosystem where you don't have the information and you don't have the data, and I think that would be stuff where you might want to wait, whereas in other areas, where you, for example, the climate stuff that Roger was presenting earlier, we do see species moving. These are issues today, and so FEPs provide us with a way to think about cross-species interactions that are evolving as the climate changes and species move and how these species are moving across geographies, state and federal and north and south. I think these are areas where, even in the short-term, limited-information FEPs could be useful.

MR. HARTIG: One of the really important things is to involve fishermen in this process. Where I am in Jupiter, in that area we fish, it's an amazing area where the Gulf Stream slams into a shelf and we have eddies that, as the shelf goes away, these eddies form. Many, many species come there to spawn over time, pelagic species in particular.

The things that we're seeing are the increase in bottom upwellings and the slowing of the Gulf Stream and all of these interactions occur, and one of the things that we're starting to see is actually recruitment of king mackerel in our area, which we had really never seen before. We see age-zeroes relatively commonly now. I've seen them at least two, and I think three, different times in the last five years in the area that I fish, which we had not seen before.

Is that a good or a bad thing? We don't know, but, if you look at it from a broader perspective and you look at how the animals used to be carried north, with those big eddies, and now the eddies are smaller and probably shorter lived, and the larvae don't seem to get as far north as they used to. To deal with the productivity, the increased productivity, that we have on that much broader shelf to the north -- Once you get into the northern Florida and Georgia and South Carolina, you have the riverine systems and that broad shelf and a lot of nutrient loading in that system.

Down south, where we are, not so much. We have nutrient loading from Lake Okeechobee, which has been traced all the way, this past year, all the way up to South Carolina. It's a really tough thing to watch these changes that happen to your fishery based on -- You mentioned the pollution

problem, and that estuary we have, where most of the fresh water from Okeechobee, between the Caloosahatchee and that St. Lucie Inlet, where I am based out of now, is a complete destruction of the entire estuary, which is the largest estuary north of that Miami area, that Biscayne Bay area, that we have.

We look at these things, and you talk about tradeoffs. The tradeoff is human on land versus your on-the-water resources. In order to have humans and crops and things of that nature farther into the Everglades, we have to destroy this estuary to be abler to have that dynamic, to be able to support the people who want to live farther towards the Everglades and to have farms that produce food, and so that's a tradeoff that's already been made outside of our involvement.

We destroyed this estuary because it has to be destroyed to do the other things that people, other people, think are more important, and so it's pretty difficult to choose these tradeoffs that we're looking at going forward other than those, but we'll see. Like I said, I'm amenable to going forward and looking at how to do this within our process and helping this to get there, but it's just hard to see, from my viewpoint, where I come from.

DR. COLEMAN: If I could just make a comment to Ben, I would argue that that's not the tradeoff we should be making. Seriously. It's about farming practices. Agriculture has to do the same sort of thing. When we were looking at the Gulf of Mexico after the oil spill, and we were trying to come up with ideas about how do we address this, particularly when you start talking about restoration, and basically one of the things we came back with is the oil spill is probably not necessarily even the worst thing that has ever happened to the Gulf of Mexico, outside of the meteor that hit during the Cretaceous or whenever it was, but the part of the point was that there are lots of other things that we can do to clean up like the problems of hypoxia.

It's a doable thing. In the coastal region, you could start filling in some of the oil and gas pipeline areas that are not being used anymore and replant grass that would start absorbing a bunch of the nutrients and maybe accrete some of the land, a little bit, back.

That would take care of part of the nutrient input into the Gulf, but the agriculture also is putting up to eight to ten times more nutrients on the crops than they can possibly use, and so there are practices there that have to be -- If you're going to restore the Gulf of Mexico, that's part of it. It involves agriculture, and I would say that's the same thing for Okeechobee. Land-based resource use doesn't trump the marine -- Well, maybe it has trumped the marine, but that's not to say that it should, and I think they're having the same kind of pressure, and the input that it has on the marine resources is just devastating.

MR. HAYMANS: So our reach is now extended into sugarcane. We're going to slowly wrap up here, but Wilson and then Mel.

DR. LANEY: Thank you, Mr. Chairman. Felicia or Phil or Michelle, and I haven't read the report yet, but, in the course of you all putting this together, have you run across what you would consider is a good model of a fishery ecosystem plan that is actually out there and being used and is capable of providing management advice?

DR. COLEMAN: I am going to punt to Phil. This would be the tough one, but one of the things we found is that all of the regions that have fishery ecosystem plans are largely descriptive, and

there are not any that have gone through the entire process. I think the Pacific had the most boxes checked, but Phil could comment more about that. If you're looking for a model, I'm not sure there is one that exists, but, Phil.

DR. LEVIN: There is two comments. One, if you want one that's out, I personally like the Pacific one, due to the fact that I helped write it, and so it must be good, right? No surprise that it sort of lines up somewhat with what we're proposing, but the North Pacific Council is putting together a Bering Sea ecosystem plan now. I believe it's out in draft form, and I think that one is a really well-crafted plan, because their council did a previous one for the Aleutian ecosystem, and so they've had the opportunity to go through this process twice, and I think that has helped them.

The unique thing about the Pacific one that I will say that other ones haven't used, which you might want to consider, is they have essentially just kind of the typical description of the ecosystem for the majority of their plan, but what they did was follow it up with an initiative appendix, essentially.

What they have done is say here are lists of key ecosystem topics that we think need to be addressed, and so this was actually done by the ecosystem plan development team, and then the council has been looking at that list, which then has been revised now two times, in consultation with stakeholders, and they look at that list and they decide what to tackle, and so it's very much of the we're not going to do the whole thing. We don't have resources and NOAA doesn't have the resources, but there are some things that we can do.

For instance, the first thing we did was focus on unfished forage fish, and so these were species that they were concerned would become target species down the road, as a consequence of climate change mostly, and so they worked on that through models and so forth and developed some restrictions on those species, before anybody was involved, and so it was actually quite easy. There were no hardcore constituents who would be put out by any restrictions there.

They then moved to an initiative that focused on ecosystem indicators, and so trying to get all of these academic indicators that are out there in a form that is very concise and very usable by the council. They want to know how -- Here is a bunch of indicators, and what am I supposed to do with them? Give me some that are easy and make sense. Then the one that they're moving to next is climate, and so very much along the lines of what I heard Roger discuss previously.

MR. BELL: Since I asked the question, a lightbulb went off, and maybe I have my own answer, but where I see these worlds coming together, maybe, is that, following the process we use now, where we do stock assessments and the SSC hands us an ABC and we turn it into an ACL and we rock on, maybe what happens here is you run a model that touches on a number of species or whatever and the outcome of that becomes information that we apply either -- Perhaps it is applied into the model we're using that affects natural mortality or something, or perhaps the outcome becomes something we use that the SSC applies maybe as scientific uncertainty or we even apply it as management uncertainty, but it inputs into the existing system.

It's just an additional layer of information that we add to kind of how we conduct business now, and so that, going back to the simplistic pie thing, is the size of the pie is affected by either when it comes to us, in terms of an ABC, or maybe we call that management uncertainty and adjust to the ACL or something, but I can see this fitting in. It's just coming up with the models and running

the models and then we see what it tells us, but I could see the two processes interfacing, I think, in that capacity. That may be overly simplified and it may not work, but I think it could work.

DR. LANEY: Thanks, Mel, and, to Ben's point, the one thing that keeps me optimistic about all of this is there is a finite amount of habitat out there, generally speaking. It's finite, and so we know that is sort of fixed, and I think that probably there is a finite production capacity for the ecosystem, and so that's fixed, sort of, even though it can vary, and where I think we create a lot of problems for ourselves is in our selection of the species that we prefer to exploit, and I have said this at the ASMFC quite a few times.

One of the things I think we did there is we picked a top predator species like striped bass to manage first, instead of some of the prey species, and so we manage that one to a tremendously high biomass, relative to historic levels anyway, and we create a giant eating machine. Then we continue to harvest some of these other species. A lot of them were harvested back during the 1970s, when we had international fleets exploiting a lot of our resources, and we get into a situation where things are thrown, to use the old trite phrase, out of balance, whatever that balance was to start with, and we find ourselves in quite a fix.

It complicates things even more, although Ben is totally correct that you have to try and integrate the human dimension into it. I think what we don't do is recognize that there are limits. There is a finite amount to how much can be produced, and, even though we have preferences, we have to somehow give some consideration to that when we're trying to do multispecies or ecosystem-based fishery management, as opposed to single species.

It's real easy to manage a single species, I think, to very high levels of biomass by imposing restrictions, in the form of management measures, on the fishery. Even then, when you do that, you still have environmental factors that are out of your control that sometimes regulate year-class strength and cause you to have to manage more often than you would like to have to manage, and so it is very complex. I think the ASMFC is trying to move in that direction, by their multispecies VPA model, which, like Mel suggested, is another model that they use, that they run, and some of the output from that model may help to provide guidance to some of the single-species models that they're using for bluefish and weakfish and striped bass.

MR. HAYMANS: Thank you, Wilson. This is becoming stories from band camp, and so I am going to let Michelle sort of bring us to a close on this discussion.

DR. DUVAL: Thank you, Mr. Chairman. When I think about backing us out to how do you operationalize this and working from sort of a simpler approach, like some of the examples Phil gave of group analysis, I see using indicators and things like that. We do, like it or not, use the annual presentation that either Marcel or Joey gives us of just the CPUEs from the MARMAP, from the SERFS survey, as something that kind of clues us into maybe there is something we should be taking a look at with red grouper or black sea bass. That is one piece of information that we have already.

The second thing is, in terms of this group analysis, is we have advisory panels. I think it could be a great exercise for any one of our species advisory panels to do these sort of large-scale building-block type of structures. It doesn't have to be like a spider web of what's connected to what. I think our stakeholders who are out on the water can tell us that right now and see changes.

That is another way that we can sort of operationalize this, and I think, a more third and final point, a more scientifically-based way would be we get ABCs that are a point estimate and not a range, and I think that would help us tremendously, if we were to have a range to try to move forward and things like that. Thank you, Mr. Chairman. That was all that I wanted to say, and I really appreciate Phil and Felicia being here, in person and virtually, to answer questions and help provide some insight on where we can go to make this real here.

MR. HAYMANS: Thank you, Madam Chair. I was about to do the same thing, to thank the good doctors for their time and their presentation and their willingness to answer questions. These good folks, through Lenfest, have been very judicious with their funding, such that there is some left over, and they're going to host a reception this afternoon at 5:30 in the Sandcastle Room, and so don't run straight out. Make sure you make your way to the Sandcastle Room. I have checked with our staff, and he has said there is no Other Business. I will check with my co-chair, just to make sure that he's good. Seeing no Other Business, this adjourns the Habitat and Ecosystem-Based Management Committee.

(Whereupon, the meeting adjourned on December 5, 2016.)

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Amanda Thomas
January 6, 2017

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DEC 5, 2016 P 1

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Dec 5, 2016 p2

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