SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

CITIZEN SCIENCE COMMITTEE

Hotel Ballast
Wilmington, North Carolina

December 3, 2019

SUMMARY MINUTES

COMMITTEE MEMBERS

Mel Bell, Chair	Dr. Kyle Christiansen, Vice Chair
David Whitaker	Dr. Carolyn Belcher
Steve Poland	Chris Conklin
Chester Brewer	Dr. Roy Crabtree
Tim Griner	Art Sapp
Robert Beal	Spud Woodward

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LCDR Jeremy Montes	Jessica McCawley
Anna Beckwith	

COUNCIL STAFF

Gregg Waugh	Dr. Brian Cheuvront
John Carmichael	Myra Brouwer
Kelly Klasnick	Dr. Chip Collier
Cierra Graham	Christina Wiegand
Dr. Mike Errigo	John Hadley
Kim Iverson	Roger Pugliese
Cameron Rhodes	
Julia Byrd	

OBSERVERS/PARTICIPANTS

Shep Grimes	Dr. Jack McGovern
Monica Smit-Brunello	Dr. Erik Williams
Dr. George Sedberry	Pat O'Shaughessy
Duane Smith	Erika Burgess
Dr. Wilson Laney	Nik Mehta
Tony DiLernia	Rick DeVictor
Dewey Hemilright	Dale Diaz

Other observers and participants attached.

The Citizen Science Committee of the South Atlantic Fishery Management Council convened at the Hotel Ballast, Wilmington, North Carolina, on Tuesday, December 3, 2019, and was called to order by Chairman Mel Bell.

MR. BELL: We will call the committee to order. Just for clarification, members of the committee are Kyle, Bob Beal, Carolyn, Chester, Chris Conklin, Roy Crabtree, Tim Griner, Steve Poland, Art Sapp, David Whitaker, and Spud Woodward. That's the committee, but, of course, folks are certainly welcome to participate if you're not on the committee.

The first item would be Approval of the Agenda. We are going to, with consent here, we're going to go ahead and flip Items 3 and 4 in sequence, which actually kind of makes sense for the flow of information and all, and, also, we will work through the technical issues, and hopefully we'll keep Rick connected here for that period of time, and so any other changes to the agenda other than that? Any objection to that one change? Seeing none, then the agenda will stand approved.

The next item is Approval of the December 2018 Minutes. Any changes or corrections to the minutes, if you've had a chance to look at the minutes? Seeing none, any objection to approval of the minutes? Seeing none, then the December 2018 minutes are approved. That brings us to the first item on our agenda, and I'm going to let Julia do most of the talking here. This is good that we've actually got a little bit of time today. We haven't had an opportunity to spend a lot of time with citizen science, and we've had a couple of little updates and things, but this will be good for us to be able to get into a little bit and have Julia bring us up to speed here.

MS. BYRD: Thanks, Mel. Good morning, everyone, and I appreciate you guys patience this morning, as we worked out some of our technical issues, and so the first item on the agenda is just for me to give you guys a quick update on programmatic activities that have happened with the Citizen Science Program during 2019. Some of these I will kind of move through quickly, because I have talked to you guys about them, giving updates at previous meetings, but I just wanted to give a quick overview of kind of what we've had going on over the past year.

At the end of last year, the last time you guys met, you approved the Citizen Science SOPPs, and then, earlier in the year, we kind of transitioned, when Amber left the council for a new position, and I kind of moved into the Citizen Science Program Manager position, and kind of the first thing that I got to start off in the position was going to the CitSci 2019 Conference, where we had a team of folks, including myself and John Carmichael and several members of our Citizen Science Action Teams. We kind of led a symposium with Dr. Jennifer Shirk, who is in the back of the room, kind of highlighting the efforts we did to develop our program, and then John Carmichael also participated in a symposium that Rick Bonney, with the Cornell Lab of Ornithology, put together on problem-driven citizen science.

Then, over the summer, we formed the Citizen Science Projects Advisory Committee, and this was one of the advisory committees that was laid out in the SOPPs, and it's made up of representatives from a number of our advisory panels, and some of their kind of primary roles are to help us update our research priorities and to help us come up with volunteer kind of engagement strategies.

Additionally, over the summer, a manuscript was submitted to *Bioscience*, and Rick Bonney led these efforts to pull together this article, and there are several of our Action Team members who are co-authors on this, and it's basically a manuscript that goes over kind of citizen science efforts

in the marine fisheries field and kind of highlights the development of our program and our initial kind of pilot project, SAFMC Scamp Release, and so Rick has received some reviews back on that manuscript, and so the authors are working to kind of address those reviews, and hopefully we will get that submitted, either again to *Bioscience* or to another journal in the upcoming months.

We will also be kind of updating the citizen science research priorities, and we'll be talking about that in more detail as our next agenda item, but we're kind of following the process that was developed by our A-Teams, and we're hoping that you guys will be able to review and modify and adopt those at this meeting.

Then we've also been working with Rick Bonney and our Citizen Science Operations Committee to develop program and project-level evaluations, and, again, I'm not going to say too much about this here, and that's something that we'll talk about in Agenda Item Number 4, and I will note that, during October of this year, we held webinar meetings with our Citizen Science Projects Advisory Committee, as well as our Operations Committee, and that was the first time that the Projects Advisory Committee has met, and kind of summaries from those two meetings are provided in your meeting materials, and they are Attachment 1c, and so you can see kind of a summary of what was discussed at those meetings.

We have also done a number of presentations, both at the spring and fall AP meetings, and we presented some at the CCC meeting in May, and we were able to, since the meeting was here in Charleston, highlight several of the South Atlantic Council's extracurricular sort of projects, and citizen science was one of the things that we went over.

In June, I also presented on a panel for the Federal Community of Crowdsourcing and Citizen Science Meeting, and they had a meeting that was looking at how citizen science can be used in decision-making, and so we were one of three panelists that was kind of asked to present, and it was pretty cool, because we were asked to present based on connections that we made earlier at the CitSci 2019 Conference, and so going to that conference really helped us kind of network within the broader citizen science community, and so that was neat to do.

The other presentation that I wanted to highlight is that Allie Iberle, who is our FISHstory project coordinator, gave a presentation at the South Carolina Marine Educators Association Conference in November, and marine educators are one of the audiences that we are kind of trying to pursue and get FISHstory into classrooms, and so she was able to present at that conference and make a lot of connections with teachers around South Carolina, and so she did a great job, and hopefully we'll be getting some teachers onboard to do FISHstory within their classrooms, once we launch early next year.

Then, as far as promotion and outreach events, at the council's booth at ICAST, the Citizen Science Program was featured this year, and we also attended Georgia CoastFest, as well as a North Carolina Fishing and Boating Industry Summit this November, and we've also developed a number of kind of outreach materials, and we have a Citizen Science brochure, and Cameron Rhodes took the lead on creating that, and we have CitSci articles on all of our council quarterly newsletters, and then we also have #citiscifri, which is another Cameron Rhodes creation, and so we try to highlight citizen science efforts through our social media feeds every Friday.

Also, we're building an email distribution list, through Constant Contact, and so we'll be able to send updates on the program to that list, and I'm putting together an annual report to kind of highlight what's been done during 2019 that we'll send out to all of our kind of interested parties, folks who served on the A-Teams and that sort of thing, and so that's a quick overview of programmatic activities that have happened over the past year, and so I'll take any questions, if anyone has any questions on those.

MR. BELL: Any questions for Julia? This is really neat, because, I mean, we're kind of, in a way, I guess pioneers here, in terms of our program, and folks are very interested in it, and we've had visibility at the CCC, and, I mean, it's a program that can -- If done the right way, we can actually supplement the science we need, and I don't think, when you -- I can tell you, from the CCC perspective, the money tree is not growing a lot more money on it, in terms of ability to support the type of research and things we need, and so we've got to be smarter in trying to fill data gaps and things, and that's where citizen science can be particularly helpful, maybe, if we structure it properly, and so it's really exciting stuff, but I think we're kind of a model program right now for what we're doing, and so any questions for Julia at this point about the kind of big picture? There's no questions on that, and do you want to move along?

MS. BYRD: All right. The next thing I wanted to do, quickly, was give you kind of an update on our pilot projects and some kind of new projects and collaborations that are under development now, and so we have two pilot projects, and I will get into these in more detail in a second, and the first one is SAFMC Scamp Release, and the second one is the FISHstory project. I will actually give kind of a quick demo of the FISHstory project in Zooniverse as part of this presentation.

We are also a collaborator on a project that is being headed by the Nature Conservancy and Gray's Reef National Marine Sanctuary, and it's a project that's looking at promoting fishing within Gray's Reef, promoting fishing best practices, such as the use of descending devices, and then hoping to kind of engage fishermen in voluntary kind of citizen science data collection efforts.

We have a couple of other projects that are under development, and one is kind of this rare species observations, and I think you guys have heard us talk about this before, but what we're hoping to do is mirror a program that started in Australia called Red Map, and the idea is to create an app where people can report kind of species that are rare occurrences in their area, and the idea is that this information could be kind of an early warning signal for things like shifting species, due to climate change, and so we have a workgroup that's comprised of folks at NOAA, SECOORA, the University of North Carolina, and ourselves, and staff have been talking and developing a prospectus, and so we've been pursuing a couple of funding opportunities, and so hopefully there will be more for me to share on this in the upcoming months.

Then another project that is under development, and this is a new one, is looking at getting diver observations for some data-limited species, focusing down in the Florida Keys, and the idea is this would be part of the Coral Reef Conservation Program, and we would be focusing on some species that are fairly data-limited, things like hogfish and some of the grouper species, and the idea is that this could provide some information for maybe rough relative abundance and rough length information that could help us have an idea of what's going on in between assessments and that sort of thing.

We are chatting with the reef program, because they collect some of this same information, and so, if we develop a project, we want to make sure it's complementary to what they're doing, and then we've also been talking with SECOORA about being a possible kind of data management partner for this program, and so those are two projects under development, and then I also wanted to highlight one kind of additional collaboration that is kind of hot off the presses.

In the Gulf of Mexico, the Southeast Fisheries Science Center held a series of participatory workshops last year that were focused on the West Florida Shelf and on the snapper grouper fishery, and so Mandy Karnauskas and Matt McPherson are the two folks who kind of headed this up, and they held meetings and brought fishermen in, where they tried to kind of listen and learn from fishermen of what are the important things in the fishery in their area, what things did they value, what research needs do they think they have that would be helpful in the management of their fishery, what kind of ecosystem changes have they seen that have affected their fisheries or their businesses or their communities.

What they tried to do is build a conceptual model based on the feedback they got from fishermen, and then, from that, they're trying to integrate some of the knowledge that they've learned into kind of stock assessments, when appropriate, or to kind of help develop research needs, or research projects, and so they did this in the Gulf, and they are interested in bringing this to the South Atlantic.

Staff have been talking with Mandy and Matt, as well as Kevin Craig at the Beaufort Lab, and so the idea that we have kind of hatched is that it would be great to kind of hold these participatory workshops in the South Atlantic and focus on the dolphin wahoo fishery. What we're hearing from fishermen is they have really different perceptions of what's going on in the fishery in the Carolinas versus what is happening in the Florida Keys.

We know you guys are going to be undertaking some management actions for the dolphin wahoo fishery, and there is very limited data that's available, and so we were thinking that it would be really helpful to kind of concentrate these participatory workshop efforts on that fishery in particular, and so the idea is that we would hold kind of workshops in the Carolinas, maybe this spring, and then in the Keys maybe over the summer, and then, for the October SSC meeting, and perhaps the December council meeting, we would have Mandy and Matt and others would have kind of the conceptual models that are built, and they would potentially be building conceptual models for the Carolinas and then the Keys, and then you could see how things match up or don't match up, and so some of that information may be helpful for you guys as you develop management actions.

There is a workshop description that's been added to your late materials documents, under Citizen Science, that describes this kind of workshop in a little bit more detail, and, again, I apologize for getting that information out to you so recently, but we've just been recently talking with these guys about getting this set up, and so that's pretty exciting, and I think it will be kind of a really interesting thing to do, and it will hopefully be helpful to you guys as you do dolphin and wahoo management actions, and so those are kind of the projects under development.

Now I will get into our specific pilot projects, and so the first one is the SAFMC Scamp Release Project, and I know you guys are really familiar with this, and so I'll kind of go through this sort of quickly. Again, we developed the app, and the app was beta tested by fishermen and Citizen

Science Action Team members. During the development of this project, we really relied and built on a lot of the work that the Citizen Science Action Team members kind of did during their programmatic infrastructure development, and we've built a website and some training videos and kind of a quick start guide and presentations and flyers, and the app was finally officially launched in June of this year, and we've been recruiting fishermen to participate, and data collection is underway now, and we have I think forty-five or forty-six fishermen signed up, a variety of commercial and for-hire and private rec guys.

To promote the project, we have done a lot of different things. We did a news release, and we've had an article in *Saltwater Sportsmen*, and we have pushed it out through our social media, and our partners have been pushing it out through their social media, and a lot of you guys have helped connect me to fishermen that I have reached out to one-on-one, and I've done some visiting of going out to charter docks and fish houses and things like that, and what I really found that works the best is one-on-one contact to recruit people to participate in this app. It's time consuming doing it that way, but that's what is really getting people to sign up.

Right now, we're also in the process of finalizing our evaluation metrics, so we can gauge how well the project works, and we've also put in a couple of additional grant proposals, and I have mentioned some of these to you in the past, but I have some new news that I wanted to share with you guys.

The first proposal that we put together was with North Carolina DMF, and they saw our Scamp Release app and were very interested, and they need to collect information on released flounder, and so they have adapted the app for flounder, and I think we'll be releasing that in the upcoming months, and so what we did was we submitted a proposal to ACCSP to kind of merge our two apps that are collecting information on released fish into one, and what it will be is an app that will be housed under ACCSP, and then it will create different profiles, and so you'll be able to tell the app that I'm offshore bottom fishing in the South Atlantic, and the questions regarding kind of scamp grouper or species that we manage will pop up. If you're inshore fishing in North Carolina, you would tell the app that, and the flounder questions would pop up.

The idea is to build kind of a flexible app that can be used by many of our kind of Atlantic state partners, and we've had lots of interest from other states, such as Rhode Island, that have fisheries where released fish -- There's a kind of data limitation and not much information available on released fish, and so I think the app that we really developed can be applicable to many other states, and so we submitted that proposal this summer, and it was reviewed this fall, and it was ranked very highly, and I think we're going to get funding for it, and that funding would come next year, and so that's really exciting.

In addition to kind of merging the app with North Carolina through ACCSP, that will mean that ACCSP will take care of all the maintenance of the app, which is great, and so that's a cost that we won't have to consider in the future. They will be updating and maintaining that, and then, also, we're going to be able to expand the app to more species, and so, right now, the pilot project is on scamp, and so we're planning to expand it to all shallow-water grouper once we get this grant proposal in place, and so that was pretty exciting.

Then we also submitted another grant proposal to the Waitt Foundation, and we kind of partnered with Sea Grant, in particular Bryan Fluech at Georgia Sea Grant was the person who submitted

the grant. We worked with him and the other state -- North Carolina State Sea Grant and South Carolina DNR and Georgia Sea Grant and Florida Sea Grant, and now South Carolina Sea Grant is coming onboard as well, but what we're trying to do is promote the project, and so we put in a proposal to basically do a series of outdoor writer media tours.

What we're planning to do is charter boats, fishing trips, in North Carolina, South Carolina, Georgia, and Florida and then bring outdoor writers out on those trips and teach them how to use the app, and we'll target scamp and teach them how to use the app and talk a little bit about best fishing practices, the use of descending devices and that sort of thing, and the idea would be that we would encourage them then to write stories about kind of our SAFMC Scamp Release project as well as best fishing practices.

We submitted that proposal, and we didn't get funding, and the Waitt Foundation -- It's a rolling, monthly grant application process, and so we re-submitted it again in November, and so we're waiting to hear back and then also pursuing a few other funding opportunities to try to get that up and running.

Another kind of cool thing that's come up, as far as this app goes, is we recently talked to someone who works for the Science Center in Santa Cruz, California, and they also are very interested in this app, and they are having issues with needing more data on some of their rockfish releases, and so it's pretty cool that the Citizen Science Program created an app that other people are wanting to use, and it's helping fill a data collection need, and it has developed a tool that is applicable not only here in North Carolina, but we've heard from states all along the Atlantic coast, and now we're hearing from folks on the west coast that they may be interested in using this app as well, and so we will kind of keep you informed as our kind of discussions with them continue.

MS. BECKWITH: I love it, and I think it's great, but I'm curious if you've gotten feedback from the folks that are interested in using this in how they might be using the data, because, obviously, some of this might be voluntarily provided, and it may not be able to be used in stock assessments or create indices of abundance or that sort of thing, and so I guess I'm curious if anyone has kind of said, hey, this is great, we're going to use it, and we're going to do this with the data, and is there that second step?

MS. BYRD: In the development of this app, we had a design committee, and Erik Williams was one of the folks who served on that design committee, and it was kind of a mix of fishermen, scientists, folks from ACCSP, who is our data management partner, as well as Harbor Lights, who developed the app, and so, in trying to develop the app, we wanted to keep it simple and to collect data that would be useful for science decision-making.

The app is really focused on collecting information on the lengths of released fish, location, and then information on whether or not you used a descending device, whether or not you vented the fish, if you cut the line and left the hook in the fish, things like that, and so, right now, we're collecting data for scamp. There is a data workshop for scamp in March, and so we'll be presenting the information that we have at that workshop, where people will determine if it's useful for a stock assessment.

What I can tell you, and Erik may be able to add some to this, is that there's very little information on the length of released fish from any sector. There is some information from the headboat

observer program and some limited information for some commercial fisheries, but this would really be filling a hole where there isn't data, and so I think any data that we collect would likely be useful.

Right now, and I will say this a little bit on another slide, is it's just going to be a matter of are we going to have a large enough sample size for it to be useful now, and we just started in June, and it's during the open grouper season, when not many people seem to be releasing scamp, and so the closed season will be coming up in January, and so we will see if we get more releases, and so I think we tried to design it in a way that we're collecting data that fills a hole, and so hopefully it will be useful, but that will be something that will be determined in the stock assessment and beyond.

MR. BELL: That's like we've said from the beginning. Ultimately, what we want to do is we want to put the thought into these different efforts ahead of time, so, eventually, if they can be used -- That's ultimately what you would like to achieve, but I think we're making good progress with this one, and just the descending -- I mean, we've already mentioned the need for data related to the use of descending devices, and so this contributes to that as well.

MS. BYRD: Then just another quick note too is there's some additional research that is kind of more broad on the programmatic level, but also kind of talks a little bit about the pilot project that Jennifer Shirk has been doing, and we'll be hearing more about that later, and then we're also talking to a potential graduate student at the College of Charleston who is interested in doing thesis work. He's kind of working out what he wants to do for his thesis right now, but he seems to be interested in looking at kind of citizen science apps and comparing to see kind of what kind of data folks are willing to collect and what kind of works in promoting these sorts of apps and that sort of thing, and so I will kind of keep you guys informed as our discussions with him continue.

Then, as far as this project goes, we've learned a lot of lessons in the development of our first pilot project, and I just wanted to kind of highlight a few that are on this slide, and the first one is that we found that it's really important to have a project design and planning team, and so that's what I was just talking about for this project that Erik served on.

We had fishermen that served on this, and it's really critical to get people who have a variety of backgrounds together talking in the development of these projects, to try to ensure that we're collecting data that's needed and that we're doing it in a way that it will work for fishermen who are on the water fishing, and so we have to do it in a way that they're going to be able to collect the data, and having everyone talking about that early on I think is really critical.

The other kind of things that I wanted to mention here on this slide is that what we found so far in this is that recruitment and retention is really resource intensive, and getting people to sign up for the app generally means me seeing them in person and talking to them on the phone or talking to them on the phone and emailing them, and so it's taking a lot of contacts with people to get them signed up and then to keep them using the app.

Again, scamp is a fish that's kind of rarely encountered for some people, and so this app is designed for scamp, and so you have to keep reminding people that it's out there, because they may not be catching scamp that much and may be forgetting to use the app or that sort of thing, and so it's a lot more labor intensive than I think we were thinking when we kind of started the project, and

then the other thing that I wanted to note too, and I've already kind of highlighted this a little bit, is that scamp was kind of a challenging pilot species to test out this app.

We wanted to do scamp, because we knew it was a relatively small fishery, and so we weren't going to be inundated with data, and so we would be able to kind of manage that data, and then we knew that there was a stock assessment coming up, and it was kind of a research track assessment, a first-time assessment, but what we found is that it's been challenging in, first of all, identifying the folks who are fishing for scamp, and then scamp are pretty rarely encountered, and, during at least what we found in the open season, the people we've been talking to, people don't release many scamp.

If they catch it and it's in the size limit, they're going to keep it, and that makes a lot of sense. The bag limits aren't really kind of causing people to release fish, and so we're anticipating, perhaps, that maybe we'll get more releases in the closed season, but I think the feedback we've gotten on the app so far is that it's really easy to use, and I think people like it, and it's just a matter of it seems that people aren't releasing a lot of scamp right now, and so it may take time to kind of build a sample size up enough to have the data be able to be used in an assessment, but, so far, I think it's been a great project, and it's been really awesome to learn that this tool that we developed -- It looks like it's applicable for so many other states, for so many other fisheries, all across the country, and so that's been really exciting. That's the scamp project. Any questions on that before I move on to FISHstory? Okay.

The next project is FISHstory, and, again, I know I gave you guys an update on this project at the September council meeting, and so I will kind of go quickly through a brief overview, just to kind of reorient everybody to this project, and then what I'm going to do is give a demonstration of the FISHstory project in Zooniverse and walk you guys through that really quickly.

Again, this project is focusing on using historic photos to try to document historic catch and length from the headboat fishery back in the 1940s, 1950s, 1960s, and early 1970s, and so what we're hoping to do with this project is to fill this historic data gap, and the headboat survey started in kind of the early to mid-1970s, depending on where you are along the coast, and so we're trying to fill that historic data gap prior to that fishery-dependent sampling, and so there's two parts to the project.

One, we're trying to get kind of species composition analysis, and, to do that, we're using crowdsourcing, and I will talk about that more in a second, and then we're also hoping to estimate lengths of fish from these photos, and we're going to try to pilot test a methodology on that on one species, as part of this project. Before moving forward, I did want to acknowledge that the funding for this project came from NOAA FIS funds, and so we were really excited to receive this grant in order to pursue this project, and I know this kind of historic photos project is something that Rusty Hudson and Ken Brennan at the Beaufort Lab have been trying to pursue for a number of years, and so it was really exciting to get this funding and get this project underway.

For the species composition portion of the project, we're using a platform called Zooniverse, which is an online website that allows you to kind of build crowdsourcing projects, and what that means is we'll kind of be able to load our photos to Zooniverse, and we're building a project, and we've developed tutorials and training materials that will allow kind of citizen scientists, members of the public, to come onto this website and help us identify the fish in these photos.

In addition to building the project within Zooniverse, we have also created a validation team that is made up of species ID experts, and so it's a mix of scientists and fishermen, and so those guys will help us validate the species identifications that are made by citizen scientists, and so, so far, we have about twenty-four validation team members that are signed up, some of which are in this room, who we really appreciate folks who are kind of willing to serve on that team, and we're going to have our validation team webinar trainings next week, to get those guys up to speed on the process that we're going to use to kind of validate these photos.

The second portion of the project is to try to estimate lengths from the photos, and so, to do this, we're -- We are not doing this through Zooniverse. Allie Iberle, who is our FISHstory Project Coordinator, and myself are going to be doing the bulk of the work on this, and the idea is to try to develop a methodology to get lengths of fish, and we're going to use an open-source software called ImageJ, and the idea is we can use kind of the two-by-fours or two-by-sixes on the leaderboards, where the fish are hung, to kind of scale the photo, so we can get estimates of length on these fish, so then maybe we can look at things like changes in length over time.

Again, I have mentioned Allie already, but she's our Project Coordinator, and she's done just a bang-up job on this project. Without her, we wouldn't be nearly as far along as we are now, and we also have a Project Design Team, and so that's made up of fishermen, scientists, kind of outreach experts, and so, again, it's been really important to have this background, people with different backgrounds, kind of contributing to the development of this project and providing guidance for us as we develop the project.

I will be taking you through the Zooniverse project in a few minutes and showing you some of the training materials that we have, and then, again, we have this kind of team of species ID experts who are on our validation team, and we're always looking to recruit more validation team members, and so, if there are other folks in the room who may be interested in doing that, or if you know of folks who may be interested in doing that, please let me know, because we would love to get additional people signed up.

Again, some of the lessons learned so far is that having a project design team with varying expertise is really critical, and citizen science projects are really resource intensive, and I will say that having a project coordinator, someone who can specifically concentrate on this project, has been key. It's hard for the scamp project, and I'm kind of the project coordinator, as well as trying to run the program, and so I think having a project coordinator is really helpful, because you can have someone concentrating full-time on that project, while someone is kind of overseeing the program.

Now what I wanted to do is give you guys a quick demonstration of the FISHstory project in Zooniverse, and so give me a minute while I pull this up. Before getting into this, I just wanted to give a shout-out to Allie Iberle, who has done all of the work on this project, building this project within Zooniverse. She's done a wonderful job, and I wish she could have been here to kind of present this to you guys, because this is really her work and her baby that's been working on with our design team, and she has worked really closely with Rusty. As you guys know, Rusty provided all the photos for this project, and so she's been working really closely with him as we have developed the project.

This is kind of the landing page, and the idea here is you can kind of get a little bit of information about the project, and we have a quote from Rusty right here, and we have our acknowledgment sections, and then we have kind of two ways that we're hoping to collect data. Zooniverse calls these workflows. One is called Mark Species and the other one is called Composition, and I will walk you through those and the data types that we're collecting through those in just a second.

First, I wanted to walk you through the About Section, and so this gives you kind of a little bit -- It gives the user a little bit more information about the project, and so we talk a little bit about the photos and what we're trying to do with the project, and we talk a little bit about the South Atlantic Council itself, the Citizen Science Program, and then the locations that these guys were fishing. Rusty provided some maps and some sort of fishing locations, so you can learn more about kind of where these guys were fishing. Then we also talk a little bit about the captains and the vessels, and so there's a picture of Rusty and a little bit of a bio on Rusty, and then there are three kind of main captains who are Rusty's family who are kind of the majority of the photos, and so it's just a little bit of information about each of those captains.

To do the biographies, there were Skipper of the Week articles back in newspapers, back in the 1960s and 1970s, and so those are the articles that we have kind of pulled in here, to give a little bit more information about each of the captains. This is Jake Stone and then Bob Stone and Frank Timmons.

Then, to collect actual data on the project, again, we have two ways we're doing that. One is through the species composition workflow, and so I'm going to pull that one up first, and so what we're hoping to do is to collect information on all of these different species or species groupings within the photos, and so you can zoom in on the photo, so you can see the fish a little bit better, but the idea here is -- We talked with a design team about what species we thought that kind of citizen scientists would be able to ID in the photos.

We have some species groupings, like scamp and yellowmouth grouper, and they are so similar that people are going to have a hard time telling the difference within the photos, and amberjack, greater and lesser amberjack, and almaco jack are very hard to tell the difference within the photos, and so we did some species groupings, and these are kind of based on our design team's expertise.

We have also developed, or Allie has also developed, a number of things to help folks kind of identify species, and so, if you think you see say a gag grouper in the photo, you can click on gag grouper, and then there's a variety of images, and some of the images are from the actual photos, so you can get a better idea of what the fish should look like in the photos.

There is a description of the fish and then "also often confused with" can pop up, and so it will give you more information about the fish that it's often confused with, so it can help you kind of identify the correct fish, and then what we're asking people is if this species or species group is present in the photo, and you say yes, and then we're trying to get a general idea of how many fish are in the photo, and so we have five kind of bins that they can select from, and then you can click "identify", and it will note that.

Some other tools that kind of Allie has developed is you can kind of filter the images based on the shape of the fish, and so you can say the fish is a snapper, and then it will pull up the two snappers that fall underneath it, or you can look at kind of what the tail shape looks like, and so, if you say

a narrow fork, you can get all the fish that have that narrow fork, and then we also have a tool to look at different patterns. If you see a pattern, it will pull up the fish that are in that pattern.

Additionally, once you identify all of the fish in that photo, some other information that we're interested in is if there are any fish that are obstructed in the picture, and so sometimes you will see wheelbarrows full of fish, or barrels full of fish, or sometimes people will be standing in front of fish, and so we want to have an idea of whether there were fish that were obstructed in the photo, and so it's a yes or no question. Then we're also asking folks to count and identify the number of people within the photo.

Then we're also asking to get an idea of whether people thought this photo was easy, medium, or hard to complete, just so we get a sense of who our users are and how difficult they think the task is, and so that's the species composition workflow, and then I wanted to also quickly walk you through the mark species workflow, and so, for this workflow, what we're trying to do is mark specific species within the photos, and so we're trying to get exact counts of certain species, and the species that we are kind of concentrating on are amberjack, grouper, any grouper species, king mackerel, and red snapper.

The idea here is, if we can get exact counts of the fish, we may be able to come up with a rough CPUE estimate that could potentially be helpful and give us an idea of what the kind of relative abundance was before we had fishery-independent sampling, and so how this works is, if there is a grouper in the photo, you would click on grouper, and then you actually mark the fish, and then it will ask you what type of grouper it is, and so you can say gag, and then you will go back in and mark all of the grouper within the photo, and then you'll do the same thing for snapper, king mackerel, et cetera, et cetera.

Again, in this one, we're asking folks to kind of circle obstructed fish, so we can get an idea of the obstructed fish, and so you could say this fish was obstructed, and then we're getting a count of the humans, and so you go in and just mark the humans in the picture.

Then the next thing I wanted to show you guys was the field guide that Allie developed, and this is a little more information that can help you identify fish within the photos, and so we have an overview of basic fish structure, and some of the descriptions is we talk about things like the caudal fin and the pectoral fin, and folks who aren't fish experts may not know what those are, and so this is just kind of an overview of what some of those terms mean.

We also have some help working in black and white and helping identify some of the different species that are difficult to identify, the groupers, fish that are kind of torpedo shaped that may look alike in the photos, snappers. Red versus gray snapper can be particularly hard to identify within the photos. Cobia and shark can actually be pretty hard to identify in the photos, if the cobia are kind of belly down, and that was one that we didn't really think about until we actually looked through the hundreds of photos that we had, and then we have a lot of kind of unusual species, and there is some eels and rays and spiny lobster and some sheepshead and spadefish within the photos, and then, also, since these photos are black and white, they are challenging to identify, and so you can see some discoloration from ice or heat or blood, and so we kind of go over that as well.

We also have more information, and this is in particular for the mark species workflow, and that just gives you a little bit more information and a little more tips on how to identify the different species in that mark species workflow, and we also have a little section on fish marking, and so a lot of the tails or necks of the fish are clipped in some of the photos, and so we figured that folks may be wondering what's going on, and so that's just a way for folks to mark which fish belong to which people, and so we give a little background on that, and then Allie is working right now on compiling a section on some of the mates on some of the boats and kind of other important people within this headboat fleet, so folks can learn more about the fishery.

Then the last thing I wanted to show you guys, as far as this project goes, is, in addition to these workflows, what Allie has developed are kind of practice runs for each of these workflows, and so, when you first come into the project, you can look at a practice workflow, and, in the field guide, there are answers, and so you can kind of check your work against what is in the field guide, to make sure that you're counting the same thing that kind of we're seeing within the picture.

Then the last thing that I will mention is each of the workflows also has this tutorial, and, when you open this project for the first time, it will force you to go through the tutorial, and so it kind of walks you through kind of how we want you to collect data, and it shows you how to use the different kind of buttons and zoom in and zoom out, dragging across the picture, and it tells you what to do with obstructed fish, and then it quickly walks you through the different species that you may see in the photos.

Then we also have a talk section, which is kind of a notes section, tech support, kind of a chat board, and so, once people get started, we can kind of chat with them, and people can ask us questions, and we can kind of make announcements, and we also have something called collections, and so members, users of the project or kind of ourselves, can create these photos, these photo collections, and so we've started one of large red snappers, because we thought that people may be interested in that, and one that has some shark photos in it that we thought that folks may be interested in as well.

That's just a quick overview of the FISHstory project, and we're getting ready to beta test it next week, and so, in Zooniverse, what we'll do is we'll tell them that we're ready to best test, and they will have some of their gold-star users test it out and give us feedback, and we'll kind of incorporate their feedback, and then we're hoping to launch in early 2020, and so that's just a quick overview of FISHstory. Does anyone have any questions? Again, Allie Iberle is the person who put all of this together, and so she deserves all the kudos for this.

MR. BELL: An awful lot of work. Thank you, Allie.

MS. SMIT-BRUNELLO: Just a quick question. How many photos are there?

MS. BYRD: Rusty has provided over 1,300 photos, and so, for this first grant, we're hoping to get 750 analyzed, and so another kind of cool thing that I will mention is we've kind of walked through this project for a number of the APs, and there are tons of our AP members that have said, oh my gosh, I have so many of these old photos, or I know the headboat fleet that I work for has so many of these old photos, or I have so many of these old photos in the restaurants in my hometown, and so I think if -- This is a pilot project, and so we're testing to see if this crowdsourcing approach works, and if it does work and the data is useful, then I think it could

really expand, because there are so many different pockets of photos like this all up and down the coast.

MR. BELL: So we're mining history, and we all knew that Rusty had a photographic memory, and very detailed, but he also has a lot of photographs, and so we really appreciate him working with us on this.

DR. MCGOVERN: I had two questions. One is are all the photos in front of the same sign there, and the second question is was there any attempt to kind of colorize the black-and-white photographs, like the old black-and-white movies they have made into color?

MS. BYRD: The answer to the second question is no. We didn't try to colorize any of the black-and-white photos, and I guess one of the things that we'll learn from this beta test is how easy it is to do this. Some of these photos are really challenging, and so, if folks are having a hard time, maybe that's something we could pursue trying to do, to see if that makes it easier for folks to be able to identify the fish in the photos.

Then, as far as whether the photos are taken in front of the same signs, yes, depending on which fleet it is. There is a lot that are taken at the Timmons Fish Camp, and those are taken in front of the same sign, and so it depends on the boat, and the boats are generally in the same -- They're taken in front of the same sign, but it depends on where that boat was being docked, at the same time.

MR. BELL: Any other questions for Julia at this point?

MR. POLAND: Thanks, Julia. This isn't about FISHstory, but I kind of wanted to go back to the participatory modeling workshops, unless anyone else -- All right. I am really interested in this, and I think you had mentioned that the Science Center was going to go ahead and try this for the dolphin wahoo fishery this spring and fall, and I've got some concerns about the timing. I certainly don't want them to schedule workshops in the spring in North Carolina, right in the middle of our dolphin fishery, because then I've got some concerns about participation in the workshop, and so I certainly encourage them to reach out, at least to the state, to try to coordinate timing and location and that stuff. Two, the report from the West Florida Shelf, is that available to us? I would like to at least have that for my records.

MS. BYRD: I guess, to answer your first question, we definitely want input from you guys, the states, and we were planning -- This is all kind of new, and I have just recently talked to kind of John Hadley about this, too. We would like to reach out to the Dolphin Wahoo AP members, to see when may be a good time to hold a meeting in North Carolina, and we were thinking early March, like before the dolphin come through, may be a better time to hold it, as opposed to April or whatever.

MR. POLAND: I would say, up our way, no later than tax day, and March would probably be preferred.

MS. BYRD: Yes, we definitely want feedback from you guys and fishermen on when and where will be the best place to hold those workshops, and so we will be reaching out to you guys, probably in the next few weeks, to try to do that, and then the second part of your question was whether or

not there is a report that's been produced from the work that Mandy and Matt have done in the Gulf, and I know -- The short answer is I'm not sure.

I know they are planning to present to the Gulf Council sometime, and, Dale, I don't know if you know, or if Erik knows anything about this, but I can reach to Mandy and see if she has something that kind of details kind of results or that sort of thing that I can share with you all. I know there have been a couple of working papers put together for the Gulf of Mexico red grouper assessment that mention this, but I will ask her, to see if she can provide some resources, and then I can get that out to you guys.

MR. BELL: Any other questions for Julia right now? That's a tremendous amount of work, but it's really sort of cutting-edge stuff here. Thank you. We'll go on to Agenda Item 2. That would also be Attachments 2a and 2b in your folder.

MS. BYRD: Now we're moving on to Agenda Item Number 2, and it's the Citizen Science Research Priorities, and so, since this is the first time we've updated the research priorities, I wanted to give you guys a quick kind of overview of the process that we're using, and then we'll get into the updated research priorities themselves.

Again, this is laid out within the Citizen Science SOPPs, but the idea is that we will kind of update the citizen science research priorities every two years, when the council updates their overall research and monitoring plan, and these research needs will guide the projects that the Citizen Science Program pursues, and so, by providing input on kind of these research priorities, you are guiding where the program is going to go.

The process that is used to kind of update these research priorities is multistep. Kind of the first step is kind of the updating of the council's overall research and monitoring plan, and that is typically done at your June meeting, or September meeting, and so that research and monitoring plan is informed by the SSC, APs, SEDARs, staff, that sort of thing, and so you guys reviewed and adopted that in June.

Then the next step is to get input on the citizen science research priorities from our Citizen Science Projects Advisory Team and our Operations Committee, and so we did that via webinar meetings this fall, and, again, those notes are provided to you guys as Attachment 1c, and then here we are now in December, where you guys are going to kind of review and consider these research priorities for adoption.

There is kind of a third stage in here that has yet to be developed, and so the idea here is that we would have kind of a portal on our website that we're calling the Citizen Science Project Portal, where members of the public could potentially submit project ideas, and that could then be considered by the Citizen Science Projects Advisory Team and Operations Committee and you guys, as you're updating this research priority document, and so we're hoping to have that up and running before we update the citizen science research priorities on our next go-round.

Just to give you kind of the timeline of what has happened, on October 3, we had our Citizen Science Projects Advisory Team provide feedback, and the Operations Team provided feedback in late October. One thing I haven't mentioned yet is that the Habitat AP provided feedback separately this go-round. They hadn't identified members yet for the Citizen Science Projects

Advisory Team, and so Roger had an agenda item on the Habitat AP meeting to get their feedback at their fall meeting, and then what happened is, kind of based on all of that feedback, I updated the citizen science research priorities and sent them back out to the Projects Advisory Team and the Operations Team for their review.

They sent edits back to me, and then those final kind of priorities were provided for you in your briefing book as Attachment 2a, and so now here we are in December, where you guys are going to be reviewing them and modifying them as necessary and considering them for adoption, and so that's, in general, the overall kind of process that was used, and now I will pull up the actual research priorities. In this document, I tried to keep -- The recommendation is italics, and then any changes in the language I have tried to highlight in yellow, and so they are kind of easy for you guys to see.

What I was planning to do was to just quickly walk through kind of the recommendation from our committees on this and then see if you guys had any questions or changes or modifications and then just walk through them that way, if that works for you all.

One other thing I will note is that both the Projects Advisory Team and the Habitat AP and the Operations Committee provided really awesome feedback on these. Not all of this feedback is summarized in the research priorities, and so I really encourage you to look at the webinar summaries from those meetings, because I was really blown away by all the feedback that we got, and it was really great, helpful feedback that will help us kind of develop projects under these kind of topical areas, and so I just wanted to mention that, and then I'll kind of start walking through these.

The first one is kind of age sampling, and I guess one other thing I will note is not every -- We had multiple groups reviewing and providing feedback. Generally, there was consensus feedback on all of the research recommendations. In a couple of places, the groups provided differing feedback, and so we went with kind of what the majority said, and I will point those out as we kind of walk through them.

The first one is age sampling, and the recommendation was to keep that as a research priority, and there was some concern that was noted that the anticipated outcome, which is characterize the age of catches, may be a little too lofty, since the sampling design is often really critical to how the age data are actually used. However, we didn't have any suggestions on how to change that language, and I just wanted to kind of make that note to you guys. I guess I just will keep kind of moving through them, and, if you guys have any feedback or questions, stop me along the way.

MR. BELL: As she goes through these, when she gets to the recommendation part, just keep in mind that, maybe as we kind of finish up on this, we need to give some feedback, or perhaps a motion, to move with the recommendations, or adopt them, and so just keep that in mind as she's going through.

MS. BYRD: The next one is maturity data, and so, again, the group supported keeping this as a research priority and potentially adding additional target species. One of the Projects Advisory Committee recommendations was to add spiny lobster here, and then I reached out to some of the reproductive biologists in our region, to see if there are any other species that they would suggest adding, and so, if they have other suggestions, I will kind of notify you guys of those.

Next is discard information, and then, again, the group supported keeping this as a research priority, and they actually suggested adding kind of all council-managed species as target species, because there is such limited discard data that are available, and so that change was made in yellow here.

Next is genetic sampling, and, again, everyone supported keeping this a research priority and suggested reaching out to some of the genetics researchers in our area, to see if there are additional target species that should be added, and so I will be doing that, and I will notify you guys if there's any other species that should be added.

The next one is bottom habitat mapping, and the recommendation was to remove this from the research priorities now, but to revisit this topic when the research priorities are updated in two years, and there is a NOAA project that looks like it may potentially already be doing this, and we want to make sure to avoid duplication in any projects that we're doing, and folks also noted that this would likely be challenging to coordinate, and they noted that there could be interest in sharing this sort of information, which could potentially lead to further exploitation of the resource.

I will note here that the Habitat AP members wanted to keep this as a research priority, but they also noted some of these kind of challenges in coordinating this sort of thing, and so, again, the recommendation here is to remove this from the current research priorities, but to revisit this topic when they're updated again in two years.

The next one is monitoring in managed areas, and the recommendation here is to remove this from the current research priorities as well, but, again, to revisit this topic when we update the research priorities within two years. Several of the fishermen who are on the Projects Advisory Committee noted that fishermen are really interested in what's going on in these areas, but some of the suggestions and comments we received suggested that it may be more appropriate for kind of cooperative research than citizen science, and it could be challenging to sample and coordinate, particularly in some of the kind of deepwater MPAs, and several of the fishermen noted that compensation may be needed if you're going out that far and that it's hard to do that on a voluntary basis.

Then folks also noted that there may be a perception of fairness that could potentially be an issue, because you would be selecting specific fishermen to participate in a project like this, and so, again, there seemed to be a lot of interest in this, but, right now, the idea is to remove this from the research priorities and revisit it again in a couple of years.

The next one is fishing infrastructure, and the recommendation was to support keeping this as a research priority and adjust the data needed to not only include locations of kind of existing kind of fishing-related infrastructure, but also try to note those of previously existing or closed infrastructure, and so, if there are fish houses that no longer exist, to try to note those too, because people -- Several of the fishermen noted that a lot of fishing infrastructure has already been lost, and so it would be helpful to try to capture that information as well.

Next is historical fishing photos, and everybody is supporting keeping that as a research priority. Then Number 9 is fishing oral histories, and everyone kind of supported keeping that as a research priority, and they recommended making an adjustment to the data needed, so that you would have

interviews with fishermen to learn about the history and the current state of the fishery. Then Number 10 is oceanographic or environmental weather conditions, and, again, everybody supported keeping that as a research priority.

Number 11 is rare or data-limited species observations, and so everyone supported keeping that as a research priority, and we wanted to try to broaden it to include collecting information on kind of data-limited species and not just those rare occurrences. Then we had two new topical areas that were recommended to add to the research priorities, and the first is diet samples, and this was recommended initially by the Habitat AP members, because they suggested that having this improved diet data could be really helpful for the Ecopath model, and folks also noted that biological sampling preservation could be challenging, similar to how kind of storing reproductive samples could be challenging, but everyone thought this was a good idea and wanted to add this to the research priorities.

Then Number 13 is also a new addition, and it's kind of personal fishing logbooks, or diaries, and so the recommendation is to try to kind of add this topic as a research priority, and some of our kind of Operations Committee members noted that there are examples where this type of information has been used to develop kind of historical indices of abundance, and so folks were onboard with kind of adding this as a research priority as well.

Then the last thing I will note here is there are two other suggestions that were kind of discussed, but not recommended for inclusion in this current version of the citizen science research priorities, and one of those was fishing effort, and folks said it could be really helpful to get information on a higher kind of spatial and temporal level, and it would also potentially be helpful to estimate effort differences between kind of public and private access points for the recreational sector, but, overall, people kind of noted that this was a really sensitive topic and could be challenging for a citizen science approach, but recommended kind of revisiting that when we update these in two years, and then we had some of the Project Advisory Team members that said it would be helpful to get a citizen science project on stone crab, and I know stone crab -- The council doesn't manage it, but I wanted to pass that on to some of the state agency folks, just to note that there seems to be some interest, in particular, in getting information on recreational harvest through a citizen science approach. That's a quick run-through of the research priorities, and I know I went through those pretty fast, but, if anybody has any questions or comments or modifications that they want to suggest.

MS. MCCAWLEY: Thank you, and so just a couple of suggestions here. Under the maturity data, spiny lobster was in there, and I don't know if we want to include that, since spiny lobster probably won't have another stock assessment, and the larvae are coming from outside the U.S., and so I'm just not quite sure how folks could help us get information, but maybe you have more insight into that?

MS. BYRD: I don't have a ton more insight. What I will say is one of the Spiny Lobster AP members is the one who recommended this, and he is from North Carolina, and he says that there's just very little information available on maturity, especially in his area, and so I don't have much more information other than that, but that was kind of why he suggested it.

MS. MCCAWLEY: Okay. I'm good to leave it on there. I had a couple of others. Under the discard information, could we add gray triggerfish to that list? Then, on Number 5, the bottom habitat mapping, why aren't commercial fishermen listed here as target volunteers?

MS. BYRD: They definitely could be listed as volunteers. Again, the recommendation here is to remove this, and so this would come out, and I think the idea was that commercial fishermen may have so much else going on that it may be easier for for-hire and recreational fishermen to do it, but, if this is pursued, or if we add it back in, or if you guys think that it should stay and shouldn't be removed, then that is something that we could add, that we could adjust.

MS. MCCAWLEY: I am good with it coming out. I'm good. Thank you.

MR. CONKLIN: I don't have all the real new, new electronics, but I understand there's some sort of like network that the new bottom machines have that maps all the bottom and sends it to some main big company that owns it, I guess, and does anybody know if there's any truth to that, or could we look into it more?

MR. BELL: Roger, do you know anything about that? No?

MR. SAPP: It's becoming more and more common, and it's a chip that -- One of the companies, and it's CMOR Mapping, and I think they have taken I think federal data and created some really neat overlays over charts, but then, as you fire up your machine, it gets into the hardware somehow, and it will ask if you want to rewrite through your bottom machine, and it won't change the chart until you've run over it a few times, and it is some interesting software and abilities, but I don't know that it actually automatically downloads and goes back to the company. I think it just stays within your unit.

MS. BYRD: It's worth looking into.

MR. BELL: Okay, and so it builds that database for you on just your unit? Okay. Again, that's just something to keep in mind, if we eventually pick that up again, and the technology -- Chris talked about what he's got, but technology has just increased, in terms of its capability and availability, over the past couple of decades, and so it's amazing what is out there, but I think the idea here right now would be to maybe put that one on the back-burner for a while. Roger, did you want to weigh-in here?

MR. PUGLIESE: Just a quick comment to that. I think, while this is -- Given the limited resources and different things, I think everybody -- Even the Habitat AP understood this, and I think the reality is though that, through other partners and through other activities, say with our Ocean Observing Association and with members, the closer we can get with some of the organizations that have the technology and begin to flesh out those, whether it be using it on a fishery-independent vessel first and seeing how that operates and then figuring if you can translate that, and those types of things are going to happen in the background anyway, because I think we really need to see this opportunity, taking opportunities where vessels are already collecting information or with resources that may be funded through SECOORA or other ones that we can begin to build and fill in.

I think there would be support from broader areas, because there is -- I don't know how many are familiar with the 2030 directive that essentially the entire world is supposed to be mapped by 2030. At first, that sounds like a pie-in-the-sky, but it's being taken very seriously by NOAA, in committing all these different resources under whatever program, and they're all getting funneled into that, and it will be interesting to see if some of these ultimately could go down to being able to engage the individuals in that and having that fleet of vessels on the water, if the resources are available, and you can test-bed it some and figure it out, both from the individual fishermen to the headboats to the charter boats and all those things, and it's just a real opportunity.

While it may not be something, given the limited resources we have to focus on it, I think a lot of those trajectories are going to still occur, because there is willingness from some of the organizations to use some of the technology and to show it to see how that can help these types of activities, and so that will still continue on, and hopefully then we can pick up and really kind of focus that in the future.

MR. BELL: Okay. Thanks, Roger. Any other comments or questions or feedback on specific research areas? The majority of them, the recommendations are to retain them, with some tweaking, and Jessica added a couple other little tweaks there, and are there any other tweaks to the ones that we're considering to retain, or any discussion of the ones that -- We had a couple that were added, and then we had a couple that were taken away. Any questions about any of that or discussion on those? If someone from the committee is game, then what we might want to do is entertain the motion that Julia has placed on the screen there. Is someone from the committee interested in making that motion?

MR. POLAND: **So moved.**

MR. BELL: **Steve Poland has made the motion to adopt the updated Citizen Science Research Priorities, with modifications as needed.** Is there a second? Second by Spud. Any further discussion of the motion? **Any objection to the motion? Seeing none, that motion is approved.** Thank you. Thanks for all the work on this, Julia. This is no small feat. There's a lot of detail and a lot of moving parts and a lot of coordination at different levels, and so to you and Allie and all the staff involved with this, thanks so much.

MS. BYRD: A big thanks to the Operations Committee and the Projects Advisory Team and the Habitat AP. They provided such wonderful feedback for those.

MR. BELL: Yes, and I didn't mean to slight them. That's really where all the discussion was, and I sat in on one of the phone calls there and listened to a lot of that, and people really were giving this a lot of thought and a lot of heartfelt input, and that's what really built this. This is built by our advisory groups and all, and so thanks to them as well.

MS. BYRD: Yes. Now we're moving on to Agenda Item Number 3, and so I want to introduce, for those of you who haven't had an opportunity to meet her yet, Dr. Jennifer Shirk, and she's coming up to the table, and she is the Interim Director for the Citizen Science Association, and we have been -- We call her and Rick Bonney our citizen science gurus, and we've been really lucky to have them guiding us and supporting us through the development of the whole program, and, in doing that, Jennifer has also been pursuing some research on our kind of programmatic development, and that's what she is going to share with us today. Take it away, Jennifer.

DR. SHIRK: Thank you.   It's a real pleasure to have a chance to come back and speak to the council again about this work, and it's an honor to have been part of this process unfolding.   If you saw the research report that I submitted with the materials, there was a very long title in there, and I'm boiling it down here to the research that I've done into the programmatic infrastructure for citizen science, and particularly a big question of the relevance and value of establishing a program in advance of launching projects.

Just a quick snapshot, and I am with the Citizen Science Association now, but, at the time that I started working with the council, and this was on behalf of Pew, or in conjunction with the Pew Charitable Trusts, through Leda Cunningham, I was working at the Cornell Lab of Ornithology with Rick Bonney, who is on the line as well, and will be speaking with us later, and I had been there since the mid-2000s, and so I came into this with a perspective of over ten years, now going on fifteen years, of looking at the field of citizen science and really trying to understand what makes citizen science work.

Most recently, before the time of the Citizen Science Workshop, Rick and I had put together what you can see on the right-side of the screen there, a review, a synthesis, of best practices and literature about really what it would take to establish infrastructure for citizen science, and so we were coming in with this theoretical understanding, and, from Rick's standpoint, very practical understanding, from doing this work at the Lab of Ornithology, about citizen science and looking across many different fields and disciplines.

It's been a few years, and it's been since 2006, and what I have been doing since that point has been research, again, through funding from the Pew Charitable Trusts, and what I'm going to share here is my research, and so this is not reflecting the views of Pew, and this is understandings that I have, and what I am not going to be doing is talking to you about evaluation, even though that's the big question, I think, that a lot of people have at this point, several years later, of did this work.

That's not a question that I am going to answer, and I will give you a preview to some of my findings, that it may even be too soon to be asking that question, and that's just a teaser, and we'll come back to that, and Rick is going to talk about this later, in the second half-hour here.   What I am going to talk to you about is rather more questions that I was asking around, as this program infrastructure was being established, really what happened, how it happened, what that took, and what we can learn.

Because the efforts of the council, from my perspective, looking across the field of citizen science, not just nationally, but internationally, this work to establish programmatic infrastructure first is both really ambitious and unprecedented, and so it's been an exciting time to be part of asking these questions and really watching what happens.   I do want to call out that the work that I'm doing is not just social science, but it's qualitative social science, and take a moment to reflect on the relevance of that approach, given this circumstance, and I want to use a metaphor to do so, which is that of natural history.

If we think about all of the quantitative science that we do today, that's really grounded in many, many years, centuries, of descriptive natural history research, looking at the resource to really try and understand what the right questions are to ask in a quantitative way, and so, when I went looking for an image online to illustrate this metaphor, I found this one and put it in as a

placeholder, and, as I started looking at it, I realized that there was another metaphor to draw here, and this is going back not so much to the angler's picture here, but to my own background or home institution at the time, that of ornithology.

If you take a close look at this picture, and check this out. I do want to also call out the value of taking the time to do descriptive research of what is happening and not just analytical research of what something is, because, as you can see here, this flying bird pictured does not really give an accurate representation of what birds actually do, although it is an accurate representation of a dead bird. Really, I am asking here what actually happens out there, quote, unquote, in the wild when an institution sets forth to enact a program, and what does that actually look like, and how does it happen?

This is my dead bird, and this is the work that Rick and I brought to the council back in 2016, and I think I said 2006 earlier, and it hasn't been that long. It was 2016. This is the theoretical framework that Rick and I presented and said -- I don't need you to grasp all of the details that are in here right now, but we basically said that you've got to do all of this. If you want citizen science to work, all of these seventeen boxes have to be paid attention to.

Again, you have to identify goals for all of the constituents and everything you want to have come out, and you have to pay attention to managing that participation and the expectations, and, throughout these overarching boxes here, you have to pay attention to participant engagement and to the sustainability and accountability of the project, and those are overarching to all of these things.

Again, this was just all our work to look at theory and best practices, and what we brought to this was an attempt to understand what happens when the council breathes life into this framework, and so I'm going to talk about two phases of my research, starting first here with observations and then moving into reflective interviews, but, when I talk about the observations, which I'm going to reflect on here first, the question that I was bringing to it was really the what happens, or what happened, when this work was taking place.

By observations, I had a chance to sit on many of the meetings, the remote meetings, of the five Action Teams, and some of the Project Planning Team's work as well, and, those that I didn't take part in, as well as those that I did, I also looked at all of the notes that were online, and some of the recorded meetings, and all of the materials in draft and those eventually finalized and put into the SOPPs. This was a lot of really intensive work, and it took up over the first half of the time that I put into this research.

Then what I did was I took this framework to it as a coding strategy, to look at where the attentions were paid by the five Action Teams, the A-Teams, throughout this process, and you can see those A-Teams down the right side of the screen there, and so the brown is the Data Management A-Team, green is Volunteers, blue is Communications, orange is Project Topics, and the dark blue at the bottom is the Finance and Infrastructure A-Team.

One of my questions was is it even realistic to think that these five A-Teams could divide and conquer and attend to all seventeen of these components, and then a parallel question was what components, or what buckets, what things, might these A-Teams be paying attention to that Rick

and I didn't even think of when we were putting together this framework, and so those were two big questions that I brought to this, as well as how these A-Teams divided and conquered.

The last thing, in looking at the next two slides, that I want to tell you is that you will see these circles show up in each of the boxes momentarily as to the who did what, and the dark circles, the filled-in circles, indicate that a product actually came out of the A-Teams' work, and the outline of the circles is that the A-Teams really attended to that, but didn't produce a product.

You can see here that, across these seventeen buckets, not only did the A-Teams attend to all of them, but they attended to them really comprehensively, and so there were products produced by these A-Teams that support everything from participant engagement to that accountability piece, and paying attention to designing protocols and to establishing capacity for partners, even outside of just staff and volunteers, and so, all across-the-board, the products hit all of these boxes. I will call out that there wasn't anything new, and there weren't any new categories that popped up that I noticed, but I am still paying attention to that, as I do final research, to see if there's anything that we might have missed.

In addition to all of these seventeen boxes being reflected in the products, you can see that there's even more work being done by these A-Teams to consider and address and be thinking about these categories as they were planning for these products. This was really comprehensive work that attended to all of the things that are necessary in supporting citizen science.

A couple of things to take away from this, just at the high-level view, and then I'm going to pull out some highlights to look at more closely, are that these dots also really just are, in effect, a presence-absence indication, and so either the A-Teams did or did not attend to something, and it doesn't indicate at all the depth to which they attended to something, and I can talk about that more in other ways if you would like, but it also doesn't indicate anything about whether these A-Teams should or should not have been attending to each of these boxes, and so I don't want to indicate at all that, if there isn't a bubble there, that that A-Team missed something. I am actually really blown away by how many bubbles there are shown across this screen, and I would not have expected this much comprehensive work.

I will say that, in descriptive work, which I will talk more about later, the fact that so many A-Teams did do work across multiple categories, where there were several teams talking about a category, that, rather than talking about them in differing directions, they were talking about them really collaboratively, with work facilitated by staff, so that the work of the A-Teams was cross-committee and coordinated work, which is really important to note.

I mentioned that I wanted to pull out a bunch of highlights, and there's lots of things that we could dig into there, but just three at the moment, and I wanted to note that identifying goals for participants really was called out in the products in equal, if not more, amount than identifying goals for science and policy, and that's not to say that those things weren't important, but identifying goals for participants was really elevated to the level of science and policy, so that there was a lot of attention paid to the need to keep participants' goals at the fore.

The second highlight is that really essential to the work of this entire program is the need to apply this research, the citizen science research, to action, to management, and all of the A-Teams talked about that, and so it was really important across the work that was being done. However, there

was only one group that produced products that support that, and I don't want to imply at all that that was a shortcoming. It was the Data Management A-Team that produced products.

Instead, the question that I want to be thinking about is really I don't know if there is anything else that could be done as a product to support management or other work that could be feasible, and so that would just be an interesting question to entertain, whether that is something that would show up, in for example, Communications or Projects and Topics, as an actual product, as opposed to planning and conversations, to make sure that's at the fore, which did happen across the A-Teams.

Then the third thing that I wanted to highlight was that, really, here's where the depth doesn't show up here, but, throughout all of the A-Teams, something that was both at the fore in the conversations that were had and the products produced was this idea of managing expectations, and so that was central, as was applying research to action, to all of the work that these A-Teams was doing, keeping this process and the development of products and the entire enterprise of planning for and conducting citizen science transparent and everybody onboard about what is feasible and what is possible and where the limitations are, and so that's significant, in my mind, that this was something that was really attended to by the A-Teams.

Then, lastly, in terms of the observations that I made, just in summary, I wanted to comment quickly about the intensity of the work that was produced, in terms of the investment made, and so what you can't read down the side there, in the tiny letters, is a screenshot of the index of the standard operating procedures, and so this is a ten-page document, which itself is just a link to many, many other documents which were produced, based on investment in a workshop back in 2016, which was significant, and one full-time staff person, and, from that, being able to leverage over forty-five volunteers and over $50,000 worth of those volunteers' time, in kind, and that's a lowball estimate, to produce hundreds of pages of plans and templates, with really intensive recommendations and a starting point for work, and now two-plus pilot projects underway, based on all of that investment, and so it's a really high return on investment from the council and partners.

I wanted to shift to the interview phase of this research, which is more descriptive now, and not what happened, but really what did it take and how was this significant, and just a couple of snapshots in the work that I've done to talk to members of the A-Teams, and not all of those forty-five by any means, but a number of leading volunteers and committee co-chairs, to get a sense of why this was important and how things happened to reflect on and further flesh-out that descriptive work.

One of the big questions is really trying to get a sense of how to describe just what a program is, and this can be a nebulous concept, and we can grasp a project that is designed around a question and collecting data, but talking to people and helping to describe the significance of a program -- I was asking the folks that I was interviewing how they would describe it, and they were putting together words like "scaffolding structures" and "rules of engagement" and the "procedures that guide the development of other projects", and then one description that I heard was not just a definition, but also a rationale, getting at the significance of why this is necessary, which was to say that a program can be understood as a system that provides the rigor necessary, given that the development of the projects in the council setting have rigorous data requirements, and so really

putting all of the pieces in place to attend to the rigor that is needed from the outcomes of these projects at the outset.

Then a real revelation for me, in doing these interviews, and this was, again, both with volunteers and with staff, was that the program is not just the products of the SOPPs and the A-Teams, but there is a really important element of the program being the people who bring those systems into life, and I want to just highlight a couple of things here, and one was that, across-the-board in the interviews that I did, it was clear that the A-Team members saw staff as fundamental to the work of the A-Teams.

Just to illustrate this, I wanted to call out, again going back to the observations, that the staff helped weave together and coordinate the work of A-Teams, to make sure that they were doing work in commensurate ways when they were addressing similar topics, and, additionally, a lot of the products that came out were pointing to the need, and also even developing products, to support and build capacity for staff, as well as for volunteers, and this was the flip side, is that, in talking to staff, and, here, I'm going to put Julia on the spot, with her permission, for a moment, but that she really helped me to see that the program is also the people on the A-Teams who are bringing the insights and the expertise to establishing these standard operating procedures and then helping to keep them alive into the future, and I will talk more about that in a few moments.

Additionally, hearing from everybody across-the-board that even the process of being part of these A-Teams and part of the Project Development Teams itself helped to establish and build relationships across people who might not have otherwise had a chance to work together, and there's a lot more that I could say about that as well, but I'm just calling that out here for the moment, and so the people side of this is also really significant.

Then, just briefly, one of the questions that I was also digging into was, again, going back to the beginning, the idea of starting a program before starting a project and what the value of that was, and really hearing from people that the two are mutually reinforcing, that it was important to have that program underway before projects were launched, because it gave the projects some infrastructure and some guidance to build on, the benefit of insights from many people in the planning process, and that, in turn, the project also tests the program in a way, and it puts those templates and those planning modules to a test early on, before they were codified into the SOPPs.

There were some differing opinions about just a few voices that were saying that it could have been beneficial to start the project earlier, so that the A-Teams might have had something to sink their teeth into and give rationale to why they were building this more conceptual program, and others who thought that it might have been better to wait to start the project, so that the project could have had the full benefit of final products from the program and better insights that may have helped get the scamp project, in particular, out ahead of some of the challenges it is encountering right now, such as lower than maybe realized participation, but, again, there were pros and cons to either side.

One thing that I did want to call out is that I asked folks if the work of the A-Teams changed once the pilot project was in the pipeline, and folks really said that, no, they were pretty much driven by the terms of reference, and so they stayed on course and didn't veer off track, and a potential downside of that was that they also didn't necessarily have as much interaction as I had expected with the project planning, once that got underway.

In reflecting on this, I wanted to share a couple of synthetic thoughts on opportunities and next steps, possibly even go out on a limb and offer some recommendations. First off, I understand that there might be some attention being paid to those process by other councils, as to whether or not citizen science works and whether this program-first approach works, and so, through the interviews, I did ask would you recommend that a program be established before a project, and, across-the-board, folks were saying that, yes, it's really valuable to adopt this approach, and, if other councils are doing this, they might as well go ahead and consider adopting many of the materials that have already been prepared, the SOPPs for one, and/or adapt to particular contexts.

In advance of doing that, the recommendations that came out were to be sure that, if another council were to do this, that there really is a true data need, or data needs, and that everybody is onboard and bought-in to those data needs, to the process, in this really multi-stakeholder way, as was done here, and then the last recommendation, per the earlier slide, is to consider how soon to start a pilot project. Yes, start with a program first, but then think about whether it's advantageous to start sooner or later, depending on the context and opportunities.

A few thoughts and recommendations that this council might want to consider, based on my findings, is really to think about the relevance of furthering staff support, and even growing staff support, in order to ensure continuity of the program, this long-term growth and this eye toward long-term sustainability.

Parallel to that, there is some thought that there is value in retaining and staying engaged with the A-Teams and the potential that these A-Teams could really have a lot of value to be mobilized in the future, to continually review and update the SOPPs and/or other products, in light of new findings or new projects, and that would in fact take more staff support, but it would, again, be mutually reinforcing, in that the A-Teams would being a lot more work and time and perspectives and insights to bolster the work efforts of the staff.

It may be worth, and I know this is hard to consider, but we're seeking and securing funds to have on hand, in case projects pop up that are really timely, given that opportunities may arise, and data needs may arise, that have a short horizon, and having funds ready to react and be actionable could be of value.

Then, finally, and this will help transition into the point that Rick will take on after a few more thoughts here, is to think about conducting further analytic studies of success factors as well as evaluation, not just of the projects, are the projects working, but is the program working, and I did ask the folks that I interviewed what would be indicators of success, and Rick is going to, I think, invite this group to further brainstorm indicators of success for the program and not just the projects, and I wanted to share here a couple of things that came out of the interviews, and not an exhaustive list, but just to get the juices flowing.

In addition to whether or not data become not just useful, but used, some other things to look at might be how many projects are running simultaneously, how many different kinds of data are feeding into council pathways. Then looking at the use of qualitative and not just quantitative data use, even in the stock assessments, and how often the council might be approached for partnerships or endorsement letters, as well as what partners say about the process, and whether that is of

endorsement or otherwise partnering, and is it easy to work with the council? Is the process laid out in a straightforward way?

Then, as well, how deep and wide is the pool of volunteers that are drawn to this, even if not engaged right off the bat, but who all might be interested in and sustain in the idea of citizen science that gives the council the opportunity to ask different questions when they arise.

I did also just want to close with a last thought and big-picture reflection of my own, as a researcher looking at this and some take-aways I have that have relevance to when to measure success, as well as other ways to go about doing it, ways to think about doing it, is that some of the things that I have looked at across the years that I have been involved is that, coming into this, folks are really eager and excited and ready to have a pilot project be a proof of concept, and can these data be used, and the reflection that I have heard from these interviews is a shift from that eagerness to a sense of patience and the importance of patience in giving the program, and not just a project, but the program, the time that it needs to unfold, so that -- Recognizing that it takes time for a project to demonstrate success, and that there may be more than just a one-off instance to demonstrate that something is of value.

In parallel to that, one of my additional reflections on this is that, as folks were talking about the process and the process of building relationships, it also seemed as if there was a shift away from everything hanging on the success of a single project, and rather to looking at the value of the program and the longevity of the program itself being an outcome that could carry the program into the future, even if one single project doesn't maybe succeed in the way that it was initially anticipated, even if there are some successes, that the process and the program itself has built some resilience that will allow citizen science to grow into the future, as multiple projects unfold. With that thought, I look forward to any questions or ideas and further thoughts from Rick about measuring success into the future.

MR. BELL: Thanks, Jennifer. That was great. I really appreciate the work and the look at what we've done, and I never thought of this as sort of giving birth to a living entity, but, in a way, with the program and all, that's what we've done. I think we may have taken sort of the field-of-dreams approach of if we build it that the program and the projects will come, and they are, and so any questions for Jennifer right now about any of this? It was great. I mean, it's a really nice overall view of this whole thing from a different perspective, and it's something that obviously the council has put energy into and effort, and staff, tremendously, and the A-Teams, and it's a lot of things that have come together to get us to this point, but we really appreciate that examination. Any questions? You all are a bundle of energy here. All right. Then we'll move on.

MS. BYRD: Thanks, Jennifer. We really appreciate it. All right. Rick, are you there?

DR. BONNEY: I am here.

MS. BYRD: Before turning things over to Rick, I just wanted to do a quick introduction. Again, Rick Bonney is with the Cornell Lab of Ornithology, and he actually recently retired, but is still affiliated with them, and he is another one of our citizen science gurus who has really been involved in helping us kind of design and guiding us as we've developed the program and projects, and we're really lucky to be able to continue to work with him as we look towards kind of evaluating the program and the projects that we have under development, and so Rick is going to

kind of give an overview of kind of program evaluation, highlighting kind of its importance and kind of what you need to have in place in order to develop an evaluation plan, and so he is in snowy Ithaca this morning, and so we are having some technical issues, and so I'm glad that we worked those out, and so, Rick, take it away, and I will advance the slides on your call.

DR. BONNEY: That's good. With the technical difficulties, I think, if you turned over the screen to me, then we would end up just falling apart and moving on to lunch, although that might not be so bad, right?

MS. BYRD: Right.

DR. BONNEY: I am going to talk about program evaluation, but I want to start with just a few reflections first about this program and this effort that you all have undertaken, because it has been almost four years now since Jennifer and I left snowy Ithaca the first time to come down, and that time it was Charleston, and I am sure that Jennifer remembers well that we almost didn't get home from that one, because of the snow, but, over the last four years, you all have done just an amazing job of putting together a program in a way that we couldn't have dreamt of.

When we first came down there, and I have that first talk, which some of you will have seen, it was called "Fish are Just Like Birds!?". In other words, fish are just like birds, but are they really? We just had absolutely no idea what was going to happen, and it seemed like, okay, the fisheries world could do some of the things that the ornithological world has done, and they can collect some data, and it could be potentially instrumental in resource management, and let's just put this out there, and it will be fun, and we'll eat well, because we'll be in Charleston, and we'll have a good time, and, if something comes of it, great, and, if something doesn't, well, we ate well, but holy cow, or holy fish or whatever.

What you guys have done is just nothing short of astonishing, just absolutely astonishing, and I think it's safe to say that this program is leading the field of citizen science and showing how program development can be done, and, recently, when Julia said to me, Rick, can you talk to us at the council meeting about how we can use some of what other programs have done, other agencies, for example the Florida survey, can you show us what they have done, in terms of program evaluation and program development, so that we can learn from them, my answer was no, because you are already so far ahead of them that what we need to do is explain or codify or write up or develop or get what you're doing out there to the world, so they can learn from you.

In the last four years, what you all have done has really just kind of flipped things on its head in the field, and, over the next few years, what I hope to be doing is taking the work that you're doing here and showing it to other agencies, to try to get them to catch up, and so congratulations, and it's just been awesome, and it's been an awesome ride, just watching what you've been doing.

Before I get started talking about program evaluation, I did want to say -- I wanted to offer thanks to our colleague Tina Phillips, who is also at the Lab of Ornithology. When Jennifer was working full-time at the lab, which she did for many years, and there's just three of us, me and Jennifer and Tina Phillips, and we did a lot of stuff together for the field of citizen science, so much so that I sometimes would call Tina Jennifer and Jennifer Tina, much to their annoyance, and I always considered it a sign of love and respect, but I think, to them, they were just kind of annoyed, but I really wanted to thank Tina here for all the work that she has done with me in thinking about

program evaluation over the years, because many of the slides I have in here are actually things that she developed, although I have adapted a lot of them.

If you would click on to the next slide, or, actually, skip the next slide for right this minute, and so the first question then is what is evaluation, and, as I said in the document that I sent in for the briefing book, evaluation is not rocket science, and it's actually way harder, because rocket science is just harder mathematics, but evaluation requires putting together all kinds of different approaches and techniques, borrowed from a lot of different fields, but it does have a simple intent, which is to determine whether something works, and you design something, you develop it, and you implement it, and is it working?

Some people think that assessments are evaluations, and evaluation can include assessment, but assessments are essentially tests, measures of knowledge, and a lot of people will say, okay, well, we're going to figure out whether this is working by giving people tests and finding out if they learned something, and that can certainly be a part of evaluation, but evaluation is really so much more than just an assessment.

Some people say, okay, evaluation is a survey, and we'll do a survey, and we'll find out if people changed their behavior because they were involved in this project, or this program, and you might have a control group, where you don't do anything, and you might have a treatment group, and you might give them pre-tests and post-tests, and you might say, look, the treatment group went fishing ten times, and, in the post-test, we found out that they changed their behavior and they are all now buying fishing rods for their grandchildren for Christmas, and that's fantastic, and that's a great finding, and that can be sort of an evaluation, but it's not the same thing as an evaluation, and the surveys can be part of it.

Jennifer has already talked to us a little bit about how the evaluation and research are not the same thing, and research is generally undertaken to find out the answer to a question, a scientific question, for example, and it tends to be somewhat generalizable, whereas evaluation, as I've already said, is newly undertaken to find out did something work, and it's not even always generalizable, and what works for one project may or may not work for a different project. However, evaluation can include research, and, as we move forward with evaluating this council's citizen science program, we certainly reviewed some of Jennifer's research results in that work.

Let's move on to the next slide, where I will now give you the twenty-dollar or the hundred-dollar or the million-dollar definition of "evaluation", and it's the systematic collection of data to measure the strengths and weaknesses of a product or a program or a policy to determine and improve their overall effectiveness. We can do that with this program, and we should do that with this program. We're going to have to work with some evaluators, and the next slide is an extremely important slide, the most important one in this whole program, because I want to assure you that evaluators are actually really nice people.

In all the years that I have been doing evaluation work, people are afraid of evaluators. They think they're going to come in and tell them that everything is wrong, and everything is screwed up, but, if you have a solid evaluator for your program, or your project, they're going to work with you from the beginning of it to make sure that you're successful, and, if you're not successful, to gently suggest ways that you can improve to be successful, and so, just to show you that evaluators don't

look like dementors, this is a picture of my favorite evaluator, who have I already mentioned, Tina Phillips, and, as you can see from her smile, she is not out to get anybody.

Now we move on to the question of what actually do we evaluate, and there are so many things that we can evaluate. For example, where Tina's and my expertise actually lies is in evaluating individual learning outcomes, which we call ILOs, and so, when somebody participates in a citizen science project, do they learn? They would be a cognitive outcome. Do they change their behavior, like buying a fishing rod? That's a behavioral outcome.

That's one thing that we can learn, and certainly, when we get into looking at what has happened to the participants in FISHstory, or in the scamp grouper project, or in any other projects that come out of using the app, we might be able to look at some of those individual learning outcomes. Down near the bottom of the slide, you can see that you can look at community-level outcomes. Are we developing community capacity? For example, five years or ten years from now, will we be able to look at all of the folks that are involved in this council, or other councils, and say they are functioning more as a community, respecting each other's hopes and dreams and desires, and is that leading to better management?

That is certainly -- Community-level outcomes is one kind of evaluation, but, if you click again, this should animate, to show that what Julia is really asking you to focus on now, first, today, is programmatic outcomes, strengths and weaknesses, acceptability and utility of data and that sort of thing.

Now I'm going to do something really unprofessional. I'm going to go ask you to go clicking backwards to Slide 2, because I really, really should have put Slide 2 next, and so just close your eyes and let whoever is doing the machine here get back to Slide 2, because, if we're going to develop a program or a project, we've got to know what the heck it is we want that program or project to do. Now, I didn't grow up reading *Alice in Wonderland*. I grew up listening to Jefferson Airplane, and that's how come I know about *Alice in Wonderland*, and one pill makes you smaller, and one pill makes you tall, but, as a result of that, I got curious about *Alice in Wonderland*, and I went back and read it, and I found out that it has some of the best published advice in the world, because Alice goes through the looking glass, and she finds this cat, and she says, can you tell me, please, which way I ought to go? The cat says, that depends a good deal on where you want to get to. Then Alice says that she doesn't much care where, and then the cat says, well, then it doesn't matter which way you do go.

If you don't care where you're going, then it doesn't matter which way you go, but this council really, really, really cares where it's going, and so it has to figure out -- It has to articulate, and it has to make it very clear where it wants to go, and so now what you need to do is you need to go click, click, click and close your eyes while the slides get advanced back to Slide 11.

Slide 11 is going to show you that, in order to figure out where it is you want to go, and if you've gotten there, you need to embrace the concept of goals and objectives and indicators. Okay. What the heck are these things? Well, "goals" are a lofty and visionary statement about how you hope something can happen or change where you want the world to be eventually, and, by their very nature, they are vague, and they are exciting.

Now, the next slide will show you the definition of an objective, which is a specific or measurable step or an action that you can take to achieve a goal. I have this lofty goal that I want something to happen, and what are the steps that I now need to take to make that happen? Is it a workshop, or is it a project, or is it a fishing rod? What the heck is it?

Then the next slide will show you that, once those objectives are codified and agreed upon, then you need to have indicators of success, which Jennifer mentioned in her slides, and she already actually began to give us some suggested possible indicators of success for this program, and these are the measurements that show that those objectives have been reached.

I will bring this home first by showing you how Tina and I thought about this, and we were working more on project evaluation and learning goals, and so, here, this was a science education project that we were working on, and the goal was to increase the skills of science inquiry, and so the group of people who were putting this project together wanted their participants to be smarter and more able to actually conduct a scientific inquiry, a scientific experiment, and this was their goal. Now, you could do that in hundreds or thousands of different ways, with all kinds of different projects, but, because this was a citizen science project focused on birds, the team got together and come up with a whole list of objectives to reach those goals, and it's pretty hard to do citizen science with organisms that you don't know what you're looking at, and what's the difference between all those different groupers, for example?

This particular group came up with a bunch of objectives, and one of them was measurable, and we want the participants in this project to improve their species identification skills, and that's a first step. Okay. Awesome. Now, what they can do is have a whole bunch of project activities that were designed to help the participants improve their species identification skills. Now, once that has happened and the project has been going on for a little while, you want to know is it happening, and so then you can go back to a survey, for example, or a test, where you do create a test to give them identification quizzes, and you find out if they did increase their identification skills as a result of the supports that we gave the project, and that would be an indicator of success.

I'm hoping that that makes some sense to you, and I will show you, in the next slide, that what Tina and I, with a whole team of other people tried to do, is we tried to come up with a whole bunch of different ways that people could measure a whole bunch of learning goals for science outcomes. You would think, okay, well, let's do this for the council's Citizen Science Program then, or for FISHstory or for the scamp project, when we get there, but the problem is that nobody has really done this yet, and we're going to have to do it all over again, and we're going to have to start from scratch, and we're going to have to lead the field of citizen science, just like we have already done, by looking at those seventeen boxes that Jennifer showed you and having action teams work on documents to fill those in and create documents and templates that could be used for these projects and which could be used by other councils for other projects, which really ought to be published someplace.

We're going to have to start all over again and develop a way of showing the success and the outcomes of a program that is focused on resource management, primarily, and so, once again, we get a chance to lead the way, and now you've already started to do this, because, going back to the goals, the lofty and visionary goals, this council has developed and codified five goals, and they were ratified and agreed upon and worked on a little bit more last summer, but then they were cast into iron at that point.

I was privileged to be in the room when that happened, and we all high-fived, and then we went and had a drink, because the goals were done, and so this is the first of the goals, to design, to implement, and to sustain a program framework to guide the development of projects to support fishery management decision-making, but see how lofty and visionary that is.

Now we need to start thinking about objectives, and the council has not actually come up with formally-adopted objectives to be able to measure whether those goals have been met so far, but, in everything that we've done from that 2016 meeting, with the blueprint we had, from all of the stuff that's been written since that time, first by Amber and then by Julia and by all the other people working with them, there has been a lot of very clear writing about where the program needs to go and what the steps are that need to be taken, and those can be developed into objectives, and they would need to be, in order to actually be an effective program evaluation.

For example, Julia and I already started working on a document where we put the goals into the Google Docs, and we started to bring some of the things that have been written before into that document in the form of sample objectives, and so here is one. What we would need to do first, in order to begin to build that framework, is to have an Organizational Infrastructure Committee, A-Teams, Action Teams, to provide program administration and oversight. We all knew that you needed to do this, but it hadn't actually been written down, and so let's get these things all written down, and that is starting to happen.

Several members of the Citizen Science Program Committee have already been editing that Google Doc to meet this end, and so now the next step is all about indicators. What are the indicators that show, for example, whether that objective has been met, and this is showing you that we don't know yet, and we haven't really written down any indicators of success, and we need to, but it's not too late. It's not too late at all. The timing is now perfect to try to write all those down, and as I just mentioned, Jennifer has already given us a few that have come out of her research, but the next slide shows you an example of an indicator that says, okay -- There is actually five Action Teams, and there were five Action Teams formed that had regular meetings and produced reports, and there is an indicator. Now, how solid were they, how good were they, that comes later, but that happened, and it's big and it's important, and nobody has ever done that before.

I am going to be done in just a couple of minutes, I think, with my formal comments here, and then we can have discussion, and it's up to Julia to decide how much input there's going to be into these objectives and these indicators and how widely to make that Google Doc available for other people to weigh-in. That's her job, as somebody that is smarter and more competent than I am, but the next slide is going to show you a few pitfalls that we have noticed in project design, which we hope that we won't get into by doing this.

The first is a wishy-washy objective, and so, if we design a project for a program and you come up with objectives that aren't really, really clear, it's going to be impossible to find out whether you ever met them, and you need to align your objectives to activities, and so, once you have those objectives, and once you're showing what it is that you're trying to accomplish, you need to make sure that your project activities, or program activities, are going to meet those objectives, and that might seem really, really obvious, but not everybody does this.

I will tell you a true story, and it sounds impossible to believe, but we once read a proposal where people were going to measure whether or not a nest box project was successful, putting up nest boxes in your backyard, and whether you were learning from that process by giving them a test on whether they were doing more on recycling. This is a true story, believe it or not, and you have to align the objectives to the activity, or you're never going to be able to tell whether you're successful. You need to provide support for the desired change that you want to have happen, and so, for example, with Julia calling people individually to work with the app, to get them out on the water using that app, and learning from them about why they may or may not be using the app, that's giving the support and also learning from them and changing the support for the other fishermen, and that's really, really important.

You can't expect too much of a project. The project can only do what you have designed it to do, and then, finally, you need to use evaluation measures that are appropriate, but, right now, I can't tell you what those evaluation measures are going to be, that are going to be appropriate, because we don't know what the indicators of success are that we have for each of our objectives.

With this group being what it is, I know we're going to get there, and, once we do, once we get to the point where we have those indicators of success, we can do a full evaluation plan. We can plan it, and we can implement it, and then we can report out. We can analyze the data that we collect, whether we do surveys or assessments or whatever it is, but we can analyze them, and we can report them to you and to the greater world through dissemination, but it's too early right now. We need to just take this one step at a time, and, right now, the timing is just right for us to be doing this project.

A couple of last things that I want to say here, and some notes that I was scratching down when I was listening to everything over the last couple of hours, and one is research priorities. As Jennifer and I work with other agencies, like the Forest Service, like the Fish and Wildlife Service, like the Bureau of Land Managers -- We were just at a meeting, just about a month ago, working with all of those agencies, and we were having a really, really hard time getting these agencies to articulate the research priorities that they are trying to meet that could benefit from citizen science data.

Now, one reason is because they're sometimes working over a much larger area, and I know that sometimes, when you think about the waters off of the coast of the Carolinas and Georgia and Florida, it must seem vast, but, actually, compared to trying to look at all the national forests, it's not. One of the things that I know that we need to start doing with the Forest Service is we've -- They need to try to look at their potential research priorities for smaller areas, and so that's something that I have learned from watching what has happened here, but you have done such an amazing job of coming up with those research priorities and talking about them and adjusting them and agreeing upon them that the citizen science projects that you want to develop are going to flow right from that, and so that's been amazing.

Another thing that I wanted to say is that I always get this like, aww, shucks, when people say that I'm citizen science guru, or that Jennifer is a citizen science guru, and we're not really gurus. We're just old at this point, especially me. People have now started calling me the grandfather of citizen science, and I don't know when that started to happen, maybe when I formally retired, but you guys are the gurus of citizen science. You are doing this, and you are lighting a path for others to follow, and I am just watching awestruck.

Then the other thing that I wanted to conclude by saying is, back to this *Bioscience* article that Julia was talking to you all about. We did write a draft, and we did submit it, and it did get four reviews, and, typically, articles get three reviews at *Bioscience*, but this one got four, and two of those reviews said that this is a great article, and it should be published immediately, to show the world how a citizen science program can be developed, and the other two went in the direction of this is premature, because we really need to find out what your results are before we can publish this. Is this program successful? Come back in a year or two or three years and show us are the data being used for stock assessments.

Well, just listening to the last two hours, I know that the program is already successful in so many different ways, and I know we can rewrite the end of that article so that we can show what those successes are, and we know that we need do it, and, if we do it, it will be accepted, and, with that, I wanted to point out, Julia, that you have a slide -- You showed a slide two hours ago now, and it's a lesson -- The slide says "lessons learned", and what we need to do is we need to do is we need to take that slide showing the lessons that have already been learned, and we need to elaborate on that into the last part of that article, because we keep saying what is it that the field needs to know, and the field needs to know about these lessons that have already been learned, and quickly, because they are really, really important.

I have one last slide here, just to say thank you for your time and your attention, and I really appreciate it. It's a little bit weird to be sitting here staring into my computer screen and talking and wondering whether everybody out there is actually listening, and so this is the way that we could best do this at this particular time, and sorry I couldn't have been there in person, and I would have loved to, and the weather is certainly probably warmer there than it is here, but thanks to all of you for inviting me and Jennifer to be part of this process and to ride along on this wave and see what you all can accomplish, and I will leave it there.

MR. BELL: Thank you, Rick. I really appreciate your presentation here and your encouragement, and I appreciate the kind words, and I think it's a testament, again, to the hard work of our staff and the teams that have built this program and all, but we just -- As I mentioned earlier, we're kind of going where folks have not gone before, and this is a little bit cutting edge, and folks are watching us, and, as you heard from Rick's comments, this has some value to others, and we're kind of setting an example, and so thanks to the council, those on the committee and the council in general, that have allowed this to take place and for us to kind of move forward here. Any questions for Rick right now, based on his comments and input? They are really here, Rick. I swear.

MR. CONKLIN: You said we're leading the country at citizen science development, I guess, right now, and our implementation of -- That's a pretty big deal, and I've been part of this since the infancy, and I've seen it turn from an idea into some useful stuff, and so that's -- I'm sure that our staff couldn't have got it done, or we couldn't have got it done, without your help, and so thank you.

MR. BELL: Any other comments or questions for Rick?

MR. DILERNIA: Not a question, but a comment. Yes, this council is probably leading the country, as far as utilizing and developing a citizen science program, and, when I have reported this back to the members of the Mid-Atlantic Fishery Management Council, a number of members

have expressed interest in the progress of the programs that you're developing, and they have asked that, at a future council meeting, that we receive an update or a briefing on the council's citizen science process, and so I would just say stay tuned, because I'm sure you will be getting a request soon from our council for a presentation and to share what you've learned so far. Thank you.

MR. BELL: Thanks, Tony. Any other questions, questions for Rick or Jennifer?

MS. BYRD: I actually wanted a little bit of discussion or feedback from you guys, and so Rick's presentation was on evaluation, and so that's something that I feel pretty strongly about. We want to make sure that this program is doing what we want it to do, and, in order to do that, and to kind of improve the program that we've built, we need to be able to evaluate it, and so, as Rick mentioned, we've come up with goals that we've agreed up, and the next step is this process is to develop objectives and indicators of success.

Kind of the tentative plan that we have in place that I wanted to share with you guys and get feedback on is we're planning to develop kind of draft objectives and kind of draft indicators of success with the Operations Committee, and we're going to have a webinar in January, and there's a Google document that people are already kind of editing, but that will kind of be the next step of kind of developing those objectives and indicators of success, and so then the idea then would be we can then bring it to you guys to look at, to get your input on that, and we can share it with our Projects Advisory Team before doing that, if you all think that would be helpful and appropriate, but, in order to come up with an evaluation plan, we need everybody to agree upon these objectives and indicators of success as well, so then we know what we're evaluating, and so kind of input that you could provide or guidance that you could provide on kind of the process we use for that or, if what I have kind of outlined sounds good, that would be good to know.

The other thing that I wanted to mention too is we are really, really lucky to have Jennifer and Rick working with us on this. Program evaluation can be kind of nebulous, and it's a hard thing to do, and these guys are kind of helping us do it and working with us to kind of build a plan, and, once we have a plan, we need to implement it, and resources are going to be needed to kind of devote to that, and having someone like Rick help do the evaluation plan is something that I think would be really great for the program, and so kind of any thoughts that you guys have on strategies for an evaluation plan or how we can maybe find resources to do that, suggestions along those lines, would be really helpful as well.

MR. BELL: I think, logically, we would obviously want to follow through and evaluate, and Jennifer used the concept of return on investment, and we have -- The council has invested time, money, and effort and staff time and people's time into this, and we want to make sure we're getting a good return, and, if the program is doing the projects, it will eventually designed what they were designed to do.

MR. BREWER: I agree, and I think that there does need to be evaluation. I mean, to me, that's critical. The question that you asked though was more of a process question, as to what steps do we take, and in what order, to get to the final evaluation plan, and I would like to see the council play some role in that, and I don't know that we would have anybody sitting at the table that would have the expertise to come up with sort of broad or general ideas of where we would kind of start, but I would like to see the council give input to that, as that plan is honed down, and so I can't be any more specific than that, but that's my thoughts on it.

MR. BELL: I think that's kind of what Julia was describing, is we move forward, and there would be a back-and-forth with the council on that.

MR. CONKLIN: Are we looking to measure the success of each individual program under the citizen science category, or are we looking to just measure it out as a whole, or do we need to do both?

MS. BYRD: I think both, is the short answer to the question. For each of our pilot projects that we've developed, we have some -- Especially for the scamp, we have goals. The Project Design Team has goals and objectives and indicators of success, and so, once the project has gone on for a little bit longer time than it has done now, we'll go back and look at those indicators of success, to kind of judge whether or not we feel that program was successful and what we could have done to improve it or how we can improve it in the future, and so we're doing that on a project level, but then we also want to do that with the program as a whole.

MR. CONKLIN: I mean, my experience with how we gauge our success is we throw it over to the SSC and let them check it out, but, in this case, this is not what we're being asked to do, and so I'm kind of like Chester. I don't have much stuff readily available right now, but, if we come up with some things, I'm sure we could build on it, I guess, unless you think that we need to get some other scientific group to look at the program, much like they just did with MRIP, but I don't know if we're far enough along to turn it over like that.

MR. BELL: One way to look at it is the program itself is sort of the larger level, and there is measures of is the program working, is the program -- The evaluation of the program and is that -- Then the program produces results in the projects, and then each individual project can be evaluated individually on whether or not it's met goals and objectives for the project. If they are ultimately to produce data, which are hopefully useful at some point, perhaps in a stock assessment or something, then that would become, perhaps, the SSC, again, looking at it or something, to determine that, yes, that project produced data which are useful. It's different levels of this, but I think we're evaluating both the program and the project.

MR. CONKLIN: I think that's the ultimate end goal, is for these to fill gaps and produce useable data to go into a stock assessment, and so that would be my measure of success, but, other than that, the rest of it seems kind of internal, and we've got to get more participants on some stuff and get these things working for a little while and then see where we want to go.

MS. BYRD: I just pulled up -- These are the five goals that folks have kind of agreed upon, just so you guys can kind of see them on the screen, and I know we didn't go over them at the meeting, and so I guess, if this sounds like a good plan to you guys, kind of our next steps will be working with the Operations Committee to develop objectives and potential indicators of success, based on these goals, and then, once we've done that, to bring that back to you guys to look at, to see if you think the objectives make sense and if you agree upon what you think indicators of success could be, because there may be things that you guys will think of that staff won't think of and that the Operations Committee won't think of, and so to bring those back to you guys, to see if we can get kind of agreed-upon objectives and indicators of success.

Then the next step will be to develop an evaluation plan. When would we evaluate and how we would we evaluate? Who would do it? How can we get resources to evaluate, because I think, in particular -- I mean, it would be helpful on the project level, but definitely on the program level, to have someone outside evaluating the program, instead of having someone inside involved in the program do it, and it would be great if we could find some resources somewhere, or if you guys have suggestions of where we may be able to get resources or could help kind of connect us with people, or, if you think it's important that we find resources to do this, to kind of let us know.

Is the plan of us working with the Operations Team and Rick to develop objectives and indicators of success and then bring those back to you guys sometime next year, and I guess we'll have to see when it works out, kind of time-wise with your priorities, and maybe in June or something like that, or September, and does that make sense to everyone, or does that sound like a good plan? Do you think we need to run objectives and indicators of success by other groups before they come to you?

MR. BREWER: I agree with Chris. I think the number-one indicator of success would be that you produce a product that is sufficient such that our scientists can use it in not just evaluations of fisheries, but whatever the project might be, and we have the example of -- Early on, we were talking about the potential of this program being used to monitor SMZs, which I understand has been put off for a while, but, if in fact a product could be produced there that the scientists could use to say, okay, this is what we now see in these SMZs, and these are the advantages, or the things don't work, to me, that's an indicator of success, so that the data is sufficient to be used for a decision-making tool. That's my thoughts.

MR. BELL: Right, and so that would be, ultimately, you would be evaluating the effectiveness of the project, whatever it happened to be, which is a result of the program, and I think what Julia was getting at here is so here's the five goals we have right now, and, after listening to Rick and all, I think there's value in moving forward, and let's flesh-out objectives, and that's something we could do internally or with, again, working with the ops folks and all, but is everybody kind of onboard into moving forward in the means that Julia described?

Yes, Chester, that's eventually where we'll get, once we complete the projects or we have the data resulting from those, and so is everybody kind of onboard with moving forward in the way that Julia described at this point? Okay. You've got some guidance there, and I think we don't need a motion or anything, but just direction to staff to kind of carry on.

Also, if you look at the goals, and this was real clear in Jennifer's comments, but this whole program and all is about people, and it's about teamwork, and Goal 5 is to inspire active engagement through communication, and 4 is build partnerships that foster -- This only works because of teamwork and engagement of the folks that are willing to cooperate in these things, and what we're basically doing is we're taking a need, our data gaps, if you will, and we're applying and we're leveraging the interest of fishermen, be they recreational or commercial or whomever, various stakeholders, but we're taking their interests and their capabilities and their skillsets and their knowledge, and we're bringing all of this together in a team effort to make this work.

Again, the concept of it being kind of a living, breathing entity, and I've never thought of that before, but it really is, but it all boils down to people and getting people to work together to produce, eventually, the outcomes we're looking for, and so I am very grateful to everybody at all

the levels here that have participated in this to get us where we are, and, again, for Rick and Jennifer's help in this, and it's just good to know that we seem to be on the right track, and so I think it was, again, a good investment so far, and we'll just continue, and so, Julia, do we need to cover anything else?

MS. BYRD: I don't think so. Rick, did you have anything that you wanted to add before we sign-off?

DR. BONNEY: No, nothing that I wanted to add right now, but thanks for the great comments there.

MS. BYRD: Thanks, Rick. We really appreciate you taking the time to be online and present this morning, and so, with that --

MR. BELL: Okay, and thanks, Rick, for -- I guess I hope the weather improves, and you could move south. You're always welcome to come south, and we'll have another meeting. All right. Any other questions or comments at this point? I think we've run through the agenda items, and so is there any other business to come before the Citizen Science Committee at this point? Seeing none, then we will adjourn the Citizen Science Committee.

(Whereupon, the meeting adjourned on December 3, 2019.)

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Certified By: _____ Date: _____

Transcribed By:
Amanda Thomas
January 9, 2020

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
2019 COUNCIL MEMBERS

✓Jessica McCawley, **Chair**
Florida Fish and Wildlife Conservation Commission
2590 Executive Center Circle E. Suite 201
Tallahassee, FL 32301
(850)487-0554 (ph); (850)487-4847 (f)
Jessica.mccawley@myfwc.com

✓Mel Bell, **Vice Chair**
SCDNR-Marine Resources Division
P.O. Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
(843)953-9007 (ph); (843)953-9159 (fax)
bellm@dnr.sc.gov

✓Robert Beal
Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200 A-N
Arlington, VA 22201
(703)842-0740 (ph); (703)842-0741 (f)
rbeal@asmfc.org

✓Anna Beckwith
1907 Paulette Road
Morehead City, NC 28557
(252)671-3474 (ph)
AnnaBarriosBeckwith@gmail.com

✓Dr. Carolyn Belcher
GA DNR – Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520
(912)264-7218 (ph); (912)262-3143 (f)
belchersafmc@gmail.com

✓Chester Brewer
250 Australian Ave. South Suite 1400
West Palm Beach, FL 33408
(561)655-4777 (ph)
wcbsafmc@gmail.com

✓Dr. Kyle Christiansen
150 Cedar St.
Richmond Hill, GA 31324
(912)756-7560 (ph)
christiansensafmc@gmail.com

✓Chris Conklin
P.O. Box 972
Murrells Inlet, SC 29576
(843)543-3833
conklinsafmc@gmail.com

✓Dr. Roy Crabtree
Regional Administrator
NOAA Fisheries, Southeast Region
263 13th Avenue South
St. Petersburg, FL 33701
(727)824-5301 (ph); (727)824-5320 (f)
roy.crabtree@noaa.gov

✓Tim Griner
4446 Woodlark Lane
Charlotte, NC 28211
(980)722-0918 (ph)
timgrinersafmc@gmail.com

U.S. Fish and Wildlife Service
Representative
TBD

✓LCDR Jeremy Montes
U.S. Coast Guard
909 SE 1st Ave.
Miami, FL 33131
(305)415-6788(ph); (305)710-4569(c)
Jeremy.J.Montes@uscg.mil

✓Stephen Poland
NC Division of Marine Fisheries
PO Box 769
3441 Arendell Street
Morehead City, NC 28557
(252)808-8011 (direct); (252)726-7021 (main)
Steve.Poland@ncdenr.gov

✓Art Sapp
2270 NE 25th St.
Lighthouse Pointe, FL 33064
(954)444-0820 (ph)
artsappsafmc@gmail.com

Deirdre Warner-Kramer
Office of Marine Conservation OES/OMC
2201 C Street, N.W. Department of State, Room 5806
Washington, DC 20520
(202)647-3228 (ph)
Warner-KramerDM@state.gov

✓David Whitaker
720 Tennent Street
Charleston, SC 29412
(843)953-9392
david.whitakersafmc@gmail.com

✓Spud Woodward
860 Buck Swamp Road
Brunswick, GA 31523
(912)258-8970 (ph)
swoodwardsafmc@gmail.com

Rick DeVictor
Duane Smith
Shep Grimes
Monica Smit-Brunello
Dr. Jack McGovern
Dr. Erik Williams
Erika Burgess
Jocef Santiago
Dale Diaz
Dewey Hemilright
Tony Dilernia
Dr. Wilson Laney
Dr. George Sedberry
Pat O'Shaughnessy
Nick Mehta

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
COUNCIL STAFF

Executive Director
✓Gregg T. Waugh
gregg.waugh@safmc.net

Deputy Director – Science & Statistics
✓John Carmichael
john.carmichael@safmc.net

Deputy Director - Management
✓Dr. Brian Cheuvront
brian.cheuvront@safmc.net

Fishery Scientist
✓Myra Brouwer
myra.brouwer@safmc.net

Senior Fishery Biologist
✓Roger Pugliese
roger.pugliese@safmc.net

Citizen Science Program Manager
✓Julia Byrd
julia.byrd@safmc.net

Outreach Program Coordinator
✓Cameron Rhodes
cameron.rhodes@safmc.net

Admin. Secretary/Travel Coordinator
Cindy Chaya
cindy.chaya@safmc.net

Staff Accountant
Suzanna Thomas
suzanna.thomas@safmc.net

Fishery Scientist
✓Dr. Chip Collier
chip.collier@safmc.net

Fisheries Social Scientist
✓Christina Wiegand
christina.wiegand@safmc.net

Purchasing & Grants
✓Cierra Graham
cierra.graham@safmc.net

Outreach Specialist
BeBe Harrison
bebe.harrison@safmc.net

Fishery Biologist
✓Dr. Mike Errigo
mike.errigo@safmc.net

Outreach Specialist
Allie Iberle
allie.iberle@safmc.net

Fishery Economist
✓John Hadley
john.hadley@safmc.net

SEDAR Coordinators

Public Information Officer
✓Kim Iverson
kim.iverson@safmc.net

Dr. Julie Neer
julie.neer@safmc.net

Administrative Officer
✓Kelly Klasnick
kelly.klasnick@safmc.net

Kathleen Howington
kathleen.howington@safmc.net