

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

CITIZEN SCIENCE COMMITTEE

**Key West Marriott Beachside
Key West, Florida**

June 16, 2022

Transcript

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Additional attendees and other participants attached.

The Citizen Science Committee of the South Atlantic Fishery Management Council convened at the Key West Marriott Beachside, Key West, Florida, on Thursday, June 16 2022, and was called to order by Chairman Kerry Marhefka.

MS. MARHEFKA: I'm going to call to order the Citizen Science Committee. First, let's look over the agenda, and I'm looking to approve the agenda. Are there any changes or additions to the agenda? All right. Seeing none, the agenda is approved. Next is the approval of the December 2021 minutes. Any changes to those minutes? All right. Hearing no changes, the minutes are approved. The first item on our agenda today is the program evaluation interview results and next steps, and I'm going to hand it over to Julia to talk about.

MS. BYRD: All right. Good afternoon, everyone, and so Rick Bonney, who isn't able to be here with us today, but I wanted to take -- To show you his picture on the screen, so you all can see who he is before he's able to talk to us, and I know some of you haven't met him before, and I did just want to say a few words before kind of handing things off to Rick.

We've been working with him on this project, to try to establish baseline levels of information about and confidence in using the citizen science process of collecting data to help inform fisheries management, and so the idea is that collecting this information would help us kind of evaluate one of our project program goals, which is really focused on mutual learning and collaboration and engagement, and so the first step in this work was Rick completing interviews with a small group of fishermen, scientists, and managers, and so he is going to share his findings on these interviews with you guys today. His full report is Attachment 1 in your briefing book, and so now I'm going to kind of hand things off to Rick, and so, Rick, if you want to unmute yourself, and I will pass control to you now.

DR. BONNEY: Thank you so much for inviting me to be part of the meeting. I wish I were there in Key West. I am particularly missing a cheeseburger in paradise at Blue Heaven, and I hope that some of you will get over there and have one on my behalf before you leave. I am also missing on the full on Mallory's Square, but it was a long way to go, and so you're there and I'm here. There is a lot on this slide, I know, and I'm going to attempt to unpack it all. You can see that, while I am giving this presentation, I do want to acknowledge Julia, because she has been a coconspirator on all of this work.

Presumably you all know what the South Atlantic Fishery Management Council is, or you wouldn't be there in Key Largo. Presumably you all know that the council has a citizen science program, and has for about six years now, and, if you didn't know, by the time that I am done, and Julia is done, you, I hope, will know a lot about it and think that it's one of the most awesome things happening in the fisheries world, and you all know Julia, and some of you can see her, and I did want to say that not only is she a coconspirator, but she's just a wonderful ally and friend, to the point where, when I was traveling through Charleston last April, and there was a tornado warning, she invited me, my wife, and our dogs into her home to take care of us, and so it's great when people that you're working with become friends.

Some of these slides are on automatic go forward, and I will try to catch them before they do that, but, now, we are here to talk about citizen science, and a lot of people aren't really sure what it is, and the reason for that, or one reason for that, is because it's actually really kind of a lot of different things.

Here is a definition that I came up with, many years ago, which has stood the test of time and is used by many organizations, but what we're talking about is members of the public engaging in authentic scientific investigation, and so notice that word "authentic". These are scientific investigations that are designed to uncover information that we do not know already, and the members of the public who are doing this might be asking questions, and they might be collecting data, and they might be processing data, and they might be interpreting results, or they might be doing all of those, and so it's a big field, a large tent, a lot of different things that are going on within it.

There are different types of citizen science, and there are also a lot of typologies of citizen science. Well, like most academics, I like mine best, and this is a really simple one, where I like to talk about data collection projects, data processing projects, community projects, and curriculum projects.

Now, the ones that most of you are probably most familiar with are data collection projects, where members of the public are going out and collecting data about something in the environment, and these kinds of projects begin with a need for data about an environmental phenomenon, whatever that may be, and a defined protocol, so that all the participants are collecting data in exactly the same way, so those data can be combined and analyzed to advance science, and they require a willing audience. They require people who are willing and able to go out and carefully collect those data, sometimes under duress, for no money, and sometimes for not a whole lot of recognition.

The most well-known citizen science projects so far are the ones that monitor birds, and the most well-known project so far is eBird, which is a project from the Cornell Lab of Ornithology, which began in 2002, and we've now collected fifty-million checklists. In the year 2020, nearly a hundred journal articles were based on eBird data, on data collected by these participants, and these journal articles range on a wide number of different topics.

Here's one where eBird data were being used to define low-risk collision areas for wind energy development, and data from these kinds of bird projects, which have been going on since before the turn of the last century, starting with the Christmas bird count, have been used to put together the State of the Birds Report for 2019, which was based on an article published in *Science*, which shows that three-billion birds, which is about 30 percent of the birds in North America, have disappeared in the last thirty to fifty years, which is a terrifying, terrifying thing to behold, and it has led to a huge conservation effort by the lab and a lot of other related conservation organizations.

Citizen science data can be very impactful, and they can lead to lots of knowledge and lots of changes. Another type of project are data-processing projects. Most of the ones that are out there in the world right now are powered by Zooniverse, which is a platform that you can go onto and build a project, where you have a whole lot of data that you've already collected, and you need the power of the people to analyze, to sort out, to figure out what all that information means.

Data processing projects start out with existing data about an environmental phenomenon, a defined protocol, so that everybody is organizing the data in the same way, or analyzing it in the same way, and, again, a willing audience of people who are ready to put in a lot of time and effort,

again just because they want to, and they think it's fun, or they think it's going to serve a greater purpose.

I'm not going to talk about curriculum projects or community-based projects today. We don't have time to, and it's not that important right this minute for the council, but an example of one of these data-processing projects would be Nest Quest Go from the Lab or Ornithology, where we have thousands of people who are transcribing and analyzing nest record cards that we started collected in 1965 on four-by-six index cards.

That is kind of an overview of what citizen science is today, in the year 2022, but how does this relate to the council? Well, the council has a lot of management issues, and you're all gathered there for a week right now to discuss many of them, and, in some cases, until your eyes bug out, and one of the issues you have is that you're managing at least seventy species, through seven fishery management areas, and you have diverse and geographically-variable species, and you have diverse and geographically-variable habitats, and you must prevent overfishing, but there are limited resources to support data collection, and so this brings up the question of is citizen science a partial answer to gathering more data that can be used to supplement the data that are already being gathered by scientists, and others, to try to inform fisheries management.

Well, fishermen are knowledgeable observers, just like birdwatchers are, and they have many, many eyes on the water, and lines in the water, and sometimes nets in the water, and this builds on cooperative research, which is research that's been going on in the fisheries world for quite a long time. Scientist and managers generally support citizen science, and I will get into that a little bit more in just a couple of minutes, and fishermen are eager to participate, or do scientists and managers support citizen science, and are fishermen truly eager to participate, because those are things that we thought were true in 2016, when we had the first citizen science program design workshop in Charleston, under the auspices of the council, where the program was formed.

The idea was there are all these eager fishermen, and scientists and managers do support this effort, and so nearly seventy-five people came together, in Charleston, to discuss citizen science and look at traits of successful projects and to have themed breakout groups, and also to eat the amazing food that's available in Charleston, and I was invited to that meeting, to give the keynote address, and the reason for that is not because I know very much about fish, which I actually don't. I know how to clean them and eat them, and I know how to catch smallmouth bass, but, when it comes to the ocean, I really don't know all that much.

What I do know a lot about is citizen science, because I've been working at the Lab of Ornithology for over forty years, and I cofounded its citizen science program, and so I was invited to come to that meeting and present a talk called, "Fish are Just Like Birds".

In other words, can we take what we've learned from ornithological citizen science, which, as I pointed out, has been going on for over a hundred years, and apply it to the bird world, and, at that meeting, there were lots of presentations, and one of my coconspirators, Jennifer Shirk, and I presented information about how to successfully design projects, and I even concluded that maybe it would be possible, someday, to have something like eFish, based on eBird, and we all went away very energized and excited about the future of citizen science in the ocean, and you all authorized the program, the council to start a citizen science program, and it was started up with its first director being Amber VonHarten.

Between 2015 and 2018, this program was formed, and along with a vision statement and a mission statement. Now, the mission statement is to build and maintain a program that improves information for fisheries management through collaborative science. Okay. The vision statement says to advance science and increase trust, one project at a time.

Now, get that. Advance science and increase trust. Increasing trust among the fisheries community and the folks that are required to manage it, that's hard. That's hard to do, particularly when you have a resource upon which some people depend for their livelihood, and that's something that is very different from ornithology, because bird watchers are not depending on eating these birds and catching them to make a living, and they're not worried about reporting data and how it might be used against them. Now, I'm not saying that fishermen are worried about that either, and I'm not making that statement, but it's a possibility, isn't it?

We had a vision statement, and we had a mission statement and four goals, and these goals also were backed up by objectives, and that's really important, that there are four goals and four objectives, because you can't figure out if the program is successful without goals and objectives that we can look back to and say did we do this or did we fail, and the first goal was to design, implement, and sustain a program framework to guide the development of projects that support fishery management and decision-making.

This is a way bigger deal than it looks. To design a framework to guide the development of projects. To the best of my knowledge, no group in North America has ever done this before. Yes, there are hundreds, if not thousands, of citizen science projects, but they're not guided by a framework, an overarching framework, and the council decided that it would do that.

So we put together an oversight board, or Operations Committee and Advisory Committee, and we came up with A-Teams, and those A-Teams went to work, and they came up with a whole lot of really, really good guidelines and templates that could be used to develop projects. Again, I have never seen this done before. In fact, we were able to publish this in the journal *Bioscience*, because of its unique nature, and, when I lecture to other groups, particularly other management agencies, like the Fish and Wildlife Service, I always say that you need to do this, and you need to have these inventories and these templates, and, guess what, you can use a lot of the ones developed by the council. Even though they were developed to look at organisms down in the inky darkness, you can still use them on land.

Also, the council came up with citizen science research priorities, which were just updated last December, and these are priorities that members of the council believe could be addressed through citizen science that would gather badly-needed data, and I'm going to come back to this.

The second goal was to facilitate development of individual projects to address specific research priorities, and that has been done. It was, as I said, started by Amber, and then, when she moved to a new job, Julia very ably took over and was instrumental in starting what's now called the SAFMC Release and FISHstory. Now, the SAFMC Release project is a data collection project, and FISHstory is a data management project that so far looks to be really quite successful, but I'm not going to talk about it now, because Julia will later, and so these two projects were started, gotten off the ground, and, in the case of FISHstory, actually the first stage is completed. Awesome.

What about this Goal 3, to ensure that data are collected by projects are accessible, robust, and fit for purpose, and what about Goal 4, fostering mutual learning, collaboration, and program engagement? Well, how are we going to know whether those goals are being met? Well, first of all, it's going to take time. You can't do that in a year or two or three, and it could be five years, or it could be ten years, before the data collected by these projects are actually usable, and possibly even in stock assessments.

How would we know whether mutual learning and collaboration and program engagement are happening without knowing where learning is now, where knowledge is now, and what kinds of collaborations are taking place now, and how are people engaged now, and we need to know that now, so that, again, in years down the road, we can look and say now what's happening, and can we compare it to 2022 and see if progress has been made, and are we advancing science and increasing trust, one project at a time?

This requires program evaluation. Program evaluation is really, really, really hard. Project evaluation is not that hard. Looking and seeing about the success of the SAFMC Release project, or FISHstory, is not really that hard. We can look and see are the data usable, how many people participated, what did they learn from it, but evaluating the entire program -- That's a really challenging thing to do, and, in fact, to the best of my knowledge, no program in North America has ever tried to do this, no citizen science program anyway, and so not only did the council break new ground in coming up with a framework, but they are also trying to break new ground in coming up with a program evaluation.

Since 2016, and, in 2019, I had made an attempt to retire, and I am actually formally retired now from the Lab of Ornithology, and I've been working part-time for a while, and Julia called me, and she asked me, very beseechingly, if I would come out of retirement and try to work on program evaluation, and I said, I don't know, Julia, it's really hard to do, and nobody has ever done it before, and I don't know, and she said, please, and please won't you help us, and so I said, okay, we'll give this a shot, because there isn't really a right way, necessarily, to do it, and nobody has done it before, and, if you really screw it up, nobody will even know we screwed it up, because we don't have anything really to base it on.

We came up with the idea that we would begin by gathering baseline data on knowledge, attitudes, collaboration, engagement, and trust levels of various stakeholders in three stages, these various stakeholders being scientists, managers, and fishermen, and we would do this through interviews, a few Zoom interviews, and you might think, well, how can we get information out of just a few interviews, and, well, first of all, if your sample is relatively homogeneous, you can learn a lot from just a handful of interviews.

If everybody is kind of saying the same thing, you can have some real confidence in what they're telling you, but these were not -- These interviews were not designed to be the be-all-end-all anyway. They were designed to get some information that would help us to develop online surveys that we would put out to these different groups and get hundreds and hundreds, if not thousands, which may be really hard, of data back, so that we could really understand what's going on with these audiences.

Then the third stage would be to implement that survey and to analyze the data, to figure out what we've learned from it, and then to put it aside to compare against later, and, so far, I have completed interviews with six fishermen, six scientists, and six managers, and I'm going to show you the results of those, and I want to point something out, is that, you know, to a certain extent, scientists are scientists, and, to a certain extent, managers are managers, but fishermen are not fishermen, because we have commercial fishermen, and we have charter boat captains, and we have recreational fishermen, and it could be argued that we really needed to do interviews with all of those individual groups, and probably other ones that I'm not even thinking of right now.

What that means is that the data that we've collected so far from the fishermen are not really enough to make any broad generalizations, but they're still interesting, and we have begun to draft survey questions for more in-depth surveys, based on those interviews, and so what did we find so far?

I did the eighteen interviews by Zoom, and they took from thirty to forty-five minutes each, and the people who were selected to be interviewed were all names that were provided by people who are on the Citizen Science Operations Committee, other members of the council, and what we did is we looked for people who had been recommended multiple times in these three different categories.

That's how we decided who these folks would be, and, yes, there's a lot of gray between scientists and managers and between managers and fishermen. There are fishermen who become managers, and some of them are sitting in the room right there right now, and they started as commercial fishermen and became so knowledgeable that they became integral to the council's process.

All those interviews were done by Zoom, and they were confidential. Only Julia and myself are able to see those data, by the agreement we have with the institutional review boards of Cornell University and the College of Charleston. All of the interviewees, in all of those categories, were highly experienced. They were mid to late-career people. Nearly all were familiar with the council, with the stock assessment process, and how data are used to inform management decisions.

That's kind of to be expected, because of the nature of the way that we got the names, and, honestly, it would have been good if we had tried to get some folks who had a little bit less experience, but we can do that moving forward, and most of the fishermen have been fishing essentially all of their lives. Three are commercial fishermen, two are charter boat captains, and one is a recreational fisherman. That's not enough information yet to make large-scale findings, but it's still really interesting, and so what were some of the key findings?

Well, opinions on the health of the fishery, of the South Atlantic fishery, were really quite varied, and why wouldn't they be? You really can't answer that question, and there are so many species, so many habitats, so many different states, and so you're going to have to really answer that question pretty much region-by-region and species-by-species, but, to generalize, and you all have a copy of my report, with more information than I'm giving you here, and most scientists felt that many species are declining and in poor health.

Managers tended to feel that fish stocks were doing better than scientists feel they are, especially species that are most actively managed, which is really good. If that's true, then that means that

management is working, right, at least to a certain extent, and we also know that in the bird world, by the way. When you go back to that report about the 30 percent of birds that have disappeared in the last thirty to fifty years, there are others that have increased, including almost all of the waterfowl. Why? Because there is a waterfowl management plan, which is financed by sales from duck hunters, and so management really does work. If you guys didn't believe that, you wouldn't be on the council.

Fishermen were the most pessimistic about the health of the fishery, with all but one stating that it's getting very hard to catch fish. Now, remember, these are folks that have been doing it for decades. The fishermen used terms like "depleted resources" and "depressed", and one of them said that, when he talks to fishermen his own age, he just ends up crying every single time, and I was really, I would say, almost shocked by talking to these six fishermen and just how depressed they were. I also wanted to say that all eighteen of these interviews were fun, interesting, and enjoyable, and I felt like I had become friends with each one of these people by the time the interview was over. Nobody held back, and everybody was honest, and it was really a wonderful opportunity to talk to folks, but talking to the fishermen was kind of depressing, and I've got to be truthful.

Now, regarding the sufficiency of data available to support fisheries management, these are the data that you are all using now to make management recommendations, and scientists tended to feel that sufficient data are available right now, especially for species that receive stock assessments, and only one of the six scientists strongly felt that more data are needed, and that's kind of fascinating, because I was brought into this project, back in 2016, with the idea that everybody felt that more data are necessary.

Managers were the opposite. They were unequivocal that more data are needed. Only one manager said that sufficient data are available, and there only for some species, and one of these managers said to me, more data, yes, we need more data, and what we're trying to do now is like trying to run a Porsche on a lawnmower engine, which became my favorite quote from all of the interviews, and, if I ever publish this, that's going to be title of the article. By the way, I've already gotten permission from that particular interviewee to use that quote.

The fishermen mostly felt that more data are more needed. Four said that more data are needed, and one stated that scientists rely too much on modeling, and another said that scientists and managers need to obtain more data from fishermen, as they are the experts on the water. I have no doubt that fishermen are experts on the water. I don't think that all fishermen understand things like random sampling and effort and how that goes into doing modeling, and I don't know whether scientists rely too much on modeling, and I know how we use modeling in the bird world and how well it works, but that was still, nevertheless, interesting findings.

Considering familiarity with citizen science, the scientists were generally familiar, but not particularly engaged, and so they knew what it was, and four had never engaged with citizen science projects or data at all, which is kind of interesting, to think about how they might have an opinion about citizen science without ever being part of a project, or even looking at the data. Managers were more involved than scientists, and three have participated in at least one program, and those were not all council programs either, and so they tended to be fish tagging projects, for the most part, but not things that the council was doing.

The fishermen were actually the most engaged, largely with council projects, and five of the six had participated in some way. Some of them advised on projects like the SAFMC Release, when it was called Scamp Release, and some of them had collected data, and some of them have looked at the data, and so the fishermen were the most engaged, but, considering familiarity with the council's citizen science program, all the scientists were at least passingly familiar.

Three knew about its goals and objectives, two had advised on current projects, but none of them were familiar with that amazing, awesome list of research priorities, which I keep telling every other agency, like the Forest Service and Parks Service, and, when I say telling them, I have a contract with that interagency group to help them develop citizen science programs, and I work with them, and I've been working for years, and I've been telling them this for a really long time, and, yet, as much as I tell people you've got to do this, not a single one of these six scientists even knew it existed.

Most managers did not know specifics about the program, and, again, none were familiar with that list of research priorities. Most fishermen were familiar with some of the specifics, and, as I pointed out, some had gathered data, and one was familiar with the list of research priorities. Finally, I found somebody who knew about it, one out of the sixteen people, but that person called it a bit -- Actually, what that person said was, you know what, honestly, Rick, it's kind of a fairy tale.

Now, support and faith in citizen science, all the scientists were generally supportive, but they stressed the need for sound project design and offered many caveats. This is not surprising, is it? Scientists are going to say, well, wait a minute, you're going to have fishermen collecting data, and, well, that project has to be designed very, very carefully, and you have to have sound protocols, and you have to make sure that people are collecting data in the same way. We would expect those caveats from the scientists. The only thing that can happen there is you can bristle a little bit and say, well, of course we're doing that, and look at what the council did, starting in 2016, by coming up with all these data management supports, and of course they're doing sound project design, but you've got bite your tongue, and you've got to wait for the data to prove their value over time.

Managers were very supportive. Four stated that fishermen would be able to collect a great deal of useful data, but, and this was, again, a little bit almost scary and sad, to me, and the fishermen, who are the ones who are going to be collecting the data, did not seem that optimistic about the utility, or the uptake, of the data, and many of them felt that scientists and managers wouldn't use it, or wouldn't trust it, and two felt that fishermen mostly won't participate.

Sometimes you hear, well, especially for commercial fishermen, they're too busy catching fish to try to collect data, and I get that. I understand that. Even for me, trying to do eBird, sometimes I just don't feel like I have time to do the reporting of the stuff that I'm collecting, because I have so many other things going on, and I get it.

Okay, and so that leads me to a few conclusions and thinking, once again, about how fish are just like birds, and these conclusions are things that Julia and I have been talking about every day for the last few days, including this morning, and I made my last changes to these slides a couple of hours ago, and so there are so many things that we can conclude here, and there is so much information to think about, but here are a few initial conclusions.

First, scientists need to be convinced that projects have sound design and that their data are truly needed. This will happen with more data and more publications, just as it has in the bird world. When I first came up with the citizen science program at the Lab of Ornithology, over thirty years ago, we were in the same place, where people said we can't collect and we can't trust those data, but now look.

In 2020, ninety-three journal articles published with eBird data, and some of those were in journals like the proceedings of the North American Academy of Science, *Bioscience*, *Ecology*, and so it will happen, if the projects do have sound design, as more data are collected and publications get out there.

Managers need to be convinced that scientists will use the data, and what we need here is to show citizen science success stories back to the managers, saying, look, we've collected data with citizen science, and it's made these small, incremental changes, and we need to do more, and that's how it worked in the bird world, but it's just that we're thirty years, or more, ahead of the fish world, and fishermen need to be convinced that scientists and managers will use the data, and this is critical. It's absolutely critical, because, without the fishermen collecting data, there's no citizen science program, and this is going to take some time, but showing examples of how data are used will help, and getting regular feedback to the fishermen participants is critical.

Even more important is this fishermen audience needs to be studied in much more detail than I've been able to do with a very, very small contract and six interviews. We really, really need to know who this audience is in detail, and we need to be doing more of an audience assessment, and, you know what, this happened with eBird, because back, again, when we started this, a couple of decades ago, we thought, if we build it, they will come, and we put out that eBird database, and we didn't get that many people reporting data, until we started audience assessments and asking people what they wanted, and, you know what, in the case of the birdwatchers, they didn't care that much about advancing science.

Some of them did, but mostly what they are interested in was a way to keep their records, a way to look at their yard lists, their office lists, their vacation lists, to compare them over time, to compare them with their neighbors, and they wanted a free way to keep all this information online, and, once we provided to that them, with a million bells and whistles, they started using it, and then we got enough data to base analysis on.

Are fishermen a willing audience? If not, why not? How can they become willing? All of this information needs to be known, and, as I pointed out before, fishermen are actually at least three audiences, right, and we need to do more interviews with members of each of those audiences, especially younger individuals, who haven't been on the ocean for thirty, forty, or fifty years, who might be more optimistic.

Deploying online interviews to scientists and managers should not be challenging, and so, once we develop our survey, and I don't think it's going to be hard to get it out there to scientists and managers and get a lot more data quickly, and see whether they corroborate what I've learned so far, and these folks were easy to reach and to schedule on Zoom, but deploying online interviews to fishermen, especially commercial fishermen -- I shouldn't say could be challenging, but I should say it will be challenging. They were hard to reach and to schedule on Zoom. I have, in the past,

talked to a couple of commercial fishermen, and I can hear the boat motor, because when else do they have time to talk to me?

We need research into the needs and the desires and the motivations of fishermen, and this will require funding. We need research into how to reach the fishermen audiences, right, and are we going to have to actually take the survey and call them on the phone, go out to the boats, go out and walk the docks, and what is it that we're going to do to get this information from these folks?

That's going to require funding, and eBird also got off to a slow start, until we understood the needs and desires and motivations of birders, and so this isn't new, and it's not anything that we couldn't have predicted, I don't think, and, in general, significant investment into the council's citizen science program is going to be required, if it's going to be successful in meeting its mission. Now, that's a double-edged sword, right, because I'm going to tell you that you need to put more money into this program, and nobody has enough money, but there's just too much opportunity here.

There are so many people who are eager and optimistic about it, and I think, if some of this research is done, and these data are collected, this program can be really, really built up, but, right now, it's just Julia and an assistant and me helping, mostly, honestly, in-kind with the salary that I've gotten from the Lab of Ornithology part-time over the last two years, which ends in two weeks, and so there is definitely some investment that's going to be needed here, and I don't want to scare anybody, but I want to point out that eBird has a couple dozen staff and an annual budget of a couple million dollars, and I'm not saying that this program needs that, but, when we start making comparisons, and when people start saying to Julia, well, why don't you look eBird looks, a lot of it is just greenbacks. It really comes down to that, because Julia is absolutely capable of building a topnotch project here.

I think that is my last slide, and I've already said this, but I think there's enough enthusiasm out there that these investments would be well worth making, and that is my last slide, but we did publish the results about how this program has gotten started in *Bioscience* last year, and that was a great start in the right direction, and I hope we'll be publishing way, way more articles, in the future, about the success of the council's citizen science program. I hope people are still awake and ready to discuss this a little bit, and I will turn it over now to Julia.

MS. BYRD: What I was going to say is I think, first, I wanted to see if you have any questions for Rick about all the information that he presented, and then we can talk a little bit about kind of next steps in this evaluation process that we're working on with him, but, first, it's probably good to see if anyone has any questions. Are there questions for Rick?

MS. MARHEFKA: Go ahead, Dewey.

MR. HEMILRIGHT: What was your second-favorite saying from a fisherman that you heard?

DR. BONNEY: My second-favorite saying from a fisherman? Well, there was the one that's in the report that I realized that I should probably have not put in the report, because I forgot how it would become public, but it was the one about -- I shouldn't say this, but it was the one about how most recreational fishermen don't know to find bait, and so how are they going to collect usable data? That one really showed me that people were being honest with me.

MS. MARHEFKA: Let the record show that that was someone saying that and not anyone in this room. Dewey, go ahead.

MR. HEMILRIGHT: All right. My last question is how about your third-favorite saying that somebody said?

DR. BONNEY: I don't know. Well, here's my third-favorite one, and it was also fourth, fifth, sixth, seventh, and eighth. So many folks, and not just the fishermen, but everybody said, look, I'm located here, or there, or wherever, and, please, next time you come by, get in touch with me, and let's go out and have a beer and talk about this some more, and I just love that.

MR. HEMILRIGHT: That wasn't the one, but thank you.

MS. MARHEFKA: The good news is anyone who was sleeping is not sleeping now, and so thank you two for that exchange. Go ahead, Laurilee.

MS. THOMPSON: I have a comment, because I am very familiar with eBird, because my birding festival was twenty-five years old, and the birding festival rose in conjunction with eBird, and I had a lot of eBird speakers, and, in fact, Dr. Fitzpatrick was one of my keynotes one time, and this is really exciting to me, because I watched eBird go from a what-on-earth-is-that to just a phenomenon, with millions of birders around the United States keeping track of their lists, and I don't know if fishermen have county lists for the fish they catch, or state lists for the fish they catch, but I could see where this could be really, really exciting.

One of the biggest people that could help get this launched was in the room last night, and that was Blair Wickstrom from *Florida Sportsman*, and I asked him, because -- Tom and I were just talking about this, and this is so important, and people have to feel like their input is appreciated and is going to be used, that it's going to be valuable, and that was one of the beauties of eBird, because the people that -- In addition to having the ease of keeping all of their lists straight, they knew that the data they were inputting was going to be valuable, and that's what we have to do. We have to help Julia make this program appreciated by the fishermen, and make them feel appreciated, and know that their work, and their input, is going to matter. Thank you.

MS. MARHEFKA: Dewey.

MR. HEMILRIGHT: I think one of the best ways, and given my experience of this, is when you see a project from start to finish and you see how it's used in a management process or a stock assessment. It's like building the house, and, when you're finished building, here's the keys to the house, and you go in and stuff putting your stuff there, and so, for me, it's -- Not that I don't have -- Not that it's not good to begin with for different things, but, on certain things, it's how you take a project, whatever it may be, from start to finish, and the end result -- I know, from reading a lot of things, it seems like, for scientists, their high thing is getting their article published for a publication. For me, as a commercial fisherman, it ain't the publication, and it's how it's getting used in a stock assessment that's going to show that I can catch more fish, or whatever the results are, to show that.

I think that's where you -- For a commercial fisherman, I think that's where you have the biggest bang for the buck to buy-in. You know, you've got all types of citizen science folks that do it because they're retired, or different things, or they like it, and they're on the water, and, as many of the things that I participate in, it's because I knew there was a deficiency there, and it was cooperative research or something, and I was getting paid to do it, in cooperation, but it's to show the end result that could be used to further something that was not there, or lacking, but I think there is merit in this, without a doubt, but it's how to get the attention, where folks have the buy-in.

You know, fishermen -- If you've been in it long enough, you're bred to be pessimistic, without a doubt, and, if you're optimistic, either something is wrong with you or you just haven't been in it long enough, because you're cultured that way, without a doubt, but that's just my thoughts.

MS. MARHEFKA: Thanks, Dewey. Spud.

MR. WOODWARD: Thanks, Rick. I want to go back to something that you mentioned at the beginning, and I think it's really probably the most fundamental challenge we face, and that is, with birding, you pointed out the fact that there was no real threat of negative consequences for a person's involvement, but we're operating in an environment where we're asking people to contribute information that may be used to restrict or, at least in their opinion, negatively affect their livelihood, or their enjoyment of life, and a variety of other things, and that, I think, puts a particularly difficult slant on this subject for us, and I will just give you an example.

I have heard, personally, from some folks that were actively engaged in donating red snapper carcasses, and, over the last year or two, they've just become angry, and they just said I'm not going to do it anymore, and, unfortunately, it spills over to other species, and, I mean, an individual pointed out -- He said, I've been asked to give cobia carcasses, and, well, you know, they blankety-blanked us over red snapper, and I'm not going to give them any cobia, and, I mean, it's unfortunate, and you try to explain to them that, in the absence of information, we typically slant towards being precautionary and risk-averse, and so what are your thoughts? How do we deal with that? I mean, that's just such a fundamental challenge that we face in the citizen science arena in supporting regulatory functions.

DR. BONNEY: Yes, and that really is the biggest question, I think, and I actually asked most of the people whom I interviewed specifically whether they considered that a problem, an issue, or a threat, and most did not. I was surprised about that, but many said, you know, most fishermen would not know how to game the system. They wouldn't know if they should say there are more fish here, or there are fewer fish here, because they don't really know how the modeling is going to be used, and I only found, I think, one person, and I could go back and look through all my notes, but I think I only found one person that said they thought that was really going to be an issue.

The fishermen mostly said, if we don't collect these data, then it's all over, and our kids aren't going to have any fish, and there's just not going to be anything left, and so, even if it does get, quote, unquote, used against us, so be it, and it's over. There's really not a whole lot we can do about it, but I think, if we were able to do more interviews, and more research, that that would be one of the fundamental questions to dig into.

MR. WOODWARD: Thanks. I wish we had a cloning device for the six fishermen that you interviewed, because they are definitely most optimistic than some of the folks that I've talked to, but that's good. That is encouraging, but I also noticed that, you know, in the report, it talks about there was a concern that, you know, even when collected, it wouldn't be used, and so I think we do have a challenge, and I think, the earlier that we can produce some sort of tangible, positive result from a citizen science initiative, the better off we're going to be in trying to at least build some support, so that you have peer-to-peer validation of this process.

MS. BYRD: Chip just reminded me, and a little bit to that, just to mention that Sean Simmons, who is with Anglers Atlas, and he runs a citizen science program, will be presenting at the July webinar, and, through kind of some work that he's done, and he has published, he compared data collected through his Anglers Atlas app with a variety of different kind of monitoring programs, and he's based in Canada, but I just wanted to mention that as something that you all might be interested in tuning into.

MS. MARHEFKA: Other questions or comments for Rick? Rick, I've heard that twice, and I find it very fascinating. I have to say that people's answers weren't what I would have predicted, in some cases, and, when you do this long enough, you think you kind of -- In your head, you think you know what people are going to say, and you presume it, and I think it was eye-opening for me to know that you shouldn't be making those presumptions about what other people are thinking, and so that was helpful for me. Dewey.

MR. HEMILRIGHT: I was wondering, Rick, and, if a fisherman reached out to you, could you maybe forward the comments that he made during the interview, for recollection of his memory, if that would be possible, and I'm serious about that, because I took part in your interview, and I would just like to see what I said, if that would be possible.

DR. BONNEY: Yes, absolutely. I have notes from all of the interviews, but, as you will recall, they were all recorded, and so, actually, if you want to, I can send you the recording. How would that be?

MR. HEMILRIGHT: That would be good, if you would, because I'm interested in -- I might have had a bad day or something, but I'm just trying to see how my memory is doing. I appreciate it. Thank you.

DR. BONNEY: Yes, and that's no problem. Anybody -- As I said, this is all confidential, but anybody who wants to volunteer that they were part of it is absolutely welcome to do so, and so sure.

MR. WOODWARD: You might want to include me in that, too.

MS. MARHEFKA: Laurilee.

MS. THOMPSON: So is the ultimate goal to create some kind of a massive database for people to report their fishing experiences, the same way that there is eBird, because I know that there's a whole bunch of different fish reporting apps that are out there now, and, if we're not going to try to create one big database, is there software that's available that we could mine the information

out of the different fish reporting apps that are out there and consolidate it into one database that would be usable by the SSCs for stock assessments?

MS. BYRD: I guess I will answer that in a couple of ways. For our program, what we're trying to do is fill specific data gaps that you guys have helped identify as research priorities for the council, and so, for instance the Release project is trying to get more information on the length of discarded fish and information that helps us better understand how many released fish survive, and we're doing that through an app called SciFish.

Then the FISHstory project is hoping to fill in information on kind of historic for-hire fishing before catch monitoring programs were in place in the region, and so different projects kind of have different goals or objectives, but I will say that the app that we've developed, or are developing, called SciFish is an app that can house multiple citizen science projects, and all of that data will go to ACCSP, and the thing we're doing now is we're trying to develop kind of a project builder tool that will allow you to build an app on the fly, based on certain data fields, to try to make sure that any projects in SciFish that are collecting similar types of data are doing it in the same way.

If you're collecting length, you're collecting length in the same way, and then all that data will go to ACCSP, where it is readily available for folks anywhere, but that's where a lot of folks in our fisheries community on the Atlantic coast get data, and so you could get it in kind of combined data from different projects, if that's appropriate for whatever kind of your end goal is.

I will say, as you mentioned, Laurilee, there are a ton of apps out there that different fishermen use for -- You know, iAngler, and MyFishCount was one that the council helped develop, and so I don't know of any active efforts right now of someone trying to kind of scrape all the data and put it together, but I know that, for like the upcoming gray triggerfish stock assessment, some people are investigating what data are available for that species from some of these different programs, and so that's kind of a long-winded way to answer your question, but hopefully it did.

MS. MARHEFKA: Anything else for Rick? If not, I'm going to pass it over to Julia, and we're going to talk about sort of next steps and where we're going from here with this.

MS. BYRD: So kind of the next steps in kind of our work with Rick was to -- We used these interviews, and now we want to use kind of the information gained from the interviews to do kind of a broader survey, so that we can see if some of the kind of trends he found in the small sample size are reflected in the broader community of kind of scientists and fishermen and managers along kind of the South Atlantic region, and a couple of things that Rick mentioned, in particular, and I think we have a lot more work to do to better understand our fishermen audiences.

We met with our Citizen Science Operations Committee last month, to try to begin developing survey questions, but some of this work we have been doing with very limited resources, and we have a very small contract with Rick, and so how we're able to do these surveys is dependent on the resources that are available, and, last week, I was sharing information on this project with Russ Dunn at NOAA Fisheries, and some of the other recreational coordinators, and I was just telling them a little bit about the project, and they mentioned that they heard some of these kind of common themes come up at the recent recreational fishing summit, and Russ very generously has found \$25,000 that they are willing to share with us to put towards kind of continuing on with this

work. We are thrilled about that, and we're trying to kind of outline, now that we have the possibility of having more funding, what that means for how we're going to be able to kind of implement this next step.

MR. CARMICHAEL: The \$25,000 goes a long way, but it won't probably cover the important part of it, which is reaching out to individual fishermen in particular. You know, we think we can do very good with the kinds of people who are likely to take part in say an online survey, and so managers and scientists and fishermen who are on our advisory panels and others that we're kind of engaged with, who are more active across the board, but it's really important to reach out to people who aren't as familiar with us, that aren't as involved in our processes, to see what they've heard about this program and their attitudes.

What I would like to do is make available another \$25,000 from council funds to try and expand this, and so to basically match what NMFS, what Russ, has put in and offered to us with council funds as well, to even expand the program further, and so, you know, we looked at the budget, and we can handle that, and I just wanted to make sure that you guys were onboard with spending that.

MS. THOMPSON: One of the things that they did to help with eBird was to go to a bunch of birding festivals, and so are you thinking about going to some different fishing shows, like the Miami Boat Show, and talking to people face-to-face at trade shows?

MR. CARMICHAEL: We probably haven't gotten that far on this particular project, but we do stuff like that regularly, as part of our outreach, and so we always try to bundle as many things as we can in any opportunity.

MS. MARHEFKA: That's exciting, and so there is \$50,000 right there for next steps, and so that's really great. I don't see anyone -- I don't see Kelly frantically waving from Mel and saying no, and so very cool. Very cool. Thank you.

MS. BYRD: Thank you, guys, very much, and so I'm really excited to kind of continue on with this work, and so, now that we have more resources available, thanks to kind of you all's generosity, and NOAA Fisheries and Russ Dunn's generosity, we're going to get a gameplan together of what that means, as far as kind of designing and deploying this survey, and so more to come in the upcoming, I guess, months and maybe year, or years.

Anything else on this subject, or anything else for Rick Bonney, and I would also say, Rick, thank you so much for being here with us and doing this work and sharing the findings from the interviews. I, much like Kerry, thought it was fascinating, and there were a lot of things that surprised me, and then also a lot of things that kind of supported some perceptions that I had, and so I think it's really fascinating work, and I'm excited to continue it, and so anything else for Rick Bonney?

MS. MARHEFKA: Dewey and then Laurilee.

MR. HEMILRIGHT: I just had a question for you. How about -- Does funding have to come from internal, or can funding come from the public on a specific project or anything like that? How does that work, about you all accepting money from out in the public?

MS. BYRD: Because we are a council, we can only accept money from NOAA, and so there are a few grant opportunities that we are aware of that we can apply for, and like ACCSP has an RFP that we could potentially get funding for, and we got some money for FISHstory from a NOAA Fisheries information system, but, right now, we can't accept donations or things like that. We are working with Monica and folks at the Atlantic States Marine Fisheries Commission to try to set up an MOU with them, which could give us much more flexibility in how we're able to fund the program. We would be able to apply for more grants, and we could potentially look into things like donations and things like that, if that goes through, but it's been slow moving. When Amber was here, she was trying to do that too, and so, right now, we're pretty limited.

MR. HEMILRIGHT: So, even going with Atlantic States, you still -- You're not looking into the future that you're going to be able to take any public donations on anything you do, and it's all got to stay through the system, or grants, or anything like that?

MS. BYRD: I guess, John, you may be better to answer that.

MR. CARMICHAEL: We're not in a position, without a change in federal law, to allow us to take donations to support this program. I do think there is a program that's out on the West Pacific that was set up like that, and it was created under Magnuson, and so it would take someone essentially adding a provision to Magnuson to allow that to happen, which is probably a long, long ways off.

MS. MARHEFKA: I have Laurilee and then Chester.

MS. THOMPSON: I just wanted to comment that I'm on the Cornell website, and looking at Rick's bio, and, in his list of recent publications, ours is the very first one. Good job. Good job, Rick.

MS. MARHEFKA: Chester.

MR. BREWER: I remember, and it's been years ago now, but we had some conversations about how to perhaps be able to funnel monies that were donated, or raised in other ways, not directly to the council, but to some sort of a foundation that was closely affiliated with the council, and, in that way, we probably -- We could find a way to not run afoul of rule that you're talking about, and did we ever -- Was that ever fleshed out, or pursued, and -- Well, I will just ask it that way, and was that ever pursued?

MR. CARMICHAEL: It was, to some extent, and the agreement with working with ASMFC as a fiduciary partner seemed to be a more promising avenue, at this point.

MS. MARHEFKA: All right. Thank you, Rick, for your time, and we really appreciate it, and we look forward to following this through a little further with you. The next item on our agenda is for Julia to talk to us about FISHstory.

DR. BELCHER: Before we get started, Kelly, did you have to do the reset? It's 3:40.

MS. MARHEFKA: Okay. Like a hard five, you all. Do not leave this room.

DR. BELCHER: A five-minute break, and just pay attention to the clock while he resets.

(Whereupon, a recess was taken.)

MS. MARHEFKA: All right. If everyone can come back to the table, our internet is reset, and we can reconvene. The longer we delay this, the later we have to stay tonight, says me. I will take the blame for it. No margaritas for anyone until everyone gets to the table. All right, and so we left off with Julia giving -- She's going to give us highlights on FISHstory, and so, Julia, go ahead.

MS. BYRD: All right. Thanks. We're just going to share some highlights from our FISHstory pilot project with you guys, and I know many council members -- You all are kind of familiar with the project, but I do want to give kind of a little bit of background information, just in case there are folks in the room, or listening on the webinar, that aren't as familiar with it.

This is the project where we're using historic photos to try to document for-hire catch and length estimates for kind of a historic time period before catch monitoring programs were in place for that sector here in the South Atlantic, and, for those you that know Rusty Hudson, he is a huge part of this project, and the picture in the middle of the screen is a very young Rusty with a red snapper.

The first thing that I wanted to say is that the FISHstory project was truly a team effort, and it wouldn't have been possible without so many amazing partners and volunteers from our FISHstory design and validation teams, to our length analysts, to the Zooniverse volunteers and outreach partners, and NOAA Fisheries providing some funding for this, through their Fishery Information System grant program.

I did want to give shoutouts to a few specific people, and the first is Rusty, who so generously donated and digitized all of his family's fishing photos, which are really the heart of this project. Ken Brennan, who is with the NOAA Fisheries Beaufort Lab, he worked with Rusty, over several years, to try to put together a project to analyze these photos. Amber VonHarten, who had the idea to take a citizen science approach to help analyze these photos, and Allie Iberle, who was our FISHstory project coordinator and did a ton of work developing the project and coordinating the project, and then, also, there are several other council staff that help, and particularly Chip did a lot of the heavy-lifting on the analysis piece of this, and so I just wanted to kind of acknowledge all of the folks who were a huge part of this project.

The FISHstory project has three components, which I know you guys are familiar with, and the first component is we wanted to digitize and archive a set of historic photos, and so, through the pilot, over 1,370 photos were digitized and archived. The second component is we were trying to collect information for for-hire catch, and we used the online crowdsourcing platform Zooniverse that Rick talked about a few minutes ago, and so, through the project, we had over 2,100 volunteers that made over 35,700 individual classifications, and so that's individual kind of counts of species, or fish, within the photos.

We also had a validation team that reviewed 180 photos, and I'll be talking more about them in a few minutes, and then the third piece was we wanted to develop a method to estimate length of fish in the photos, and so we developed that method, and we tested it on king mackerel, and all of the photos in the photoset were reviewed for kind of king mackerel measurements, as part of this pilot project.

The first thing I wanted to do was just give a quick overview of kind of the historical photoset, and I think these photos really kind of help describe the beginnings of the for-hire fishery in the Daytona Beach, Florida area, and so the range of the photos was between 1949 and 1975, and then the kind of circular, donut-looking chart on the left-hand side of the screen shows the percentage of photos by decade, and so the majority of the photos were from the 1960s, about 67 percent, and then there were about equal photos between the 1950s and 1970s, and there were about 4 percent of the photos that didn't have a year associated with them. The photos included trips from every single month of the year, and the majority of the photos were from April to August, which likely kind of mimicked the effort in this fishing fleet over these years.

All of the photos for this pilot project were from the Daytona Beach, Florida area, and they represent Rusty Hudson's family's fishing fleet, and so the Hudson, Stone, and Timmons families, and so they primarily cover photos from fishing trips that departed from Inlet Harbor and the Timmons Fish Camp, which the orange star on the screen kind of shows you where that is in the map. At least seventeen vessels were represented in the photos, but the majority of the photos came from these five vessels on the screen: The Flamingo, the Mako, The Broadbill, The Miss Juanita, and The Marianne.

Now I just wanted to share with you guys some examples of the FISHstory photos, to show you kind of the range of difficulty, and so most of the pictures were black-and-white, and the resolution wasn't always great, but this is an example of what we would call an easier photo.

The fish are all hanging on the leaderboard, and they're spaced out, and none of them are obstructing one another. People aren't obstructing fish in the photos, and there are only a couple of species, like king mackerel and little tunny, in the photos, and so this was kind of one of the easier photos.

This is an example of one of the hard photos, more challenging photos. Even though this is a color photo, the resolution isn't great, and you can see there are a ton of species in the photo. If you look closely, you can see that there are a lot of fish on stringers hanging on the leaderboard that are kind of laying on top of one another, and you can see that there's a wheelbarrow of fish, and then you can also see that there are a couple of people who are standing in front of fish, and so they're obstructing them and making them hard to identify.

The reason that I just wanted to show these is, you know, to show you the range of difficulty in these photos, and some of these photos are really hard, even for people who are really good at fish ID, and so there was a wide range of photos, and I wanted to just kind of highlight that for you guys before kind of getting into some of our findings.

Now I want to talk about the for-hire catch component of the project, and, since this was a pilot project, a lot of what we did was develop kind of the processes to kind of collect and analyze these data, and I am not going to go into detail about all of these different steps, but I wanted to show you kind of an overview, and so each circle represents a different step that we took, just to emphasize that there is a lot of steps in kind of getting this project up and running, and so, before launching in Zooniverse, you had to build the project, develop training materials, recruit and train validation team members, beta test the project that you built, and then adjust, as you needed, to improve it, and then, post-launch, you had to batch and add photos, identify photos that needed

validation team review and coordinate that, and there was volunteer outreach engagement throughout the whole process, and then we had the data analysis piece.

We had never worked with data quite like this before, and so that took so work, and now we're just starting kind of the last step in the process, which is sharing results with you guys, and we want to make sure that we share it with all of our volunteers and other folks who are interested in the project as well.

To understand some of the findings we'll be sharing, I wanted to talk a little bit about how the data were collected within Zooniverse, and so we had two workflows, and so two separate ways that volunteers could collect data in the project, and so the first was kind of an easier workflow, where we asked people to count the total number of fish and the total number of people in the photos, using a marking tool with different colors, and so, if you can see in the photo here, there are green dots all on the fish, and then blue dots all on the people, and so people would kind of point and click to count the fish and people in photos.

We had ten volunteers classify each of these photos, through this workflow. Preliminary analysis indicated that we didn't need validation team review of this, and all of the photos in our photoset were analyzed through this easier workflow.

The harder workflow was the one where we asked people to identify and count fish into sixteen species or species groups, and then we had them document obstructed fish that they couldn't identify, or try to identify, and so what we ended up doing was kind of collecting data in a kind of tiered data collection system, via kind of two tasks, or two steps, that the volunteers would do, and so, for the species that occurred most frequently in the photos, and that are managed by the council, we asked volunteers to initially mark the individual fish species, or species group, with different colors, and so they did for this red snapper and amberjack species group, king mackerel, and a grouper species group. They also marked kind of what they thought was an obstructed fish that they couldn't identify.

After completing that task, before moving on to the next photo, they would then be asked to provide binned counts of the remainder of the species within that photo, and then, once they completed that task, they could move on to the next photo.

Since this was a much more challenging workflow, we had twenty volunteers look at each photo, and we had a validation team that was made up of scientists and fishermen with fish identification expertise who helped review some of the photos where there was substantial volunteer disagreement, and volunteers completed about a thousand photos through this harder workflow, as part of this pilot project.

Now I'm going to switch gears a little bit and talk about some of the findings, and I'm just going to highlight a few things, because I know we want to keep on task and on track for the meeting, and so I'm going to be showing a series of box plots, but I thought that it might be helpful to kind of orient folks to these, and the reason that we wanted to show box plots is because they kind of show the median, or middle, value and then give you some idea of the distribution of the data.

Kind of the dark line in the middle of the boxes is the median, the middle value of the data, and the box itself kind of shows you the middle 50 percent of the data, and then the whiskers on the

top and bottom are kind of the interquartile ranges, and then you can see that, if dots occur out of these whiskers, they are 1.5 times that interquartile range.

The other thing that I will mention too is, when we got started, and this is a pilot project, and we weren't sure what kind of data we were collecting, and so kind of the first step and analysis was just summarizing the data, and that's what we've done to-date. We haven't done any statistical tests on anything, to look for trends, and that's something that we're hoping to do as we work to hopefully prepare this for publication, and so this first graph just shows you kind of the total landings per angler, in five-year time blocks, and so all species combined, and so you can see kind of the catch per angler, or catch rate, was highest in 1955, and the median value was a little over three, and then, for the last kind of three time periods, it was slightly lower, and it was a little bit over two-ish per angler.

The next thing that I wanted to show you is kind of a comparison, a graph that shows the comparison of validation team counts versus citizen science volunteer counts, and so the volunteers classified a thousand photos, and the validation team reviewed 180 photos, and they mainly did a lot of the hard ones, the really challenging ones, and so what this graph shows -- On kind of the bottom, you can see the different species groupings and the obstructed fish, and, on the Y-axis, you can see kind of the difference between the two groups, and so, the closer the box is to the zero, and the smaller it is, the less difference was seen between the two groups, and so, if there's a positive difference, that means the validation team counted more, and, if there's a negative difference, that means the citizen science counted more. This graphic just shows kind of the 180 photos that both of these groups did.

First off, if you kind of look at things, the agreement between the two groups is pretty good. There are not that many species that had kind of bias in counts, and there are a few exceptions. Two of those are kind of black sea bass and kind of the snapper other category, and snapper other was anything besides red snapper, and the validation team saw more of these two species, or species groups, than the citizen scientists, and I think some of the reason for that is black sea bass tended to occur at the bottom of photos, like the bottom of the leaderboard, and so they were easier to miss, and then the snapper other group -- I think citizen scientists could have misidentified some of those snapper as red snapper.

The biggest differences between the two groups were seen with black sea bass and snapper other and then kind of obstructed fish and red snapper, although they didn't have the same biases associated with the other two that are kind of outlined in orange, and so, for red snapper, they were one of the fish that were seen most frequently in the photos. I think, in eight or nine of the photos that the validation team reviewed, there were as many as fifty red snapper in a single photo, and so I think some of that could contribute to some of the variations seen for that species, and then, with obstructed fish, we found out that that was pretty subjective, and so we really weren't surprised to see bigger differences there.

Another thing that is probably worth noting is that, for many of the species that were more kind of rare events and occurred less frequently in the photos, that kind of contributed to that small amount of variation that you would see there, but, in general, since the agreement seemed okay, we then investigated kind of the volunteer data, to look at things like catch rates for these kind of core species groups, like grouper, amberjack, king mackerel, and red snapper.

This graph shows kind of the landings per angler for these four different species groups, and so the fish on top of the -- In the upper-right-hand corner, it shows you what species that kind of graphic is for, and so the first thing I will mention is the scales on the different graphs for the different species are different, and I just wanted to point that out, and so, for instance, red snapper goes from zero to ten, and those were one of the most frequently-caught fish in the photos, and then, for grouper, it goes from zero to one.

Again, we haven't done any kind of statistical analyses looking at trends or differences, but you can see some kind of patterns here, and the grouper, kind of in the mid kind of 1960s to 1970s, the kind of catch rates was about 0.2, and, if you look at red snapper, you can see that the catch rate was highest in 1960, in the 1960 time block. For king mackerel, you can look at the highest catch rates in the 1950s, and the same for amberjack, the amberjack group.

Then another way to look at this is we wanted to look at it by month, and so this is the kind of catch rates by month for these species, just to see if there were kind of seasonal patterns, and so you can see some pattern in the grouper and red snapper, with higher, or kind of the median values or higher, kind of in the spring and the fall, and then, for mackerel and amberjack, it's more kind of in the summer.

Now I want to give a little bit of information on the length component of the project, and, again, this is when we were trying to develop a method to estimate length in the photos and then pilot testing that on one species, king mackerel, and so we chose king mackerel because it's a fish that's kind of more easy to identify, and they're typically hanging on the leaderboards and not in piles or wheelbarrows or trash cans or that sort of thing, and they occur in a lot of the photos.

I did want to emphasize that this was kind of a multistep approach that we took to developing this method, and so, first, we identified the scaler we were going to use, which were the kind of two-by-four or two-by-six lumber in the leaderboards, and then we developed the protocol, and then we tested the protocol against kind of items of known length, to help us gauge kind of accuracy and precision, and then we were very lucky to have five length analysts to help us measure fish, and they all have fish ID expertise, and so everyone had to be trained, and then we had kind of a training set of photos that everybody went through, to make sure everybody was kind of measuring fish in the photos in the same way.

Then we had to coordinate and actually measure the fish in all the photos and then develop the length distributions from there, and then, again, we're kind of at this last step here, where we're just beginning to kind of share results on this project.

Within the photos, all of the 1,374 photos were reviewed for king mackerel, and king mackerel occurred in about 42 or 43 percent of the photos. Some photos had no king mackerel, and some photos had up to fifty-four king mackerel, and so we can produce annual size distributions, although the sample size varies a lot by year, but, for this presentation, I just wanted to show the modal length, to give you guys an idea of the size of fish that were seen.

You can see that the modal length kind of ranged between nineteen and around thirty-seven inches fork length, and that there's kind of an increasing trend from 1958 on throughout the end of the time series in the early 1970s. We're really excited and hopeful that this data can be considered

in the upcoming stock assessment for king mackerel, and used in a sensitivity run, to see how kind of this additional kind of historic data, that wasn't available before, could kind of benefit the model.

Then the last thing that I wanted to say, before I kind of talked about some take-aways from the project, is just mention that outreach was a huge component of this project, and so we tried multiple avenues and lots of different ways to kind of promote the project, recruit volunteers, communicate with volunteers, and we were very lucky that we had a lot of partners that worked really closely with us on this outreach.

Then the last thing that I wanted to kind of leave you guys with was a few kind of key takeaways, and so I think that the methods that were developed during this pilot project for analyzing historic photos shows a lot of promise. I think it shows that volunteers can make valuable contributions, but identifying fish in these historic photos is really challenging. It can be really challenging, and I think trying to simplify data collection could help us improve data quality, and, internally, we've started talking about ways to do this.

We also found -- You know, citizen science is not a no-cost endeavor, and this project required a lot more time and resources than we had anticipated, but I think a lot of the work that we did in the pilot, in developing the processes, and like the code to do some of the analyses and things like that, will make it a more efficient project, moving forward, and then the last thing that I wanted to mention too is that I think fishermen are interested in sharing historic photos and their stories, and I think we can learn a lot from them and gain a lot of valuable data from them.

I know that, when we launched the project, there were some folks who reached out to us with photos, and I know that some of our advisory panel members have mentioned that they have photos, and Judy, this week, just was texting me a bunch of historic photos, and so, I mean, I think there is a lot of valuable information that we can learn about these photos that can tell us about the start of these fisheries and a time when, you know, data collection wasn't in place for this sector, or was just starting to be in place.

With that, I just wanted to have -- I have one more slide, and I just was hoping to get some input from you guys of if the council is interested in continuing the FISHstory project, and we've talked about internally, and there is lots of avenues that we could pursue to kind of move the project forward, or continue it, and some of them will require different kind of amounts of resources and that sort of thing, and I know one thing we're really interested in is trying to explore ways that we could gather more photos, additional historic photos, and so, you know, we could try to do something, and I think I mentioned this in March, of like a scanning night at a council meeting, or an advisory panel meeting, or a public hearing, where we would come in and scan someone's photos for this project, but then give them a digital copy of the photo, so that they have a digital version of that.

I think we could do something like that at a relatively low cost, or low amount of resources, and we could also pursue additional analyses with the existing photos we have, and we did -- We measured king mackerel, but that's the only species we measured in these photos, and so we can try to apply the method we developed to other species. We also have a few hundred photos of Rusty's that haven't been analyzed completely in Zooniverse, and Rusty has already found someone else, down in kind of Daytona Beach, Florida area who has a couple hundred photos as well that could be scanned in.

Those sorts of activities would take some more investment, and getting Zooniverse up and running and making improvements to it, and kind of adding new photos, would take kind of more resources, and, really, another thing that's worth noting too is it was so valuable having Allie dedicated to FISHstory, and could do a lot of this work and coordinate between all of these different design team, validation, team, volunteers, outreach partners, and that's really critical for a project like this. I will stop there, and see if anyone has questions, and then I'm interested if you guys have any guidance on how you would like kind of this project to move forward.

MS. MARHEFKA: Thanks, Julia. I love this program, and I think it's important, and one of the reasons I think it's important, from a commercial perspective, is that our fleet is getting older, and thinning out, and there's a lot of institutional knowledge in someone like a Rusty, and there are Rusty's in every state, and so I think, especially with oral history, I think that's going to be important to preserve. Judy.

MS. HELMEY: Thank you, Julia. That was great. You said you can determine, estimate, the length of the fish, and have you all come up with a formula yet to do the weight?

MS. BYRD: We have not. All we've done is try to estimate the length of the fish, using kind of that lumber as a scale, and so we haven't really -- I haven't thought about trying to do weight, but I think you probably could do length-weight conversions, and we could just use the length-weight conversion equations that are done -- Like the meristics as part of a stock assessment, and so I guess you could get that, right?

MS. MARHEFKA: Other questions for Julia? Did you have something that you wanted to add? Clay.

DR. PORCH: Thank you, Chair, and thank you, Julia, for that presentation, and that's always one of my favorite parts of the citizen science aspect, is going back and looking at those photos, and, also, I think, potentially, one of the more useful. Whether or not we plug it into the assessment or not, it help us to validate some of the things we're seeing.

For instance, if you think that the stock has undergone overfishing and become overfished, presumably the average size would be smaller than what they were catching in the past, and this is a way to validate that. If in fact the average size was about the same in the past, then we would kind of want to question some of our assumptions that went in on it, or maybe we find out that there is something else that happened, some selection patterns or something, but, still, it's really useful information, and I would like to see it continue.

MS. MARHEFKA: That's good news. Trish.

MS. MURPHEY: I think this is just cool stuff, and so I guess a question, or a thought, on pursuing this further, and trying to get additional funding and still trying to be efficient on everything, and would it be good to stick -- I guess Rusty -- Is this mostly headboat and charter boat or just -- I wonder if sticking to that, for no better word, fleet -- As you pursue funding, I wonder if you should just build off of what you have here and kind of -- I guess I'm also thinking bigger bang for your buck, but you could hit the different -- Like I'm thinking the Captain Stacy in Morehead City has been around since probably, what, the 1950s, or I don't know how long they've been around, but

it seems to me they've been around, and, anyway, I guess my point is that may help get more bang for your buck, I guess, is to maybe stick with that charter boat and headboat fleet and work your way throughout the coast.

I'm not saying don't go to private recs or whatever, but, since you've already kind of got a good baseline with Daytona Beach, basically, maybe expand up the coast, and you may -- Just think of the quantity of pictures that are probably available, and that may be a good way to continue this work and get additional information. Then maybe, as you do that, then maybe get to recs. I mean, that's just a suggestion, just trying to think out loud.

MS. BYRD: I think -- You know, I think it is -- I don't know if "tradition" is the right word, but, when people go out on headboats or charter boats, they like to come back and take a picture with all their catch, and, I mean, you see it all over social media today still, and so I think that makes a lot of sense, and I think that's where we're hoping to kind of focus on, is that sector, at least as we work to kind of move this project forward, and so thanks, Trish.

MS. MARHEFKA: All right. Any other questions for Julia? I am hearing a lot of encouragement and support among this body, to pursue this and keep this going, and so, in the interest of time, and unless we hear otherwise, then I think you can take that as a big thumbs-up, and you can move on and talk about the snowy grouper.

MS. BYRD: Okay. The next thing we'll talk about is this kind of snowy grouper citizen science project idea that came up at the March meeting, and so the idea was to kind of explore the development of a citizen science project that worked with dealers to try to collect supplementary commercial snowy grouper length data, and, based on that discussion, it seems like one of the things that the council was interested in looking at was whether there were regional differences in the size distribution of snowy grouper and then maybe seeing if collecting additional length data, to kind of supplement current programs, as data could become more limited with kind of a lower sort of ACL, as it's reduced.

I think this was something that was mentioned earlier, during Rick's presentation, but really something we've taken to heart in this program is that we want to make sure that data collected through our projects can be used, and so kind of the first step we took, when kind of exploring this idea, was kind of looking at the commercial snowy grouper length and age data that were available through the current programs and then also had some informal kind of discussions with some folks on the assessment team at the Beaufort Lab, to see what was used in the last assessment and talk a little bit about what type of data may be helpful.

What I did, and I'm not going to walk through these in detail, but we kind of pulled some information together, and Table 1 is looking at snowy grouper commercial landings and trips, and I used the years from the last years of the most recent snowy grouper stock assessment, because I figured all those data have been vetted by all the data providers, and so I just am showing you this, so it provides some sort of context, when you're looking at the number of length or age samples.

Then this is just a table of the age samples that were used from the last four years of the most recent snowy grouper stock assessment, and the analysts told me -- So these samples are, I think, mainly TIP samples, or samples from states, and they're the number of ages, and the analysts told

me that about 80 percent of the lengths had ages for this species, and so you can see that the sample sizes are pretty good.

Then, as many of you guys know, kind of size at age is very variable for many snapper grouper species, and so that's the case for snowy, and so age data can be more informative than length data, but, when sufficient age data aren't available, length data become more important. In the most recent stock assessment, there was sufficient data to be used, and so, when ages were available, the age compositions were used, instead of the length compositions, and then, just looking at overall coverage, the percent of trips where biological samples were taken were pretty good for this species.

Then, also, I just wanted to mention other information where snowy grouper biological samples are being collected now is with NOAA's new South Atlantic Deepwater Longline Survey, or SADL, and so I just included the sample sizes that were from kind of 2020 and 2021, and those were presented at the last SSC meeting, to give you an idea of other places where biological data are being collected on these species.

I just wanted to note that the kind of data available, through kind of the current data collection programs, just having kind of looked at the sample sizes and talking to some of the analysts, are likely sufficient to be able to compare size distributions of commercial snowy grouper by region in the South Atlantic, and so the SADL survey will just kind of help increase that, and so it sounded like that was something that you guys were interested in, and it sounds like the data is there to do that, perhaps, and then the other thing I wanted to note is that snowy grouper age samples collected through the current data collection programs are currently sufficient for use in the stock assessment, and so supplemental length data may not be used in the assessment, unless there is a decrease in otolith sampling, and so I just wanted to provide you kind of that background information, as you guys are kind of thinking about whether we want to pursue a citizen science project to collect more supplemental length data on snowy grouper.

I guess I will pause here for a second, and then, if folks are interested in pursuing a citizen science project, I put a lot of other things that we may need to consider and resources that would be needed to do something like that, but I will pause here.

MS. MARHEFKA: Thanks, Julia. Well, in the interest of time, I just want to make sure that I understand. The bottom line, what I'm hearing from you, is that sort of what we have is sufficient for what we need right now, and, if you go on to the part of the report that you haven't gotten to, the resources to expand it may not be worth the -- It may not be necessary to use in this manner, because we are getting what we need, and it would be very resource intensive to pursue it in citizen science at this time.

MS. BYRD: Yes, and, of course, the program is -- We want to do what the council wants to do, but it seems like, based on the discussion in March, that, to answer some of the questions you all are interested in answering, the data might be sufficient to do that right now, and so, again, I think you kind of captured it, Kerry.

MS. MARHEFKA: Okay, and so, hearing that, does anyone have any questions for Julia? Do you want to lead off on how you want to guide her? Dewey.

MR. HEMILRIGHT: I've just a got a question, and can you scroll back down to your states where the samples were taken? I was just wondering, and, you know, this is great, and it shows North Carolina and the number of fish and the number of trips, but I was looking -- I am looking for something that shows the variance of the State of North Carolina where this is taken from and different things, because it's my understanding, and belief, that certain sections are catching bigger fish, and other sections are catching smaller fish, and I'm just wondering how that gets parsed out, and if the number of these fish, digging into the data that could be seen, where -- You know, here is a certain size coming out of a certain area, and here is smaller ones coming out of a certain area, and I guess that's a further digging, and it might not be for citizen science, but I am just curious how to look at that, because it's clear there are differences, and, with management, there could be differences, in the future.

MS. BYRD: I am going to let Chip kind of answer that, but I will say that I just looked at sample sizes, when I was pulling this together, and I didn't actually dig into all the lengths.

MR. HEMILRIGHT: Let me ask one more question, quick. How hard would it be for dealers? You've got a 200-pound trip limit, and how hard would it be for dealers to write down, and would there be any utility to write down how many fish equals that 200 pounds, or, if it's 110 pounds, would it be three or four fish, or five fish, and I'm just wondering if there's any utility, from the science part of that, would that be, and that's like the dealer counting so many fish and writing it down, and I just wonder if there's any utility in that.

DR. COLLIER: I mean, it could definitely be used to estimate catch. A better way to really look at regional differences, and length differences, is going to be that survey that you're participating in, that SADL survey, because it's going throughout the coast, and they will be able to see if there are size distribution changes along that, and it's using a consistent data collection method, and that's probably going to be the best way to do it.

MS. MARHEFKA: All right. Any other questions about this? Again, what I'm hearing is that we have it covered right now, and this is not somewhere that we're going to direct resources towards at this time, and does anyone disagree with that assessment? Okay. Great. Thank you. That was helpful. Then our final agenda item is the Citizen Science Program update.

MS. BYRD: I know that we're running a little late, and so, instead of going through that, you all can kind of check it out yourself, and there are two things that I did want to mention, one of which I am -- Both of which I'm very excited about, but I am super excited to announce that we've hired a new Citizen Science Project Coordinator, and her name is Meg Withers, and so she graduated from Emory, and she worked with Tracy Yandle, when she was an undergrad, who was on our SSC for a very long time, doing a variety of fisheries work.

Then she went to Scotland to get her masters in -- It's marine ecosystem management, I believe, and then she's done a lot of science kind of communication and outreach work, most recently for the National Parks Service, and so we're really excited to bring her onboard. She'll be starting on June 27, and so she'll be doing a variety of things, but focusing a lot of her efforts on the SAFMC Release project.

Then the other thing that I just wanted to note too, and you guys may already be aware, but the Release project added red snapper onto the species list in mid-April of this year, and so we're

collecting information on shallow-water grouper and red snapper now, and those are kind of the two big things, and then, if anyone has any questions on anything else in that presentation, just feel free to grab me, and I'm happy to share.

MS. MARHEFKA: Thank you, Julia. As always, wonderful job, and it's fascinating, and I think we could go on for hours, and I'm sorry that you're always sort of crammed into this time, but any other business to come before this committee? Hearing none, we'll pass it back to you, Madam Chair.

(Whereupon, the meeting adjourned on June 16, 2022.)

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Amanda Thomas
July 22, 2022

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Attendee Report: Meeting (6/13/22 - 6/17/22)

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Webinar ID

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Actual Start Date/Time

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10 hours 18 minutes

Attendee Details

Attended	Last Name	First Name
Yes	Aukeman	Trip
Yes	BROUWER	MYRA
Yes	BYRD	01JULIA
Yes	Bell	00 Mel
Yes	Bellavance	00 - Rick
Yes	Berry	James "chip"
Yes	Bianchi	Alan
Yes	Bonney	Rick
Yes	Bonura	Vincent
Yes	Brame	Richen
Yes	Bubley	Walter
Yes	Buckel	Jeff
Yes	Calay	Shannon
Yes	Chaya	Cindy
Yes	Cimo	Laura
Yes	Coggins	Lew
Yes	Collier	Chip
Yes	Conklin	00The Real Chris
Yes	Copeland	00 Bobby
Yes	Cox	Derek
Yes	Curtis	Judd
Yes	Darden	Tanya
Yes	DeVictor	Rick
Yes	Dover	Miles
Yes	Drury	Mark
Yes	Dukes	Amy
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Yes	Glazier	Ed
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