TABLE OF CONTENTS

- - -

TABLE OF MOTIONS

- - -

CARIBBEAN FISHERY MANAGEMENT COUNCIL
168TH REGULAR COUNCIL MEETING
Hilton Ponce Golf and Casino Resort
Ponce, Puerto Rico

DECEMBER 10-11, 2019

The Caribbean Fishery Management Council convened at the Hilton Ponce Golf and Casino Resort, Ponce, Puerto Rico, Tuesday morning, December 10, 2019, and was called to order at 9:00 o'clock a.m. by Chairman Marcos Hanke.

CALL TO ORDER

MARCOS HANKE: Good morning, everyone. We're going to start the meeting. We are still working on Go to Meeting, some technical problems. During the day, or as soon as possible, we're going to address that problem, and we'll keep you posted.

Good morning, everyone. Today is December 10, and it's 9:10 a.m., and we are in Ponce, Puerto Rico. Welcome, everyone. This meeting is the 168th Caribbean Council Meeting, and let's start with a roll call, please. Natalia.

NATALIA PERDOMO: Natalia Perdomo, council staff.

GRACIELA GARCIA-MOLINER: Graciela Garcia-Moliner, council staff.

BILL ARNOLD: Bill Arnold, NOAA Fisheries.

CARLOS FARCHETTE: Carlos Farchette, council member, St. Croix District.

JEAN-PIERRE ORIOL: Jean-Pierre Oriol, Commissioner, Department of Planning and Natural Resources for the U.S. Virgin Islands.

DAMARIS DELGADO: Good morning. Damaris Delgado, Puerto Rico DNER.

TONY BLANCHARD: Tony Blanchard, St. Thomas/St. John, council.

MARCOS HANKE: Marcos Hanke, Chairman, Caribbean Council.

MIGUEL ROLON: Miguel Rolon, council staff.

ROY CRABTREE: Roy Crabtree, NOAA Fisheries.

JOCELYN D'AMBROSIO: Jocelyn D'Ambrosio, NOAA Office of General Counsel.

SHANNON CALAY: Shannon Calay, Southeast Fisheries Science Center.

VANESSA RAMIREZ: Vanessa Ramirez, council member and commercial fisherman.

JEREMY MONTES: Jeremy Montes, U.S. Coast Guard.

DEIDRE WARNER-KRAMER: Deidre Warner-Kramer, Department of State.

LOREN REMSBERG: Loren Remsberg, NOAA Office of General Counsel.

KEVIN MCCARTHY: Kevin McCarthy, Southeast Fisheries Science Center.

HOWARD FORBES: Howard Forbes, DPNR Enforcement.

MANNY ANTONARAS: Manny Antonaras, NOAA Office of Law Enforcement.

MIGUEL BORGES: Miguel Borges, Office of Law Enforcement, NOAA.

MARIA LOPEZ: Maria Lopez, NOAA Fisheries.

JACK MCGOVERN: Jack McGovern, NOAA Fisheries.

DIANA MARTINO: Diana Martino, council staff.

RICHARD APPELDOORN: Rich Appeldoorn, SSC Chair.

JULIAN MAGRAS: Julian Magras, DAP Chair, St. Thomas/St. John.

WILLIAM TOBIAS: William Tobias, Vice Chair, DAP, St. Croix.

NELSON CRESPO: Nelson Crespo, DAP Chair, Puerto Rico.

ALIDA ORTIZ: Alida Ortiz, Outreach and Education Advisory Panel.

MARIA DE LOS IRIZARRY: María de los Irizarry, council staff.

TONY IAROCCI: Tony Iarocci, commercial fisherman.

SAM CHEN: Sam Chen, NOAA Fisheries.

MADISON HARRIS: Madi Harris, NOAA Fisheries International Affairs.

RUTH GOMEZ: Ruth Gomez, St. Thomas/St. John Fishermen's Association.

ORIAN TZADIK: Orian Tzadik, The Pew Charitable Trusts.

YASMIN VELEZ: Yasmin Velez, scientist, the Pew Charitable Trusts. I am introducing you to our new manager in the U.S. Caribbean region, and I will let him say his name.

DAVID ORTIZ: David Ortiz, new manager of Pew Caribbean.

LAUREN O'BRIEN: Lauren O'Brien, Gulf of Maine Research Institute.

SEAN MEEHAN: Sean Meehan, Recreational Fishing Coordinator, NOAA Fisheries.

WILSON SANTIAGO: Wilson Santiago, Puerto Rico DNER.

ADOPTION OF AGENDA

MARCOS HANKE: Thank you. The next item on the agenda is Adoption of the Agenda. Graciela.

GRACIELA GARCIA-MOLINER: You have a couple of changes. One is you will have the SSC report, and it will include, within that same section of the agenda, a SEDAR 57 spiny lobster presentation by Shannon Calay from the Southeast Fisheries Science Center. After that, we'll have a discussion on the ABC control rule.

In addition to that, tomorrow, there is a change in -- The queen triggerfish biological studies will not be presented. We talked to Jesus, and he will be presenting after he has conducted all of the research, and so he'll be back with us sometime in 2020. The oceanographic connectivity studies in the USVI and Puerto Rico, it's not Jorge Capella. It's Miguel Canals who will be presenting, and the ciguatera studies report will be presented by Miguel del Pozo, who is actually conducting ciguatera research in the area. I saw some slides, because there is a new listing, or new threat of listing, queen conch under the ESA, and so I don't know if you want to include that in the agenda as of right now.

JOCELYN D'AMBROSIO: Sure. We can give a little bit of an update on the status of the queen conch listing, which we've been talking about at past meetings, the determination that was challenged, and the court has issued a decision, and so we have a little bit of an update.

GRACIELA GARCIA-MOLINER: That needs to be added to the agenda.

MIGUEL ROLON: That will be right after lunch.

MARCOS HANKE: Noted. Thank you. Anything else, Graciela?

GRACIELA GARCIA-MOLINER: Not that I have in my notes, except if we have anything new for the ED report that I don't have in my notes.

MARCOS HANKE: We need a motion to adopt the agenda.

MIGUEL ROLON: Just to clarify that Damaris Delgado is here in her capacity as the representative of the Department of Natural and Environmental Resources in Puerto Rico, but there is a technicality. She has been appointed less than forty-eight hours, and so she will participate in all the discussion, but she cannot vote.

CARLOS FARCHETTE: Motion to accept the agenda as amended.

DAMARIS DELGADO: I just wanted to clarify that there have been some organizational changes within DNER, and there is going to be a new bureau, the Bureau of Fisheries, and so it's not going to be the usual Fish and Wildlife Bureau, and I am directing, right now, that new Bureau of Fisheries, and so I am waiting, pending the confirmation of that designation, but I have been assigned the role of leading that new bureau within DNER.

MARCOS HANKE: Thank you, Damaris.

CARLOS FARCHETTE: Motion to accept the agenda as amended.

TONY BLANCHARD: Second.

CONSIDERATION OF 166TH COUNCIL MEETING VERBATIM TRANSCRIPTIONS AND 167TH WEBINAR MEETING

MARCOS HANKE: All in favor. No objections? Thank you very much to everybody. The next item on the Agenda is Consideration of the 166th Council Meeting Verbatim Transcription. Any comment?

CARLOS FARCHETTE: I have a comment. The webinar didn't work out very good, when it came to our audio, and so I think we need to consider some improvement to that somehow in the future.

MIGUEL ROLON: Funny that you mention it, because we just hired a new guy who is working on it. What happened was we were in a transition, and the provider wasn't working that well with us, and so hopefully we will avoid webinars, but, if we have one, it will work.

MARCOS HANKE: We took note of that. Thank you, Carlos. Do we have a motion to adopt?

CARLOS FARCHETTE: Motion to adopt the verbatim transcription of the 166th Council Meeting and the 167th webinar meeting.

TONY BLANCHARD: Second.

MARCOS HANKE: All in favor. Any comment or objection? Thank you very much to all. Now the Executive Director's Report.

EXECUTIVE DIRECTOR'S REPORT

MIGUEL ROLON: We just wanted to start by welcoming Deidre from the Department of State. The Department of State is a member of each council, and I am glad that she was able to attend two meetings in a row. We were talking, and the last time she was in this hotel was when we discussed -- a long time ago, and so, whenever you want to say something, please do so.

At this time, my report is kind of a boring part of the meeting, but let me tell you that the budget for 2020 is -- We received funding, and we have to be careful with it, because we only received a partial amount, and there is no guarantee that we are going to receive the full amount, and that's a technical thing that we have to say in every meeting, but, according to Chris Oliver, there is no foreseeable problems to receive the budget as approved for all the eight councils.

Actually, Tony and Marcos and I were at the meeting of the CCC, and they told us that, in addition to the base funding, all councils may receive additional funding for items that in the past used to be called soft money, but, in this case, what they are going to do is to add to the basic funding, to the base funding, some additional monies, at the discretion of the head of the National Marine Fisheries Service, in this case Mr. Chris Oliver. Then, Mr. Chairman, I would like to call to the front Bill Arnold. Bill, sorry, but --

CARLOS FARCHETTE: Marcos, while Bill is going up there, do we have a jump drive for this meeting?

MIGUEL ROLON: We wanted to say something nice about this gentleman, but we all know him, and Bill is retiring on the 17th of January of 2020, a happy fellow, and he might be working with us in different capacities, but, at this time, we wanted to recognize Bill and his interest and his academic experience.

People tend to forget that he's got a PhD, and he had publications before he came to work with us, and, not only does he understand the science and can translate the science to layman's terms, but he understands the people, and he has been instrumental in working with the fishers of the U.S. Virgin Islands and Puerto Rico.

We are grateful for all of his work. He's one of the most organized persons I have ever met. I mean, he can tell you all this put thing and put it on a scale. He has been supported with a good staff, and Maria is here, which is probably the one who is going to be sitting from now on at the meeting, but, at this time, we wanted to thank you and recognize all your work, and we're going to give you something.

We cannot give you a reef, but we copied this from Superman movies, and so we have a reef in a bottle, and we can give it to you right now. While I look for it, Marcos will say something nice.

MARCOS HANKE: My words is more on the lines that, coming from the industry, I can testify and assure you that there is just a few people, and Bill is one very special person, that makes the bridge and makes the scientific connection and really got into the heart of the fishermen, helping them to be precise on the things that they say at the council and make this meeting much more productive. We really appreciate everything, Bill. Thank you very much. *(Applause)*

MIGUEL ROLON: Bill, this is the reef in a bottle.

BILL ARNOLD: This is what they're supposed to look like?

MIGUEL ROLON: Yes. You don't need a management measure for that. You just keep it in the bottle. Anyway, thank you, Bill, and we wish you the best in your endeavors, but we would like to see your face once in a while, working with the council in different capacities, as I said, especially with the ecosystem-based management. You have a lot to contribute in the future, and, if you don't get tired of us, we would like to have you around. Do you want to say something?

BILL ARNOLD: I want to say that I'm going to miss you guys. I really am. The best part of this whole thing has been the people, and I truly mean that from the bottom of my heart. It's been a privilege and an honor to be able to work with you guys, and it's been a great learning experience and a fantastic challenge. Yes, you're challenging, and so thank you, all. *(Applause)*

JULIAN MAGRAS: Bill, on behalf of the fishermen of the U.S. Virgin

Islands, I would like to say a special thank you for all the dedication that you have given to us. You taught us a lot, and we have come a long, long way in the whole council process, and we are looking forward -- Even though you're retiring, we're looking forward to doing a lot of work with you and you to continue teaching us and guiding us in the right direction.

I know that sometimes we butt heads, but, at the end of the day, we come up with something that can work for both the environment and for the fishers, and so thank you very much for all of your dedication that you have given the fishers over the years. *(Applause)*

MIGUEL ROLON: That's it for me.

MARCOS HANKE: Thank you very much, Miguel, and let's keep going on. Bill instructed me to be very effective on this meeting, and I will do so. I will try to keep the schedule, and I want to say something that is very important for this meeting. That is that we have to be very precise and very effective on the participation, because the agenda is very loaded, and I look forward to your cooperation, and we need to keep the timing sharp and moving forward. Thank you to all for your cooperation on that part. Now we are going to go to Miguel again.

MIGUEL ROLON: Just that there's a cable here, if somebody is missing a cable, and it's going to be sitting here. If you recognize it from a distance, it's yours.

MARCOS HANKE: The next item on the agenda is the SSC Report. Richard.

SSC REPORT

RICHARD APPELDOORN: Thank you. I would add my own note that Bill has been as effective at driving the SSC as he has been at driving the council, and we're all going to miss his participation there as well. Thank you.

This is going to be something that I think you're all going to look forward to, because it's going to be short. We were looking at two things in this three-day meeting. One was the continuation of the development of the conceptual ecosystem model, and the other was to hear a presentation and make recommendations on the SEDAR 57 that was recently concluded, and that's the one on spiny lobster.

Looking at the conceptual model issues first, this is where we

left you at the last meeting. We had a mess of lines going through all kinds of boxes, and we spent most of the meeting somewhat cleaning up some of those lines and then replacing them with a lot more, and so it now kind of looks like this. It's a work in progress, and so stay tuned, and so let me go to SEDAR 57.

We were given a presentation, and you're going to have a presentation right after this, and so you'll see that what I'm going to say is really not based on you knowing the details of SEDAR 57, but, first of all, we support that the stock assessments for the three islands do provide the best scientific information available relative to the stock determination criteria of overfishing status and overfished status.

We also accept and recommend the use of the value of fishing mortality at 30 percent spawning potential ratio as an MSY proxy for spiny lobster. We also supported the outcome of the SEDAR 57 for all three islands, which said that overfishing is not occurring relative to the recommended value of F for our proxy and the populations are not overfished relative to the council's minimum stock status threshold level of 75 percent of the biomass at MSY.

The SSC supports and recommends the use of the assessment to establish the management reference points using the Tier 3 of the ABC control rule.

Following that then, the SSC recommends that the determination of the components of Tier 3 be implemented, and this is sigma, and I will give an example of what I mean here, which is determined by the SSC, and the P* value, which is determined by the council, and I have a slide that shows those two, and there will be a subsequent presentation on those as well.

Importantly, that previous bullet took place at like 5:07 on the last day of the meeting, and so we did not have time to evaluate the research recommendations in the SEDAR 57 stock assessments, and so we're requesting time to be able to address those in a future meeting.

Where are we going next? This is the Tier 3 data-limited quantitative assessment control rule, and it's used when we have relatively data-limited or out-of-date assessments. Here, we're talking about data-limited. We have an MSY proxy, which was that 30 percent spawning potential ratio value, and we have a number of stock determinant criteria, and the important one is this one, OFL, which just comes out of the analysis, and that's our basis for that moving forward to get ABCs and ACLs.

The ABC is determined from the OFL, the overfishing limit, as reduced or buffered by scientific uncertainty and reflecting the acceptable probability of overfishing, and so scientific uncertainty is what the SSC provides input on, but the council determines what is the acceptable probability of overfishing.

There is an additional constraint here that talks about the width of the probability density function, and I will show a picture of that, and there's a minimum of this indicator of variance, if you will. It has to be greater than two-times a minimum variance, and that minimum was actually set in the Tier 1 control rule as 0.5, and so two-times that would be one.

This is kind of what we're talking about. We have a probability density function here of what OFL should be, and this is made-up data, and so it's not from the assessment, and it's centered on 100 here, and the width of this distribution is defined by a mean, and it's defined by a variance, or a coefficient of variation, which is really, for Tier 3, kind of more of what we're dealing with.

The width of this is determined by this variance, and so this is the probability density function of predicted overfishing limit, and so you can see there is uncertainty here as to where this OFL should be, but we have a point here which is a peak, and so this would represent the goal of where we should never go beyond, and that is a 50 percent chance of having overfishing, and so it needs to be buffered below that, and so, the wider that distribution is, the more uncertainty there is on where that OFL should actually set, and, thus, this width represents the scientific uncertainty, and that's the part that the SSC deals with.

The final step is we have a distribution, and this is looking at the green one now, where here is our 50 percent probability, including our MSY, and we don't want to go to a point where we're catching beyond that, and so we want to avoid this level of catch, and so it needs to be buffered down, to some degree, and this buffering down --

This is what the council's responsibility will be, through the application of what's called the P*, and the P* is going to be related to the level that you're bringing down from 0.5 to some level down here, and these can be quite extreme, and some of the councils have adopted values that range from 0.45, in the best like Tier 1 cases, down to -- Well, Shannon, who will give the presentation, knows more about this, but 0.25 I have seen, and so it depends on the risk that the council is willing to accept for the level of analysis that is available, and so, the greater the

degree of uncertainty, you might want to buffer more, but this is a discussion that you're going to have and make decisions on. That's not the SSC's role.

The last step in this is that you're going to do some kind of buffering, and so this is the risk of overfishing coming in here, and that's your buffer, and you would then go from -- The risk of overfishing is the level of risk that the council is willing to accept that overfishing will not occur, and that's set by the council and reflected by this value of P*, and so you're getting your MSY here, and that's buffered either to the blue line, if our distribution looked like this, or to the green line, down to here, if our distribution was that, and so that's the process that we're looking forward to engaging the council on.

The SSC still needs to look at how we are setting the width, but I think the lobster case looks to be fairly straightforward, and so I did have a note there that that width is going to depend not only on the outcome of the assessment, but how we feel some of the assumptions that are incorporated into that -- Do we have to give extra concern, because some of those assumptions are kind of tricky, or does everything look fairly straightforward and we can go with the minimum values or what, and so that's the discussion the SSC will be having in the future, as we look toward that, but we're very happy that this assessment really looks like, as I said, the best scientific available information, and we can go from our kind of educated guesswork in Tier 4 up to something a little bit more reliable in Tier 3, and maybe, in the future, even higher, and so that's my report. Thank you. Any questions?

MARCOS HANKE: Thank you, Richard. Any questions? Miguel.

MIGUEL ROLON: Richard, how different -- For example, in the case of the spiny lobster, how different is this approach from what we have right now?

RICHARD APPELDOORN: This is completely different.

MIGUEL ROLON: In what way?

RICHARD APPELDOORN: Tier 4 was based on catch only, and the SSC had to make some kind of reasonable and, in some cases, obtuse assumptions about what is going on in the fishery and how we can relate the vulnerability of species relative to their life histories to what their potential vulnerability would be and to fishing pressure.

We assign different classes in Tier 4 based on those kinds of

vulnerabilities, and we had to come up with some kind of level from which we call -- I actually forget what it was called, the sustainable yield level or something like that, because we didn't have any idea of where an MSY really should be, or OFL, and we're basically going on this is what has happened in the past, and, based on that, we think we can do this, and how do we generate these numbers across all the species in some kind of organized way, and so we developed the rules to do that, based on means, if we thought there might be a problem, or medians, if we thought there might not be a problem, and then we're buffering up by some -- Not buffering up, but going up to set the sustainable yield level based on a criteria that is scientific educated guessing, based on our understanding of the species and our understanding of the performance of the fisheries over the long term.

Now we actually have a quantitative assessment that is giving us a prediction with a degree of variance around that, and so, not only do we have a target, but we know what the variability around that is as well, and so it's just completely different. It's really a quantitative assessment versus expert opinion by the SSC. Bill.

BILL ARNOLD: You may have said this, Richard, and I apologize if I missed it, but the X-axis, the hundred-and-some-odd-thousand pounds, that's just an example, right?

RICHARD APPELDOORN: That is totally artificial numbers, yes. Julian.

JULIAN MAGRAS: I must say that I was involved in the SEDAR 57 process, and it was a great experience, from being in the process from the beginning to the very end, to the final assessment, and I felt that the scientists, the Southeast Fisheries Science Center, and all the different scientists, not only that sits on the SSC for the Caribbean Fishery Management Council, but the other scientists in the final assessment, they really had a lot of questions for the fishers, from the three different islands, and, with us being present, we were able to accomplish and take away a lot of the uncertainty factors, and we were able to bring it into a more tight fit.

It was great working with Richard and his team and the different scientists at the Southeast Fisheries Science Center and all the NOAA people, and this was a great experience, and I look forward to us doing more, so that we can close the gaps and get some other assessments done for different species, and so great job. Thank you.

RICHARD APPELDOORN: I would like to add that there's some kind of follow-ups to this. As I mentioned, one, the SSC is going to look at this, and we have to look at the assumptions behind the analysis, and so, if they affect some of the uncertainty that may not be reflected in the numbers that come out, we need to take that into account, and so one of the follow-ups to this was that there was a real question about selectivity, and, in particular, our larger lobsters not being taken, either because they can't get into the traps, or the market doesn't like them, or they're too deep, for whatever reasons.

One of the things that has already happened is that the studies to answer that question are already being initiated, and so, when the SSC gets together to start working on these things, hopefully those parts of uncertainty will already be answered.

Another thing that came out of this is that the SEAMAP program, and I think we're hearing a presentation on SEAMAP tomorrow, but the SEAMAP program is looking at lobster, and one of the issues there was age structures and growth, and so SEAMAP, which is due to start their latest cycle of lobster investigations, is going to try to look at those things, and so, again, because we have this quantitative assessment, we can actually target what do we need to make this better, and, because of that, the places where those assessments can be done to make these things better are picking up on these things already, even though the SSC hasn't made any recommendations on those research priorities itself, and other entities have already picked up on this, and so it's a really good trigger for improving what we have already, because we can more isolate that this is the thing we need to make it better or that thing will make it better.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Today, and you will hear a presentation later on, but what we need to do as a council is for you to understand your responsibility next year. P* is a number that will give you a range of alternatives that you can do, statistically speaking, and we need to understand what P* means, so that, when we get to the point that you are going to select the risk percentage that you want, you will be able to do so with knowledge of the underlying numbers and concepts.

The island-based FMP has been submitted, and Graciela was mentioning that to me, and so the island-based FMPs are being submitted as requested by the council, and the council had a motion in the spring to submit the island-based FMPs, and remember there are three of them, to review by the Southeast Fisheries Science

Center and the Regional Office, and you also gave a license to the staff to work the little items that needed to be arranged and also to incorporate whatever was needed, according to the law.

Already it has been done, and the Chair submitted the island-based FMPs to the review process, and so, in 2020, those three management plans should be given the nay or yea by the Secretary. Let's say that they approve the island-based FMPs, and so immediately we will have to start working on these items.

In the case of the P*, usually when I ask a fisherman what range you want, he says as much as I can get, and so, according to the law, you can get as much as you can, provided that you have a buffer that will eliminate the possibility of going to overfishing, and so what Richard is presenting today gives you the range in that example, gives you the range of possibilities, and where you should be.

Remember that you can say, okay, we're going to fish at MSY, but, if you go a little bit off MSY, the fishery is shut down, and it's closed for whatever time is needed, and so it's important for all the council members, if you have a question, especially after Shannon's presentation, to move the discussion, so you don't leave the meeting without any questions being answered. The same with the Chairs of the DAPs or anybody in the public. Richard, is that it for you at this time, or do you need more? Okay.

MARCOS HANKE: Thank you very much, Richard. Let's follow-up with Shannon's presentation, please.

SEDAR 57 SPINY LOBSTER PRESENTATION

SHANNON CALAY: Thank you very much, and it's a pleasure to follow the excellent presentation of Rich. I think that you'll see that a number of the things that he introduced are also contained in my presentation, and we can either go quickly through them or we can have a more in-depth discussion.

I am going to start by briefly presenting the spiny lobster assessment, SEDAR 57, and there were actually three stock assessments conducted, one for each island platform, and so there is an assessment for St. Thomas, St. Croix, and for Puerto Rico.

Stock assessments essentially use models to determine whether fishing yield is sustainable and to determine the stock size and whether it is above or below the level that can produce maximum sustainable yield. They also are used to quantify the uncertainty of the status of the stock estimates and to provide management

advice, including annual catch limits and maximum sustainable yield, and so they are essentially used to provide management advice to optimize resource utilization, and the figure on the right-hand side just shows you essentially a schematic of the stock assessment process.

The important thing to mention here is that this was conducted through the SEDAR process, and it was reviewed by a panel of experts and by the SSC in October, and it will be finalized by the SSC at a later date. All of the documents for the SEDAR are available, and I will give you links to a few of them at the end of this presentation, but all of the documentation is available on the SEDAR website.

This is a summary of the various management measures that are in place for spiny lobster, and so they include annual catch limits by the island-based fishery management areas that were determined through this catch-only Tier 4 process. There are also management measures on the minimum size limit, currently 3.5 inches, or 8.9 centimeters, carapace length.

There are bag limits for recreational harvest in federal waters, and there are a number of gear restrictions on spiny lobster. There is a prohibition against taking egg-bearing female lobsters aboard a vessel, and spiny lobsters must be landed whole when they reach the port, and there are also similar restrictions on importing of spiny lobster.

This table shows you the current annual catch limits that were effective in 2012 for spiny lobster on the three island platforms and also for spiny lobster -- I think these are the 2012 catch limits here, and the point I want to make here is how important spiny lobster is in the U.S. Caribbean across the three island platforms. It has the highest annual catch limit of any species.

This is a brief history of the stock assessments that have been conducted on spiny lobster in the past, and the important thing to note here is that none of these processes, although they did produce management advice, none of these stock assessments, to date, could provide quantitative catch advice, such as an annual catch limit or an overfishing limit, as required by Magnuson, and so they were not very effective tools for management of the stock under the Magnuson law.

I also wanted to point out, on this slide, that many of these approaches had very rigid assumptions about the selectivity or about various biological processes that took place. The Stock Synthesis tool that was used for SEDAR 57 has far more flexibility.

It allows us to estimate some of the biological behaviors, or the fishery behaviors, that formerly required strong assumptions, and, when these parameters were fixed in the stock assessment model, it gave us an integrated platform to look at the sensitivity of those assumptions to different values, say in the literature, and so Stock Synthesis is a very powerful platform to test your assumptions about the biology of an animal and about the fishery.

We used Stock Synthesis Version 3.3, and so Stock Synthesis is an integrated catch-at-age model, and what does that mean? That basically means that we can provide all of the biological data and assumptions by age class or by cohort, and so, for example, natural mortality, maturity, these are all processes that are age-related, and so the catch is also presumed to be catch-at-age in an integrated modeling approach. You don't require catch-at-age information, but, intrinsically, the model will keep track of the animals by year and by age class, and that's what it means.

The model simulates the stock dynamics of the fishery, and so the mortality processes, maturity, growth, and the dynamics of the fishery, including the fishing effort, the catch, and the selectivity.

It is flexible in its ability to use the diversity of data, including information on age, size, and aggregate data from the surveys and fisheries, and so, in this particular case, we're using a very data-limited version of Stock Synthesis, which pretty much only contains information about the biology of the animal, the catch, and the length frequency of the catch from the TIP program, but, as additional sources of information become available, for example indices of abundance, they can also be added to this Stock Synthesis model to improve the model.

This is rather detailed, but how does it work, essentially? We have a variety of different data sources, such as catch and the length composition data, and they give us various pieces of information about the true state of the fishery and the stock, and so Stock Synthesis essentially works in the same way that a linear regression works. It fits to all the various pieces of data that we have to allow us to create, essentially, the fisheries dynamics that produced that data.

We want to have a good match between the data that we observed and the estimates, the data estimates, that come out of Stock Synthesis, and so, essentially, it uses a tuning process to fit to the observations, the same way you might fit a least squares regression, only integrated across all the data sources.

We want to choose -- We get to choose in the model which values we want to model, and we solve for the estimated parameters, and we also get to choose which values we fix, or assume, in the model, and I will get more into that later, but Stock Synthesis does require us to fix some parameters, but we can explore across ranges of plausible uncertainty.

How did we do this? We essentially started from the lowest complexity, and we built up, and, as we built up, we tested how robust the model was, and we essentially developed a plan for -- When we needed to, we borrowed information from another data source and fixed that in the model, or we reduced the complexity, and so, if we hit a point where the desired complexity could not be supported by the data that we had, we either borrowed data from other regions or we reduced the complexity, to avoid the problem.

There is a summary of all these modeling steps provided in the stock assessment report and addenda, which are up on the SEDAR website.

Now what data did we actually use across the three island platforms? We essentially used the annual removals, or catch, by gear, the landings, and we used the length composition data by gear. We had to fix a number of parameters, and I will discuss what we used to fix them, including the growth, natural mortality, maturity, steepness, which is a measure of how resilient a stock is, the reproductive capacity of a stock, and steepness -- 0.95 indicates that a stock is very productive, and so quite resilient to fishing.

We assumed a 50/50 sex ratio, and we used time blocks to represent changes in retention, due to a size limit, and so those are size-specific changes, and, essentially, when you impose a size limit, fishermen can retain animals above the size limit, but they must discard below, and so the model keeps track of those changes in fishing behavior.

We did estimate parameters, including the unfished level of recruitment, and so that is the recruitment that occurred when the stock was at unfished condition, and we estimated parameters about the selectivity functions and retention, which I will talk about in a little bit more detail in subsequent slides.

These are the data that were available to us for this modeling process, and so, on the top set of panels across the three island platforms, you can see the annual removals or catch. In St. Thomas, the annual catches are dominated by the pot and trap fisheries, which you can see in blue that the total is actually

the black line, and pots and traps is the blue line, and the orange component is diving gear.

In St. Croix, again, you see -- Well, in this case, diving is the main source of removals, and diving is blue in that panel, just to make things super confusing, and orange shows you the pots and traps, and, in Puerto Rico, you actually have a combination of the gears, where you can see that diving gear now is in blue, and the pots and traps are in orange, and so kind of a similar magnitude across the time series of those different gear types.

On the bottom panels, it shows you the length composition data that we had, and it shows you also that the main source of removals is also where we get the majority of the length composition data, which makes sense.

We did fix several parameters, which is not unusual in stock assessments. Even data-rich stock assessments often fits these sorts of biological parameters, and this is the von Bertalannfy length function, as described by the document Leon et al. 1995. This shows you a sex-specific growth pattern, where males are actually larger at their maximum age.

They are about 184 millimeters carapace length at maximum age, and females are smaller, and so that shows you, on the right-hand side, the blue line is the male growth pattern, and the orange is the females, and, on the left-hand side, you just had the length composition data aggregated across all islands and all gears, and, again, you can see here that the males are larger than the females.

We also fixed natural mortality at an estimate from a document from Cruz et al. 1981, and the point estimate was 0.34 per year, and this is within a range of values, as specified by the FAO document in 2001, and their range was 0.3 to 0.4, and it's also similar to previous stock assessments conducted in the region.

Release mortality is how many of the animals die after they are discarded, and we assumed that release mortality was negligible for spiny lobster, and so most of the animals that are discarded by the fisheries do survive.

Diving was considered to be highly selective, meaning that the fishermen were able to select animals of the length that they preferred from what was available to them, and we assumed that there was limited handling time associated with trap fisheries and that post-release predation, how many animals were actually killed by predators after they were discarded by the fisheries, we assumed that mortality was unknown, and therefore negligible in the stock

assessment.

There is a fecundity at length process involved here, and so, as animals grow, they produce more eggs, and that relationship is described by FAO 2001 and also used in the SEDAR 8 assessment of spiny lobster, and, finally, we have a relationship here with maturity at length, which is from a publication by Die in 2005, and this publication shows that the length at 50 percent maturity is ninety-two millimeters, which is very close to the size limit imposed in this fishery, which is three inches carapace length, or I believe 89 millimeters, and so that minimum size limit is set right about the age of 50 percent maturity.

Selectivity is a jargon term that we use a lot in our community, but it's basically how animals are collected by fishing, and so let's say, on the top here, we have what's called an asymptotic or logistic selectivity pattern, and it's quite knife-edged at right about seventy-five millimeters.

In this first one on the top, the asymptotic, it would say that no animals are selected for by that fishery until they're about seventy-five millimeters, and so either there is a gear selectivity component, and no animals smaller can be collected by the gear, or availability, or animals that small are not available to this fishery, because they don't exist where the fishery operates.

At about seventy-five centimeters, it goes all the way up to one, and it's very knife-edged and flat-topped, meaning that every animal above seventy-five millimeters could be selected by that fishery, and so, if they are available, they can be caught, and so, with that one -- The one on top implies then that, if there are no animals that large that are in the catch, it's because they don't exist, because of fishing mortality, for example.

Now, the one on the bottom is called a dome-shaped selectivity pattern, and this one means that, between say fifty and 150 millimeters, that animals could be selected for by that fishery, and it's got a peak at about 100, but this one implies that, above say 150 millimeters, that the animals are simply not selected for for that fishery, and so they could be here, but maybe you would prefer a plate-sized fish or lobster, and so either the gear, the animal can't enter the gear, because it's too large, or the fishermen do not prefer to catch an animal that large, and so the selectivity goes to zero at these larger sizes.

These are actually the selectivity patterns that we estimated in the stock assessment model, and so we see that they're all relatively dome-shaped, implying that animals larger than say 150,

or 100, millimeters fork length are basically unavailable to the fishermen or are not preferred by the fishermen, and so they are not observed in the catch.

I did also want to mention that there were sensitivity runs that examine both logistic or asymptotic, and the dome-shaped selectivity function, and the models preferred the dome-shaped selectivity functions. They gave a better fit to the stock assessment model, and they were the ones that were chosen by the review workshop for the final advice, the dome-shaped selectivity functions.

In St. Thomas, this is the model structure. We had two fisheries in St. Thomas, pots and traps and diving gear, and selectivity at length was estimated for the pots and traps, because they were the major predominant gear. That same selectivity pattern was mirrored for the diving fleet, because there was insufficient information to estimate a separate selectivity pattern for this small component of the catch.

We assumed that the fishing mortality in the first year of the model was zero, and so, essentially, it starts off from an unfished condition in about 1970. The minimum size limit was eighty-nine millimeters, and that was introduced in 1985 in this model, and so we had two time blocks for retention, 1985 to 2003 and the second one for the more recent time period.

Now, you notice that there are some years missing here, and those missing years are because that's a period of time where, for some reason, there were a lot of fish below the size limit reported, and it gave the model essentially fits to try to accommodate that, and so these years were actually not included in the estimation of retention, and so whatever happened, essentially in the intervening time period, we just assume is essentially the same underlying retention function as the earlier period. There were estimated quantities in this model, including the recruitment, at the time where there was no fishing and the selectivity functions.

St. Croix had a very similar model structure, except now that the -- I believe it's the diving fleet is the majority fleet, and so we actually estimated its selectivity, and then we mirrored the pot and trap fleet to the same selectivity pattern, and we had the same time blocking of retention occurring. In this case, we're only estimating the time block for retention from 1985 to 2016, and so after the size limit. Prior to that time, in both St. Croix and St. Thomas, we're assuming that all animals were retained, because, before the size limit, there would have been no reason to discard lobsters. Here, we're estimating unfished recruitment,

again, and the selectivity parameters, and Puerto Rico is the next slide.

This is slightly more complicated, in that we have two types of fleets that both have significant landings, and so, in this case, we estimated the selectivity patterns for both of these fleets, and we assume that the F initial was zero for the pots and traps, which is the orange here, and so the initial fishing mortality is zero, but, as you can see, in the diving fleet, there were very substantial catches in the initial year of the stock assessment, and so we did have to estimate that initial fishing mortality value in Puerto Rico.

Again, we have time blocked retention patterns based on the size limits, and, here, we're estimating the initial F of the diving fleet and the retention parameters for each fleet and the selectivity, and so a slightly more complex structure of the Puerto Rican model.

Here are the stock assessment results, and so, on the top panel, these ones all show you the fishing mortality trends, and so I will explain. In St. Thomas, we assume that fishing mortality was zero in the first year of the stock assessment, and it shows you that, as you would expect, the fishing mortality increases through time, up to the mid-2000s, when it was about -- The fishery was taking about 17 percent of the available animals each year, according to the stock assessment. Since that time, there has been somewhat of a decrease and then, again, increase in the most recent years.

In St. Croix, the fishing mortality is zero in the beginning, and it's increasing to maybe 20 percent, and so, basically, fishing mortality is taking 20 percent of the available animals in St. Croix each year in the mid-2000s and then a rapid decrease.

In Puerto Rico, you actually have significant removals occurring in the first year of the stock assessment, and so I believe that says about 22 percent of the available animals were extracted by fishing in the initial year of the stock assessment, but that's been variable, but not trended, through time, and so there's been substantial fishing in Puerto Rico throughout the time series.

The bottom set of panels just show you the spawning depletion, and so the population size relative to unfished condition, and so starting off at unfished condition in St. Thomas and essentially decreasing through time, to about 40 percent of the unfished condition.

In St. Croix, you can see it's starting off again in unfished condition and going down to an SPR of about 30 percent in 2010, 30 percent of the unfished condition, and then a rapid increase, and, in Puerto Rico, it's relatively flat through time, from about 20 to 40 percent of the unfished stock size, and so a typical measure of a spawning stock at the level required to produce MSY is about 30 percent, and so what you're seeing here is about 40, a little bit above 40, almost 0.6 here, and about 0.4 here, and so it kind of gives you an indication already that this stock seems to be in a fairly healthy condition.

We did the peer review, which featured Center for Independent Expert reviewers as well as the SSC. They reviewed various sensitivities, and so they looked at our assumptions about natural mortality, growth, initial F, and selectivity. They reviewed a whole variety of diagnostics that are produced by SS, including retrospectives, jitters, correlation analyses, and likelihood profiles. These are all contained in the reports, if you would like to review them.

They found all these diagnostics to be acceptable performance, and they did recommend, or they supported our conclusions, that spiny lobster is not overfished and not experiencing overfishing for the review workshop base cases, and they supported using a proxy for MSY of essentially SPR 30, and so they suggested a number of research areas, which are listed here.

They suggested further research on selectivity, and they suggested research on the Puerto Rican expansion factors and on construction of indices of abundance, and they also recommended research to quantify various sources of mortality that were not included in the stock assessment, including mortality due to the recreational fishery from illegal and unreported fishing and discards. They prioritized St. Thomas, because they felt that St. Thomas was closer to the overfishing threshold.

They also had a very high-priority recommendation to develop indices of abundance before the next stock assessment, and that is something that we're already working to achieve.

MIGUEL ROLON: Shannon, before you go to the next slide, just a placeholder, so that, at the end of your presentation, can we prioritize those recommendations and see what the council can do to assist in solving some of the -- Not solving, but addressing some of those recommendations. Not now, but at the end of your presentation.

SHANNON CALAY: Okay, and I did also want to mention, since we

have this slide up, that a lot of the research that we are outlining here we are already conducting, and so we've already arranged for funding to examine selectivity, and we're already working on catch validation. The indices of abundance is something that was discussed, and, basically, we're still working to try to improve our indices of abundance.

We also just submitted a pretty extensive proposal, which I have not heard whether it will be funded or not, to develop fishery indicators for the Caribbean, and so a lot of the work that you are seeing here is already underway, and certainly we could use all the assistance that we can get to have additional work to improve these areas of research.

These are the conclusions, and I realize this is very small, and so I will just highlight a few. The current spawning stock biomass relative to the spawning stock biomass that supports MSY, on all three model platforms, the number is higher than one, which means that we are not overfished, and we are above the spawning stock biomass that produces MSY.

Also, F current relative to FMSY, all of these numbers are below one, which suggests that we are also not overfishing spiny lobster on any of the island platforms.

You see here an estimate of MSY, and St. Thomas is 134,000 pounds. It's 128,000 pounds in St. Croix, and it's about 433,000 pounds in Puerto Rico, and so I think the rest of it I will allow you to look at at your leisure.

We typically get stock assessment results for the annual catch limits from projections of a stock assessment model, and that simply means that we take the model, with the terminal year, I believe, of 2016, and we had to make assumptions about the catches -- Well, we actually had estimates of the catches in 2017 and 2018, and these were the assumptions that we made.

Basically, we project fishing at F that supports MSY, and so we project forward at FMSY, which happens to also be the level that produces OFL, the overfishing limit, and this is the values that you get for 2019, 2020, and 2021 and 2022, and so the value outside of the parentheses is the OFL, the overfishing limit, estimated by the stock assessment, and inside the parentheses is, I believe, the standard deviation of that estimate.

You can see it varies by year, because we're fishing at a constant F in the projections, and so the catch you get from that constant F actually will differ as the population size changes in the

projection.

Just for comparison, I've got, on the bottom, the ACLs from 2012, the ACLs from the island-based fishery management plan, and the SEDAR 57 MSY estimates, and so you can see how they compare. This is just a summary of the model inputs, estimated and fixed parameters, and a summary of the research recommendations. Miguel.

MIGUEL ROLON: From this report, especially the prior slide, where you have the ACL comparison with the table, the spiny lobster is okay. If you compare the ACL in the island-based FMPs, and let's say, for example, St. Thomas is 220,000, versus 185,000 now, and 148,000 in 2020, and the lobster is doing okay, and so we don't need any other management measures, aside from the size limit that we implemented in 1981. Is that assessment true, or is that statement true?

SHANNON CALAY: I am not entirely certain that I understand your question.

MIGUEL ROLON: My question is do we need to do anything with the spiny lobster besides what we are doing right now?

SHANNON CALAY: Well, basically, all that this stock assessment tells you is that we would say the overfishing limit in 2019 would be 185,943 pounds, and so you could take a variety of management measures that would ensure that catch does not exceed that level, but I don't -- The stock assessment doesn't give you information about which management measures you would take. It just provides a catch limit, and so there are other analyses that we could conduct, in cooperation with SERO, that would help you understand management options, but they're not directly contained in the stock assessment. That's an additional body of work.

One thing you will notice here is this big jump between 2018 and 2019, and I wanted to explain that a little bit. In 2016, which was the terminal year of the assessment, we assume that these low levels of catch in 2017 and 2018 are an effect of the hurricane, and so, essentially, the catches were very low because we believe effort was low, either because fishermen were not fishing or their gear had been destroyed, et cetera, et cetera.

That left essentially spiny lobster in the water to reproduce and to grow, and so you can essentially catch those now, in 2019 and 2020 and 2021, et cetera, and so, essentially, we're making the assumption that these low levels of catch which occurred post-hurricane are due to a decrease in effort and that the hurricane did not impact the population of animals. It did not directly

kill spiny lobster.

That's why these numbers are quite large in the initial years, because you're actually above the level of biomass that supports MSY, and so you can fish them down a bit, and so you're actually fishing these animals down towards their maximum sustainable yield, which is 134,000 pounds, according to the stock assessment, and here as well. You can see you're fishing them down towards 128,000, and you are fishing them down towards 433,000.

That is essentially the SEDAR 57 assessment, and we can leave up this slide if it helps you with questions that you might ask, but, at this point, I will open the floor to any questions that you might have about the assessment.

MARCOS HANKE: I have Tony Blanchard.

TONY BLANCHARD: I've got a couple of questions. You have a slide there that states the maximum size of the female and the male lobster. The question is where did the information come from? In other words, where did you come up with the maximum size on the male and the female, and what would be the weight calculated to the length? That's question number one.

SHANNON CALAY: I don't have the information handy about the weight-length relationship. I could get that for you during this meeting. The growth curve came from a paper by Leon et al. in 1995. This comes from the document Leon et al. in 1995, and so these are just shapes that are fit to the underlying data, and, unfortunately, the underlying data is not plotted here on this plot, but you can see, with the length composition data that's available to us, we also see that males are larger than the females, and this can occur for a few different reasons. It can occur if the growth is different, which is our assumption, and so we're assuming here that males just grow larger than females.

This can also occur if the mortality is different between the two sexes, but we assumed that mortality is the same, that the mortality at age is the same for males and females, and what differs is their growth, and so, if you're asking me where did it come from, in terms of location, I will also have to look that up for you.

MARCOS HANKE: One follow-up.

TONY BLANCHARD: Yes, because I believe that these numbers are off, and I believe that the lobsters in the Caribbean are actually bigger than this, and that's why I wanted to see what it calculated

to. The other thing is the projections on the last slide that you showed. The projections only go down, and now my question is how you could project that numbers are going to go down through time.

SHANNON CALAY: All right, and so let's attack the first question first. The growth curves that I showed you with the L infinity value -- I should point out that this would just be the mean size of animals at age, and so there will be animals bigger and smaller at the same size, and this is not the maximum size, but it's the mean size at age, is what L infinity is, and so this does not mean that there aren't animals bigger than this.

It just means that, at age-fourteen say, that there would be animals distributed above and below this curve. This does show you our estimate of the variation of the size, but this is just a CV, and so it still does not indicate the total range of sizes that could be available, and so, yes, there could be larger animals out there.

Now, how do we project? We assume that the selectivity pattern that occurs in the last year of the stock assessment, which is that dome-shaped pattern, and so maybe you can find one of those dome-shaped patterns, and we assume that the selectivity of the fishery remains constant in the projections, and so any of these is fine.

For example, if this was a selectivity pattern estimated in 2016, which it is, for St. Thomas, in the projections, the selectivity pattern of the fishery remains the same, but the animals in the projections continue to grow older and experience mortality, growth, reproduction, and fishing, and so, basically, we continue to estimate the population dynamics, but we assume that recruitment will be constant, that selectivity will be constant, and that the fishing effort will be FMSY, the fishing level that supports MSY.

One more thing to mention about the projections, and maybe if you could just bring up that table again at the end. This would be an estimate of our overfishing limit in 2019, and let's say you actually caught less than this. Let's say you caught only 150,000 pounds. That would mean that there's actually more available to catch in subsequent years, and so, any time you either have an underage or an overage in a fishery, it's going to impact the catch limits in subsequent years. That is just something to mention, a caveat of projections.

What typically happens in our stock assessments is, once we actually know whether there was a substantial overage or underage in 2019, it might lead to a council request to update these

projections, so that we account for the actual level of fishing that took place.

TONY BLANCHARD: My personal thing is I don't believe in projections, because things change very quickly, whether it's for the good or it's for the bad. The thing that gets to me is that the projections are always on the down side, meaning that it's always -- The trend is that the fishery is going to get weaker, just by looking at this, and, now, if the carapace length is three-and-a-half, and, according to the information you just brought earlier, the maturity at 50 percent was a three-inch carapace, and that would actually mean that they have quite a bit of time to produce more eggs, and, according to you, the bigger the lobster, the more eggs that they're going to produce.

Actually, in my opinion, this don't calculate for me, because you're going to have bigger lobsters, and I'm going to tell you why we're going to have bigger lobsters. It's because how we fish. Nobody wants the eleven or twelve-pound lobster. The reality of it is that you can't come up with the money. An individual, most individuals, would not buy something that big, and so you are producing a lobster, you're bringing a lobster to market, that you're going to be able to sell, and that's the whole thing about bringing it to market, unless you're taking it for yourself.

The majority of lobsters would fall within a size range, because of how we decide to take them, and so you're not calculating for as big as they come, as many of the sizes that we're going to release, because let's say we decide to keep lobsters no bigger than five pounds. The lobsters get a lot bigger than that and with all the eggs that they're producing, but the thing that gets to me is always on the down side and the projections. It's never that the fishery gets any better.

To me, it looks like the fishery is going to get better when you're targeting a smaller lobster, and the minimum size for production is a three-inch, when we take a three-and-a-half, and so we're taking it straight up the middle, in my opinion, and so the projections don't work for me, and that's just my opinion.

MARCOS HANKE: Roy, to that point?

ROY CRABTREE: Yes, and so I agree with you. I don't believe in projections either, and I suspect Shannon doesn't really believe in projections, but we do them, but, when you're projecting out into the future, you don't know what's going to happen, and so they're usually pretty good maybe for a few years, but, beyond that, who knows?

In this case, the stock is in somewhat better shape than the target level, and so, when you project out into the future, it's going to converge on MSY, because that's the way it's set up, so that it has to.

If you were, though, in a rebuilding plan with an overfished stock, and you ran projections, they are going to show an increasing stock, and increasing catch levels, because the stock is going to rebuild under the projections, but the reality is we're assuming that recruitment is going to stay the same, and we know that it won't stay the same.

It's going to go up, and it's going to go down, and it's going to bounce around, and then there are all kinds of unknowns, like what's going to happen with the market and what's going to happen with demand and hurricanes and all those things, and so you're right to be skeptical of projections.

They're something we have to, because we have to set the catch levels, but we all know that the future is an unknown, and, the farther out into the future you try to project, the more difficult it becomes, and so we do them, and they guide us, but we know that, ultimately, they're wrong, and it won't come out exactly like that, but they don't necessarily go down. They can go up, but it just depends on what the status of the fishery is.

I guess, in this case, we don't have ABCs, and it's my understanding that we need to have a discussion of what P* we would use, and then what we need to do is we would then get an ABC, I guess at the next council meeting, maybe, in the April, and then we're going to need to do a framework amendment to reset our ACLs, and that will then go into place once the island-specific plans are implemented, and so I think our goal probably here ought to be to use this assessment and get the new ABCs and adjust our annual catch limits for the 2021 season, and so we would want to get those in place towards the end of next year, maybe.

MARCOS HANKE: Thank you, Roy. Very quick, Tony, and then we'll go to Richard.

TONY BLANCHARD: Okay. I'm glad that you said that, Roy, because now we're talking about predictions, or projections, I should say. Your projection is, when a stock is overfished and it's in a rebuilding process, that it's going to go up. Now, this don't have to do with lobsters, but I'm glad that you brought it up. What about the groupers? What are the projections on that?

They are supposed to be in a rebuilding stage, and for how many years now we've closed down the fishery, and we can't come up with some kind of numbers to bring to the table? Do you understand the point that I'm trying to make?

ROY CRABTREE: I understand your point, and so the dilemma we have here is we don't have projections for the grouper, because we don't have assessments, and so this is really the first quantitative assessment we've gotten, where we actually have projections, and so it's a big step forward for us, and it's the right direction, but we have a long ways to go to get to assessments for more of these finfish species, and, once we get a quantitative assessment, we'll get projections out of it, and they will be subject to all kinds of uncertainties and things, and maybe they will show the groupers weren't overfished to begin with, and I don't know what they will show, but that's our problem.

I don't think we have projections for any other species we manage. We just have judgment calls that we think it was overfished, and we think the management we have put in place is about right, and so we think things should be improving, but we don't really know, and we really can't quantify or project it, and so that's kind of the dilemma.

In the Gulf and in the South Atlantic, we have lots of stocks where we have assessments, and we have projections for all of those, and they go in different directions and all of that, but we just don't have that yet here.

MARCOS HANKE: Tony, please, very quickly.

TONY BLANCHARD: Okay. Let me get back to you, and this is the problem, is we always seem to project that things will get worse, or we're always assuming something is not right, and we are mandated to manage stocks, and I am talking about the grouper, specifically.

We don't have the information, and Nemeth and the college goes out there every year, on the Grammanik and on the Grouper Bank, to study the groupers. I don't know if it's let's say our lack of not wanting to take it on to bring a stock assessment to these groupers, and I don't know whether we're afraid to see what the truth is, but I think we have a responsibility that we need to look at this stock, and I am not blaming you, but I'm just bringing it to the table, because you can't pick and choose what you're going to manage, because, at the end of the day, the only one that is really being affected here is the fishermen, and the commercial fishers, because the scientists are going to get the grant to go

inside there and study the fishery, and we get to sit outside and watch them make money off of our fishery. The truth of it is the stock of the grouper on the Grammanik, from what I understand, from talking to people that has dived on the bank, is the numbers are well up there.

ROY CRABTREE: Well, I agree with what you're saying. I think the reason we started with spiny lobster here is because that's where we have the most information, but our goal is to get to some of these other stocks and get assessments there, and I understand that the fishermen pay a price for all this. We all pay a price for all of this, because we come down here, and we want to be able to eat these things, and they may not be available, because the fishery management isn't up to where it needs to get to.

I don't think anybody is afraid of trying to get these assessments. I think we all want to get there, but it's just a process. They have made a lot of progress on how to do assessments for data-poor stocks, and we just are going to have to see what finfish species do we think we can apply these same methods to, and can we produce an assessment that is credible and that we think is good enough for us to manage them on.

MARCOS HANKE: Let's include other people in the loop. I have Miguel and then Richard.

MIGUEL ROLON: Remember the discussion among the council members is the most important part of any meeting, and I am glad that Tony brought all these questions to the table, because the exchange between Roy and Tony is what you really are after in this meeting.

In the case of the spiny lobster, it's the first of all the species that we have, in forty years, that we have the numbers that the scientists can look at them and take them to peer review and come back to the council with specific numbers. That doesn't mean that any of the things that you have here will trigger an immediate action by the council and go running like crazy to close here and there. That's not what we're saying.

What we're saying is that you have better information now to make a decision on the management of the species, especially the spiny lobster. The issue of the Nassau grouper and the other groupers is a very important one, and, once we have the island-based FMP approved, hopefully next year, you will be able to pinpoint issues that are actually related to the islands that you are going to have these management plans for.

What Tony is talking about is your responsibility, and that's what

you are supposed to be doing in the next twenty years, and hopefully I won't be around, and so I believe that we should allow Shannon to finish the presentation with a discussion, and we have the Chair of the SSC raising his hand for a long time, but this is important that you all understand what this means.

P* is something that -- Actually, I found a lot of information about P* and what it is, but I bet everybody is like me and is confused a little bit about what the hell is P* and what it came from, and P* is -- Luckily for us, we only have one, and psychologists have two, and doctors have three and four, because, if you want to drink poison, you want to make sure that it won't kill you, and so you need four stars, but you are talking about fisheries here, and the council, not at this meeting, and not at this moment, but, probably in the spring, you will have to come and decide some of the things that you have to do regarding the information with the P* that we have here, which is the probability of -- We can discuss it later, but, if you have a question of what the hell is it, I'm sure that Shannon and Richard and Roy can explain to you a little bit better than me.

Basically, now, what we need to do is to accept the report from the SEDAR 57, but also allow Shannon to finish, and then continue with the discussion, and we have plenty of time.

MARCOS HANKE: I want to go to Richard.

RICHARD APPELDOORN: I just want to make a comment relative to Miguel's initial question, which was is the management we have in place okay, and Shannon didn't show it, but we were presented this in the SSC, of what the track of the history of the various fisheries on the islands were over the time period of data analyzed, and, in that, and, Shannon, you can correct me if I'm wrong, but I think St. Croix exceeded the limits once, and then came back into compliance during its history. St. Thomas approached those limits, but never exceeded them, and Puerto Rico has not come dangerously close to exceeding the limits, and so, unless you set your OFLs and ABCs and ACLs at the proper limits -- Yes, it's certainly possible to exceed what the safe bounds of the fishing is.

MARCOS HANKE: Thank you, Richard. I have Julian.

JULIAN MAGRAS: Just one thing on the projections here for 2019. We project a higher number, but we must also, when looking at that number, take into consideration that a lot of the fishers still have not gone back to where they used to be in fishing effort, due to the fact that we haven't received our disaster funding, as yet,

and we don't have the monies to put back into our businesses to bring us back to that level.

I think that 185,000 pounds is -- It should actually be a lower number, and then you go down, and so I have the same problem that Tony has with the projections and that, but I understand, at the same time, that you have to put numbers there, and we also have to take into consideration, because of the hurricanes also, and it's not only the catch per unit effort, but our fishery is a market-driven fishery. The big hotels, some of them are still not open, and those that are open aren't at 100 percent. That drives those numbers even lower. That's just my comment on that.

The next thing is, in the recommendations area, of the last day of the final assessment meeting in Miami, one of the discussions that went on the table and went on the record was, in the reports, there was no place that showed clearly to the scientists during the final review where all of the area closures were at, and we had this discussion at the end of the day, where we were all able, from the three different sectors, able to put that information out there, and some of the scientists from the different areas were concerned about that, because they were like, well, wait, this can make this even go better for the fishermen, because you have all of these large protected areas, and you have done no assessments in those areas, and we're just talking about the lobster.

We do assessments in all of the area closures, like we have the Red Hind Bank and the MCD, and we only study the Hind inside of there, and you have the Grammanik Bank, and you study the Nassau grouper, and you study the yellowfin grouper, but those banks don't only produce those species. They produce every species all year long, and so I see that it didn't make it to the recommendations list, and so, if possible, if a council member can add that to the recommendation list, that we do assessments in both federal waters and territorial waters, for the large area closures that we have.

One last note is, when it comes to stock assessments, when we put the SFA in place back in 2005, we put a lot of seasonal closures in place, and, every meeting I attend, I request for stock assessments, and I know the next SEDAR is going to be on the queen triggerfish.

Queen triggerfish is very important to our fishery, but, at the same time, it's not one of those stocks that has been closed on a seasonal closure for fifteen years and we still don't know what they are doing, and so I'm just throwing that out there, and I think we're moving in the right direction, but I think the council can make some improvements in some of those areas. Thank you.

MARCOS HANKE: Shannon.

SHANNON CALAY: I would like to respond to a few things about the projections, as mentioned by Tony and by Julian. I wanted to clarify that this decrease you see in the -- First of all, let me start by clarifying that this is not a predicted catch.

This is not a prediction of the catch. This is the catch limit, above which you would be overfishing, and that's what the stock assessment model produces, and so, if the fishery does not actually catch as much as this, or if it exceeds this catch in 2019, the council could request, and this is what happens in other regions, in the Gulf and the South Atlantic, an updated series of projections.

These values matter, and so this is our annual catch limit, and you would not want to exceed this value, but, if you are below it or above it, it affects all the subsequent numbers, and so you would ask for an update.

All right. The next thing is it has nothing to do with the selectivity patterns that we projected that these numbers decrease through time. Instead, it's because you are above what is considered the maximum sustainable yield of this population, and so, because we project FMSY to give you the -- We allow you to have as much as you can take without overfishing, and the stock assessment model allows you to catch that surplus, and so it's allowing you to catch more than MSY as long as you're above the level that supports MSY, and you are essentially fishing down to the level that supports MSY.

Then, if you carry these numbers out, through a long period of time, they would converge on MSY, and so that's why these numbers decrease, and it has nothing to do with the selectivity pattern. It's simply that, currently, in all three island platforms, we are above the level that supports MSY, and you can take the surplus. I think those are two of the questions. Then I can't remember the first question Julian asked that I could actually answer.

MARCOS HANKE: The closed areas.

SHANNON CALAY: That's the second question, but the second question about the closed areas -- I mean, currently, this model is not spatial in nature, and so it just takes the total removals and the length of those removals and the biological information, and it assumes that, however you manage the fishery, it has produced those removals and that length composition data and that that will

continue similarly into the future.

What's important is, if you were to introduce a new management measure that we have not incorporated, that would have to be addressed in future assessments. Now, yes, you can absolutely make a recommendation that we try to improve upon how we are modeling the spatial nature of the stock assessment or how we are evaluating the various management measures, and that's certainly a good recommendation to make, but, at this time, the data limitations are relatively severe, and this particular model does not contain that sort of spatial structure to analyze specific closures.

MARCOS HANKE: Thank you very much. I have many requests for a break. Because everybody is so interested, I think this is going to extend a little bit. I have Toby in the queue, and let's take a ten-minute break and come back for questions to Shannon.

(Whereupon, a brief recess was taken.)

MARCOS HANKE: Shannon is going to restart her presentation. Please take your seats. Thank you for your patience, Shannon. Let's keep going. Before you proceed, I have one question left from the queue before from Toby.

WILLIAM TOBIAS: Thank you very much for your presentation. It was very interesting and very detailed, and it's nice to find out that we have some qualitative information now that the spiny lobster fishery is not overfished and not undergoing overfishing. Can you pull up the last or the next-to-the-last slide with the table? Thank you.

Looking at the ACL and the new SEDAR 57 MSY figures for St. Croix and St. Thomas, the difference between St. Croix and St. Thomas really is not very much. What's interesting to note though is that the island platforms of those two areas are so very different.

St. Croix is an oceanic island with probably only 10 percent the size of the platform of St. Thomas and St. John, yet the catch rate is -- The ACLs are slightly higher, or nearly as high, in the MSY projection.

One of the recommendations that I would like to see forthcoming is why, in terms of recruitment, is the catch so high on St. Croix, given the platform being so small. Where does the recruitment come from? The larvae life cycle is extremely long, and, by the time these lobster get to marketable size, they are beyond three-years-plus in age, and so I think that recommendation I would like

to see come forth.

SHANNON CALAY: Thank you. I will duly note that. Thank you. Shall we move on to the presentation?

MARCOS HANKE: Yes, please.

PROPOSED HARVEST CONTROL RULES FOR THE U.S. CARIBBEAN

SHANNON CALAY: Okay. Some of the slides that I am going to show you were previewed by Rich, and so you'll have seen this before, and you will probably see it again in the future. This is a summary of the control rule and how the control rule works to go from OFL to estimates of ABC, acceptable biological catch.

Just a few definitions. "Overfishing" just means that your annual rate of catch is too high to support MSY. MSY is the largest long-term average catch that can be taken under existing environmental and fishing conditions. Scientific uncertainty, what we're talking about is the uncertainty in the information about a stock and its MSY yield reference points, and so that could include, for example, incorrect specifications of biological information or fisheries selectivity. It could also include time lags in the assessment updates, potential ecosystem and environmental effects, and other factors.

"Management uncertainty" is the uncertainty in the ability of managers to constrain the catch so that ACL is not exceeded, and so this could be estimation errors in the true catch amount, but it could also be late catch reporting, misreporting, underreporting, et cetera.

You probably saw this slide a few years ago, but these are all the acronyms that are used under Magnuson, and overfishing limit, again, is the level above which -- It's the catch that should achieve MSY in the long term, and you are overfishing if you are above OFL. ABC is the acceptable biological catch, and it is a level reduced from OFL to account for scientific uncertainty, and that reduction is described by the ABC control rule.

ACL is a level of catch that will invoke an accountability measure, such as a closure or a management action, and ACT is used by some councils, and it can be further reduced from ACL to account further for management uncertainty or to achieve optimum yield.

Now, the important thing to note about this control rule is that you can set any one of these equal, but ABC, ACL, and ACT -- ABC cannot exceed OFL, and ACL cannot exceed ABC, but they could,

theoretically, be set equal to one another.

One more thing about this. By MSRA definitions, this reduction is typically scientific uncertainty, and it's described by the SSC in its ABC control rule, and, from here to here, these are reductions that can be used by a council.

How does this all work? First, we need to estimate the overfishing limit, and so, again, OFL, fishing at that level over the long term, will achieve the maximum sustainable yield, and it is also the level above which overfishing occurs.

Now, OFL is only able to be properly estimated using a stock assessment model. Tiers 1 through 3 of the Caribbean control rule require stock assessment results to compute the OFL, and the recent spiny lobster assessment is considered a Tier 3 stock assessment, and it does produce that estimate of OFL that is required, but, to enact the ABC control rule, the SSC requires some input from the council, specifically regarding the acceptable risk or probability of overfishing, in order to develop the estimate of ABC.

Richard showed you this, and this is the text, some text, from the Tier 3 control rule, and so condition for use is that you have either a relatively data-limited or an out-of-date stock assessment, and, in this case, we have a data-limited stock assessment.

I wanted to point out that, unlike Tier 4, which is the catch-only tier, this stock assessment does produce your status determination criteria, and so it does produce real estimates of the maximum fishing mortality threshold, minimum stock size threshold, and MSY. These all are produced by the spiny lobster stock assessment.

In your Tier 3 control rule, the OFL is specified as the annual catch when fishing at the maximum fishing mortality threshold, which is typically set at FMSY or its proxy, and so that is how we computed OFL, and we projected fishing at MFMT. Your ABC is the acceptable biological catch as reduced from OFL by scientific uncertainty, and it reflects, essentially, the acceptable -- Also by reflecting the acceptable probability of overfishing, which is P*.

Scientific uncertainty is quantified by the SSC, by taking into account various information about the species life history and ecological function, perceived level of depletion and vulnerability of the stock to collapse, and, by definition, the acceptable probability of overfishing is determined by a council, typically, and it cannot exceed 50 percent, and it should almost

always be lower than that.

Step one of this process is to estimate OFL using a stock assessment, which we have done. You just saw the review of the stock assessment, but stock assessments use information not just about catch, but about catch, catch per unit effort, length composition data, age composition data, which we don't have in this case, and fish growth, mortality, and reproduction rates to estimate the trends in fishing mortality and population size, as well as the current stock status, whether a stock is overfished or experiencing overfishing, and also its status determination criteria. All of these things require a stock assessment.

A stock assessment can produce a point estimate of the overfishing limit, and this is just a theoretical example. None of the data you're about to see in the first bit of this presentation are real, but let's say you have a stock assessment and it says OFL equals 100,000 pounds. That is called a point estimate.

Now, you have, within a stock assessment, uncertainty in your data inputs and your model parameters, and that uncertainty can be used in the stock assessment, through a boot strapping process, for example, to produce a PDF, and so now say you have 1,000 outcomes, or I think, in this case, it was 10,000 permutations of the stock assessment that include the uncertainty in the various data inputs and assumptions, and so now it produces OFL estimates ranging from 40,000 to roughly 300,000 pounds.

Now, this is the cumulative probability, and so starting at zero and then someone out here, around 300,000 pounds, you have 100 percent of your probability. The 50th percentile of this PDF occurs at 100,000 pounds, and that is your OFL, and so that's 50 percent probability of overfishing, and let me explain that a little bit more.

In this case, remember that the estimate that comes from a stock assessment is truly just an estimate, and so let's say that your true OFL is actually lower than 100,000 pounds, and so 50 percent then of this distribution would -- If your true OFL is lower, than you have some probability of overfishing, and, by definition, we're assuming that -- This gets a little complex, but the OFL is set at the level that is a 50 percent probability of overfishing, and so a true OFL lower than that will indicate overfishing. If your true OFL is higher than that, you will actually be underexploiting the resource.

What is ABC? Again, ABC is acceptable biological catch as reduced from the OFL by some measure of scientific uncertainty and

reflecting an acceptable probability of overfishing, and so, again, that's all P* is. We're going to say P* a thousand times, and it's just the acceptable probability of overfishing, and so there are actually two variables that determine how big is that reduction between OFL and ABC, and it is the sigma min that you will hear about and P*.

First, let's look just at the effect of P*, which is -- We're asking the council for its advice on how to set P*. The highest legal P*, to my understanding, is 0.5, which has a 50 percent probability of overfishing. If you used a P* of 0.5, you are implicitly setting OFL equal to ABC, and you are saying there is no scientific uncertainty. You are neglecting scientific uncertainty, and so one should only consider a P* at or near 0.5 for data-rich assessments, when you can assume that scientific uncertainty is negligible, and we are not in a data-rich assessment condition here in the U.S. Caribbean.

Most councils have chosen to set P* values ranging from 0.3 to 0.4, or a 30 to 40 percent probability of overfishing, and they do this to avoid triggering overfished or overfishing determinations, and an overfishing determination requires the council to take essentially immediate action to end overfishing, and an overfished determination requires the implementation of a rebuilding plan, to bring the stock back up to an acceptable level of biomass.

In either case, if these things happen, a significant reduction in catch can occur, and so that's why you set a buffer, to prevent these actions, which may require a substantial reduction in effort from a fishery.

The effect of P*, and so I showed you that 50 percent probability of your PDF on OFL is how we set the OFL level. In this case, that was 100,000 pounds. We're asking the council to give us advice on their acceptable risk of probability of overfishing, and they have to be lower than, or no higher than, at least 0.5, and so I'm showing you here, in yellow, a P* of 0.4.

If you just track essentially back to the cumulative probability, that one occurs in this yellow bar, and so it actually occurs at 91,000 pounds, and so it's a 9 percent reduction from OFL if you choose a P* of 0.4.

If you were to go to a P* of 0.25, which you might for say a data-limited assessment or for a stock you felt was at particular risk of overfishing for some reason, that would be the green bar here, and it is actually an ABC of 78,000 pounds and a 22 percent reduction from OFL.

Now, for this example, I did use a sigma min of 0.36, which I will tell you why I did that in a moment, and I assume that OFL occurs at the 50th percentile, and so, in every one of these cases, OFL is 100,000 pounds, but ABC depends on how conservative you want to be with your P* level.

Typically, in management councils, for data-rich assessments, they might be looking at P*s of about 0.45. The Gulf Council, for example, has set -- They have a tiers and dimensions table that they use to set P*, but they have, by definition, set them to range between 0.5 and 0.3, and most of them are around 0.4 for assessed stocks. In some councils, they have chosen to use more conservative levels of P*, for particularly data-limited stock assessments.

That 0.36, that sigma min, just a little bit of a diversion and some background information, and it comes from a document called Ralston et al. in Fishery Bulletin published in 2011. What Ralston did, and his team, is actually look at the historical performance of a number of stock assessments, I think fifteen different stock assessments, and so what he is showing you here -- This is a whole bunch of assessments of Pacific whiting, which you can see has a -- These are the spawning biomass estimates that come from a whole bunch of different stock assessments conducted over time, and you can see that any one stock assessment model has some uncertainty, but, if you look at the performance of stock assessment models that are done over time, multiple times, they have an even higher level of uncertainty, and some of that is because you learn new information, information improves over time, and so your stock assessments change too, as information improves.

In general, during the most recent years, they actually perform fairly similarly, and that's true of many stock assessments, and so now what he did is he looked at the deviations between all these different realizations of a stock assessment of Pacific whiting and fifteen other stocks.

What he showed is, across all of these stock assessments that he examined, you could basically look at the variance structure, how variable the results are, and it turns out that this distribution, which I'm showing you for data-rich assessments conducted in the Pacific, had a sigma of 0.36, which is what, in this case, this author, used as sigma min. That's how that was derived, from looking at all of the stock assessments they conduct over many, many, many iterations.

Now I'm kind of letting you know that, when you calculate ABC, the

percent reduction between ABC and OFL actually depends on both sigma min and P*, and so sigma min is the scientific uncertainty, and it is essentially the SSC's determination of the plausible or of the likely, I should say, scientific uncertainty in a stock assessment model, and P*, which is your probability of overfishing, as determined by the council.

Here is your percent that -- It's ABC as a percentage of OFL, and so, when you're at 100 percent here, ABC is equal to OFL, and there is no buffer, and that occurs whenever you set P* at 50 percent, and so, if you were to use a P* of 50 percent, no matter what the scientific uncertainty of the stock assessment, you would be setting OFL equal to ABC, and there would be no buffer.

Now, when you go down to 0.45, for example, you can see that, as sigma min increases from 0.36, 0.54, 0.72, 1.08, 1.44, and so, as your sigma min increases, so does the size of your buffer between OFL and ABC, and so let's just do one that's easy to read.

At 0.4, and a sigma min of 0.36, the buffer -- The percent reduction is about 10 percent between OFL and ABC, or you could say that ABC is 90 percent of OFL, but, way down here, if you assume a much wider distribution, a much bigger scientific uncertainty, in this case a standard deviation of 1.44, the buffer now is about 30 percent, and so your ABC is roughly 70 percent of OFL.

Then, as you get down to P* of 0.25, you can see that the buffer can be quite large, depending on your sigma min, and so remember that sigma min is the width of that distribution. What does this all mean for you?

Here is spiny lobster, and I want to tell you, again, that these are preliminary results, preliminary OFL estimates, and we probably will need to -- We have currently assumed landings for 2017 and 2018 in that assessment. As we get new information about those realized landings, that assessment could be updated, and so this is based on the base models that were presented to the SSC in October.

Here is your OFL, and let's pay attention first to this first value for St. Thomas in 2020, and it says the OFL is 160,433 pounds in that year, and so, according to the SSC, they are currently expecting a sigma min value of 0.5, and Tier 3 requires that you use two-times sigma min, and so you're using a sigma min then of 1.0 in this case, and what does this mean in terms of your P* values and your ABC?

You will see again that a P* of 50 percent, you return OFL equal

to ABC, and so 160,433, and so ABC is 100 percent of OFL, and there is no reduction, and you are assuming there is no scientific uncertainty, and, if you exceed 160,433, you will trigger accountability measures, because you will be overfishing. You will also trigger an overfishing determination.

At a P* of 0.45, the ABC is reduced 141,488, and so you've got about a 12 percent buffer now, and ABC is 88 percent of OFL, and so that's how that works, and so you will see that the difference between OFL and ABC gets larger as the P* decreases.

MIGUEL ROLON: Shannon, just a comment to the council members. Those two or three slides that Shannon just presented are the core of the discussion that you have to have, and, as I said before, if I'm a fisherman, I would like to have as many lobster as I can. Let the scientists figure out the P* or whatever other star you need, but, in this case, the best available information, remember, has to be by the SSC.

The Center provides you the best methodology they can, the best available assessment, but here is where you have to look at the picture and now project in your mind how will that affect your fishery, the management at the local level and the federal level of the lobster.

Shannon has said, over and over again, that the ABC as close as the OFL is when you have good, reliable data, time series that you can rely on it. When you don't have that -- In our case, when you have uncertainty, you have to choose between the possibility of closing the fishery because you reach that OFL or creating the buffer that you need to preclude people from going over that overfishing, and that's what you need to decide.

Maybe not at this meeting, but at the next meeting, but we need to give some indication to the scientists as to where you want to go. This explanation, to me, has been the best explanation ever of the P* and what happens whenever you choose one or the other.

The sigma number is new to me, and I didn't know anything about the sigma number, and I am too old, and this was probably developed recently, but it gives you strength at the level that you are going to pick, and can we go to your graph, where you have the lines?

That gives you a good picture of where are the parameters and what will happen if you pick one or the other. 0.25, if you think that you don't have any data whatsoever that will give you some confidence, you pick 0.25, but then you won't be able to survive any fishing dock, and so you move to the right of that curve. At

the end, you have 0.5, which is where you have all the data in the world to make your discussion, and so the council has to pick between 0.4, 0.45, and 0.3. That's where you need to look at and decide.

Then you can ask the scientists that, if I pick one, any of those, then how the fishery will behave, and that's what the other table that Shannon is presenting to you gives the picture of where you're going to be. This time, she had numbers to present to you.

MARCOS HANKE: Bill.

BILL ARNOLD: Shannon, I have two questions, and one of them is on this. Now, this is my lack of understanding, but this is databased, as you explain it, but can you factor in an existing conservative approach to the fishery, for example that three-and-a-half versus three-inch for spiny lobster, and, if you did, how might that influence your choice of points along these curves?

SHANNON CALAY: Well, usually, we have typically done things the other way around, where we have given -- The council has, essentially, determined OFL and ABC, and then, when we get requests to analyze different management measures, they come after, subsequently, and that requires often -- We have what we call a decision support tool, which could be used, because the decision support tool is a tool written for Stock Synthesis, which this model was done in, which does allow us to make some different decisions about management, for example selectivity and retention and size limits, and so we could be asked to provide information, through a council request, but, typically, already the council would have decided what their catch they desire is, and they would just be looking at minimum size limits that could achieve that catch, for example.

BILL ARNOLD: I just like to make sure all the options are out there, and so my second question is on your last slide, the one with the --

SHANNON CALAY: It's not quite my last slide, but it's getting there.

BILL ARNOLD: Okay. Sorry. That one. Talking about doing things backwards, in the past, we have established the percent reduction, and that has tacitly created a P*, and we didn't know what it was, but it was there, and so could we do that here? For example, again using spiny lobster as an example, the SSC set a reduction of 5 percent, or the council did, and I don't remember who, but that's beside the point, and I assume that could be done, and you would

get a P* of like 0.48, and there's no absolute obligation to choose a P* that's 0.5, 0.4, or 0.45, right? It's just a continuum, isn't it?

SHANNON CALAY: There is no obligation to choose 0.45 or 0.4. Yes, that's correct. It could be any value below 0.5, by law. You could, essentially, decide that you want to -- You want a 20 percent buffer between OFL and ABC, and that will track directly to a P* level. They are mappable.

These reductions will always take place at this P* level, the way we are currently computer them, because the way we're currently computing them is to establish sigma min and to establish P*, and so we're not using directly the PDF that comes out of the stock assessment, because, typically, projections that come out of stock assessments have much lower uncertainty, because so many of the parameters are fixed and not estimated.

That sigma min and P* cause this reduction to be able to be directly mapped to a P* level, the way we're computing it today, and so, yes, you could. If you wanted to say a 20 percent reduction, we could map it directly to the corresponding P*.

Now these ABCs show you how sigma min of 0.5 and this P* affects this estimate of OFL, and so here's OFL, and these are the ABCs that would be derived using a different P*, but now let's use 0.4, just as an example, and the sigma min of 0.5 to compute the ABCs for each year in each island platform.

MARCOS HANKE: Shannon, excuse me. I have a question that I think is to the previous point. Julian and then Kevin.

JULIAN MAGRAS: This goes back to your first presentation of where you're putting out the preliminary OFLs. In 2020, you have a number of 185,943 pounds. Now what we're looking at is 2020.

SHANNON CALAY: I introduced a confusion here, because that 185,943 is actually a 2019 estimate, and so these are the same estimates that come out of the final slide of the stock assessment, but you saw 2019 as well, but I took them out of this table, because you can't actually manage 2019 anymore. It's over.

JULIAN MAGRAS: Well, I understand that, but that's a problem, because you're already introducing them, and you're showing me a higher number for a fishery that's not to its potential. We are slated to have all of our hotels open up by December of 2020, and so our catch is going to go up. What I see coming out of this is you're driving me into an overfishing place that I am not

comfortable with, because I previously saw that number of 185,000 pounds, which should actually be the number for 2020.

SHANNON CALAY: Correct.

JULIAN MAGRAS: I am just putting it out there to the council that I think that these numbers need to be revisited, so we can come up with the right, corrected number, and so I'm a little confused. If I'm wrong, correct me.

ROY CRABTREE: When do we expect we would get the 2019 landings?

KEVIN MCCARTHY: That is entirely dependent upon territorial staff and their ability to get the data entered. I would hate to give them a deadline, because they sure don't work for me, but I think it's late spring, May let's call it.

ROY CRABTREE: Shannon, if we got you the estimates for 2019, you could plug them into these projections and do that relatively easily?

SHANNON CALAY: Yes, that's absolutely possible and routine.

ROY CRABTREE: If our goal is to get this done by say the August meeting, we should be able to get those landings, and, if Julian is right and they come out lower, plug them in, and that would raise the values for future years, and so I think we can do that.

MARCOS HANKE: Kevin.

KEVIN MCCARTHY: A couple of things. One, in response to -- Well, let me clarify. There's a caveat with the landings for Puerto Rico, because recall that there is an expansion or a correction factor that gets added in, and sometimes that's delayed beyond what the actual input of the landings are, and so it's a little more complicated for Puerto Rico, and so I wouldn't want to -- Well, first of all, I can't tell any of the staff down here when they need to have the data entered, but, typically, they're on about the same pace as the data entry is on the mainland, which is several months behind, and that's -- We've got late reports coming in and all of that kind of stuff, and so that's one thing.

The other point that I had, before we got off on that subject, was I feel like we're entering a period of confusion here between what P* is and what scientific uncertainty is, because I'm starting to hear this how can we work the numbers, and that's really not the intent here, and so I guess I would back up and ask Shannon to say, in your experience, what falls under the heading of scientific

uncertainty, because Bill asked a question about does this larger minimum size -- How does that fall into scientific uncertainty and how can we account for that, and would you put that in the realm of scientific uncertainty, and, if so, what else is in there, and, if not, what else is in there? What is scientific uncertainty, in your experience, versus the P* factor?

SHANNON CALAY: The Science Center right now has essentially advised that this sigma value, which is the width of the PDF that we're talking about, be determined by the SSC, and you can't, unfortunately, use directly the bootstraps that might come out of the stock assessment, because that usually will produce an underestimate of the true uncertainty, because it is just one realization of a model, for one reason, and you saw, with the Ralston paper that I showed you, that, if we were to conduct the stock assessment over and over again for years, there would be more uncertainty between the models than in any one model, than within a model.

The other reason being that, because this is quite a data-limited stock assessment, many of the parameters are fixed, and they are not estimated, and so there is no uncertainty in that parameter. Of course, there really is. Of course, we don't know natural mortality exactly, and so, if we go to more advanced stock assessment techniques, once the data begins to improve, we might be able to free up some of those fixed values and better estimate the true uncertainty, but, right now, what we've asked the SSC to do, or what we've recommended, is that the SSC establish what's called this sigma min value.

KEVIN MCCARTHY: That's scientific uncertainty.

SHANNON CALAY: Which represents the scientific uncertainty in the estimate of OFL.

KEVIN MCCARTHY: I just wanted to make sure that everybody is clear on -- We've got all these new terms that are flying around, and we should use words for a while, so that everybody is clear on what they mean, because I have to step back and say, okay, what does this mean, and I do some of this stuff, and so just so everybody is clear on the first go-round of this that the terminology and the roles and responsibilities for who does this part and who does that part -- Just I think we need to establish, in everybody's mind, what is happening here.

SHANNON CALAY: Now assuming that -- These are all preliminary numbers, and the one reason I say that is because the SSC has not finished their discussions about their decision about sigma min,

for example, and so now what they have is an informal recommendation of 0.5, and, because you're in Tier 3, that gets doubled, and so it's a CV, essentially, of 1.0, and it's quite broad, and so you're saying that the scientific uncertainty is quite large, and these are the P* values.

This is the risk of overfishing that the council is willing to accept, knowing that, if you do exceed OFL, that you have to take actions to immediately end overfishing and potentially rebuild a stock, if it is also overfished, and so you see these percent reductions here, and this is computed with a two-times sigma min of 0.5, otherwise a sigma of 1.0, and that's where these come from. If you chose a different sigma min, these reductions would be different.

KEVIN MCCARTHY: Except for 0.5. 0.5 gets you that no matter what.

SHANNON CALAY: Correct. 0.5 is always the same. OFL is always equal to ABC, and there is no scientific uncertainty. The last slide is now you have annual and island-specific estimates of OFL from the stock assessment. If you assume a sigma min of 0.5, and, in this case, I have assumed a P* of 0.4, just for convenience of illustration, and these are the ABCs that result.

As Julian has mentioned, and others, Tony I believe, any time -- For example, in 2019, you saw that value of roughly 180,000 for St. Thomas. If they caught less than that, we would update these projections, and these numbers would all increase. If you catch more than the recommendation, we would update these numbers, and they would decrease, and so that is a process that we typically do for councils that use stock assessments to produce management advice. It just requires a council request to get updated projections on the calendar.

Here is how the ABC is computed using a P* of 0.4, which is your responsibility to select the P*, and this is just an example, and here's how they compare to the ACLs from the 2012, from the ACLs from the island-based fishery management, and from the SEDAR 57 estimate of MSY. You can see that they are essentially all near or above the 2012 ACL, but they are below the island-based FMP ACL, which was estimated using the Tier 4 catch-only rule.

MARCOS HANKE: Thank you for your presentation. This is probably one of the most important presentations we are going to have in a long time, and there is things that we are all learning how to interpret, and I'm going to make a point that, as a fisherman, for me it's hard to understand.

Once you go to the SEDAR discussion, and you see the graphics, and you see the comparisons, and you see the trends on the population, on the fishery, on the landings, and I'm going to use Puerto Rico as an example. You see very stable things that match, match with the formulas or the scientific expectations of it, in most cases, and they match what the fishermen expect from it, right, and that, for me, is really hard to assume a widening example on the paper that are reached with a different gear and different scenario applied to this and like not a copy-and-paste, and I know that we are all learning on it, but, for my part, I would say that I need much more time to learn about it.

There is no other fishery in the Caribbean that is as known as the lobster fishery, in terms of how stable and how it has been performing and the gears that have been used and the data that have been supplied. Basically, I am raising a flag that I think -- I am using myself as an example, but we need to understand what the sigma min means and if the truly applies to us to 0.36 or how that dynamic works out.

MARCOS HANKE: You don't really need to understand that. What you need to understand is the consequences of adopting one or the other, because, for that, you have to read that paper that Shannon mentioned, and it's going to complicate it. Actually, I was trying to follow it here, and it's over my head.

I will leave Shannon and Kevin to fight with that, but, by the way, I have some information about the -- Puerto Rico probably will have the numbers that you need by July, and we are trying to see if Daniel can hurry up and give us the number, and they are getting close to having the numbers by the end of the year each year, but, anyway, the important thing, I believe, for the councils, and we are not pushing you to make a decision today, and the decision probably will have to be made in August, where you have more elements of judgment and you have more information to do this, but do you remember one time when we were discussing something here with Bonnie Ponwith, and the only two people who knew what the hell they were talking about was Roy and Bonnie?

We got confused with the 50 percent and the 25 percent and all those percentages, and I keep saying that, for a fisherman, what you need is how much you can get away with that is legal and will not get me into trouble in the future, and what we need to do here, in August probably, is to get from here to August to get you as much information as possible. We can even have a short seminar to discuss all of this, if you want to make sure.

If you have questions, you can send it to us or discuss it here,

and that's why we moved Graciela's presentation to tomorrow morning, and, this afternoon, we can continue with this discussion, until you have all your questions cleared up, but rest assured that we won't be able to understand all the intricacies of the mathematics of this in one day.

It will take years to figure that out, but, as Marcos is saying, as a fisherman, you need to know what are the consequences of adopting one or the other, and that's what I believe that Shannon has done a tremendous, excellent job, and I sound like the President now, with those fantastic words, but I believe this is the best explanation that we have heard so far of the intricacies of the P* and everything, and so I believe that, after lunch, we can continue the discussion and probably go back to some of the key questions that you have and go to the -- For example, go to the graph where you have the P* at the X-axis all the way from 0.25 to 0.50, and then you have the sigma number, but just to make sure that we understand that part, and then we'll go again, because people are asking me, Miguel, what the hell is P*?

If you are still hooked up with P*, all the other things just -- You hear it, but you are still thinking, what the hell is P*, and I believe that Shannon has done the best possible explanation on the P*, but after lunch we will go back and discuss it a little bit further.

The other point that Tony and Julian were bringing to the table is, when you have these projections and these numbers, and you take that home, you scare the hell out of people, because they can compare what they are catching, what they predict they are catching -- Every fisherman predicts what they are catching. Otherwise, they don't pay the rent, and so they know what they are catching, more or less, and so they have an idea of the reality of life whenever you have these numbers that they can compare with.

Mr. Chairman, I believe that we can break for lunch for an hour-and-a-half, and then please jot down your questions, so that, when we come back, we can ask Shannon and Kevin and the people around the table, so you get out of this meeting with a better understanding of the process, and remember that you won't be able to make a decision at this time, but at least you will have an idea of where to go.

That table in the lower-left, from 0.25 to 0.50, with the 0.4, it gives you an indication that, if you are going to pursue this using the best available data and best available methodology, and you want to have the minimum risk that you can get, but, at the same time, it will stop you from going overfishing, and considering

that this is not a fishery with a lot of information with the time series, you may go from 0.4 to 0.45, but 0.5 is too risky to go.

It may sound good at the beginning, but if, at the end of the year, you go over the OFL, the next year you will have problems, and remember that you won't have problems immediately, because you have a three-year average and all that, but this is the discussion that we need to have.

Then, between here and August, if you need to have a special day to discuss all of this, you can do that, and this is under the spiny lobster. For the other species, as the Italians say, forget about it, because we don't have any information, and so that's what we would like to suggest, Mr. Chair.

MARCOS HANKE: Thank you, Miguel, and we are on the same lines. One thing I request is the opportunity that we have you here, and now, over lunch, for sure we're going to talk about it and come with better questions to understand, and one thing that one of the fishermen mentioned to me is that we're going to create a new system, a new way of looking into this, that historically has been fishing for lobster, and, to the point of today, we think that the status of our resource is in good shape.

We haven't been overfishing or doing bad things to the resource, but they are afraid of creating something that artificially precludes them from having access to something that they have been responsible for and doing a good job as a fisherman and as an industry, but we need to learn those concepts, and that's my request. I really want to take the opportunity to have you and Kevin and the people in the room to instruct as, as council members, about that. We can break for lunch, if you want to say something.

SHANNON CALAY: I think just a parting thought about P* is P* is just the probability of overfishing, and so all this means is that, if you caught 160,433 pounds, the stock assessment model indicates that you have a 50 percent probability that you are actually overfishing, and so that's all that P* is, is your probability that you are overfishing, and so, basically, the decision needs to be made on just how much cost and other unfortunate outcomes arrive when you have an overfishing declaration, and so it's really --

That's why it's basically a council prerogative to determine their risk of overfishing, because you need to determine how much you want to avoid an overfishing determination, and, if the risk is very high to you that a big catch reduction, for example, would have high costs to the fishery -- If you want to avoid triggering

that determination, you might choose a more precautionary P*, but, if you're fairly confident that you understand the risks of that overfishing determination and that you're willing to accept a higher risk, then you might choose a value closer to 0.5, and so that's what P* is. It's just the acceptable probability of overfishing.

MARCOS HANKE: Let's go for lunch, because there's a combination of questions associated to that that are going to come up, and we can come back at 1:30. Thank you, everybody, and let's break for lunch. Thank you.

(Whereupon, the meeting recessed for lunch on December 10, 2019.)

\- - -

December 10, 2019

TUESDAY AFTERNOON SESSION

\- - -

The Caribbean Fishery Management Council reconvened at the Hilton Ponce Golf and Casino Resort, Ponce, Puerto Rico, Tuesday afternoon, December 10, 2019, and was called to order at 1:30 o'clock p.m. by Chairman Marcos Hanke.

MARCOS HANKE: We're coming back and being ready for the discussion and being promptly sitting down and ready to go. Diana first.

DIANA MARTINO: For everybody that drove to the meeting and are going back home, I have the tickets for the parking. They gave us a special rate of ten-dollars plus taxes, and so, whoever needs the ticket, just come to me, and I will give it to you, the ticket, and then I would like to announce that, in the evening, at seven o'clock, we're going to have dinner at the Playa Ponce Fishermen's Association. We can meet at the lobby, and you can follow me, and Miguel has a van, and he can carry nine people. We are having this as part of our Sustainable Seafood Campaign.

MIGUEL ROLON: This is a meeting with the fishers of Playa Ponce, Puerto Rico. It's one of the key fishing centers of the south coast of Puerto Rico, and it's being supported by the Mayor of Ponce, but they have a tradition of many years of fishing.

The opportunity is to allow the council members and visitors that we have today to see a cozy place that the fishermen call the fishermen's association, and then we have a chef, the one that

Carlos and Marcos is familiar with, the one that goes to CHOW, Juan Carlos, and he's professional, and he accepted to participate, and so, tonight, we are going to offer three species that are not commonly caught and sold in our markets, and we want to alleviate the pressure that some of the other species that are having through the years.

Probably if people get to taste them and they like them, then we will have another plan for those three species, but, at this time, we are going to provide that tasting to you. All of you are invited. You don't have to come if you don't want to, but it will be a nice setup, and it will be for around two hours, and so we expect people to be back by nine o'clock.

DIANA MARTINO: Thank you.

MARCOS HANKE: Thank you, Diana. We can keep going with the presentation and the questions. Shannon, we're going back to you.

SHANNON CALAY: Do you want me to take the podium or just answer from here?

MARCOS HANKE: Whatever you feel comfortable with.

SHANNON CALAY: I will try it from here, for the time being. Are there any further questions about either presentation?

MARCOS HANKE: Julian.

JULIAN MAGRAS: I still have a lot of issues with what's going on here, and one of the things that really caught my attention, right before we broke for lunch, is, back in August of 2018, the SSC worked for almost two years or better in coming up with scalars and buffers for all the different managed species identified by the council.

I am just going to talk on the lobster, because the lobster is what we have here at the table, and the SYL for the lobster was set at 367,000 pounds, and the ABC was set at 220,221 pounds. Now, looking at what the numbers that I see up here today, I see a very, very big difference in those numbers.

The fishery management plans right now that are being reviewed for approval, those are the numbers that are sitting in that plan, and, for my life, I can't understand how -- If we have a fishery that was in the 4a tier and has been moved to Tier 3, which is no longer undergoing overfishing or overfished, where our numbers are supposed to increase, here once again we're taking almost another

75,000 to 100,000 pounds decrease.

I am lost, because this -- We spend so much time, and you're driving us to the point now that we are actually standing a very good chance of actually going into overfishing, and so I would like some clarification on where we're headed.

I know we're not looking at none of the other species, because we haven't done assessments on them, and so those new scalars and buffers that are in place are going to stay in place until we do assessments on those species, but here it is that we have taken the first stock ever, and we're moving them from an overfished stock to a Tier 3, which is not undergoing overfishing anymore, but, instead of us getting an increase, we're going to take a massive decrease.

SHANNON CALAY: I certainly understand your concerns, and Tier 4 uses only catch information and some scientific examinations to try to decide whether the stock is likely to be at risk of overfishing, and so it does not include any information at all that allows us to estimate the current stock status, and so it's a guess, essentially an educated guess, with scientific information.

When the Science Center at least initially proposed a strawman rule, which later was adopted somewhat by the SSC and by the council, it was our intention, given that in Tier 4 you have only catch, and you have no real reliable information to actually make a status determination for the stock, it was the Science Center's intent to set ABC and SYL at levels that would be unlikely to trigger an overfishing determination or an overfished determination without cause, and so they are fairly high levels.

It was also kind of the Science Center's understanding that it was unlikely that the ABC level, or the SYL level, would be attained by a fishery year after year after year. It was thought instead that those might be excursions from a mean or a median level of fishing that would occur infrequently and would be unlikely to substantially damage a stock.

We were trying to create a control rule that was unlikely to trigger management actions without sufficient cause, because we did not have a stock assessment in Tier 4, and no ability to actually estimate status determination criteria.

There is no guarantee, as you have noticed, that, when you move to Tier 3, that you will get a higher catch. That will depend on how accurate -- Basically, you can't estimate things like MSY or OFL

quantitatively using catch only.

You just can't, which is why we try to develop stock assessment advice instead, but, when we move up to Tier 3, it may be that, for some stocks, the information suggests that we can accept a higher level of catch, and for some it will be lower, and there is no way to know that until we actually conduct these stock assessments.

You are correct that the catch only Tier 4 control rule does give you a higher level of catch, but it is not informed by the scientific information that was used for the Tier 3 stock assessment, and so it is certainly the Science Center's recommendation, and it was also the Center for Independent Expert Reviewers' recommendation that the Tier 3 stock assessment conducted by SEDAR 57 was superior in terms of the scientific information used, but it does produce a lower estimate of ABC, and I understand why that causes concern, and so did you want to --

JULIAN MAGRAS: I want to ask a question, because how do you come up with a lower number? What do you use now to come up with a lower number? What scalars and what buffers did you use, because I didn't see this come back to the SSC, where it would normally go through, and say, well, listen, we need to revisit the scalars and buffers that were used before, and that hasn't come back to the SSC, who gives the council the recommendation of how we move with that.

SHANNON CALAY: The SSC determines ABC, and, to do so, they need, from the council, a P* estimate, and that's what they need. Once they have P*, they can compute the ABCs that they will then recommend to the council. What I showed you is just an example, making an assumption of the sigma min preferred by the SSC currently and a P* that I made up myself, which was 0.4, and so those are provisional, based on your final determination of P* here at the council, and so nothing that I presented is a final ABC. That all comes from your SSC, and sorry for all the acronyms.

JULIAN MAGRAS: Okay. Well, I would like to see some numbers at some point, but, for right now, if possible, if we can see something with -- The SSC set a 0.05 before, and I would like to see that be used and get the P* from that and back-calculate -- Recalculate it off of that, and if we can see some numbers on that, to see what they look like, for St. Thomas and St. John, and I would be interested in seeing that.

SHANNON CALAY: The 0.5 sigma min --

JULIAN MAGRAS: 0.05.

SHANNON CALAY: 0.05?

JULIAN MAGRAS: The SSC set a 0.05 before, and we would like to see that, and we would like to get the P* from their 0.05 that was set. Bill, can you help me with some clarification on this, please?

MIGUEL ROLON: If I may, I believe that you are mixing two things here, and you need to clarify that before you continue the discussion. Bill.

BILL ARNOLD: I can clarify. I think what Julian is saying is that, when they determined their reduction, that their reduction was 5 percent, and this pertains to what I had asked Shannon earlier, during her presentation. You can set a P*, and that gives you your percent reduction, and you can also set a percent reduction and get the P* from that, and so what Julian is suggesting is to use that 5 percent reduction and calculate your P* accordingly, and there you have it.

ROY CRABTREE: That was a reduction off of some level of average catch or something, I assume, that we did there?

BILL ARNOLD: That was the SSC's estimate of uncertainty.

MARCOS HANKE: Roy.

ROY CRABTREE: Our goal here, and our obligation, is to get better information and improve the science that we have. That doesn't mean that the catches are always going to go up. They may go down, and so don't expect that, every time we get more information, it's going to show you can catch more, because it -- There is no reason to think that's always how it's going to work out.

MARCOS HANKE: Bill.

BILL ARNOLD: A little clarification might help, and I think Shannon would agree with this, but please let me know if you don't, but, as she said about these projections, I think too much emphasis is being placed on the projections, and I think these projections more than one year out, or maybe two, should be totally ignored, because, if my understanding is correct, the Science Center will re-estimate what they think, or what they expect, a reasonable catch can be, based on new landings data, and that is done by the Science Center and not through a SEDAR process.

You don't have to go through a formal process, and the Science Center can do that, and so you can do it pretty responsively, and so it's not like it's going to take years to get that done. You can do that for 2020, or 2021, or whatever, and so new projections, one-year projections, are going to be constantly available, and these projections that are going out three or four years -- Scientifically, they provide you with some guidance, but, on a practical level, they're not that useful, and would you agree with that, Shannon?

SHANNON CALAY: Well, I do agree. I mean, there are certainly stocks -- First of all, you're correct. The projections that we would make do not have to go through a SEDAR process. They are just requested by the council, and they are negotiated in terms of a timeline with the Science Center, but, basically, what we would need are updated landings information, and so, when those updated landings are available, the council could request that we update the projections, and that's a routine request made by the South Atlantic Council and made by the Gulf Council, and it doesn't usually take us a great deal of time once those landings are available.

The only stock that I think we estimate annually is red snapper, but this could become your Caribbean red snapper if you like, but there is a real workload issue at the Science Center, and there is a negotiation process that happens, and there are times when, to meet one objective, another has to be postponed, and so those are the kinds of conversations that we would have, but, that being said, we consider updated projections a fairly routine task.

MARCOS HANKE: Miguel, did you have something to say?

MIGUEL ROLON: A couple of things, and this is what I said before. Sometimes it's better not to know than to know, because you can guess a nicer scenario, but, now that you have the information, you have to abide by the law, and so you have to be careful with that.

The other thing is the fishermen say is tell me how much I can get away with, tell me how much I can put on my table, my boat, and then figure out the numbers, and usually that's more or less what Julian is bringing to the table, but, now that we are on this path, I have information from Puerto Rico.

The Director of the Laboratory said that they will finish the data for spiny lobster for 2019 in May, and so it goes with what Kevin already said. They will have the data collected and digitized, and the correction factor will be included in the same month, May,

and so you will have the raw data and the correction factor, and the Center will use that information for the models that they are working on.

MARCOS HANKE: Thank you, Miguel. Can you hold for a second for Tony? Tony, go ahead.

TONY BLANCHARD: Okay. Let me just get straight to the point. I sit down here, and I'm watching these numbers on the screen earlier, and they don't ring a bell, and usually, when I see numbers, somewhere along the line, they come into play, and I remember them somewhere along the line, and I don't remember the numbers that was up on the previous presentation.

This is what I am going to ask, since I ain't afraid to ask. I'm going to ask the Commissioner if he could call up Fish and Wildlife and request the year sequence between 2012 and 2016 for the numbers on the lobsters, because, usually, when something don't sit good with me, it don't sit good with me, and so, to suffice me, I want to know what the numbers was, to match them against what we had, because they don't ring a bell.

As for the projections, it seems like these projections always go downhill for us, and they never go uphill, but, like Roy said, we're building stocks that go up, but I believe that, in the slides of the projections, St. Croix was going up, and my question is some things make sense and some things don't make sense to me.

I would like the numbers for those years, if possible, from Fish and Wildlife, to suffice me, and I will ask for St. Croix numbers too, since I am on the same page, and then I would also like to bring to reality the yearly looking of this estimating the stocks. Like you said, they do it for the red snappers.

Well, the reality of it is, as we all know, we is a small fish in the pond, and so we will get run out of town by the bigger fish, and I'm not saying it's impossible for us to get this yearly, but we all know that, as far as I could see, unless I am proven wrong, that this won't happen year-round, and so I am not sitting back and waiting on a promise to a fool that we will be looking at these stocks every year, and that's just my opinion on how I'm sitting now and looking at it. I can say that something is suspect about the numbers to me, and so, to suffice what I think, I would like to see them on the board, coming out of Fish and Wildlife.

MARCOS HANKE: Thank you. Bill.

BILL ARNOLD: I have a procedural question, Shannon. If, as is

possible, the Science Center does not have the opportunity to look at the new numbers, then do you hold at the level you're at, or do you follow the projections?

SHANNON CALAY: Well, let's just talk about what is typical. I am involved with a group that typically reports to the Gulf Council and the Caribbean Council, and so, for example, in the Gulf Council, we usually give them three to five-year projections. We prefer three.

At the end of the last year, if we have not had an opportunity to re-assess the stock, to update the stock assessment, then you would typically -- It depends on whether the stock is rebuilding or whether it's stable, but, basically, you would -- Well, maybe Roy is the better person to respond. What happens when our projections expire? What is the common practice?

ROY CRABTREE: Well, the ACLs go into the regulations, and they stay there until we change them, and so sometimes we'll get projections and we'll put the catch levels in for three years running, and they might be going down, or they might be going up, and then, at the end of that, they just stay where we would set them. Now, then we would try to get an update before we got to it.

Other times, we have taken an average and set some sort of average value, until we get the next update, and so there's a variety of ways to do this, and, as I said earlier, I think what we need to do is come up with kind of a range of P* that we're interested in and get the SSC to give us that numbers, and we can look at those at the next meeting. Then we can talk about how many years out do we want to use the projections, and do we want to do some sort of average, and how do we want to deal with that.

I would see some sort of back-and-forth with the SSC and the Science Center and figure out what were going to do, and then we can try to put something in place in the second-half of next year and get it done before we get into the 2021 season, and so I think there are things that we have to figure out, but they're not decisions that we're going to make today.

MARCOS HANKE: Tony.

TONY BLANCHARD: Let me try and be very clear. Before I come into even thinking about any P factors here, we need to come up with some numbers of what I requested.

ROY CRABTREE: You're requesting the landings?

TONY BLANCHARD: I am requesting the landings from 2012 to 2016 out of Fish and Wildlife, which I am asking the Commissioner, and I'm not telling him to do it, because, at that point in time, we were functioning at basically 100 percent capacity.

ROY CRABTREE: Okay. I mean, I think those landings are in the assessment, and so we have them.

TONY BLANCHARD: Because the numbers that were shown on the board earlier don't ring a bell.

SHANNON CALAY: I have them in a table.

ROY CRABTREE: I would say we can find those numbers and put them up and then tell us what doesn't ring a bell. I don't know if we actually saw them or not.

SHANNON CALAY: I think there was a slide in the first presentation that had the landings data used in the stock assessment, and it was Slide 10 of the first presentation, I think. These were the landings data that were included in the stock assessment, and these will be -- There will be tables of this data in the stock assessment report, which will be a lot easier to read than these charts, and this is what was provided to us through the SEDAR process.

TONY BLANCHARD: You had another chart with the predictions.

SHANNON CALAY: Okay, and so you're talking about the projections?

TONY BLANCHARD: Yes, the projections.

SHANNON CALAY: Okay, and that is at the end of the presentation. Again, I want to caution people that 2017 and 2018 are assumed landings. We did not have the landings data available to us, and so, if the landings data for 2017 and 2018 were provided, we would update that data. 2019 through 2022 are projected landings, assuming that we fish at FMSY, which is a measure of effort.

This is not a predicted catch. This is a limit, above which you would be overfishing, and this is the OFL. Now, Tony mentioned that, each year, from 2019 to 2022, these catches decrease, and that is because the stock assessment says that this stock is above the level of biomass that corresponds to MSY, and, because we are meant to give you the maximum level of catch that can be sustained, the stock assessment allows you to take that surplus each year, until you get down to the level that produces MSY, which, in the case of St. Thomas, is 134,000 pounds.

ROY CRABTREE: If you projected that out for like ten or fifteen years, it would get to MSY, and then it would just stay there.

SHANNON CALAY: Correct. This downward trajectory will happen every time you have a stock assessment where it says that you are above the level that produces MSY, the stock assessments, unless you tell them otherwise for some reason, like if you tell them to produce constant catch. You can do that.

This tells you that you can take the maximum catch allowed to you each year that does not produce overfishing, and so it allows you to fish the stock down to the level of biomass that produces MSY, and so this stock trajectory -- If you looked at the spawning biomass, it actually does decline each year until it achieves SSB at MSY, in which case it would stay flat.

It's kind of counterintuitive, but, when you have a stock that's actually overfished, we create what's called a rebuilding plan, which allows a stock to recover, and, under those scenarios, you typically see the allowed catch increase each year, and so this is not an indication that the stock is in bad shape. It's actually an indication that it's in good shape, but that levels as high as 185,000 pounds in 2019 -- That catch is not sustainable forever. It's something you can take this year, because there is a surplus.

TONY BLANCHARD: -- with a big female and a big male and a measurement, and why I was asking you that was I wanted to know where these numbers came from, meaning whether they was caught in the Gulf or they was caught in the Caribbean, because that's two different fisheries, as far as I can see.

I believe we have bigger numbers than was reflected on the board, but, if you show me in pounds what that calculated to, I would have a better idea, and seeing how we basically target a mid-stream, a mid-sized, lobster, we are losing the smaller ones, because of the size limit, and we are losing the bigger ones because of the market value and not being able to move it.

I think this is a misrepresentation of what the fishery is actually all about, and so, if you start off -- It's like building a house. If you start off and your footing is no good, I don't care how strong you build the rest of your house, your house ain't going to stand up. It's only as strong as the footing, and so that's the point that I'm trying to bring here.

You see it as numbers, to a certain degree, and we see it as money, because that's how we get paid, and so the more I could get --

When I say the more I could get, I want to make sure that -- Like you may say that I get the most bang for my buck, and that's what we want. We don't want to undercut ourselves.

Now, we don't want to overfish either, but we want to make sure that we're getting as good of a deal as possible, and, when I see numbers, and I don't believe that that's really how it should be looked at, or there is something suspect, I am going to question it, because that's my money.

That's the rest of the guys that I represent their money, and, at the end of the day, when things go south, they are going to come to me and ask me why this is so, and I've got to answer now, and so I've got to be able to live with the decision that I make, and so I've got to make sure that I'm making the right decision, as far as the best decision I could make. It's not about questioning your credibility, but it's about questioning how I think things are looked at, and maybe it should be looked at differently.

MARCOS HANKE: Miguel and then Vanessa.

MIGUEL ROLON: I asked Graciela if she had the information, and she has the table there. The thing is, for the fishers, for us, for me, it's very difficult to project that to the reality of my backyard, and so I asked Graciela to just give us the numbers that are talking about, Tony, from 2016, and you will see the total landings, because it's very difficult to see how your fishery behaves in looking at these numbers.

From a scientific point of view, it makes a lot of sense, but, for the fishers, we would like to see the composition of the landings, similar to what David Olsen did a long time ago, when he had thirty years or so and he did that. Mr. Chairman, with your indulgence.

MARCOS HANKE: Yes. The graphic is on the way. Vanessa, please.

VANESSA RAMIREZ: I wanted to just make a comment in the same line of Tony and Julian about the numbers. Practically, already we know that the data from Puerto Rico is very wrong. Just to make a simple exercise, in just two fish markets, they make 5,000 per week, just two of them, and I have ten in my town, and so, just with that exercise, we know that we are going to be over.

Since last year, we have been working with the commercial fishermen to -- With the education program of PEPCO and MRIP, to tell them why they should be giving the real numbers, and so they are starting with that, and then they are going to receive less numbers, and just -- I don't know how we can work with that, but

I think that the numbers in 2019 will not reflect the reality, again, and so I think that we should have like one or two years more of that.

MARCOS HANKE: Thank you, Vanessa. Do you have the graphic, Graciela?

GRACIELA GARCIA-MOLINER: It's a table, and so the data will be there, in the thousands of pounds that are reported.

ROY CRABTREE: Can you back up to the landings slide again, and I think it's Number 10?

MARCOS HANKE: Julian.

JULIAN MAGRAS: Just to answer you, Dr. Crabtree, those numbers look right, because we are a market-driven fishery. What happens if we decide that we want to export? Automatically we overrun that ACL.

It states on the Magnuson-Stevens Act that everything that takes place is we got to promote commerce, and we just had this as one of our presentations at the meeting not too long ago, and we were going off of the 220,000 pounds that was set by the SSC, and so here it is that we had a meeting, and we promoted commerce at the meeting, and now, all of a sudden, we're looking at these numbers, and there's a 90,000-pound difference in what was presented, even though it was not finalized at the time, but it was approved to move forward in the island-based management plans.

With the outcome of the SEDAR 57, we end up with this new number of 134,000 pounds, and I think that's what I saw up there, and a question that I was going to ask Shannon and the team is was any scalars or buffers used in those numbers now, because it still goes back to -- You used the scalars and buffers before, because you had a healthy fishery, and you felt that the fishery could have sustained more pressure, due to the fact because of the market-driven issue and because of the economy issue, and all of those factors were taken into place when we spent all the time looking at those numbers. Now we come up with these new numbers, but has any buffers or scalars been added to those numbers?

ROY CRABTREE: Can you move up to Slide 21? That one will give you the MSYs, and there is no buffers in that. That's the estimate of what the maximum sustainable yield from the fishery is. Right there, and, if you can enlarge it a little bit maybe, but you can see the bottom line.

There is the estimates of maximum sustainable yield, and so, based on this analysis, that's the most you can expect to get out of this fishery, and those numbers, as I said, match up pretty close with the peak landings you have ever had over the years, and so those are the best estimates we have now, and there is no buffer applied to that. That's just the number. Your ABC will be less than that.

JULIAN MAGRAS: Okay. I understand that, but this is what I am saying. We had a number before that we worked off of from 2012 to 2016.

ROY CRABTREE: I get that.

JULIAN MAGRAS: We went off of that, and we applied the buffers and the scalars, and, with all of the information that was provided, it gave the scientists enough information that they felt that the fisheries could have taken more, and we looked at those same landings, that same 134,000 pounds, and we looked at all of that in our discussions, and what was still applied was buffers and scalars that brought the numbers up, and we're talking MSY there. In the paperwork that went in, sustainable yield was at three-hundred-and-sixty-seven --

ROY CRABTREE: I get that, Julian, but my point is we have a new analysis and a new assessment here, and it's giving lower numbers, and it's not buffers. That is the numbers that are coming out.

JULIAN MAGRAS: But it's the same number that was presented to the SSC before, and they felt there was enough justification. This is my arguing point. They felt there was enough justification that that fishery could have taken an increase, because of the 3.5 carapace length and all the rules and regs that were in place. This is what -- We are going right back to that. Now you are saying something totally different.

ROY CRABTREE: I don't know what the SSC will do. We have this assessment and this analysis, and we'll see where we wind up, but those are the numbers that we have right now.

MARCOS HANKE: Miguel.

MIGUEL ROLON: I believe that we came to the top of the discussion. You will not have anything else out of the discussion, and so my suggestion, Mr. Chairman, is we have other issues. Remember that we tabled the next item in the agenda for today, and, although Bill is retiring, we don't want to piss him off and push it for the next meeting, and I suggest, Mr. Chairman, that we stop it

here and let the -- Remember that, the way this works is the -- That's the other thing that I was going to ask. Do you need a P* decision at this meeting, or do you want to throw it to the SSC and then come back at the spring meeting?

ROY CRABTREE: I think what you should do is come up with kind of a range of values that you want to see P* for. We're going to get 50 percent, because that's MSY, basically, and do we want to get them to give us 45 percent, 40 percent, 35 percent, and we'll see what the ABCs would be at those levels, and then we'll come back to the discussion at the next meeting? I don't see how we're going to pick a P* today, and so the best we can do is give them a range we would like to see how it shakes out and then we look at it at the next meeting.

MARCOS HANKE: Miguel.

MIGUEL ROLON: That's exactly what I was asking. That way, you will have all the elements to make a decision the next time, and the analysis will be done by the staff. I asked Graciela to put a table there, and probably the last one we want to see, but it goes to Tony's question. Tony, you were asking about 2012 to --

TONY BLANCHARD: 2012 to 2016.

MIGUEL ROLON: Yes, and we have it there.

TONY BLANCHARD: When it was operating at full capacity.

GRACIELA GARCIA-MOLINER: This is what you had requested, is the data from the SEDAR, and so that's 2012 to 2016 for St. Thomas specifically, and it reads the year on the left-hand side, the diving, poundage landed, pots and traps, other gear, and the total landings, and so that's the data that was used for the SEDAR 57, and that's the data that was incorporated in all the work that had been done to date.

MIGUEL ROLON: If you look at the table, the most you did was 121,000, 13,000 less than the MSY that you were discussing.

TONY BLANCHARD: Okay, and so that's not including any factors that would come into play, correct?

MIGUEL ROLON: No, it doesn't have -- Forget about that factor. The only people that we have a problem with that factor is Puerto Rico. The numbers that you get from the U.S. Virgin Islands go as they presented directly to the Center. In Puerto Rico, before they sent the Table 3, which is the one that has the report, and

they also have what they call the factor that accounts for the escapement of data, which the fishers statistics project cannot get.

The Center uses the raw data rather than the one with the correction factor, but, anyway, the point is that, for the next meeting, you have to indicate what you want to see. Do you want to see the behavior of 0.5, the behavior of 0.45, or 0.4? Then you can take the decision at that time, and that will be probably in August. The question to Shannon is, using that thing between here and that, considering that Puerto Rico will have the numbers ready by May, if we are lucky --

SHANNON CALAY: I think it's two separate questions. Once the data are available, I think then we can negotiate how long it will take us to complete the updated projections, and it should be relatively -- I mean, I'm guessing it would be on the order of six weeks from the time we received the data, but I haven't received the data yet, and so I don't want to promise when these projections could be updated.

We can definitely give you a range of P*, and, if you're more comfortable with just telling us the reduction that you want, that can also be done, and it would map to a P* level, and so, however you are most comfortable giving us that range, we can compute ABC. Then, of course, it has to go to the SSC, because the SSC then establishes the ABC recommendation and not the Science Center.

MARCOS HANKE: Miguel.

MIGUEL ROLON: I believe that, in order to have a better grasp of the situation, we can tell the Center the level of reduction that we want, and, also, we can ask her -- If we don't get the data on time for 2019, we can have an analysis of how the behavior of the P* will result, and so those two can be done.

That goes back to what Julian was mentioning, the 0.5 reduction, and then remember that all of this has to be taken to the meeting of the SSC, because the SSC is the one who flips that information for you, but I don't want anybody leaving the room here thinking that what we are doing is to get the higher number for you to play with. At the end, you may end up having a lower number, but at least you will have a justification for it.

The other thing that I wanted to -- Once you have these numbers, the decision does not necessarily have to be made by you. It can be made for you in court, and so we have to be careful what we ask for, but, at this time, to summarize, Mr. Chairman, we have the

information presented of SEDAR 57 and the best available data, and we have shown the years that Tony mentioned, 2012 to 2016, and we are asking now for the Center to consider the reduction of 5 percent, and we are also asking the Center to provide us an analysis of the different range levels of P*, from 0.4 to 0.5, and I don't think that you want to consider 0.25, unless you want to shoot yourself, and so 0.4 or 0.45 or 0.5, and that's something that Shannon, I believe, can have for the next meeting in August.

In the meantime, between here and August, we may have good news that the island-based FMPs have been approved, and there is no guarantee of that, but it's when you establish the island-based FMPs that you can focus on these issues better than now, and so, Mr. Chair, I propose that we move over and allow this presentation that is following, because that other presentation has bearing on the discussion of spiny lobster, but we need to hear from you whether you agree or not with what I just said.

MARCOS HANKE: From my point, I was holding on until -- I really think that we need to do the exercise from 0.40, like you said, Miguel, up all the way to 0.5, and to have those numbers for us to keep the education process, to really understand what is going on, and I want to ask the two other persons that are going to participate now to be very brief, because we need to go to the other item, and the last one is Tony and then Bill.

TONY BLANCHARD: Okay. Let me support the 0.4 to the 0.5, like Marcos asked for, for the P factor that we're talking about, correct?

MARCOS HANKE: That's correct.

TONY BLANCHARD: Let me see St. Croix's numbers, because I can't see the heading to the top. Okay.

MARCOS HANKE: Thank you. Bill.

BILL ARNOLD: This is a question for Jocelyn, and it's not clear, and I want to make sure that we do this right. The SSC has brought recommendations regarding this assessment to the council. Does the council now have to vote on this, to accept them or anything, or what?

MARCOS HANKE: Roy.

ROY CRABTREE: No, and they are the recommendations of the SSC, and we're asking for some additional looks from them, which presumably they will give those to us, and, if not, then -- Like

I said, there's going to be some back-and-forth between the council and the SSC to figure this out, but we've got until the second half of next year to get there, and I think we could, and so I think we're good.

MARCOS HANKE: Thank you, Roy. Jocelyn, did you want to say something?

JOCELYN D'AMBROSIO: I agree with what Roy said, and, as Shannon had said, the SSC recommends the ABC, and so, ultimately, if you're getting projections from the Science Center, and then the council is choosing their risk policy through the P*, then that would go back to the SSC, and then the SSC could evaluate and provide the recommendations, and so, as Roy said, there's going to be some back-and-forth, and the Science Center and the council and the SSC are, obviously, the players here.

MARCOS HANKE: Perfect. We are ready for the next item on the agenda. Thank you very much, and I want to just make a comment that I think we went very far ahead, farther than what I expected, in terms of understanding the process, and we are getting, little by little, in the right direction, and I really like the way the whole council interacts with this very important step that we are taking, and we have to be very assertive and cautious, but effective at the same time, and we have been doing that that way, and thank you very much to everybody. The next item on the agenda is -- Bill, we will do your presentation now.

REVIEW OF PERTINENT STATE AND FEDERAL MANAGEMENT REGULATIONS IN USVI

BILL ARNOLD: What I want to talk about is -- I want to talk about a USVI topic, and this managing trap fisheries, and this all kind of came, originally, from their request to get the use of recreational traps in federal waters under control, but it's much more complicated than that, and so here's a brief overview of the council and constituents' request to review three intertwined topics of recreational trap use in federal waters, extending the fish trap reduction plan to federal waters, and revising spiny lobster management.

You have got sort of a general thing, you've got a fish thing, and you've got a lobster thing, but they are wrapped up in one another, and so, at the April 2019 council meeting, the motion was direct staff to develop amendments to each of the FMPs, and that would be the St. Croix and St. Thomas FMPs, the new ones, to address the use of fish traps and pots in the EEZ, and so that was the setting for all of this.

As I say right there, of course, nothing is ever that simple. Prior to addressing these three issues, existing regulations need to be clarified, and there is a variety of issues, and I want to point out that Jocelyn is the legal advisor or, if the USVI representatives have any disagreements with this or point out anywhere that I was wrong, I won't be surprised at all if there's things that I missed, and so don't hesitate to speak up.

What I would say, after looking over the regulations and looking at the situation, is, if you want to extend fish trap regulations into federal waters, the first thing you have to do is establish an unequivocal distinction between what a fish trap is and what a lobster trap is, and, as far as I can tell, that does not exist, and so, if a law enforcement officer came upon a fisherman, and he pulled his trap when the law enforcement officer said that I want to look at it, I don't know that the law enforcement officer would be able to tell, by looking at that trap, that it is a fish trap versus a lobster trap, and that's a very important determination if you're going to have fish-trap specific or lobster-trap specific regulations.

Second, you would have to straighten out the design and construction requirements and trap and buoy markings, and you wouldn't necessarily have to do that, but I would say, as I go through, that you will see that there are probably some issues that need to be dealt with there.

Then, third, state and federal spiny lobster compatibility will require consideration of licenses and permits, minimum harvest size, requirements for imports, retention of undersized and egg-bearing, use of chemicals, and ACLs and AMs, and you will see, as I go through this, that there is a lot of inconsistencies in each of these issues.

The first thing is trap use by recreational fishers. The USVI prohibits the use of pots, traps, haul seines, and set nets by recreational fishers, and that's in the Virgin Island Code, 312(k). The need is for appropriate management of the use of pots and traps, and perhaps other gear, depending upon what you want to do, by recreational fishers in USVI EEZ waters.

I want you to pay particular attention to the word "appropriate", because this is the EEZ, and, of course, to create management regulations, or modify them, in the EEZ, the council has to follow the mandated process.

They have to consider a range of alternatives, and they have to

choose the best alternative, based upon biological, ecological, physical, social, economic, and administrative considerations, my point here being that the council can't just be told that we want you to do this and then do it. They've got to go through this elaborate process, and you have to keep that in mind, and the outcome of that elaborate process may not be what you hope or think it could be, and so that's an important consideration always when we're developing regulations.

Then this idea of extending fish trap reductions to federal waters, and so the council established these two trap reduction steering committees in the USVI, one for St. Croix and one for St. Thomas/St John, and their outcomes were not identical. They were close, but they weren't identical, and so, for example, for St. Croix, the purpose was to develop proposed programs for reducing effort and increasing the economic efficiency of the USVI fish and lobster, and keep in mind that this is your fish trap reduction program, but, right in it, they mention lobster trap fishing, and so, already, you are asking yourself, well, where do we want to go with this.

Over on St. Thomas, the purpose was to develop fish trap management plan, which would reduce effort. These are quotes right out of these plans. It would reduce effort and increase the economic efficiency of the USVI fish and lobster trap fisheries. Now, there may be a good reason for including that, but, here, you've got fish trap management plans, and here you've got the lobster trap fishery. Again, before the feds can move forward -- If the state wants to do this, this is great, but, before the feds can move forward, they need clarity on this, so that they can establish an appropriate response that meets the needs and the requests of the council.

Second, the STX Trap Reduction Steering Committee is composed of, and, again, these are right out of the fish trap documents, of fish and lobster trap fishermen, and this one says the STT/STJ Steering Committee is fish and lobster trap fishermen supported by state and federal reps and the chief scientist, and that's kind of old stuff, and so, regardless, each of these plans was approved a long time ago, 2013, by Roy Pemberton and Alicia Barnes, and was received by Carlos Farchette, as the Council Chair at the time, on December 9, 2013. That's where we were.

Then the actual final approval of these was received in 2017, and I don't need to read all this, but that's four years, and things have changed, but notice I've got underlined here "implement fish trap reduction", and so now, already, you have got some confusion going on here between we're doing a fish trap reduction, and we've

got spiny lobster in there, and we don't have a clear distinction, and I will get to this, between what a fish trap is and what a lobster trap is, and now you're creating some confusions, and, confusions, legally, you can drive freight trains through, because it only takes a small confusion to create a big loophole, and, in front of a judge, the judge is going to go, get out of my courtroom and go fix this. Again, Jocelyn, correct me when I'm wrong, please.

Now we go to trap construction, and this is very confusing to me, and I'm easily confused, and I admit that, and so, in St. Thomas/St. John, the reg book states that fish traps must have a minimum two-inch-square mesh, or one-and-a-half-inch hexagonal mesh, as the smallest mesh on two sides of the fish trap.

However, in 12 Virgin Islands Rules and Regulations, the requirement is for St. Thomas and St. John fish traps to have a mesh size of at least two inches square or, if hexagonal, two inches between opposite sides, and so there is a conflict between the regs in the booklet, which, of course, probably doesn't hold, but I am just putting out what's there, and the actual regs, which is different, and this is important if we're going to create regulations to manage these things.

In St. Croix, the regs book states that all traps must have a minimum one-and-a-half-inch hexagonal as the smallest mesh on two sides of the fish traps, all traps, fish trap. R&R states, for STX, that all fish traps must have a mesh size of at least two inches square or, if hexagonal, two inches between opposite sides.

Then, in the Virgin Island Code, it states that no fish trap, fish pot, or lobster pot constructed of wire mesh can have a mesh size smaller than 1.25 smallest dimension. Now, that doesn't rule out these other ones, because they are bigger, but you kind of get my point that things aren't as clear as we might want them to be, and I want to emphasize that I'm not saying all of this to criticize the USVI.

I am just saying it because we need to -- The council will need full clarity on this before they can move forward with any federal regulations, and so please don't take this wrong, and, again, I could be totally confused myself, and so that's why I wanted to put this stuff out there, because, if we're going to move forward with these fish and lobster trap management efforts, we need to start from a common, solid ground.

Trap construction continued, federal regulations for fish traps, and so, see, we screw up too, is mesh size depends upon the material

and the shape. Then, for spiny lobster traps, they do not address mesh size or construction materials, other than for escape panels, and so now we've got this dichotomy, and so what's the need?

The need, in my opinion, is, within each of the St. Thomas/St. John and St. Croix management areas, the USVI regulations need to include a description of allowable construction, including mesh material and size, for each of the fish and lobster traps, and I would like to point out that, if your fish trap and your lobster trap are the same thing, then there is no point in having fish management regulations or lobster management regulations, because it's all the same thing.

You could say you can have fifty fish traps, but we're not going to regulate lobster traps, and so the fisherman only has to say, well, I've got fifty fish traps and 10,000 lobster traps, and they're all exactly the same trap, and you've got nothing to go on, and so, if you want to have separate management of fish and lobster traps, you've got be able to distinguish between what a fish trap is and what a lobster trap is.

Ideally, the compatible federal legal descriptions should be consistent throughout the Caribbean EEZ, and not the individual island EEZs, but all three of them, and so that's important, and that's why Puerto Rico needs to pay attention to, because, even if the individual islands want to have separate approaches, and we can have separate approaches in the EEZ, and these sorts of things create both enforcement and judicial potential issues, and I'm not saying they do, but these are the things that we want to pay attention to, and, like I said, you need to clearly define them as either a fish trap or a lobster trap.

Here is some of the traps, and this is from Nelson and Carlos. They sent me all these pictures and described them, and so tell me where I'm wrong, you guys.

Here is a St. Croix wood lobster trap, a St. Croix plastic lobster trap, a wire lobster trap, and I wish you could see those a little bit better, and then St. Thomas/St. John wood and plastic, and they're similar, but there's a lot of different constructions. There are St. Thomas/St. John other traps, and I don't know what an other trap is. This was from the spiny lobster presentation given at the 2014 council meeting, August 2014 council meeting. I guess these are -- I'm sure you guys, the fishermen, recognize these and can tell us exactly what they are, but could an enforcement agent tell you for sure that these are lobster traps or these are fish traps or whatever? Maybe they can.

Then here's more from the USVI, and you've got the rectangular, box, arrowhead, arrowhead with bunch berry wood frame, arrowhead with rebar frame, z-traps, and are these fish traps, or are these lobster traps? Are they both? Are they neither?

Then you've got Puerto Rico, and you've got a West Coast 1, and you've got a West Coast 2, and you've got an East Coast, and so I think that you get the idea. There's a lot of things out there in the water, and probably more than this, and how do you manage those, and how are you going to go about managing these in an effective manner? Nothing has to change, but, if it doesn't, you need to ask yourself if it's worth pursuing in additional regulations.

Then we go to escape panels, and this isn't quite as important, because, if you know this is a fish trap and you know this is a lobster trap, what difference does it make what their escape panels look like, but there are differences.

In USVI territorial waters, fish pots may be constructed of any material, but they have to have an escape panel, and an escape panel is not the same as an escape vent. An escape panel is something that holds everything in for a certain period of time, but, eventually, like if it's lost, the panel falls off. An escape vent is something that is always operating that allows smaller animals to get out of that trap at all times, but it keeps the big ones in, and so it never rots out or anything, but it's just a way for undersized animals to get out. It has to be some material less durable than the construction of the pot itself, and you guys are all familiar with this.

Similar, but more specific, regulations apply in federal waters, and I'm not going to go into this, but I just wanted to point out, again, there's a difference between state and federal regs.

Spiny lobster regs require an escape mechanism on any vertical side no smaller than the diameter, and so it's a different explanation, and so, once again, you've got your fish traps, and you've got your spiny lobster traps, and they are not the same, but they are not different either, and that creates a problem.

Again, you need clear and compatible regulations regarding trap escape panel design and attachment, and I use "compatible" advisedly, because maybe you don't want to be compatible between state and federal waters, but, if you want to have a smooth regulatory regime, then you're going to need that, and I wanted to point out that I didn't find any reference to escape vents, and these are the gaps and not the panels, the vents, in any of these

regulations, although I think, in St. Thomas/St. John, a lot of the fishermen have escape vents in their traps, and I'm not so sure about St. Croix, but those are the little box openings that small animals can get out of.

Then there is marking traps and lines, and there's a lot of differences here, too. Again, if you want to have state and federal regulations that work, you've got to have as much consistency as possible, and USVI law allows buoys to be marked with a commercial fisher's license number. The buoy is to bear the fisher's assigned color scheme. All traps and pots must be marked with a commercial license number, and those are not the buoys. Those are the actual traps and pots sitting on the bottom, and so they have the fisher's license number, but they can't be seen from the surface. The buoys can be.

In the EEZ, federal law requires fish traps and spiny lobster traps and their associated buoys to be marked with a vessel number specified by the USVI. Buoys must have the color code assigned to the vessel, and so, again, it's different between state and federal, and so we need clarity and consistency between state and federal regulations.

Marking traps and lines continued, the number and location of the buoys is not described for territorial deployments. In the EEZ, individual traps must have at least one buoy that floats on the surface, and, if it's a trap line, then a buoy must be attached at end of the line, and so it would be advisable for the territorial description of a buoy location for individual traps and trap lines to also be included.

For trap lines, clarify that a minimum of two buoys is required, and, okay, that's my opinion, one at each end of the trap line, so you know what you're dealing with, and I would ask if each trap should be required to have its own float, which would allow accounting from the surface of the water?

If you've got a fish trap reduction plan, and you've got a fisherman that's allowed fifty traps, then, really, once those traps are in the water, they never come back out, and the only way to inventory them is to have each buoy attributable to each individual fisherman, so you can go out there and figure out who has got what.

As long as you've got many traps that are down at the bottom of the ocean, and they can't be accounted for, then a fish trap reduction plan is, in essence, useless, because you really -- You can get them at the shoreline, but, of course, they don't have to

take their traps all up at the same time. Once they're out there, they're out there, and so say you get fifty. You can put your fifty out there and, three weeks later, you could put another fifty out there, and another fifty out there, and there is no accounting for it, and so that's an issue with a fish trap reduction plan.

Now, again, that may be okay for the territories, but the feds are going to have a hard time -- We would have a very difficult time, and Roy may want to correct me, getting this through the Secretary of Commerce, because they would recognize these inconsistencies, and they would ask about them, and, even if we pushed it that far forward, they would probably send it back and say, well, this is not ready for primetime, and so that's fish marking traps and lines.

Then the third topic is spiny lobster management, licenses and permits, and the USVI Code requires commercial fishers to have a commercial fishing license, and helpers have to have helper licenses, and a licensed commercial fisher has to be onboard, and so, as you know, much goes along with this. You have reporting requirements associated with that and catch sampling consent, and I think there are other things as well.

To sell fish landed in the USVI, you have to have that commercial fishing license and a business license, and Randy is here, but it's my understanding that even if it's harvested from the EEZ and even with an HMS permit, and so no person not a resident of the territory may sell in the territory without proper license issued by the Commissioner.

That can work for the territory, but it's not going to work as well -- That's a difficult proposition in EEZ waters, because we generally say that access has to be fair and equal, and, again, Jocelyn, you might want to explain that better, and so, in my opinion, the need is for -- We have even been asked this. Do we want a permit to manage spiny lobster harvest in the EEZ? If that's the case, then the above regulations governing fishing and harvesting in the USVI territorial waters and landing and selling fish will have to be considered within that context.

A question I would ask is how often do fishers harvest in the USVI EEZ and then sell in non-USVI locations, and I have been told that this happens. For example, heading back over to Puerto Rico and selling there, or possibly even into the British Virgin Islands, and so that's another thing that needs to be considered.

Then the minimum size limit, and the minimum size is three-and-a-half inches in all jurisdictions, and so that's easy, but, when it

comes to imports, things are not quite as equivalent. The USVI has a tail weight, and all you've got is the tail, and so how do you relate that to three-and-a-half-inch minimum size? You use weight, and that weight is six ounces.

For the feds, we have a range, from 5.9 to 6.4, which really makes the tail weight 5.9, because, whether they call it six or 6.5, as long as you've got a 5.9-ounce tail, you are legal, according to federal regulations, but, in state waters, it has to be six ounces, and that is not a -- Six ounces is not the same as 5.9 ounces, and so you've got an inconsistency there. Admittedly, it's a small inconsistency, but it is still an inconsistency, and these are the sorts of things that throw things off the rails.

More on egg-bearing. In the USVI, you are allowed egg-bearing lobster to remain in the traps in the water, with no limit on the number. Egg-bearing lobster can remain in the traps until the eggs have been naturally released, and then the lobster can be harvested, assuming it's of minimum legal size.

Federal law requires egg-bearing lobster to be returned to the water and not the trap. Well, I don't know. How do you interpret that? Returned to the water unharmed. It can remain in the trap. Sorry. It's been a while. I was supposed to present this previously, and so I have forgotten some of it, but provided the trap is returned immediately to the water, and so they're similar, but the wording is not identical. The interpretation, I don't know. It would probably be better to make sure that you have fully consistent regulations there.

For undersized lobster, in USVI waters, undersized lobster can be used as attractants in traps or pots, although the fisher booklet does not mention use of attractants. In the federal regulations, it states that an undersized lobster may not be possessed, sold, or purchased, and must be released with minimum harm, but there is no specific reference to using them as attractants, and so is releasing with minimum harm putting them back in the trap? I don't know. I mean, maybe everybody else does, but I don't. Again, the need is to clarify a consistency regarding the use of attractants, particularly for undersized lobster.

Then the use of chemicals, and the use of chemicals to target spiny lobster is specifically prohibited in USVI waters, but the federal regulations state that a chemical or plant-derived toxin may not be used to harvest a Caribbean coral reef resource in the Caribbean EEZ. Well, a coral reef resource is not necessarily the same as a lobster.

It also states that poison, drugs, and other chemicals may not be used to fish for Caribbean reef fish in the Caribbean EEZ, but my interpretation, and I think that's the interpretation we've used, is reef fish does not include spiny lobster. We have had them separate for pretty much ever. There is no similar regulations in the USVI.

What is the need? The need would be to prohibit the use of chemicals, et cetera, to harvest spiny lobster in EEZ waters. The USVI regs booklet states that chemicals cannot be used in the EEZ waters, but my suggestion would be that you just get a regulation out there for in the state and in the federal waters that just says you're not allowed to use these things.

Finally, application of ACLs and AMs, this may be the biggest challenge. Annual catch limits reflect sustainable harvest based on the best available science. As such, they are our best estimate of how much can be harvested annually from each stock in a sustainable manner. I mean, that's what the ACLs are.

Exceeding the ACL for a stock will put that stock at risk for overfishing, which is what we want to avoid to maintain sustainability over the long term. Accountability measures are the tool used by managers to ensure that harvest stays within the ACL for each stock, and there is no value to the ACL unless the AM is available.

All ACLs are developed using combined landings from state and federal waters, as we all know, and so it's important to apply those ACLs to both state and waters and, similarly, for the AMs. Thus, the foundation of effective fishery management in the U.S. Caribbean region is compatible application of ACLs and AMs, and I know that's a very difficult ask, but I think that that is a key early step in properly managing not just spiny lobster, but all these resources across the state and federal boundary.

The ACLs have an extended value, in my opinion, and I got this plot from Denise Johnson, our economist. It just shows how the value, the economic impact of a fishery, increases as you approach -- As you increase the percent of the ACL landed, and so, at 25 percent, and these are just arbitrary numbers. If, at 25 percent, your sales are around 200, at 100 percent, they are around 5,000, and so four-times the ACL and five-times the value, and so it's not necessarily linear.

It's a bit curvilinear there, and so, actually, and this is what optimum yield is all about. You want to harvest your annual catch limit. This is a fundamental concept of fishery management in the

modern age, and it's not just to conserve the resource, but to maximally, sustainably utilize the resource.

There are additional extended values of the ACLs, and that is that it allows you -- Knowing how much you can harvest from the resource really creates opportunities that I don't think are being taken advantage of, and so it allows you to have a view of the future of your fishery, and you can use that view of the future to plan for your industry.

You can plan -- You know, Julian mentioned exports earlier, and you can make some plans, and given that these things fluctuate, but at least you have some idea of what the future holds, so you can say does our fishery have room to grow, is it pretty much where it needs to be, is it exceeding sustainability? You can tell your kids that, if you're a fisherman. You can say, look, you guys, these are fisheries with bright futures, and here are the numbers to back that up, and so this is a good industry to get into, so it doesn't die off and we no longer have commercial fisheries in this region.

How does it tie in with permits? It helps you to build a permit program. You know, if you're going to have permits, what's the capacity? If we've got this many fishers, and they need to land this much fish to maintain a reasonable standard of living, how much is left over? Does it allow for entry of new fishers, or do we need to reduce the total amount or shift it to another resource, et cetera, et cetera?

The value of the ACL is not -- I mean, the implications of ACLs is not all negative. It can be positive, if you take advantage of it, and any industry needs numbers to be able to predict not just where they are, but where they're going, and these ACLs basically boil down to those numbers, and so I think that this kind of new era with the recent ABC control rule and the new island-based fishery management plans and actual achievement of a successful assessment, with hopefully more to come in the future, I think is overall a very good thing, because it's going to give you the structure and vision of your fisheries that you can use to plan for the future, and so that's a little bit of an aside, but it really ties right back into how are we going to manage these things, are we going to do fish trap reductions, and that's just one small part of how are you going to manage fisheries in the U.S. Caribbean.

That's pretty much it, and I went through it quickly, because I know we have a busy schedule, but I'm certainly happy to entertain any questions, as best I can.

MARCOS HANKE: Anybody who would like to make a comment? Miguel.

MIGUEL ROLON: Remember how this all started. The fishermen of St. Thomas/St. John met with Bill and others, and we were discussing this before. We also started the discussion several years ago, where at the table we were discussing the possibility of the federal government adopting compatible regulations with the U.S. Virgin Islands and Puerto Rico regarding traps and lobster pots. Dr. Roy Crabtree at that time said that I need to know what you want.

For you to know what you want, you need to know what you have, and so what the presentation is telling us at this time is the status of the language that you have in the regulations -- What you need to do, in order to harmonize them, and also to decide whether or not you're ready to request the federal government to establish compatible regulations for the fish traps.

The first thing that you have seen is, okay, what the heck is a fish trap and what is a lobster trap? For those of us, we know that the straight funnel fish trap is a lobster trap, and the wooden one catches fishes too, and so we need to really address those questions.

Then, if you go by the presentation that Bill has, there is a lot of needs and questions and things that you need to do, and I don't think that you can do it now, but we would like to hear discussion, especially from the group, council members and members of the fishing community, as to what will be the next step.

I was talking to the Chair here, and probably the midpoint of doing something and doing nothing is a fishery management plan, and I was told that by a good friend of mine a long time ago, but, also, one way of addressing issues is by creating a committee, a committee that will work, and so, if we have a proposal, once you discuss this, as to what you want to do, to have this committee of people who are going to be working on examining the whole situation and going one by one of the items that have been prepared by Bill and then come back to the council with recommendations.

You have to address, for example, harmonizing the laws of the U.S. Virgin Islands, and we have different sections that may show like -- They may sort of contradict one to another, and you can come back with specific recommendations to the council.

Remember that, in the case of the U.S. Virgin Islands, the fishermen, a long time ago, before everybody was thinking about

this, they started talking about a moratorium, a trap reduction program, and so you need to address that too, and you need to bring them into the discussion.

MARCOS HANKE: I am going to just put some points there on the table to start the discussion, because I have been working with the trap fishermen in Puerto Rico, and this is a request, that they are passing through the same struggles that you guys passed. We fish very similar, and, basically, fishermen can be very creative in the fine details of how they use their traps and where they use their traps and the size of the traps and the size of the funnel and all of that, the weight of the trap and on and on and on.

They catch basically the same species. Some of them catch a little more of boxfish, and some of them catch a little more of this or that, but that can be because of bait, and it can be a range of different things involved in the trap fishery, but, at the end of the run, all of them catch lobster, and all of them catch fish in one way or the other. I want to address that there is little changes on it, but it's a reality, that they impact multiple resources at the same time.

One thing that highlights to me from the fishermen is that the high-end fishermen in Puerto Rico that catch a lot of lobster, the big players, they use bigger fish traps, which is the lobster traps with the side panel with the different entrance and not the classic box with the entrance from the top.

That, for me, is very important to say, because people that depend on lobster fishing are using wire mesh traps that in other places are defined as lobster traps, and, like I said, the way of baiting, where you put it, how you deep you put them, and how you move your traps can affect the amount of fish or lobster you catch, and the catch rate of traps, wire mesh and wooden classic lobster traps, under the same size and circumstances can be very, very similar. This is what they report to me.

One of the biggest differences between the classic approach to read this is the top or the side entrance, and, once you start to go over all of this, the most important thing that has to be addressed by this group, in my opinion, after interacting with the trap fishermen, is the trap definition.

After you have that, then you can consider all the rest that Bill has stated that are very important and involve all the fishers, because that, I think, will be the most important and the most difficult part. From my point, I think all traps catch lobster,

and all of them should be considered as traps for lobster or fish, traps in general, by definition for traps in general, and it should be addressed, instead of putting them apart.

I know that there is other considerations, and I'm not an expert, and I am going to listen about that, but that's my input to the group. I think all traps catch lobster, and all of them are lobster traps. Julian.

JULIAN MAGRAS: The only thing I'm going to say is there will be a presentation that will be given later on this afternoon, and it will clearly identify where the St. Thomas/St. John Fishermen's Association projects of interest are, and so I will wait until that presentation is given, but I would like to say a special thank you to Bill, because he spent a lot of time pulling this together, and it's a good presentation, and it's good to identify the areas of concern, because, if you actually pick up the handbooks, and you are not looking at them as carefully as he looked at them, you would never be able to really pick out the differences, because it looks very similar.

By me looking at the presentation that he gave today, it gave me the opportunity to see where the differences are and how they can be easily corrected, and so that was a good presentation, Bill, and I look forward to working with you on completing this project, and so thanks, everyone.

MARCOS HANKE: Thank you. Next is Nelson.

NELSON CRESPO: Last week, I was talking with one trap fisherman, and he is the same line as Marcos. This fisherman is in the Snapper Unit 1 closure, and he used to fish yelloweye snappers in deep water, but, when the closure came, he moved his traps to the shore to trap lobsters, and he uses the same trap, and he is very efficient for the snappers and for the lobsters, and so we are talking about what you requested me to ask to the fishermen about how to catch big lobsters in traps, to try to develop maybe some study regarding the big lobsters. That is coming through with that conversation.

MARCOS HANKE: Thank you, Nelson. Miguel.

MIGUEL ROLON: Remember the first question that Bill asked was whether you think we need to do something. There is always no action. If you are going to do something, you have to figure out where we are and where we want to go, and so, especially from the council members, we need to hear if you're happy with where we are and what we need to do and so forth.

MARCOS HANKE: Carlos.

CARLOS FARCHETTE: I remember one of the meetings, and it was maybe about two or three meetings ago, Roy Crabtree stated that he would like to have a description of the USVI plan, and so I think the first thing we need to do is have the USVI lobster, spiny lobster, management plan.

St. Croix already started that, through the Fisheries Advisory Committee, and we have a committee of nine members, a sub-committee of nine members, that have a draft plan, and it has a description of what a lobster trap is, which is a top-entrance trap only, and it can be made of wire or wood or plastic, but it must have a top entrance, to differentiate from a fish trap.

I have spoken to quite a bit of fishermen on St. Croix, and I spoke to one from St. Thomas, who said that a trap with a top entrance rarely ever catches fish, and, Marcos, you mentioned that it might have a boxfish, or it might have a triggerfish, who is actually going in to target the lobster.

I have interviewed divers on St. Croix who also own traps that say that they have noticed, while diving, that, if lobster are in the trap before the fish, the fish really don't go in those traps. He doesn't know why or what the reason is, but they just stay away from the traps. If there's already fish in there, the lobster goes in, and that's a different story.

When it comes to compatibility, the St. Croix FAC also formed a sub-committee of four people, which are going to work electronically to look at both federal and local regulations, to do a spreadsheet and see where we are and where we aren't compatible and how this can work out.

We are also doing that as another sub-committee of four people, and we're going to work electronically, on recreational bag limits, because, right now, in the territorial waters, the only recreational bag limit that exists is queen conch, and I think tuna for recreational harvest, and the ninety-nine-inch marlin for recreational harvest, and that's the only thing that we have for back limits for territorial waters.

The fish trap reduction plan that Bill was talking about up there has problems in it, and that needs to be corrected before the federal government decides to adopt the trap reduction plan in federal waters. There is a fee in there that is wrong, and there is something that was never mentioned in that plan, which is what

happens if a fisher who does not meet the control date, but gets a license transfer from a fisher who has traps, and he decides to sell him his gear, and he really doesn't qualify to fish those traps, because he never met that control date, and so that has to be fixed in that plan.

Also, the spiny lobster control date. If that's not implemented right now, but you have fishers, both on St. Croix and St. Thomas, who, because they cannot get into the fish trap fishery, they are putting out lobster traps. They will be after the control date, and so what do you do with these guys? There are a lot of issues that need to be discussed, and the FAC for St. Croix is trying to work through these issues, and it's going to take a while. That's really what I have for now.

MARCOS HANKE: Julian and then Tony.

JULIAN MAGRAS: I just wanted to say that the question was asked by Miguel to the council members of what you guys would like to do with this, and I'm not a council member. I'm a DAP Chair for St. Thomas/St. John, and I truly believe that, since we are in the process of moving to island-based management plans, that we need to move forward and continue working on this project.

Each island needs to work and get all their rules and regs in place with working with the federal officials and everything, and I really -- I was one of them that brought it up, along with Mr. Blanchard, that we need to look into this, and we need to move forward with this, and so I'm hoping that the council would support us in moving forward with addressing the issues, both regulatory and looking at the trap reduction plan and looking at the lobster control date and control rule and so forth, and so that's my comment.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Excuse me, Tony. I believe that the council is by all means in support of -- By support, I mean help you with the logistics and all that, and what Carlos presented probably will be a step in the right direction. We should allow the Virgin Islands to finish what you have, and you have two sub-committees that -- When do you think that the report from those committees would come out?

CARLOS FARCHETTE: Well, with the spiny lobster draft, we have already started, but we are missing -- I've got to say that Bill has helped us out, because we called him at home at night, and sorry about that, but still to be determined is those in the

fishery before the control date -- We have to specify something about that, and we have those entering the fishery after the control date, and what do we do with those people, and those entering the fishery due to existential circumstances.

While I'm on the trap thing, we have -- I have two fishermen on St. Croix, and I don't know what they are doing here, but they are going down at 600 and 800 feet with lobster traps, top-entrance, and they are catching a -- Although it's not managed, but they're catching a species of lobsters with claws, and it's like cherry red in color, and I told them to send me a picture, but they haven't done it yet, and I don't know if they are worried that maybe I will try to regulate it, but I just wanted to see it, and even if it is a lobster and not a shrimp, and it's a pound-and-a-half or two pounds or something like that.

MIGUEL ROLON: The point is, Mr. Chairman, that you should allow the U.S. Virgin Islands to finish what you started, and so, once you finish all of that that you're saying in 2020, and hopefully we have the island-based FMPs implemented, we can then narrow the discussion, in this case, to St. Croix, because remember that you have, in St. Croix, to figure all these problems, or not problems, but challenges. We don't say "problems" anymore. These challenges that you have, and then, in 2020, you might be able to again have a report that these are the recommendations for the local government.

CARLOS FARCHETTE: Right.

MIGUEL ROLON: Then these are the recommendations for the federal government, but we need to have a U.S. Virgin Islands management regime before we move forward to the federal government. Then, in the case of St. Thomas/St. John, I believe that they will start working on the same issues, with maybe different outcomes, because you have a different situation from one island to the other.

In the case of Puerto Rico, you have the famous Junta, which is the equivalent of the fishery advisory committee of the U.S. Virgin Islands, and that is something that you have to discuss at the level of Puerto Rico and decide what is it that you would like to see, in terms of management measures and amendments to the local Puerto Rico laws and regulations.

If we can have that by let's say in the first half of 2020, we can discuss it at the August meeting, and we can help you with the logistics, as I said. For the Virgin Islands, we sent a new recording machine, so you can record every meeting, and you don't need a stenographer, and so that will be easier, and I believe

that you have one in St. Croix. Also, with any other thing that you think that we can help you with.

If I understand correctly, you are working with two sub-committees already in St. Croix, and then you will be ready probably sometime during 2020 with some report from those committees, and then you will identify some key issues of the people that have traps and they want out of the fishery and what they do with their traps and all that. Also, now that you mention it, please do not confuse "control date" with "control rule", because control date is easy. It's this day before and after. Control rule is a huge what do you do with the fisheries.

CARLOS FARCHETTE: That's another point that I wanted to talk about, but, before I go there, you know our committee, and Nicole Angeli is on our committee, and so it makes it easier, that she's already there, as Director of Fish and Wildlife, and so, whatever we submit, she can make comments on, whether it needs to change, whether it's okay, before it gets the blessing of the Commissioner, because there is no sense submitting something to the council without the Commissioner's blessing already in there.

MIGUEL ROLON: That's another point. We don't receive anything from the Fisheries Advisory Committee that doesn't come through the Commissioner. In the case of Puerto Rico, it comes through the Secretary. Just to put that on the table, because somebody asked me the question before the meeting.

CARLOS FARCHETTE: Right, and my second point was there was a control date submitted for lobster traps fishing, but I am not really sure that we're not putting the cart before the horse. How can you have a control date when you don't have a definition of what that lobster trap is, or maybe you can have a control date without a defined lobster trap, and then, when you define it, then you throw it in there, and I'm not really sure how that's going to work.

MIGUEL ROLON: The control date is just that, what happened before and what happened after. You can set a control date at any time. Also, you can change it at any time. It all depends on how you want to manage your fisheries, but it's important that you have a date that people can relate to and say, well, before this date, we have so many traps. If they are going to impose a moratorium, or minimum traps, I know that, after that date, I cannot have those traps, and so I have to get rid of them somehow. That's all you do with a control date.

Then you can work on the other part, which is a control rule to

set the regulations that you have, that you propose and you implement, and that's another ballgame altogether, but there is no incompatibility to keep working with what you are doing and having the control date that you can target all the actions that you have before and after.

CARLOS FARCHETTE: So that control date -- I mean, I see it's going to have to change, because, right now, we have people getting into the fishery of lobsters and using lobster traps, because they cannot fish the fish traps, because of that control date, and so you can't have five people setting lobster traps and then find out that it was a 2017 control date, and so you really can't have those traps, and you have already invested, and so something has got to change.

MIGUEL ROLON: That is the point. Once you have a control date, and we're talking about the control date at the local government level and not the federal government level, and you can have both. They should be compatible, by the way, and it will be -- They have to be compatible.

Let's say that you have a control date and you publish the control date that, after this date, you cannot have blue traps, and so, if you know that, as a fisherman, and you decide to invest in blue traps, you are losing your money, but you need to advertise that. Once you decide this is the control date, for whatever species you are talking about, whatever fishery, you have to advertise it, so people will know ahead of time what is happening.

CARLOS FARCHETTE: So that means that the control date that was proposed before and passed by the council of September of 2017 is really -- Well, it's not implemented yet, because it's --

MIGUEL ROLON: Once you have the control date -- I don't know the status of the control date. Bill, do you have any idea what the control date is? Once we start as a control date, then people have to abide by it.

MARCOS HANKE: Bill.

BILL ARNOLD: I was going to let Maria do this, but the control date is in place, and it's available for use, but you do not have to use it just because it's there. It's just an option that's available if it fits within your management regime.

MARCOS HANKE: Tony.

TONY IAROCCI: Thank you, Mr. Chairman. Bill, first, I want to

say that I think we're all going to miss you, and that was a great presentation, and I hope we all are going to look forward to working with you in the future, and I went through -- The last couple of weeks, I dug out all of our old notes from the start of the old Windward Passage days, Julian, when it was some rambunctious meetings, and I made notes through a lot of the stuff that was brought up.

Pertaining to the fish trap management plans, and I want to refresh everybody's memory here. Since the fish trap management plan, lobster management has been discussed throughout the whole thing, from the first meeting on. Everyone, all the fishermen, said, if we're going to discuss fish traps, don't forget that we're going to have to include this lobster fishery.

The goals and priorities of these guys, from day one, was to preserve and protect the historical and cultural Caribbean spiny lobster fishery in a sustainable manner and involve all the user groups and educate the fishermen about ACLs, control rules, and the management process, and define our lobster fishery and traps and gear types used.

When you look at that, the local fishermen have changed over from depending on the side-entrance funnel to the top-entrance funnel, depending on the sizes. Every fisherman builds a better mousetrap, and every fisherman prefers a different size trap, different type of trap, different material of trap, depending on where you fish in the deeper water, the shallower water. If you've got a bigger boat, you build a bigger trap, and you fish less traps in smaller areas.

That all comes down to the fisherman's priority, but it all comes under definition. I don't care if you're looking at Florida or Maine or Central America. They are all using different style traps, and lobster traps are defined by both top-entrance and side-entrance, and so you've got to really prioritize this definition of what you're going to do with that.

The status of this lobster fishery, after the data that was shown today, I see this as -- It was quoted today as a fairly healthy fishery. I think it's a robust, healthy fishery, from what I see and what I'm seeing now, other than what has happened after the hurricane, and there's been less effort and less traps in the water, and the market-driven thing, as Julian has said a hundred times, and we've got to consider that.

Data collection, we're coming out of the -- Remember that the council and the SSC uses best available data for management, and

lobster fishermen throughout the Caribbean are willing to move forward using fishermen's data being used to modify and define the lobster fishery.

It's a very, very healthy fishery, if you make a comparison of this fishery to what we've seen, and I just spent three weeks in Central America, and that fishery is in trouble, because they don't have the management stuff that you've got on the table here. They don't have the enforcement, and they don't have people looking into people that are scrubbing eggers and bringing in the shorts and the black market of this stuff.

Florida right now is going through a crisis, because we've had back-to-back hurricanes, just like you guys did here, and your lobster fishery is in deep water. Ours is in shallow water, and we lost a lot of recruitment, and we lost a whole year of stock of fish. It's probably one of the worst lobster fisheries on record right now in Florida, and it's a very off season through Central America right now.

The Caribbean, with their -- I hate to say this on the record, because I'm going to hear it from Roy and Julian, but this three-and-a-half-inch carapace year-round fishery here is working. I mean, I've got applaud that effort. Forever and ever, I have always -- You know, I've been around stating more about three inch, but that's what I fished forever in Florida, and we have to reevaluate and look at the research recommendations.

We have talked about this, and Miguel has said it on the record, but how do we move forward? It's a well-managed fishery, and we've got MREP down here now, and look at the discussion today at the table. Look at Tony, and look at Nelson, and look at Julian. I mean, Ruth is sitting there now at the head of an association, and I can't stress the importance of these fisheries associations and working together through the council and working through this process.

You heard Richard today, and where do we go next? Julian's comments about closing the gaps, and Miguel said it earlier, where do we move forward with this stuff, and it was said today that studies have been initiated and the uncertainty and the deep water and the big lobsters.

When they had this problem, and I'm not saying there's a problem here, but in Maine, what they did, what they initiated, was an over and under gauge. The big, spawning lobster, especially the big females, they took them out of the equation. They don't let you fish for them. If there isn't a market for these big spawners

that you guys have got down here, it might be something to consider to only make this fishery healthier, is to look at those big females and take them out of the fishery, but that has to come from the industry.

Marcos had talked about, this morning at breakfast, when we talked about this, but we've got all the pieces of a -- It was a great analogy, but we've got a puzzle, and we've got all the pieces of the puzzle right now, and all we have to do is -- We've got the committees, and we've got to look at it, and how do we put this puzzle together?

We've got different types of discussion being said about attractants and the big lobsters, and I can honestly say that, in Florida, we don't use bait. We use attractants, the undersized, but we keep them in a live well, and that's how we bait our traps, and we keep them healthy.

Here, you guys do use bait, and I know some of you guys might be using attractants, but I want to stress the importance of, from this meeting on, moving forward in how we do this. Island-based management is there, and anything I can do behind the scenes or in front or whatever, I want to help move this thing forward, and I think we'll have Bill in the background throughout this, but I think it is time.

Richard said it, and Marcos said it, and Miguel and the fishermen, and it's time to move this thing forward. I have talked to some of the fishermen in Puerto Rico, and they were going to try to be here today, but they're not, and I talked to Julian about it, and everybody wants to help get this stuff defined and move forward with this thing. We've just got to figure out how to put this puzzle, as Marcos calls it, together, and, anything I can do, I would really like to help. Thanks.

MARCOS HANKE: Anybody else? Bill.

BILL ARNOLD: Just a quick aside. I think it's really nice of you people to be saying how much you're going to miss me, but I assure you that Maria and Sarah are going to do a great job, and you won't miss me for long.

MARCOS HANKE: Now we have -- If there is no other questions, we have the queen conch update that we passed for this afternoon. It should have been after lunch, but, because of the priority with Shannon's presentation, we left it for later.

ENDANGERED SPECIES ACT LISTING DETERMINATION STATUS

JOCELYN D'AMBROSIO: I think there should be a couple of slides for that. Do you have those? Okay. This is just a very brief update on the status of the Endangered Species Act listing for queen conch, and so, at the past few meetings, I have been providing updates, and I think probably previous folks have been providing updates about whether queen conch was going to be listed as an endangered or threatened species under the Endangered Species Act.

Just to refresh everyone's recollection, in February of 2012, NMFS received a petition from Wild Earth Guardians to list queen conch under the Endangered Species Act, and, as a result of that process, getting that petition, ultimately, the agency conducted a status review, to see if the listing was warranted, and they determined that it wasn't warranted to list the species as threatened or endangered, and they published that determination on November 5, 2014.

Then thereafter, Wild Earth Guardians and Friends of Animals filed a lawsuit challenging that determination, and that was filed in July of 2016, and so that case was pending until this past summer, and so, on August 26, the court issued its ruling, and the struck down -- They vacated that determination that the listing wasn't warranted, on a little bit of a procedural grounds, because the agency had relied on part of a policy that another court had struck down, and so the court said, in light of this change in the policy, revisit your determination.

On the next slide, this is the next steps in light of that court's ruling, and so NMFS is going to conduct a new status review, and they have announced that they're going to do that status review as of December 6, and so there's a sixty-day comment period, and the agency is requesting information that persons have that would be related to whether or not queen conch should be listed as threatened or endangered under the Endangered Species Act, and so you could submit comments to the agency.

The comment period closes February 4 of next year, and so there's a link to the regulations.gov, the page there and the docket number. You can enter that in, and then that's how you can submit comments to the agency, and they're going to be doing a status review, and then they will issue another determination about whether or not the species warrants listing.

There is contact information up on the screen for some of the biologists that are working on this, and so, if you have any specific questions, or if you have information that you want to

submit, you can either reach out to them, and then, again, if you want to submit information for the agency to consider, go to the regulations.gov page.

MARCOS HANKE: Any comments?

CARLOS FARCHETTE: Is that petition for queen conch throughout its range or just what's found in U.S. waters?

JOCELYN D'AMBROSIO: They would be looking at whether or not to list it either throughout all of its range or throughout a significant portion of its range, and that was one of the questions that the court considered, how the agency defined the range and what was a significant portion, and so that's one of the things that the agency will be looking at, but, yes, it has the discretion to list it throughout all of its range or if it's a significant portion, and that's the question they look at.

MARCOS HANKE: I am going to go to Kevin, and then I want to make a comment about it.

KEVIN MCCARTHY: Jocelyn, just a question on the procedure here. I was involved with this thing the first time around, and I can't honestly remember if I heard anything from Colusa or not, and she was involved back in the day as well, and so, after this sixty-day comment period, what does NOAA then do?

JOCELYN D'AMBROSIO: That's for the status review that they're doing, and so they're going to have a status review team that's going to be putting together the status review report, and then, following that information, they will put out their determination, whether or not the listing is warranted.

KEVIN MCCARTHY: Right, and so there's this comment period and then there's the status review?

JOCELYN D'AMBROSIO: Yes, and so this is to gather information for the status review, and so you can provide any relevant information to the agency, and the agency will consider it as it reviews the status, and then there will be a determination on whether or not listing is warranted.

KEVIN MCCARTHY: I am just curious if they're going to go back to some of the same people who were involved the first time around or what they are planning, but I guess I will wait and see.

JOCELYN D'AMBROSIO: I'm not really sure who is on the status review team, but Colusa would be able to answer questions about

that.

MARCOS HANKE: Toby.

WILLIAM TOBIAS: Jocelyn, a quick question for you in regard to queen conch during a seasonal closure. The Virgin Islands government has a seasonal closure for conch, and is it legal to restrict imports into the Virgin Islands during that period of time? Can I get your professional opinion on that?

JOCELYN D'AMBROSIO: Well, I mean, we would have to look at the law and what the closure says. I would have to pull that up, but I would imagine there is no fishing within that particular area during that season, and then there would be a different question of import that would be -- I think there is U.S. Customs laws and things like that that govern imports, and so it's not something I could answer right now. I would have to look into it further.

MARCOS HANKE: Richard.

RICHARD APPELDOORN: This is more of a follow-up on Kevin's line of questioning, but exactly what are we commenting on now? Is there a list of information or is it the old document or what?

JOCELYN D'AMBROSIO: The specific request that was published is they are requesting information with respect to conservation measures, regulatory mechanisms, protective measures, anything about the status of queen conch, and so any information that you think the agency should consider when it's determining whether or not to list the species under the Endangered Species Act. They are just soliciting information until February to inform that status review.

RICHARD APPELDOORN: All right. Thanks. I've already gotten two requests for this, but I haven't opened either one of them yet.

MARCOS HANKE: Kevin.

KEVIN MCCARTHY: Richard, I am just wondering if -- When this went through the first time around, I know I received something from Bob, and maybe your name was associated with that, but it was sort of an argument against listing, and I don't know that that kind of stuff was examined the first time around, and so, if you're familiar with that document, or maybe get in touch with Bob Glazer, and I know there was -- He had produced something that was pretty extensive, or he sent it to me anyway, and I don't know who all was involved, and maybe that's the sort of thing that would be appropriate for this. I could always get in touch with Colusa,

and maybe that just needs an update.

RICHARD APPELDOORN: All right. I mean, we now have a whole region-wide queen conch working group which the council is spearheading, really, and we have a meeting next week here in Puerto Rico with that group, and so there is a well-organized group that really should be the target, maybe, of those requests, because we're overlooking everything, obviously, from more of a CITES point of view, but a lot of the problems or issues are the same for ESA, and so trying to handpick things from individuals might not be the way to go, I suppose, to get something more specific from this larger group.

KEVIN MCCARTHY: It seems to me that that would be the group, too. Maybe a discussion one of those days during the meeting might be useful, and those are going to be the experts, and so that's who needs to respond to this, I think.

MARCOS HANKE: I invite you both to keep talking, and we need your support on that, and just to move along with the agenda, but for sure the input of both of you will be very important on this matter. Hearing nobody else on this item, we are going to go to Ruth's presentation.

NEW FISHERS ASSOCIATION ST. THOMAS/ST. JOHN

RUTH GOMEZ: Good afternoon. Bill, I'm going to miss you too. The St. Thomas Fishermen's Association, in 2005, I think in 2005, was the first time the council was introduced to the Fishermen's Association, and somewhere within five to six years after that, it sort of disappeared. After many requests to myself and Julian and Daryl by fishermen, we decided we wanted to bring the association back to life.

For the last month-and-a-half or two months, I have spent many hours filing its non-profit status, and we hired an accounting firm, and we took all the old documents, and David Olsen was very accommodating in sending us all the paperwork that he had from previously, and he pretty much turned it all over to Daryl and myself, to bring this association back to life, but I will say this for the record, that David is not a part of this go-round.

Presently, the elected officers are Julian is the Chairman, the President is Thierry Ledee, the Vice President is Daryl, and we have two Secretaries, Shirley Ledee and Evelyn Ledee, and then the Treasurer is Theresa Questel, and she serves as the in-house treasurer for the association, but, like I said previously, we have hired an outside accounting firm to handle the books for the

association.

The membership was revised to include recreational fishermen and sportfishing operations, because, as we talked to fishers out there, we were getting feedback from recreational and sportfishing operations that they had issues that they would like to have addressed, and so we decided we were going to revise the membership this go-round and include those two as well as the commercial fishermen, and the election of new officers will take place in June of 2020.

The first event that we had was a meeting on November 25, and we had forty-nine fishers attend, two members of the 33rd Legislature, members of the media, and, the afternoon prior to this meeting, Julian and myself sat in on a phone call with Congresswoman Stacey Plaskett, to answer some questions that she had.

The three main topics that we talked about were the fishery disaster aid, the island-based fishery management plan, and the St. Thomas/St. John Fishery Advisory Committee provided us with an update on the work that they are doing.

We also extended an invitation to the Economic Development Authority, because, in June, they are going to put on a two-day workshop for fishermen and farmers, and it's called the Fishermen and Farmers Business Conference, and so one of their staff members came to talk to the fishermen and extend a formal invitation to ask them to take part.

The priorities that I am going to talk about are in no order of priority. I didn't want to list it that way, because I didn't want any fisherman to feel like their concerns were not as important as the next guy, and so I just took all the concerns that they had and listed them here.

The fish trap reduction plan, Carlos, I agree that there are some issues with it that need to be addressed. The transfer of tags between licensed commercial fishermen is a big issue for the St. Thomas/St. John guys. There is no language in there that talks of it, and it's pretty generic, and they are really, really excited in having some sort of language in there that details the transfer of the tags between the licensed commercial fishermen.

In St. Thomas, no fisherman can exceed 250 traps, and definitely, even though we would like to see that language inserted, we don't want to increase the total number of traps that was allocated when the plan was signed, and I think, if my memory serves me correctly, it's a little under 4,000 traps, and so, even though we want to

transfer tags between fishermen, we still don't want to exceed the bottom line. Carlos, again, modification to the annual trap tag fees, and we have problems with that in St. Thomas as well.

Definition of a fish trap versus lobster trap, Bill took care of that, and there's no need for me to go there, but pretty much there is no regulations on lobster traps in territorial waters. Modifying the existing fish trap regulation to address funnel dimensions in both the EEZ and territorial and modifying the existing lobster trap regulations in the EEZ to include plastic pots.

Fishermen, and I've heard it before, but they can get pretty creative when it comes to the funnel, and so we really need to come up with some concrete definitions on what is a fish pot versus a lobster pot, and the members of the association would really like to see that happen sooner than later.

Data collection, one of the messages that we constantly promote to the members of the association is the importance of data, and so we would like to work with DPNR and DFW to increase their port sampling efforts, and so, whatever it is that they're doing now, we would like to take it a step above, because there is more -- There is data out there that we can collect, and, if it requires having the association assist them with collecting more port sample data, then we are all for it.

I am not saying that anything is wrong with DPNR's efforts, but we would just like to increase it, because there is still a lot more fishermen that are expressing concerns that they would like to increase their number of samples, and, whatever we can do to help, we would be more than happy to assist DPNR.

We want to create a Buy Fresh Local Seafood Education and Outreach Campaign. We have a lot of problems with imports from other islands and from the mainland, and so we want to spend a tremendous amount of effort talking to the restaurants and the locals about the importance of buying fresh, local seafood.

The dolphin and wahoo regulations, the FAC in St. Thomas submitted some proposed regulations to Commissioner Oriol, and they are really, really, really concerned about the size of dolphin that are being caught by the recreational and the vessel for-hire operations.

Their Facebook page tells a story, and so we would like to see if we can start a conversation with Commissioner Oriol about potentially getting these dolphin and wahoo regulations

implemented. If DPNR has concerns, open some sort of dialogue, where we can discuss getting them implemented, because, in St. Thomas and St. John, if you take a look at those Facebook pages, we don't like what we see.

We are trying to be proactive, and we're trying to save our stocks, and so, especially when it comes to the dolphin, we really would like to see some sort of bag limit and size restriction be implemented.

The sale of catch by unlicensed fishermen in the St. Thomas/St. John District is pretty bad, and so the association would like to start a dialogue with DPNR Enforcement and see what we could do to assist them in cracking down on the sale of catch by unlicensed fishermen.

When we talked about revising the association, and we wanted to include the recreational fishermen in this revision, we tried to figure out, okay, what would be the best way to bring the two together, because never has it ever been that way.

There is a game club that speaks only to recreational, and there is the association that spoke only to commercial, and so we tried to figure out what would be the best way to merge two groups of people that sometimes are at odds with each other to come up with a common goal and a common fight, right, and so we decided that we were going to hold a meeting with the recreational fishermen, by themselves, and hold a meeting with the commercial fishermen and get the concerns from both groups and then bring them together and try to unify both groups and come up with a smooth-sailing, very calm membership.

When Julian and I talked about it, and Daryl talked about it, we knew that bringing the two groups together like the first time, literally they would take the roof off. They have a lot of issues back and forth with each other, and so we don't want to exclude them, and their issues are just as important as the commercial fishermen, and so we want to make sure that, when the two groups are unified, that we do it in a very constructive and productive way.

The St. Thomas/St. John Lobster Steering Committee, that has sort of gone silent, and so we would like to energize or see the St. Thomas/St. John Lobster Steering Committee get re-energized and come up with a draft plan by December of 2020, and I applaud the guys from St. Croix for all the work that they've done with their draft plan, or what they have so far, and we sure would like to get there, where they're at.

We would like to see that committee come together and produce a draft plan by 2020, and, just for the record, the St. Thomas Fishermen's Association submitted correspondence to NMFS in support of the September 1, 2017 control date. Pretty much that's it. Any questions?

MARCOS HANKE: Thank you, Ruth. Any questions? Julian.

JULIAN MAGRAS: I would like to just make a comment. Thanks, Ruth, for that great presentation. Like she said, we were up and running, and we fought the SFA, and we got in the door, and we got working under some heated discussions with the council and a lot of scientists, and, at the beginning, it was a fight.

It's no longer a fight. We are here to work alongside of the scientists, and the scientists have shown a lot of interest to work with the fishermen, also. We became part of the process, and the scientists, when they have uncertainty questions, we are able to answer a lot of the questions, and the same with our questions of uncertainty. They are able to help us, and so we are seeing more of a hands-on communication, and we're getting the association back up and running.

We feel that we will be able to be involved, once again, in doing a lot of studies and doing a lot more outreach and education, and, most importantly, getting the public aware of what goes on. There is forty of us here in this room today, and how much of the information is carried out of this room and brought to the people in the different areas? It's not much.

It's not much at all, and you've got the representatives from each one of the islands here, and there is only so many people that we can get to, but, by having associations and committees and doing outreach projects, you are able to spread the word of what's actually taking place.

A lot of people look at it that we are in here and we're just coming up with rules and regulations, but, at the end of the day, we're here looking at the future of our fishery, and, at the same time, the heritage and culture, and so I look forward, once again -- Like I said, we're back, and we're going to do an election, and we're going to have a new board, and we're hoping to see new faces on that board, because I already told them that I want to step from being on the board, and we need some young blood, but I will give them my full support to bring them up to speed, because, when I do walk away, someone else needs to carry the fight. I am looking forward to working with everyone here at the table, and

whoever else comes along, and let's make it happen, and let's make it positive for everyone. Thank you.

MARCOS HANKE: Thank you, Julian. Any other comments? Maria.

MARIA LOPEZ: I just have a question. What kind of regulations are you guys thinking about for dolphin and wahoo? I'm just curious.

JULIAN MAGRAS: Right now, the St. Thomas/St. John FAC, I'm the Vice Chair of that committee, and we came up with size limits and bag limits for both recreational and commercial, and so the size limit that we picked is actually a little bit bigger than the one that they use in the United States, and the numbers are reasonable. I just don't have those numbers with me right now, but all of that was put together.

How we came up with those numbers, the FAC last year kept a meeting for the recreational fishers at the Frenchtown Community Center, and they invited all of them, the sport fishermen and everyone, to come to that meeting, to come to the meeting, and we listened to their concerns, and we had the commercial guys there, also. We listened to what they wanted to see as bag limits and size limits.

Those notes and minutes were taken, and, from there, we brought it back to our next FAC meeting and had a lot of collaboration and discussion about it, and we formulated a letter, and it was presented, and we are just waiting for a response on that.

MARCOS HANKE: Carlos.

CARLOS FARCHETTE: Maria, on that subject, the St. Croix Fisheries Advisory Committee Sub-Committee on Bag Limits does not agree with the federal regulations of fifteen/thirty. We believe that thirty mahi for a recreational person is way too much.

I know we probably won't be able to amend that, and I'm not sure, but we're also looking at size limits, to be what the tournament regulation is, I believe thirty-three inches. I have got to verify that, but I think it's thirty-three for tournament harvest, but fifteen and thirty is just too much, but, if we're stuck with federal, to be compatible, that's maybe what we're going to have to accept.

MIGUEL ROLON: Carlos, the Coast Guard has some clarification.

JEREMY MONTES: Just to clarify, Dolphin Wahoo Amendment 10 is currently getting put through, and they're working on it in the

South Atlantic, and I just came from a meeting last week, and we talked about it for way too long, but they're looking at reducing it. Right now, it's ten per person, up to sixty, for dolphinfish, and they are looking at reducing down to forty, or maybe thirty-six, just so you've got a number that's divisible by six for the charter guys, but, yes, currently, it's a very large number, but, like I said, Dolphin Amendment 10 is going to reduce the recreational bag limit for dolphinfish.

MARCOS HANKE: Miguel.

MIGUEL ROLON: The important thing is, once you finish your work, and you figure out what the appropriate bag limit should be for commercial and recreational, then you can present your case to the federal government for the surrounding waters of the U.S. Virgin Islands. The same in the case of Puerto Rico. Puerto Rico has been battling with this for a long time, and I remember one time one phone call from recreational, and it changed the whole bag limit, because the Secretary did it with one strike of the pen.

It is important, the work that you're doing, and the St. Thomas/St. John group, and we should look for probably 2020 and 2021, that timeframe, because that's when the island-based FMP will be in place, and remember that the dolphin wahoo is part of the management unit now.

In addition, at the Caribbean level, they are looking at possibilities of adopting a fishery management plan for the dolphin wahoo at the international level, and they will be compiling, between 2020 and 2022, all the regulations throughout the Caribbean, and there are not many, addressing wahoo and dolphin, but they are looking at the USA as an example to follow or not to follow, with the bag limits and so forth, for the management of the dolphin and the wahoo.

MARCOS HANKE: A quick comment. I have been involved with this for twenty years, and I think it's a very important exercise from the beginning, when I was a little kid, and I believed that the minimum size for mahi was something that shouldn't be pursued. I will not go over it, but, right now, the situation is different, because, culturally, we see we're connected to the traditional way of catching mahi, with bigger hook and so on, and we didn't have an area around the fishery for mahi like we are having with the sargassum influx, which exposed the mahi to be caught from a very small size.

For that reason, I think we should be very proactive, and I invite the effort from St. Thomas/St. John and from St. Croix and from

Puerto Rico that, to the extent possible, that if you can make something, and I don't think that the islands, in that sense, are too different, in terms of establishing an number for the bag limit that makes sense.

We should try to make it compatible across-the-board, because the fishery is very, very similar, especially if we're dealing with recreational fishermen, and I don't want to go into the details, but I just wanted to put myself available for any discussion and support on that discussion. Toby.

WILLIAM TOBIAS: The issue of sale of recreationally-caught dolphin and wahoo is extremely important here in the Virgin Islands. It's an important issue for enforcement, which is very difficult for them to address. Fishing tournaments, recreational fishing tournaments, typically result in high catches of dolphin and wahoo, and these fish end up being marketed illegally, and I'm sure this occurs also in Puerto Rico as well.

The establishment of bag limits, recreational bag limits, on dolphin and wahoo must take this into consideration, in terms of setting a number, because it's been a severe issue affecting commercial fishers in the Virgin Islands for many, many years.

MARCOS HANKE: Montes.

JEREMY MONTES: Just to spout out my party line every time we start talking about this, because I forget whether or not it's at the South Atlantic meetings or the Caribbean meetings or any of the other meetings that I'm at, but, with the sale of fish, if the intent is to sell fish, either way, if the stated intent is to sell fish, and say it's a recreational or a charter boat or a sportfish that's out there, and I caught too many fish, and they want to sell some when they get back, they have to adhere to commercial fishing vessel safety regulations at that point, which includes a sticker within five years and the full commercial fishing vessel safety requirements, which, if anybody has looked into transitioning back and forth between the two, it's constantly.

Every time it comes up, I just remind the councils that, if it was ever to be considered as a regulation, to allow the sale of recreationally-harvested fish, that, regardless of the -- Regardless that it was coming from the recreational sector, they would still be -- They would have to adhere to the commercial fishing vessel regulations, because, at that point, they are operating as a commercial fishing vessel.

MARCOS HANKE: Carlos, we are at the end of the meeting, and you

are going to be the last one, but this could be a very rich discussion. There is many things to talk about, and your final point, and then we'll keep moving.

CARLOS FARCHETTE: Real quick, we would have to do an educational outreach to the enforcement people, because there are actually two species of dolphin that pass our waters, which is a regular dolphin and the pompano dolphin, which is smaller, and they don't grow very big, and so we're going to have to really look at that carefully.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Are you finished talking about the dolphin?

MARCOS HANKE: I am not talking.

MIGUEL ROLON: Okay. Shannon asked me to tell you that she would like to address the group for one clarification and one announcement.

SHANNON CALAY: Thank you, Miguel. In the presentation that shows the table of projections, at the bottom, you saw the lines that said island-based fishery management ACL, and Jocelyn, with a keen eye, noticed that those were actually the ABC values that were reported, and so I have sent a corrected presentation to Graciela.

That one line of the table that you saw was actually the ABC values for the island-based management, and I added the true ACL values as well, and now they're both there, and they're correct. Thank you, Jocelyn.

MARCOS HANKE: Actually, I have received already the -- Most of the people should have received it. They should have it. Thank you. Thank you for your clarification. We are in the period of five-minute comments for the public.

PUBLIC COMMENT PERIOD

TONY IAROCCI: Real quick, I did get a call from Miranda and Brian, two of the fishermen on the other coast, that are still doing their data sheets, and they wanted to thank the council for working on this and hopefully moving forward with this data collection at some time, once we, as I said earlier, we put this puzzle together, and I want to congratulate the St. Thomas Association for getting back together.

I think it's very important, and we should have these associations

from St. Thomas, St. Croix, and Puerto Rico working very closely with the council, and, also, I had talked to Miguel and Vanessa and a few of the other people here, and I'm putting together a stewardship program to bring up some of the fishermen from the Caribbean to work in Florida on the lobster boats.

We need crew members there, and we are looking at bringing up active fishermen that want to come up there and get educated to the process of how we fish up there, and the techniques that we use, and we have a place for them to stay, and we will put them on the boats, but I want to make sure that we bring up the right people, and we could do a little pilot program.

Vanessa has a few people that are available, and I have already contacted them, if it's okay for -- If the council supports this, I would like to move forward with it. The main thing is that I would like to get fishermen from St. Thomas, St. Croix, and Puerto Rico for next season, because it is needed up there big time, and I think it's an educational thing, where these guys will get educated, and, as Vanessa said earlier, a lot of these divers, if they can't dive anymore, they are looking at ways to get into different types of trapping or different fisheries, and they can get up there, and then they can learn this process and do that. I just wanted to put that on the record, and I have already -- Like I said, I'll be in touch, and we'll see how we can move forward with this. Thank you.

MARCOS HANKE: Thank you very much. You already contacted the right person. Anybody else? Very quick, please.

JULIAN MAGRAS: Very quick. Just to make an announcement, the meeting that was scheduled for November 19th and 20th for the Ecosystem-Based Management Plan for St. Thomas/St. John was cancelled, and it has been rescheduled for the last week of March, and we will confirm that at a date coming up here very soon, and it's going to be a DAP workshop, where we will have the DAP members there. Also, we will have the agencies for us to have the discussions and presentations on the issues that we have questions and concerns on. I just wanted to make that announcement. Thank you.

MARCOS HANKE: Thank you, Julian. I don't see anything else on the agenda, Miguel, and we are ready to end this meeting.

MIGUEL ROLON: We are going to go into Administrative Matters, and then we have a closed session.

MARCOS HANKE: We have Administrative Matters now? Go ahead.

ADMINISTRATIVE MATTERS

MIGUEL ROLON: This will be easy. There is nothing to talk about. In the case of Administrative Matters, as I said before, we have the budget for 2020, and the National Marine Fisheries Service gave an advance to all the councils, and that's not the full amount. It will depend on whatever happens in 2020 with the budget situation.

We are ending the last year of the five-year cycle of the budget in 2019, and remember the budgets that are allocated to the councils comes in five-year packages, and so are finishing the 2019. We may end up -- Actually, we have a no-cost extension with several projects that we mentioned before at the August meeting, and so I think that it has been a successful five years for all the councils, in terms of budgets.

For 2020 to 2024, the councils are asking for more money, and other considerations and issues are being discussed as we speak, and so we will advise you at the next council meeting if we have any deviation from this funding.

Also, in Administrative Matters, we are going to hire a person to assist Graciela with the ecosystem-based management, and remember that we lost Mallory and Meaghan, and we will have a person stationed in Puerto Rico or the Virgin Islands, close by, and so that person should be hired during the first quarter of 2020. Graciela will give a little more information tomorrow morning, in her presentation, about the development with this plan.

The council also is supporting outreach and education with the two local governments, and I believe that what you mentioned, Ruth, about the local fishing strategy was done in Puerto Rico, too. The council might be able to help you with that, and, Mr. Chairman, now we can go into the closed session, and people should be back tomorrow morning at nine o'clock.

MARCOS HANKE: Yes, we are getting into a closed session. Thank you very much for helping me out and being so understanding about the times that I have to cut you off. Let's get moving. Thank you. We will come back in ten minutes.

(Whereupon, the meeting went into closed session on December 10, 2019.)

- - -

December 11, 2019

WEDNESDAY MORNING SESSION

- - -

The Caribbean Fishery Management Council reconvened at the Hilton Ponce Golf and Casino Resort, Ponce, Puerto Rico, Wednesday morning, December 11, 2019, and was called to order at 9:00 a.m. by Chairman Marcos Hanke.

MARCOS HANKE: Good morning, everyone. Let's start the meeting. We're going to start the second day of the 168th council meeting, the Caribbean Fishery Management Council, December 11, 2019. It is 9:08 a.m. Let's start with the roll call with the Coast Guard.

JEREMY MONTES: Jeremy Montes, U.S. Coast Guard.

VANESSA RAMIREZ: Vanessa Ramirez, council member, Puerto Rico.

SHANNON CALAY: Shannon Calay, Southeast Fisheries Science Center.

JOCELYN D'AMBROSIO: Jocelyn D'Ambrosio, NOAA Office of General Counsel.

ROY CRABTREE: Roy Crabtree, NOAA Fisheries.

MIGUEL ROLON: Miguel Rolon, council staff.

MARCOS HANKE: Marcos Hanke, Chairman.

TONY BLANCHARD: Tony Blanchard, Vice Chair.

CARLOS FARCHETTE: Carlos Farchette, council member, St. Croix District.

MARIA LOPEZ: Maria Lopez, NOAA Fisheries.

GRACIELA GARCIA-MOLINER: Graciela Garcia-Moliner, council staff.

NATALIA PERDOMO: Natalia Perdomo, council staff.

MARIA DE LOS IRIZARRY: María de los Irizarry, council staff.

ALIDA ORTIZ: Alida Ortiz, Outreach and Education Advisory Panel.

NELSON CRESPO: Nelson Crespo, DAP Chair, Puerto Rico.

WILLIAM TOBIAS: William Tobias, DAP Vice Chair, St. Croix.

JULIAN MAGRAS: Julian Magras, DAP Chair, St. Thomas/St. John.

RICHARD APPELDOORN: Rich Appeldoorn, SSC Chair.

LOREN REMSBERG: Loren Remsberg, NOAA Office of General Counsel.

KEVIN MCCARTHY: Kevin McCarthy, Southeast Fisheries Science Center.

HOWARD FORBES: Howard Forbes, DPNR Enforcement.

MANNY ANTONARAS: Manny Antonaras, NOAA Office of Law Enforcement.

MIGUEL BORGES: Miguel Borges, NOAA Law Enforcement.

BILL ARNOLD: Bill Arnold, NOAA Fisheries.

JACK MCGOVERN: Jack McGovern, NOAA Fisheries.

MIGUEL CANALS: Miguel Canals, University of Puerto Rico.

TONY IAROCCI: Tony Iarocci, commercial fisherman.

NOEMI PENA: Noemi Pena, Fisheries Research Lab.

GRISEL RODRIGUEZ: Grisel Rodriguez, DNER.

YASMIN VELEZ-SANCHEZ: Yasmin Velez-Sanchez, the Pew Charitable Trusts.

RUTH GOMEZ: Ruth Gomez, St. Thomas/St. John Fishermen's Association.

DAVID ORTIZ: David Ortiz, Pew Charitable Trusts.

CHRISTINA OLAN: Christina Olan, council staff.

WILSON SANTIAGO: Wilson Santiago, DNER.

RAIMUNDO ESPINOZA: Raimundo Espinoza, Conservación ConCiencia.

AIDA ROSARIO: Aida Rosario, Puerto Rico DNER.

VERONICA SEDA: Veronica Seda, Fisheries Research Lab.

RUPERTO CHAPARRO: Ruperto Chaparro, SEAMAP Caribbean.

EVAN TUOHY: Evan Tuohy, University of Puerto Rico.

WANDA ORTIZ: Wanda Ortiz, University of Puerto Rico.

CARLOS ZAYAS: Carlos Zayas, University of Puerto Rico Mayaguez.

CHELSEA TUOHY: Chelsea Tuohy, Isla Mar.

ORIAN TZADIK: Orian Tzadik, Pew Charitable Trusts.

MADISON HARRIS: Madi Harris, NOAA Fisheries International Affairs.

RANDY BLANKENSHIP: Randy Blankenship, NOAA Fisheries.

MARCOS HANKE: That's all, Graciela?

JEAN-PIERRE ORIOL: Good morning. Jean-Pierre Oriol, Commissioner, Department of Planning and Natural Resources for the U.S. Virgin Islands.

RUSS DUNN: Russ Dunn with NOAA Fisheries.

SEAN MEEHAN: Good morning. Sean Meehan, NOAA Fisheries.

GRACIELA GARCIA-MOLINER: Online, you do have Michelle Scharer, Michelle Duval, Sarah Stephenson, Stephanie Martinez, and Toby.

MARCOS HANKE: Thank you, Graciela. Before the presentation of HMS, we have to announce the council has three names that decided at the -- Go ahead, Miguel.

MIGUEL ROLON: Okay. The council met yesterday in a closed session, and we went over the candidates that will be included at this time for consideration of the council, via a motion, that will fill the eight members of the Ecosystem-Based Management Technical Advisory Panel. For that, we need a motion with the three names, and so, Mr. Chairman, would you like to read the three names, and then we can have a motion to adopt?

MARCOS HANKE: The three names are Sennai Habtes, Alida Ortiz, and Bill Arnold.

TONY BLANCHARD: So moved.

CARLOS FARCHETTE: Second.

MARCOS HANKE: Any comment? **All in favor; any opposed. The motion carries then.**

Also, I would like to announce the chairman for this panel, the technical panel that was just announced through the motion and approved, and it will be Bill Arnold, the chairman of this group. Also, I would like, first of all, to thank Toby Tobias for his job as Chairman of the St. Croix DAP and always having good input, and it's always a pleasure to work with you. At this time, also, after recognizing his great job, I would like to announce that Ed Schuster will be the Chairman for the DAP for St. Croix. Now we will go to Randy.

CARLOS FARCHETTE: Mr. Chair, we have had some discussions at our St. Croix FAC when it comes to voting, and I remember how we do this here, but what constitutes a vote, by individual vote or just an aye or a nay or abstain in a general consensus?

MIGUEL ROLON: In any assembly, if you follow Roberts Rules, the vote could be written, by voice, and usually the Chairman calls for the vote, yea or nay and abstentions, and absentees, also. That is the easy, basic way of proceeding with the votes.

CARLOS FARCHETTE: So, if the Chairman sees the need for an individual vote, he just says this is how I want it?

MIGUEL ROLON: Yes.

CARLOS FARCHETTE: Okay. Good. All right.

MIGUEL ROLON: In the case of the council, any vote on a motion that is going to submit it to the Secretary has to be a roll call vote. They will call your name and you vote.

CARLOS FARCHETTE: Okay. I will take that back to our committee, so we can do it the right way.

MARCOS HANKE: Thank you for the question, Carlos. Now Randy. Thank you very much.

HIGHLY MIGRATORY SPECIES UPDATE

RANDY BLANKENSHIP: Thank you, Chair. My name is Randy Blankenship, and I am the Chief of the Atlantic Highly Migratory Species Management Division within NOAA Fisheries. My office is located in St. Petersburg, Florida, co-located there at the Southeast Regional Office, and we have highly migratory species branch offices in Silver Spring, Maryland, and in Gloucester,

Massachusetts.

I want to thank the council for the invitation to speak today. It is an honor to come down here, and I've been able to present to the council on various topics over the last little bit more than a decade, and I always enjoy being able to come down here, and this is no exception.

The Caribbean Council and the stakeholders in the Caribbean region have been important partners in Atlantic HMS management, and certainly the Atlantic HMS fisheries in the U.S. Caribbean as part of the overall Atlantic HMS fisheries.

Recently, there has been interest in particularly the pelagic longline fishery and U.S. vessels in the Caribbean region fishing and relations that govern the operation of that fishery and monitoring that is required, and so that certainly has been a hot topic.

There is also some ongoing interest and questions about shark fishing in this area, and, more broadly, highly migratory species identification as well, and so, in my presentation today, I am going to cover a lot of ground.

The beginning part of it will be kind of a Highly Migratory Species 101, to provide a little bit of background about the management of HMS within federal fishery management, and I will also get into a little bit more specifics about the Caribbean small boat permit, which is valid in the U.S. Caribbean and that we spent quite a bit of time developing under Amendment 4 several years ago, and then I will spend some time with a little bit more specifics about the pelagic longline fishery and management and monitoring for that, and then, finally, I will wrap up with just a quick overview of some current initiatives that we have going on within Atlantic HMS across our management area.

To get this started, I want to review some of the basics in this HMS 101 kind of a setting, and so, for Atlantic highly migratory species, our management area covers Maine to Texas and the U.S. Caribbean, and it includes management specifically of highly migratory species identified in the Magnuson-Stevens Act, and those include the tunas, the bluefin, bigeye, albacore, yellowfin, and skipjack tunas, the billfishes, to include the blue marlin, white marlin, roundscale spearfish, sailfish, and longbill spearfish. It also includes swordfish and also sharks, and I just mention a couple here, the shortfin mako, thresher, blacktip, bull, tiger, also oceanic whitetip, and many others that it would take a slide in and of itself to list.

A little bit of history for management of HMS. Of course, there is the seminal federal fishery management legislation in 1976, the passing of the Magnuson-Stevens Act, or the Magnuson Fishery Conservation and Management Act, at the time. Then, in 1990, that was amended, giving authority to the Secretary of Commerce directly to manage highly migratory species and defining what those were.

At the time, or previous to that, Atlantic tunas were managed not by a council, but actually by GARFO, then the New England Regional Office, or whatever it was called at that time, and then that was pulled out from that setting, and then also Atlantic sharks, swordfish, and billfish were managed by councils, and so that was then pulled from council management and then, together, HMS then became directly managed by NMFS, and secretarial authority was delegated to NMFS to manage those.

The National Marine Fisheries Service created the HMS Management Division in 1992, and then, in 1996, the Magnuson Act was reauthorized and renamed the Magnuson-Stevens Act, and that then set up and required NMFS to establish separate advisory panels for Atlantic HMS and for billfish, and so, at that time, there were two advisory panels.

Since then, in the 2006 consolidated HMS FMP, the FMPs were brought together into one FMP that we operate under now, and the advisory panels were combined into one, and so we now have one HMS Advisory Panel.

A little bit more of an overview on management under the Magnuson-Stevens Act, and, of course, many of you are very familiar with these provisions, and they also apply in HMS, and some of the specific requirements that apply for councils and for HMS include National Standards, such as preventing overfishing, minimizing bycatch, promoting safety-at-sea, best available science, and there are others.

Also, fishery management plan requirements include measures to rebuild overfished stocks, describing essential fish habitat, and cumulative impact assessment. There is also some provisions in the Magnuson-Stevens Act that are unique to HMS, such as the advisory panel that I just talked about, and some international considerations and fishery management plan requirements specific to HMS and international considerations.

I won’t spend much time on this, but I think it’s important, because a lot of the questions that we have received over the last few years from individual constituents and from some of the

entities in the area have been surrounding things like how are sea turtles considered and what about marine mammals, and I just wanted to put this on there to say that we must also, in HMS management, comply with all of these other laws and Executive Orders that include the Endangered Species Act, Marine Mammal Protection Act, and many others.

Within HMS management, we conduct rulemaking to develop fishery management measures for highly migratory species throughout its range, and we issue individual fishing permits, dealer permits, and research permits for HMS, and we also monitor ourselves, and in partnership with the applicable Science Centers, we monitor commercial landings and recreational catch, and we register HMS tournaments and collect landings from those and effort data, and, also, we conduct biological and socioeconomic analysis.

An important part of HMS management is the international aspect, and so the United States, along with multiple other countries, work at the International Commission for the Conservation of Atlantic Tunas, or ICCAT, where management recommendations for tuna and tuna-like species are developed, and those are tunas, billfish, swordfish, and some sharks right now are considered as bycatch in the directed ICCAT fisheries, and the convention was recently -- An amendment to that was recently adopted, but it will take some time for that to be implemented, but at least changes are underway, and that will apply and relate to some sharks in the long-term. Also, other bycatch species, such as seabirds, sea turtles, and cetaceans, can be covered through ICCAT.

Recommendations are binding on the United States, and they include many different management measures in different fisheries, and the HMS Management Division implements those ICCAT recommendations as necessary and appropriate under the Atlantic Tunas Convention Act.

The Atlantic Tunas Convention Act provides the authority to choose ICCAT recommendations domestically, and it regulates and provides for the authority to regulate all fishing activities, including research, and it also specifies and limits subsequent action that could have the effect of increasing or decreasing any U.S. allocation of quota agreed to at ICCAT.

A little bit more about ICCAT and the process there. There is fifty-two contracting parties, and those are different countries, and also including the European Union as one contracting party. There is an annual meeting every November, and we just had one this past November in Majorca, Spain, and recommendations developed there, as I mentioned earlier, are binding. Resolutions are non-binding.

An important part of the ICCAT process is the Standing Committee on Research and Statistics, or the SCRS, which is the scientific portion of ICCAT, and we have national scientists that participate on that, and U.S. scientists are an extremely important part of that process, Shannon Calay being one of those that participates in that process, and several others that we have at the Southeast Fisheries Science Center.

There are about three to four stock assessments that are conducted by the SCRS every year, and the species groups in the SCRS convene to develop what becomes management recommendations that are adopted at the SCRS plenary meeting in October, and then that advice is presented to the overall commission at its annual meeting each November.

This is just a real quick schematic, and it's not all-encompassing of every partner in HMS management, but it is one to kind of help you visualize a little bit about how HMS management kind of works over time.

There is the HMS Management Division, which I work for, and there is the Office of International Affairs and Seafood Inspection, and there is a lot of work back and forth between these two groups, particularly in relation to ICCAT work. Then we have the HMS Advisory Panel that I mentioned previously, and a lot of work goes on between the HMS Management Division and that.

There is also the ICCAT Advisory Committee, which is authorized under ATCA, the Atlantic Tunas Convention Act, and membership on both of these. Real quickly, there is also council representation on those two groups, and Marcos Hanke is the representative of both of those for the Caribbean Fishery Management Council.

We also have important partners, of course, with the Southeast Fisheries Science Center, the Northeast Fisheries Science Center, and the Office of Science and Technology that are involved in this. What's not on here are partners like General Counsel and the actual fishery management councils themselves, which are important partners, but I wanted to kind of provide this schematic, to show how interrelated -- We work to domestically manage HMS, but also develop positions for negotiation at ICCAT and also then do those negotiations and bring them back home and work on implementation domestically.

A little bit of comparing and contrasting here between the fishery management council management process and HMS management with the HMS Advisory Panel. The council members in the council management

process, council members vote to approve or disapprove actions to submit to NMFS. In the HMS Advisory Panel process, the AP recommends -- They provide recommendations, and they are advisory in nature and not decision-making.

Under the council process, NMFS approves or disapproves actions that are presented and forwarded by the council. Under the HMS process, NMFS decides what actions to consider and implement. Under the council process, there is the scientific and statistical committees that provide expert advice to the council. Under the HMS process, HMS staff seek the input of the Science Center staff. They, of course, take seriously the work that's done by the ICCAT SCRS as well.

Then, for the council process, councils meet about five times a year, and, for the HMS Advisory Panel process, there are -- We have usually had about two advisory panel meetings per year.

A couple of points. Remember that, in HMS, we're talking about swordfish, billfish, sharks, and tunas. Through the domestic management process, federal regulations that are developed for HMS apply in the U.S. EEZ and then, for some species, they also apply in the territorial waters and state waters, and so, under the Atlantic Tunas Convention Act, the tunas that I listed are actually managed to the shore, and so those are the species that regulations apply within territorial waters.

Regulations vary by type of fishing activity, gear, and species, and we have commercial and recreational fisheries permits that are required, as well as dealer permits, and I want to make a particular note that many people are familiar with, but it's worth mentioning, that billfish may not be sold or possessed for any purpose of selling, and that is actually under the Billfish Conservation Act of 2012, and so that's actually a federal law.

Within HMS management, HMS must only be sold to permitted HMS dealers, and there is one exception to that, which is the Caribbean small boat permit, and I will get into that in a little bit more detail in a moment, and that would be some of the specific regulations that have been developed for the U.S. Caribbean.

I want to provide a real quick overview of commercial fishing permits within HMS. This is a long list, and I won't go into much detail, but some key things to look at here are the name of the permit in this column, or at least the subject matter that it covers, in this column is whether or not it's limited access, and, actually, the question is are new permits being issued, and so is this an open-access permit or not, the target species, and then

where the fish can be sold, whether it's to a dealer or if it can be sold directly to the public.

We have permits that are directed or incidental permits for swordfish and shark and the hand-gear permits for swordfish, and those are limited access, and there are no new permits being issued, and so existing permits can be renewed, and they can also be transferred from one permit holder to another, if they want to be sold between entities, but there are no new permits being issued there.

The swordfish general commercial permit and the tunas general permit, harpoon and trap categories, are open access permits, and the Atlantic tunas longline and purse seine categories are not open access, and there are no new permits being issued there, and the charter headboat permit for HMS, with a commercial endorsement, is a commercial permit, and that is open access.

I am going to skip the commercial Caribbean small boat for a second and move down to the smoothhound shark commercial permit, which is also open access, and then the permits that I have covered so far are all permits where the product and the fish landed must be landed and sold only to HMS-permitted dealers.

Now, for the exception. The exception is the HMS commercial Caribbean small boat permit, which was developed under Amendment 4 and finalized in 2012, and there was a lot of work over multiple years that went into developing that permit, and the need for that permit comes from the way that many of the fisheries operate in the U.S. Caribbean, where is where the selling of fish oftentimes happens directly to the public, in local markets or even boat-side.

It wasn't a good model to -- The requirements for selling only to permitted dealers was not a really good model for the way that some of the fisheries operated down here, and so, through a multiyear process of working with the Southeast Fisheries Science Center and with the territorial governments and with constituents, we developed the Caribbean small boat permit.

With that, it is an open access permit, and it allows for the harvest of swordfish and tunas, and it also authorizes shark harvest, but, currently, the shark retention limit is zero sharks under that permit, and, once again, fish can be sold directly to the public under this permit, and I will go into a little bit more detail in a little bit, but I will say that data collection for this happens through the territorial commercial fisher reporting forms that are required per trip.

A little more detail about the Caribbean small boat permit. It's valid only in the U.S. Caribbean. It's not valid in the waters around the mainland of the United States, and it is limited only to vessels less than or equal to forty-five feet in length overall, and it cannot be held in combination with any other HMS permits, and there are retention and size limits, and they are kind of outlined here in the table down below, and specifically authorized gears include rod-and-reel, handline, bandit gear, and buoy gear for swordfish, and buoy gear is also called yo-yo gear in many places within the Caribbean, and so it does provide for BAYS tunas, and not blueline, but BAYS are bigeye, albacore, yelloweye, and skipjack tunas, and so ten BAYS per vessel per trip and a swordfish limit of two swordfish per vessel per trip, minimum size limits, and then, of course, with sharks, zero retention limit at this time.

Now, a little bit more about this is that, over the last more than a year, we have heard a lot of -- Well, multiple years now, but we have heard a lot from local constituents, in Puerto Rico in particular, and also at our advisory panel meetings, about interest in the allowance of harvesting some sharks.

Also, there has been interest in trying to make the swordfish retention limit match up, management-wise, with the swordfish general commercial permit, which is an open access permit that applies not only in the Caribbean, but also across the rest of our management area.

We have been exploring the possibility of being able to take a look and evaluate both trying to match up the swordfish retention limit between those permits and provide for in-season management abilities and then also consideration of some limited amount of shark harvest under the Caribbean small boat permit.

That is something that we've been working on and are working towards actually developing a proposed rule on, and you might be able to see and hear more about that later on in 2020, probably early in 2020.

Moving on to HMS dealer permits and reporting requirements, as I mentioned before, there are requirements to sell only to HMS-permitted dealers, and we issue dealer permits for shark, swordfish, and tunas. There are only a few dealer permits that currently are issued in the U.S. Caribbean, and there could be more, because it's an open access, to be able to get a dealer permit, but there are reporting requirements that go along with this.

Atlantic HMS dealers are required to report their HMS electronically through one of the NMFS-approved electronic reporting programs, and, in the U.S. Caribbean, the one that is being used is the eDealer system, and eDealer facilitates reporting of HMS only, and no other species are reported through the eDealer system. It's only HMS.

In other areas, other systems are used, depending upon the different region and states, and, in many cases, we depend, in other states, on the trip ticket programs of those states. In some other places, it may be the SAFIS electronic reporting system, but all dealers must report. Currently, this is the only federal dealer permit and dealer reporting requirement in the U.S. Caribbean.

Moving on to talk a little bit about the reporting requirements for fishers in the U.S. Caribbean, and you all are familiar with this, and this is the territorial commercial fishermen reporting forms, and so it is the case, for the Caribbean small boat permit, that those permit holders -- When they land and sell their catch, they must report via the territorial reporting forms, and any of our HMS-permitted vessels and the fishers with those permits would be required to meet any of the territorial requirements that may apply, including this one, if this applies to them.

A real quick slide, in summary, about how to obtain these permits, and there's a couple of ways. One is some of these permits are available through an online system, which is called the NMFS Permit Shop, and I provided the website and the phone number here for this, and I understand this presentation will be made available publicly when it's posted, and so this is a place where a fisherman can go in and obtain vessel permits online, using a credit card, and get them very quickly.

It includes all of the Atlantic tunas permits, except for longline, and it includes the HMS charter headboat permit, HMS angling permit, which is not a commercial permit, and also the swordfish general commercial permit. The other place where permits can be obtained is from the Southeast Regional Permits Office, and the contact information is here. A good way to find this online information is just to do a Google search for the SERO Permits Office or the NMFS Southeast Permits Office, and you will find the information.

This is where the HMS commercial Caribbean small boat permit is issued out of, through that application process in the Southeast, and then also renewal and any transfers of limited access permits,

such as the Atlantic tunas longline permits.

Speaking of the Atlantic tunas longline permits and fisheries, I will get into a little bit of the specifics here. There are three permits that are required to be held in combination for any pelagic longline vessel. Those include one of the directed swordfish limited access permit or incidental swordfish limited access permit and the directed shark limited access permit or incidental shark limited access permit and the Atlantic tunas longline limited access permit, and so, once again, three permits must be held in combination in order to fish with pelagic longline gear.

These are limited-access permits, and there are -- In 2018, there were 257 vessels authorized to fish with pelagic longline gear, but only seventy-four have been active in a management area from Maine to Texas and the U.S. Caribbean, and so active, in this case, means that they reported at least one swordfish landing, and so, once again, 257 potential vessels, but seventy-four that are active.

This is a real quick overview and picture of the time/area management measures and closures that apply to the pelagic longline fishery, and you can tell and see that there are a number of them. Some of these are closed year-round, and some of them are seasonal in nature, and this same picture is available in our compliance guides.

I will take this moment, related to compliance guides, to say that I have a handful of them that I brought with me, and, after my talk and after -- Maybe at a break, if you would like to have one of them, I certainly can give you one.

I wanted to go through some of the specific requirements that apply to pelagic longline vessels. Some of them relate to sea turtle bycatch mitigation measures that are required under the biological opinion that’s applicable under the Endangered Species Act. The first three up here are those, and only large, corrodible circle hooks may be deployed. Specifically, those are 16/0 and 18/0 circle hooks.

Only whole finfish or whole squid bait may be used, and gangions must be at least 10 percent longer than the length of float lines, and this is to allow any potentially-hooked sea turtle to be able to reach the surface.

Additionally, there are other requirements. Pelagic longline vessels may not possess, retain, or sell any billfish. There are a number of prohibited sharks, nineteen of them, and they also

include the prohibition and retention of silky, oceanic whitetip, or hammerhead sharks on pelagic longline vessels.

Vessels must also release any shortfin mako or porbeagle sharks that are alive at haul-back, and the pelagic longline fishery is managed under an individual bluefin tuna quota system, and vessels must have sufficient IBQ, or individual bluefin tuna quota, in order to make one set at the beginning of any quarter, and then any deficit that occurs in IBQ within a quarter must be rectified at the end of a quarter.

Then vessels must possess and use the sea turtle safe handling and release gear, and they must also use those gears in compliance with marine mammal, sea turtle, and sawfish regulations.

Additionally, related to recordkeeping and reporting requirements, vessels must comply with the science-based quotas for swordfish, sharks, and tunas, which are monitored using dealer reporting, mandatory logbook reporting, observer -- Again, they must carry observers when they are selected to carry observers, and all vessels also have electronic monitoring systems onboard to account for bluefin tuna interactions and shortfin mako interactions.

All vessels have installed and use NMFS-approved vessel monitoring systems, which are monitored by the Office of Law Enforcement, and there are hail-in and hail-out requirements through the VMS system that are required. Additionally, through the VMS system, there must be a report of any bluefin tuna catch, or absence of catch, with any set that's made with pelagic longline during a trip.

Once again, these vessels carry observers if they are selected, and they must offload and sell only to federally-permitted HMS dealers, and they must submit the logbooks within seven days of offloading, and all vessel owners and operators must attend a safe handling and release workshop every three years.

I also wanted to provide a quick overview of some current HMS initiatives that we have going on. They include, in the pelagic longline fishery, an initiative right now to look at gear-restricted areas and weak hook management measures. This is with the purpose of determining if existing area-based and weak hook management measures are the best means of achieving current management objectives and providing flexibility to adapt to fishing variability in the future.

This is, of course, an initiative across our management area, from Maine to Texas, the U.S. Caribbean and on the high seas, with the pelagic longline fishery. The weak hook management measure that's

mentioned here is unique to the Gulf of Mexico, where weak hooks are required in the pelagic longline fishery in the Gulf of Mexico, in order to facilitate quickly releasing adult-sized bluefin tuna.

We have had a scoping process that we've undertaken for this. A draft environmental impact statement and proposed rule was out, and the comment period ended on September 30, and we anticipate a final rule and final EIS being out in the spring of 2020, and a website is available for more information on this subject.

Another initiative we have is looking at going about, from a programmatic standpoint, collecting data collection and research in support of spatial fishery management, and, basically, this means how to go about, in an organized and programmatic way, collecting data in time/area closures, whether it's seasonal or year-round, in order to determine if they are still the most effective and most appropriate management measures in any given situation.

This is not unique to pelagic longline fishing, and this is across all different gears and fisheries for HMS, and we've had scoping that took place on this in 2019, and we anticipate a proposed rule later in 2020.

We also are working on Draft Amendment 13, which is all things bluefin tuna, focusing on refining the IBQ system that I was talking about earlier and making some updates there, based upon a three-year review of that program that we recently completed, and also looking at the potential to reassess allocation of bluefin tuna quotas and potentially discontinuing the purse seine fishery as well as looking at other provisions in directed and incidental bluefin tuna fisheries. Once again, we had scoping on this earlier in 2019, and a proposed rule and a draft environmental impact statement are anticipated in the spring of 2020.

I mentioned the three-year review of the IBQ program, which we recently completed, and that's available online. You can Google that, if you wish, and here is the website, and then we also have a final action taken back in the spring, in March of 2019, that I wanted to highlight, and that's related to shortfin mako, and so this is final measures that are represented. Once again, this was to address overfishing and help to start rebuilding the shortfin mako stock.

These measures became effective on March 3 of 2019, and they include the live release of shortfin mako sharks and retention with longline or gillnet gear only if a shark is dead at haul-back, and, for pelagic longline gear, vessels must have a

functioning electronic monitoring system, which they are already required to have, and those are monitored in order to account for the disposition of sharks when they come back at haul-back.

In the recreational fishery, under an ICCAT recommendation, there is implemented the minimum size limit of seventy-one inches fork length, and that's a straight-line measurement for males and eighty-three inches fork length for females, and the required use of circle hooks in recreational shark fisheries at all times and in all places.

I also wanted to mention a recent happening related to short-fin mako sharks, and this is not a NOAA action, but it is a CITES action, and that was the listing of short-fin mako in Appendix II, and this occurred on August 28 of 2019, and implementation is of November 26, and it requires specific permits from the U.S. Fish and Wildlife Service that are needed in order to import, export, or re-export short-fin mako sharks, and this includes fishermen who catch short-fin mako sharks on the high-seas, and that they will also need the permit from the U.S. Fish and Wildlife Service if they intend to land that fish.

Also, any short-fin mako sharks, including fins that are landed before November 26, need a pre-convention certificate, and, of course, at this point, probably most of those are taken care of by now, but it is an important thing to keep in mind.

I have provided a couple of links for more information. one thing I will just plug is the HMS news email listserv, which is available on the HMS website. If you want to get regular information emails about any new things coming out from HMS, please go that website and sign up for it. It is the best way to stay up-to-date on HMS actions. With that, I will conclude and be ready to answer any questions.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Thank you, Randy. That was a thorough description of the HMS program, and we have needed that for a long time. I have a question regarding the requirement for any fisherman fishing in the EEZ for wahoo and dolphin who has a permit to sell, according to the present regulations. Do you have any numbers of U.S. Virgin Islanders or Puerto Ricans that have that permit already for the selling of dolphin and wahoo caught in the EEZ?

RANDY BLANKENSHIP: First of all, dolphin and wahoo are not considered Atlantic highly migratory species, and so they don't fall within the management of the HMS Management Division.

However, some of the pelagic longline fishermen also may land and sell dolphin and wahoo, and, depending on where they are fishing, they will need to abide by the applicable regulations that may apply for those species.

Related to that, there is the dolphin and wahoo permit that is required under the South Atlantic management measures, and many of those vessels do have a dolphin wahoo commercial permit, and that would be on a vessel-by-vessel basis, and then they would have to abide by those requirements.

If they are fishing in the U.S. Caribbean, my understanding is that there's not a current commercial dolphin wahoo permit, and so that wouldn't be necessarily required in the U.S. Caribbean, and I could definitely use some clarification on that, if there is any to be had.

MIGUEL ROLON: The reason I asked is a couple of fishermen have asked me, and there is a confusion, and this applies to longline vessels that are able also to catch dolphin and wahoo, but some have the confusion that, if I am fishing out there for dolphin and wahoo, do I need a permit to sell the catch, and my answer has been so far that you have to abide by the U.S. Virgin Islands and Puerto Rico local government requirements to sell, and then the question they ask is always that one. They say, Miguel, if I fish outside the local waters in Puerto Rico, do I need a permit from the federal government to sell the dolphin or the wahoo?

Because we are going to get into the management of the dolphin and wahoo once the island-based FMPs are approved, that is the main question they have, and we also are telling them that this is not a highly migratory species, and it's a coastal pelagic, and we might be involved next year in the international Caribbean dolphin wahoo fishery administration, but, anyway, that's the rationale and the reason for the question.

MARCOS HANKE: Carlos.

CARLOS FARCHETTE: Hi, Randy. Who presently manages dolphin and wahoo? Is it the South Atlantic Council? Somebody has management on wahoo and dolphin, don't they?

RANDY BLANKENSHIP: Right, and so the South Atlantic does manage dolphin and wahoo within the range of that fishery management plan, which would be according to the range of that, and I can't really speak to that. I think there has been some analysis of what that is, and I know Jack has just raised his hand, and he could speak to that a little better. There are other areas where dolphin and

wahoo are not managed, including the Gulf of Mexico and right now I think the U.S. Caribbean.

MARCOS HANKE: Jack.

JACK MCGOVERN: Dolphin and wahoo are managed by the South Atlantic Council from the Keys to Maine, and they are not managed in the Gulf of Mexico, and there is a permit for it, and it's an open-access permit for dolphin and wahoo.

JOCELYN D'AMBROSIO: I was just going to say that, with the island-based FMPs that were approved in April, some of the islands manage dolphin and wahoo, and we can double-check and make sure that we get them right, but I know that -- I think both are managed in Puerto Rico, and is that right, Maria?

MARIA LOPEZ: Yes.

JOCELYN D'AMBROSIO: When those go into effect, that will be managed, and you can develop any further management measures that you want, but, right now, there are ACLs and AMs in the Puerto Rico plan for dolphin and wahoo, and I will check for St. Croix and St. Thomas/St. John which of those species are included.

CARLOS FARCHETTE: So you're telling me that the territory has a management plan for --

JOCELYN D'AMBROSIO: No, the island-based FMPs that the council just established, and so, in the federal plans, for Puerto Rico at least, it's dolphin and wahoo, and then I just have to double-check the St. Croix and the St. Thomas/St. John.

CARLOS FARCHETTE: So, Jack, can I go online and look at their plan and how they manage dolphin and wahoo in the South Atlantic, because I would like to use some -- I need to get some verbiage out of that.

MARCOS HANKE: Go ahead, Jack.

JACK MCGOVERN: Sure, and I can send you the link to the Dolphin Wahoo FMP, and I can send you amendments to that, and I will email you, and we can talk about that.

MARCOS HANKE: Richard.

RICHARD APPELDOORN: I just wanted to remind the group that, at least for dolphin, we're talking one stock for the Caribbean and the South Atlantic and the Gulf and the other countries that are

involved there, and so, while each one may have their own plans, there is no coordinated plan looking at the stock as a whole.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Also, we're talking about two species of dolphin, what we call mahi-mahi and what we call the dolphin. In 2020, the Caribbean countries are going to review the whole literature about dolphin and wahoo, and we are going to -- That will be available to all of you. We also want to ask the local governments what is the present regulations that you have for dolphin and wahoo, which is a little bit different from the island-based FMP draft that we prepared.

MARCOS HANKE: I would like to give the floor to Damaris first and recognize her presence here. I didn't have the opportunity to say so. Damaris.

DAMARIS DELGADO: Good morning. Damaris Delgado, DNER. I just wanted to recognize Randy's efforts, and I congratulate him for his presentation, and, also, I wanted to recognize that he has been addressing our questions.

We had a lot of questions that we wanted to consult with Randy, especially because we received a lot of questions from the fishers in this past time, and so he managed to answer so many questions from the fishers, and so thank you very much for your time and time put in answering all of our questions and giving us time to talk about all these issues that are of such great interest, especially from the fishers' side, and also from our biologists in DNER, and so I really appreciate your support and the clarification of all of our doubts and questions. Thank you.

MARCOS HANKE: Thank you, Damaris. Toby.

WILLIAM TOBIAS: Randy, when you issue a Caribbean small vessel permit for tuna and swordfish, do you also provide information that the applicant must be compliant to territorial regs as well, because there has been some confusion in regard to federal permits issued to individuals who don't hold territorial commercial fishing permits for sale of those fish.

RANDY BLANKENSHIP: Thanks for the question, Toby, and, yes, we do provide clarification. Actually, even on the face of the permit that's issued, among several things, it says that territorial requirements are applicable, and so that is incumbent upon the vessel then to find out from the territory what those requirements are that they need to abide by, but it has always been part of the

development of Amendment 4 and the issuance of those permits that it is clear that they must abide by territorial requirements as well.

MARCOS HANKE: Carlos.

CARLOS FARCHETTE: Thank you, Mr. Chair. Randy, I don't want you to go back to the slide, because I don't even remember where it's at, but it said that the small boat permit holder does not have to sell to HMS dealers, and can a small boat permit holder also have a -- There it is. Can a small boat permit holder also have a dealer permit, or apply for a dealer permit?

RANDY BLANKENSHIP: Yes, and so it's an option for them. A Caribbean small boat permit holder could sell directly to the public, and they could also sell to an HMS-permitted dealer. They could also, if they wished to be, become a dealer themselves and then buy from other fishermen. They would be bound by the requirements to report as a dealer what those purchases are.

CARLOS FARCHETTE: You just said that they can sell directly to the public, but aren't they required to have a dealer permit to sell tunas to the public, or it is just for yellowfin?

RANDY BLANKENSHIP: If they have a Caribbean small boat permit, under federal requirements, they are not required to have a dealer permit to sell to the public. This permit authorizes them to sell directly to the public.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Randy, then our interpretation is that a small boat operator will be authorized to sell, once they have the permit and everything to catch, according to the table, from the shoreline to the edge of the EEZ, and this is only for the EEZ. My question is do we need regulation in the local government to follow this, or does the federal government sort of trump the local government regarding the swordfish and so there is no need to have other local fishery regulations on top of that one, and that's the question that they have.

RANDY BLANKENSHIP: The Caribbean small boat permit applies in federal waters. The selling to the public is a provision of this permit that authorizes them to sell directly to the public, rather than to a dealer, but it is a federal permit that applies in federal waters.

MIGUEL ROLON: There are two points to that. One is where you

catch them, and you need to have a permit to fish for these species, but, once you have that permit, you sell it at the dock in Puerto Rico or the Virgin Islands, to whomever you want to sell it.

RANDY BLANKENSHIP: That is correct.

MIGUEL ROLON: My intention with this, Mr. Chairman, is that there have been -- They are asking me a lot of questions, and, most of the time, what I do is I refer the fishers to the language that you have in the Federal Register.

Our intention, and this is advancing a little bit on what Dr. Alida Ortiz is going to present, but we are putting together a fact sheet of information that will be electronic and distributed on paper, and we will prepare a draft and send it to your office, to make sure that we don't have any mistakes. Once we have that blessing, we are going to distribute that in Spanish and English to the local fishers.

Also, we are going to include whatever local regulations the U.S. Virgin Islands and Puerto Rico may have, and so all the information will be provided to the public in both languages, but we will thank you in advance for reviewing whatever we are going to prepare.

RANDY BLANKENSHIP: Thank you, and we'll look forward to receiving that, and we'll review it, absolutely.

MARCOS HANKE: I want to -- I have many people in the queue, as expected, and I want to comment that, when Damaris made the intervention, because I have been part of facilitating the discussion, and I know that there is interest in the department and the coordination with your office to improve the language and clarify a few things that we need to work around it.

I personally sent a letter requesting, to the legal division of the DNR, some opinions from them and some clarification points, and the work is -- It is moving forward, and I am looking forward to that. Right now -- Jocelyn.

JOCELYN D'AMBROSIO: I just wanted to close the loop on Carlos's question about management of dolphin and wahoo, and so I was able to double-check the St. Croix and the St. Thomas/St. John island-based FMPs that the council approved to send to the Secretary in April, and they also would manage dolphin and wahoo, and, again, we're just pending a secretarial approval of that, and so we have to still have a proposed rule and a final rule, but dolphin and wahoo are included in all three of the island-based FMPs, and they have ACLs and AMs for management.

MARCOS HANKE: Thank you for the clarification. Next in the queue is Nelson.

NELSON CRESPO: I have two questions. The first one is regarding the small boat permits. I remember that, in the past, many fishermen are interested in this permit, but it's so difficult, because they don't find the website application, and so are you planning to, in the future, to implement an application site for this permit?

RANDY BLANKENSHIP: The permit application is available through the Southeast Permits Shop and is available for download from that website, and we are not planning a separate process from that. It still would remain through the Southeast Permits Office, and, as I provided, later on in this presentation, back here, the bottom area right here is information about how to get to that, and I suggested -- Because, actually, the website was too long to put on this slide, but you can do a search for "SERO Permits Office", or "Southeast National Marine Fisheries Service Permits Office", and it will get you to that website.

Then I found it very easily, and so then you can download the application and go through the application process, and, of course, there is also the phone number available here, and the Permits Office is very good about doing customer service and walking applicants through the process and answering questions along the line, and, also, they have the ability to get Spanish speakers on the line as well and talk to them in that process.

NELSON CRESPO: Okay, and the second one is regarding the dogfish and all other deepwater sharks, like the vilma, and I don't remember the name in English. Marcos, what is vilma in English?

MARCOS HANKE: Smoothhound.

NELSON CRESPO: Yes. Can you add that in the mode of education, because we think we need some permits.

RANDY BLANKENSHIP: For fishermen in a scenario, let's say, where they are fishing deep water for a snapper or a grouper or something along that line, where they may be meeting the requirements for that, and they catch a smoothhound shark at the same time, there is a permit available that would meet that need, and that is the smoothhound shark commercial permit, and that requires selling to an HMS-permitted dealer.

That's something to keep in mind, but it is an open-access permit,

and it is available through the Southeast Permits Office, once again, through that same process of getting to that site. Then, in addition to that, as I mentioned, we are considering, potentially later in 2020, a proposed rule that would be out that would consider, under the Caribbean small boat permit, potentially allowing some retention of sharks.

One of the species that we are considering in that proposed rule will be smoothhound, and so keep an eye out for that. That would then allow, once again, on the Caribbean small boat permit, the ability to sell them without having to go through an HMS-permitted dealer.

NELSON CRESPO: Okay, because those sharks are, for the deepwater snapper fishermen, are bycatch, but I am pretty sure that, in the future, that we will have a market for it, and many fishermen are interested in that. Thank you.

RANDY BLANKENSHIP: To recap, in federal waters currently, a permit is required to land and sell those smoothhound, and that is the smoothhound permit. That is the current permit that allows for that.

MARCOS HANKE: Thank you, Randy. Next is Julian.

JULIAN MAGRAS: Good morning. Great presentation. I just needed a little bit more clarification to see if I am understanding this right. The small boat permit allows anyone -- The first question is anyone can apply for a small boat permit, both commercial and recreational?

RANDY BLANKENSHIP: This is not a recreational permit. This is a commercial permit, and there is the requirement that the vessel be less than or equal to forty-five feet in length, and it is only valid in the U.S. Caribbean, and so anyone can apply for it, even on the mainland, but it's only valid in the U.S. Caribbean, and, once again, they must abide by any territorial requirements that apply.

JULIAN MAGRAS: Okay. Well, I think that answers my question, because I was misunderstanding that you can apply for the permit and then you can sell to the public, but, because the Virgin Island law states that you must be a commercial fisher with a business license in order to harvest and sell, and so I just wanted to make sure, because it was coming across that anyone could apply for the permit, and so you clarified it. Thank you very much.

RANDY BLANKENSHIP: This permit does not preclude that territory

requirement.

MARCOS HANKE: Damaris, do you have an earlier comment?

DAMARIS DELGADO: Yes. As Marcos was mentioning, we have been analyzing potential new territorial requirements for the longliners, and that's why we are waiting for a position from our Legal Affairs Office, and we are in that process, and we are considering requiring the longliners to have a Puerto Rico license, but, also, I wanted to ask you if there is a possibility that, once we decide about that, and that potentially happens, could you add into your website and the information available the requirements that we establish as territorial permits? Could you orient and educate the people that are interested in these things about the official requirements?

RANDY BLANKENSHIP: We can certainly consider how we might go about doing that. Given that there may be different requirements at any given state or other territory, we would have to think about how we go about doing that, but, yes, we would want to be able to provide some type of outreach that indicates that state or territorial requirements may be applicable, in addition to the federal requirements, and I would think also that potentially the compliance outreach material that Miguel was talking about that was Caribbean specific might be another opportunity to provide that kind of clarification.

DAMARIS DELGADO: Thank you very much, and, also, we were talking about maybe being able, DNER, to receive the reports that you receive from the applicants, and is there a way to formalize that request of receiving all the information on the landings and the bycatch from the people that have the permits in Puerto Rico?

RANDY BLANKENSHIP: Yes, and so, in particular, what we're talking about here is the pelagic longline fishery and the data that's collected from them, and I think that the answer is, yes, we would continue to talk about that and figure out the processes for that. Some of this data reside at the Southeast Fisheries Science Center, or is accessible through them, but we can discuss how that takes place.

Two data sources that are available include -- Let me rephrase that. Some of it resides at the Southeast Fisheries Science Center, and some are in other locations, but the dealer data reside in a couple of different dealer databases. The logbook data that is collected from all the longline vessels resides at the Southeast Fisheries Science Center, but, yes, we can talk about that further.

DAMARIS DELGADO: Thank you.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Damaris, for any data collected, you need to identify a contact point, and that person has to submit documentation to allow that person to receive that information. If you have information -- All information that is in aggregate and is published is free, and it's on the internet, but what Randy is talking about, where you have all these datasets, you can do it through the Fisheries Research Laboratory, if you identify one person that can collect that information for the local government.

The other thing is that, whatever you do at the local government, you have to be mindful of the federal regulations, and you cannot go over the federal regulations regarding any of the management measures that you have, and longliners are a different animal, when you treat the fishery.

They may not be fishing in Puerto Rico or the Virgin Islands, and, actually, the two that are fishing, they are fishing on the Atlantic Ridge, and so you may be talking about small vessels fishing for tuna and all that, and so the point is that we need a little bit more discussion, and so we offer to you the assistance of the council and maybe to work together, and I'm sure that Marcos will be there, and, whatever we prepare, we can send it to Randy for clarification, or any other help that we can assist you with.

In the case of the Virgin Islands, I don't know if the Commissioner has anything to add regarding the status of the regulations that you have that are related to highly migratory or dolphin and wahoo.

JOHN-PIERRE ORIOL: I have nothing to add at this time.

MARCOS HANKE: Graciela, did you have a follow-up?

GRACIELA GARCIA-MOLINER: Damaris, we would like to request a point of contact. Who is the person who is dealing with the small vessels and longliners in the territorial waters, if you could please put us in contact, so that we can communicate. Thanks.

DAMARIS DELGADO: Thank you.

MARCOS HANKE: Thank you. Maria.

MARIA LOPEZ: My question is regarding the dolphin wahoo, and it's more like a clarification. You were saying that the persons that have the longliner permits -- If they are going to retain dolphin

and wahoo, they also will have a South Atlantic permit, right?

RANDY BLANKENSHIP: Yes, if they are fishing in the area that would require the dolphin wahoo permit.

MARIA LOPEZ: Right. Okay. So that means that, whatever dolphin and wahoo that they are catching, it's going to be reported somewhere, maybe one of those places that you mentioned in your presentation, and that means that we can have access to that data, so that we can count -- Now that we are going to be managing dolphin and wahoo under the island-based fishery management plans, we can have access to that data, so we can count that and monitor that harvest, and is that correct?

RANDY BLANKENSHIP: Yes, that's exactly correct, and I will also mention that, keeping in mind, as you're going through exploring getting these data, is the low number of pelagic longline vessels that are actually fishing in the U.S. Caribbean at any given time. Over the last six years, it has ranged between one vessel and four, and, even in the year where there was four, it wasn't four at one time. It was over the course of the year, and so you're talking about very low numbers, and there will be confidentiality of the data concerns that need to be taken into account, and so those are all things just to be aware of, but, yes, the data are available.

MARCOS HANKE: A follow-up?

MARIA LOPEZ: Thank you. I have another question, and I don't know if this for Randy or more for Puerto Rico, but the longliners that sell to the dealer, and that dealer is -- If there is a dealer, that it's in Puerto Rico waters, what kind of permit do they need, and how is the information, the data, that come from those activities -- How is that collected and reported?

MARCOS HANKE: Damaris.

DAMARIS DELGADO: Thank you for the question. We are analyzing precisely that, and these are the conversations that we have been having with Randy and Marcos especially, and we wanted to have the legal opinion from our Legal Affairs Office, because our regulation establishes that we have to follow the federal regulations, and we recognize, in our fisheries, fishing regulations, the existence of these other regulations that are federal and that people have to comply with what Randy mentioned, but, besides that, we might need a permit, and we are not getting the data and landings from the people that do business here in Puerto Rico, and so we really would like to get that information.

That's why I was asking Randy officially how we do that, but we really would like to take a look at what's going on in our waters, and we might want to require a commercial license to those people that are doing that business, and that's the main question that we need to clarify, and, internally within DNER, and also with the fishers, try to bring the subject with fishers, and maybe that will be a good idea, because that is not clear right now in our minds, and we have to check what is the benefits and the disadvantages of doing that, but, in general, I guess that will help us have more information about what's going on in our waters.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Maria, the answer to your question is no, until they come up with what Damaris described, and so, presently, whatever information you get from the federal government, that's it, and that's a requirement that they have. There is only one dealer in San Juan that is working with the longliners and fishing in the Atlantic region, and that's Tommy Forte, and he is willing to provide any extra information that you might need, but all the information that he collects go to the databases that Randy was mentioning before.

It is envisioned that, in 2020, if the Junta de Pesca reviews the status of this fishery in Puerto Rico, we may end up having a requirement, as Damaris mentioned, but it is still an open question. In the case of the government of Puerto Rico, the rule of thumb is do not duplicate what is already there in the federal government.

MARCOS HANKE: Thank you, Miguel. Vanessa.

VANESSA RAMIREZ: My question is about the permit of the Caribbean small boat. As you said, it's very easy to find the application and to ask for the permit. I worked on one last year, and practically in thirty-five days the permit was already here, but the thing is, for our commercial fishermen, it's too long, the application. It's seventeen pages, and they only need to fill out the first three and the last one, but, once they get all that paper, they just throw them away, and because it's in English. Is there any option that they can have for a Spanish or a translator?

RANDY BLANKENSHIP: That's a valid question and a concern there. The permit application is very long, and it is for multiple different permits, which is part of the reason why it's so long, because there is information needed for different permits.

There have been a lot of improvements made on that system, and I

know that more improvements are planned in the Permits Shop there in the Southeast, and Roy or Jack might be able to speak more to that, because, actually, that Permits Shop falls under their purview, actually Roy's, but I will leave that to you.

MARCOS HANKE: Roy.

ROY CRABTREE: Well, they are working on a number of improvements, primarily to allow fishermen to apply online and reduce the amount of paperwork, and so I think, for most of the permits they issue now, you can apply and do it all online, and I don't know if that's true of these particular permits or not, but they are trying to streamline it.

VANESSA RAMIREZ: Well, practically, the application on the internet is the same one, and you have to download it and send it by email the first time, and then, for the renewal, you can do it by the internet, but the thing is that most of our commercial fishermen don't speak or write English.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Randy, we can help with that. The Caribbean Council can translate that, unofficially, and then send it to whatever Puerto Rican fisherman is interested in receiving that information, and we can do that very quickly, or we can do it this month, and so, that way, we are not interfering with the federal government, but we can provide it to the local fishers in Spanish, and then they will be able to use it.

Usually, most of the fishers that apply for this permit might need some help, in terms of how they get it, and I know that you have been doing that, and so I just wanted to offer that, and the council can do that, if you agree, Randy, and, Roy, we can go ahead and do that, and we promise that everything that we write in Spanish is exactly the same as English.

ROY CRABTREE: I think we can provide assistance with that if people call. The trouble is there's a number of things we get into. One, we have a group of people in the Permits Office who process this and have to enter all of it, and then most of them probably don't speak Spanish, and so they wouldn't be able to -- Then all of this involves programming and putting the forms into the computer system and software, and we're very limited on how much programming we can do, and we have to prioritize things, and so all of these changes, even if they don't sound that difficult, they still require money and time, and someone has to go in and program the system to deal with all of that, and that is why it

takes a while to get there.

MARCOS HANKE: Randy.

RANDY BLANKENSHIP: To build off of what Roy said, as I mentioned earlier, I know that there is -- There are folks in the building that do oftentimes get on the phone with Spanish speakers to help the Permits Shop work through questions on applications, and Maria is one of them, and there's others, and that is -- We will make efforts to try to facilitate fishermen being able to understand what they need to do on that permit application. It is a recognized need for some additional work there, and I think, Miguel, your offer is a good one. Exactly what that looks like, probably we should continue to work on that, in providing that assistance.

MIGUEL ROLON: My point is that this would be -- We have done this before in the past, and it has been the fishers who understand the language, but my proposal is this. We can translate that, and we have Guillermo here, we can have a purchase order, and they can translate the document, and I can send it to the Regional Office, and Maria can double-check and make sure that it follows the regulations, but we are not intending to have a Spanish version in the federal government, at the Regional Office, for people. It's just an assistance, but they will still have to sign their name and apply in the English version.

Also, we can offer -- Because I don't think that a thousand fishermen will come and apply for that permit. First, they don't have a boat, and, second, they don't have the desire. However, there's an opportunity here to teach fishermen from the Virgin Islands and Puerto Rico and offer them this opportunity.

In general, to catch two swordfish a day and sell them is a lot of money involved there, and that's why Tommy Forte is fishing for them, and so, to summarize, the council can do the translation this month and send it to the Regional Office and double-check that, and then, for next year, we can help any fisherman who wishes to receive that, and I can send it to Vanessa, or anybody who wants it.

In St. Croix, there are fishermen who only speak Spanish and Vietnamese, and so we can do that rather easily, and we don't have to discuss the whole thing now, but the commitment that the council can make at this time is we will have that translated and download the seventeen pages and send it to the Regional Office. Once that is cleared up, I can send it to Vanessa or whomever wants to receive the information, and they can use the Spanish version to be able to fill out in the information in English.

MARCOS HANKE: The conversation is going to keep going, for sure, between Randy and Miguel and the people that are involved in trying to facilitate this important part. Carlos, and then I have two people from the public.

CARLOS FARCHETTE: Real quick, you can do like what we do on St. Croix. If somebody has difficulty with the English language, enforcement is willing to download the application and sit with them and help them fill it out, and, that way, when they sign, it's sent out, and I think DNER can do the same thing, help the fishermen fill that application out.

UNIDENTIFIED: I think my question was already answered, but, a couple of months ago, I saw the list of people having the Caribbean small boat permit, and it was a couple of people whose port is in Puerto Rico, and I was wondering if there are reports of the landings, if any, that they did in Caribbean waters and didn't sell here, if they salt their catch in Puerto Rico, because, even though that permit has been a long time available for fishermen, I only saw four fishermen that had the permit, and one of the permits was about to expire, and I was wondering if there are any actual reports, because I know the local fish trip data has them to fill the -- They have to fill out the number of HMS permits, but they are not doing that, and so it's been about seven years of us trying to get them to comply, but it isn't happening, and I was wondering if you have any data regarding the catch and landings of HMS in the Caribbean.

RANDY BLANKENSHIP: The data that come in through the commercial trip reporting through the territory is ultimately sent to the Southeast Fisheries Science Center, and we do get that information, and, yes, there are landings of HMS that come in through that reporting system, and we do incorporate those in our overall landings updates that we post online, and they're not -- We post them across the management area, and they're not by region, and so you can't see it specifically, but, when we do get them, we incorporate them in there for swordfish and for the BAYS tunas, which are the landings that would be coming in through that, and so, yes, we are getting the information.

I would say that there is room for improvement in outreach in how those fishermen fill out the forms properly, but we do get some HMS reports coming in through that, and it's a longer lag time on that, because there's a longer process of that data coming in than let's say through the dealer reporting, which, as you saw, is seven days after the landing occurs. Within seven days, we get that information, but we are getting that through the forms.

MARCOS HANKE: Thank you for the question. Tony Iarocci, and then we'll go for a coffee break.

TONY IAROCCI: Thank you, Randy. That was a very informative presentation, and I wanted to stress -- I was going to ask the same exact question, and so I'm going to have to ad-lib a little bit here, but I would like to stress the importance of this permit as an alternative fishery for these small boats throughout the Caribbean.

Last night, we were at a social here with some of the commercial fishermen, and, as I walked the docks and checked out the little boats, behind one of the small boats was a swordfish tail nailed to the dock, like similar to what we do up in New England, and I looked at it, and I said, wow, here's one of the guys here fishing for these swordfish, and there's many changes in that fishery now that apply to the small boats.

They are using live bait, and they are using lighter gear, spider wire, and there's all kinds of things, and I just want to stress that I think -- You're right that we have to make sure that they've got the right permits and they go through the process and the landings are documented. Do you see -- She said there's only four permits right now in Puerto Rico, and do you have a number for the whole Caribbean?

RANDY BLANKENSHIP: They are reported in our annual SAFE report, which is available online, and so you can actually see numbers of permits in that SAFE report, and it's a 2018 SAFE report, which is the last one that we put out, and there were four from Puerto Rico and I think two in the USVI.

The number remains very low, and so we're looking for ways for fishermen to really become aware of that permit and the benefits that that permit offers them, and then there's also -- There are some things, as far as what Damaris mentioned, about clarification on applicability of regulations in the territorial waters that can also come into play over the longer term, once that clarification becomes available, as to how that permit then applies to fishermen.

Another part of this is that fishermen really would like to also harvest sharks, in addition to those tunas and swordfish, and the retention limit under that permit has been zero, and part of the unique aspect of that is that the requirements of that permit, as a condition of that permit, make those requirements apply within territorial waters, if they have the permit, and, therefore, if they get that permit, which has a zero retention of sharks, then,

technically, under federal requirements, they are bound by that requirement in territorial waters, which they don't want to be bound by that.

There is still this interplay that needs to be worked out on that, and then, in addition to that, I mentioned earlier a proposed rule that we're considering, which would look at the possibility of allowing some small amount, limited amount, of retention of sharks under that permit for the first time, which may also be part of trying to deal with this.

Separate from the Caribbean small boat permit, I will also reiterate that there are some other permits available, commercial permits, that would allow for the catching and selling of HMS, tunas and swordfish, and fishermen could get those, but they require selling to an HMS-permitted dealer, and so, for instance, if you look at like the tunas general permit that is the commercial permit for rod-and-reel that allows for the retention of yellowfin tuna, bigeye, albacore, skipjack in this area, there are commercial tunas general permits that are issued in Puerto Rico and in the USVI, and so fishermen can operate under those, but they would have to sell to an HMS-permitted dealer to do that legally.

Then, in addition to that, there are options under the charter/headboat permit with a commercial endorsement and options under the swordfish general commercial permit as well, but, once again, all of those have to be sold to dealers. There are a lot of opportunities for fishermen to do the things they need to do, but they need to abide by the regulations that are applicable.

MARCOS HANKE: Thank you, Randy, and, for sure, people are going to keep asking and stopping you around for many other questions. Thank you very much, and, from my point of view of this, being involved on the HMS issues and discussions, I invite everybody to analyze and to put their best effort to make the regulations to work to be clear and to be accessible to the fishermen. Let's go for a coffee break for ten minutes. Thank you very much.

(Whereupon, a brief recess was taken.)

MARCOS HANKE: Please take your seats. We are restarting the meeting. We have a presentation from yesterday that we have to accommodate your presentation, and can you please present it?

DISCUSSION OF TECHNICAL ADVISORY PANEL

GRACIELA GARCIA-MOLINER: This is very brief. You have the update from the ecosystem-based fishery management update. Just to give

you a reminder, the way that the council had looked at the setup of the --

MARCOS HANKE: We will need to hold for two minutes. There is still some people out of the room. Hold on for a second. Graciela, thank you. Proceed, please.

GRACIELA GARCIA-MOLINER: You had a closed session yesterday, and the council approved this morning the new members for the TAP, Technical Advisory Panel, and so, the way that you had set it up at the October meeting, was that the EBFM TAP will be basically like the SSC. It will work basically like the SSC, completely independent, and the consultation from the other advisory panels, as well as other stakeholders, will be done strictly through the council, and so --

MIGUEL ROLON: It will not work like the SSC. It will be separate from everybody else, and these eight technical people will follow the work that started before, and it's a big distinction. Then what Graciela is going to present now is the interaction that we are going to have with this TAP.

GRACIELA GARCIA-MOLINER: The TAP panel will be in contact directly with the council, and there will be establishment of the writing team, and that will be up to the region and to the Science Center and to the council to establish the writing team, per se, and it will be communicating through the council.

All of the advisory panels will be also communicating with the TAP through the council, and so that will be the connection for submitting information, et cetera. The TAP will be able to request information from any of the advisory panels, and the stakeholders as well.

The history and the next steps, this is what you had established for the Technical Advisory Panel at the October meeting. You had appointed five members at that time, and all of them have confirmed their availability and willingness to participate in the TAP. At the December meeting, you established the next three members that will form the eight-member TAP group, and at least two of them have confirmed their willingness and availability to participate, and we still need to contact one of the other members.

The first thing that is going to happen during the first quarter of 2020, and that little asterisk there has to do with the fact that Michelle Duval will be preparing the strategic plan for the council starting in January of 2020, and all of the development and things that are related to the development of the fishery

ecosystem plan will be part of that strategic plan for the next five years of the council.

The first thing would be to contract an assistant to deal with the technicalities of the ecosystem-based approach, and so that will be done by publishing an announcement for the person to be hired. The first meeting will be within the first quarter of 2020, and that would be, more than anything else, an organizational meeting. There are quite a number of efforts running parallel to what the council is doing, and so we don't want to duplicate any efforts. We want everyone to be pushing in the same direction, and so we will be contacting those point-of-contact staff from other agencies and dealing with that first, so that we are all on the same page and pushing forward.

At that time, we will be providing the terms of reference, and we will be developing the agenda before then, but, basically, where are we now, where are we heading and how this is going to work and what are the assignments and set up the meeting schedule for the rest of the upcoming years, if possible, because everyone will have probably a lot to do from their other duties.

We will be developing the FEP outline, or at least that would be the intention, but, by the second quarter, most likely that would have to be established, and that would be presented to the council, and then get directive from the council as to the direction that the FEP will take.

The third quarter of 2020, then we'll be back to finalizing the conceptual models that we we've all been working on. At this time, the council is already working, actually with Carlos, and you will meet him shortly, to transfer the information from the models that we have had, the Mental Modeler, to a more network-analysis-type of approach that can be used and analyze the data in a formal way, and, more than anything else, to have a better visualization, because, you saw from Richard's presentation yesterday that the SSC has created quite a conceptual model, and the same thing goes for the DAPs.

There is so much information that it really needs to be presented in a better graphical manner for everyone to understand, and so we will be populating the outline, and, by the end of 2020, we should be able to present results from the conceptual models and from the stacking of these conceptual models, to see where we're heading for each of the islands. Then, in 2021 to 2023, that will be decided during 2020. At this time, we don't have anything else, and that's it, Mr. Chair.

MARCOS HANKE: Miguel.

MIGUEL ROLON: Also to inform you that, yesterday, the -- If you look at the outline that Graciela presented, there will be a lot of communication with the DAPs, and so we envision several meetings in 2020 of the DAPs. The first one will be the last week of March, and it will follow the one that was postponed in St. Thomas/St. John on November 25, and so I found that March 25 and 26 are the two dates that we are going to have that meeting. It will occur in St. Thomas, and it will be chaired by Julian, and we will incorporate as many people as possible who have anything to say about the ecosystem-based model. Graciela is the coordinator, and Bill Arnold, as you recall from this morning, is the chair of this new advisory panel. That's all we have, Mr. Chairman.

MARCOS HANKE: Thank you, Miguel. Thank you for a very clear roadmap and information about what is about to happen in the future. Now, Carlos, we'll have the next presentation.

RED HIND STUDIES

CARLOS ZAYAS: Good morning. My name is Carlos Zayas-Santiago, and I will be presenting this acoustic studies of red hind spawning aggregations in Puerto Rico, and this is a group of many studies that are through time.

MIGUEL ROLON: Carlos, can you tell a little bit about yourself, like where you and what you are doing.

CARLOS ZAYAS: Yes, and so, as I mentioned, my name is Carlos Zayas-Santiago, and I just recently graduated from the University of Puerto Rico Mayaguez Campus with a Masters in Biological Oceanography, and I did my work with passive acoustics, specifically in red hind, and so that is what I will be presenting here today, which is information on my thesis as well as other studies and projects and research that has been going on associated to red hind spawning aggregations and acoustics.

Before we get into the main character, which is red hind, I just wanted to mention some other groupers that are obviously economically and ecologically important, as well as produce sounds and form spawning aggregations. It's important because we need to keep in mind that many spawning aggregations can be multiple species, and so some of the things that we'll be showing here for red hind can also be used for other species, even though there is variability and diversity in all of this.

Red hind, the star of the show, it's mainly a solitary species,

and they are sequential hermaphrodites, and so they're born as females, and then they, around twenty-seven centimeters, mature into males, and so the big fish are males and the smaller are females. They inhabit tropical waters, and, like the other groupers, they are commercially important for Puerto Rico and the U.S. Virgin Islands and other places.

This is important, that they mainly have a solitary lifestyle in the early years, because they do form these spawning aggregations, which are discreet events in time and location that take place, and so they are basically having -- They live a solitary lifestyle, and they are coming into these spawning aggregation areas to do courtship displays and do sound displays and all of this to do their spawning event, and these spawning events are very predictable in time and space.

Talking a little bit more in detail about the actual things that are going on when they spawn, and so, before the spawning event, the males reach a spawning site, and it's usually near shelf edges, and they start setting up territories, and so they move around and start picking up a territory, because their reproduction characteristics are of like mating systems, where the males come in first and establish territories, and then the females, which are the smaller figures, come, and then they move around the spawning aggregation site, evaluating the habitats and evaluating the fish, to see who they can identify to spawn with.

You have big males that were fighting over territories, and then the females are coming in and evaluating these territories, or the males, to reproduce, and so this is a very complex reproduction system, and it establishes hierarchical positions, which will lead to reproductive success.

We have been able to -- This has been shown, these movements, or these migration patterns, inside and outside the spawning aggregation sites, and that has been shown before, and so this tag and recapture data, showing that, in two spawning aggregations in St. Thomas and St. Croix, there were changes in the female sex ratio, and so there is changes in the movements and in the fish that are in the spawning aggregation site, and so, like I mentioned, this is a mating system, where the males form a harem and spawning with the females.

That has been shown to happen with other studies, but we can also use sound, and so that is our main talking point, how we can use sound to interpret and study these spawning aggregation events, and so here is a spectrogram, which is a visual representation of the sound that the fish are producing, and so please note that

it's basically an image of the sound in frequency in time, and in loudness, or decibels, and so we basically take the sound and use a mathematical function to turn it into this, and so we can read this. Basically, we can read and interpret the sounds that are being produced at a spawning site. This is a typical courtship-associated sound done by red hind.

As we can read and look at the parameters and see how sounds are different, we can do it with fish, but we can also do it with boats, and so this is the sound of a boat passing by a spawning aggregation site, and so we can treat it like a call, in the sense that you can characterize it, and you can look for it, and you can count it, and you can make observations off of it.

When we are able to study these spawning events using passive acoustics, we basically set up a hydrophone that can record for every five minutes and twenty seconds for a six-month period, and so you have very high resolution data of the acoustic activity of the spawning aggregation site, and so, here, you can see daily counts of a red hind spawning aggregation, and so you can see that there is an increase in sound production, followed by a sharp decrease associated with the full moon, and so these events can be predicted in time by fishermen, and they have been shown to happen in other studies, but, here, we can also see it with passive acoustics. However, our sampling resolution is much, much higher, and so we can study in detail the behaviors of these fish during the spawning seasons with passive acoustics.

This is another example of a spawning aggregation site, and you can see the number of files, and so I basically counted the spectrograms that we were seeing earlier, and so you can see there is a peak and then a steep drop-off associated with the spawning behavior, but we can also count the boats, and, when we overlay them, we can get results like this, and so this is boat presence during the spawning aggregation season in a spawning aggregation site, and so this is the type of data that we can obtain with passive acoustics.

Not only can we sample in high resolution with passive acoustics, but we can also sample many different locations or spawning aggregation sites or basically any site of importance that we want to study, and so we can deploy different hydrophones at different sites and have simultaneous recordings in different places, again with a high temporal resolution independent of sea wind state, and we've been doing that for some places since 2007.

When you do that, when you have that many hydrophones and time series data, you can not only count the files, the sound files,

characterized as call types or boats, but you can also use the sound levels, which is basically how loud the sound is, but associated to a specific time event, and so these are sound levels associated with the spawning aggregation sites of red hind in Puerto Rico, and so you can see that there are peaks, and this is from 2011 to 2015, and you can see that there are two peaks.

However, they seem to shift a little bit to the right, and you can see that there's not much acoustic activity here, and, as time goes by, it increases, and so those diagonal lines that you are seeing is the shift with the moon of the spawning aggregation, and so we can determine that exactly when does the spawning season start and where does it end with a high temporal resolution, and this is a comparison of multiple years, and we can also get -- If you compare these sound graphs, you can see that most behavior is two peaks, but then you get weird stuff going around, like these two peaks that we don't know why they are there, and there should be just one peak and down and then up and down.

You can get a lot of information, and you can see patterns, temporal patterns, very well with sound production, and not necessarily call counts, and so you're detecting -- You are monitoring and analyzing a lot of places in a lot of years, and you can compare them, but you can also do spatial comparisons, and so this is basically a spatial comparison of two spawning aggregation sites nine kilometers apart.

The peak of sound production is the same day, and so that is telling you that they basically are behaving the same, and that is important to managing that area, because there is more than one spawning aggregation site, and so, again, if you do a spatial comparison of other sites, in this case two spawning aggregations twelve kilometers apart, you can see that there is a seven-day offset on the peak of spawning production, and they are -- Basically, they do have some geomorphological and oceanographical differences, which may account for that, and we don't know, but the point is that we can see these differences, and we can detect the small differences in big locations or a small space scale.

Sound has been useful in determining time and space, but how many fish are there? That's really what people want to know, and can we get this number of fish, or abundance of fishes, from sound production?

We have been trying to look at that, but we haven't been successful on that. Specifically, this is predictions based on sound levels of densities and not call counts, and so there is two things. There is sound levels, which is some of the figures that I showed,

and actually counting each number of files, but this is just sound levels, or how loud the spawning aggregation was, basically, and how associated it is with the density surveys that were made, and so it hasn't been constant throughout years or among sites.

To recapitulate, we have passive acoustics, and we can use it to describe and study the courtship behavior, or spawning-aggregation-associated behavior, of different groupers with very high temporal resolution, but establishing abundance estimates has been troublesome, and so that is what I will be talking a little bit more about, and that's where my thesis comes in, and so we're just trying to fill in that gap of information that we need to convert abundance estimates from sound data.

These are some of the questions that I tried to answer and my thesis committee tried to answer. Which type of call sounds can red hind reproduce? Again, red hind is the main character in this, but have in mind that many other groupers do similar stuff.

What type of behavior is accompanied by the call type, and what are the characteristics of the call types? Can we differentiate between them? What are the temporal patterns of these call types, and, last by not least, can we track an individual's sonic activity through a spawning period?

That is important, because establishing a relationship between sound and abundance from sound levels has been hard, and so we're trying to get it as a call rate, and so, basically, taking that information from call counts and being able to use a call rate to convert sound data to abundance estimates, and so, basically, how many calls per time can a male make?

To do this, we put out hydrophones in an FSA, or a fishing spawning aggregation, site, and we simultaneously recorded data in captivity, and so we set up a tank experiment, where we put the fish and recorded their behavior, their sound behavior and their video behavior, in a controlled environment during the spawning season, and so we got permits for that, and then we used the field data.

We used a passive acoustic device to monitor the fish spawning aggregation site, and we used that data to characterize the calls and test the temporal patterns of the calls and validate the experiment that we were doing in captivity, to see if the behaviors we were recording were actually going on in the wild, or something similar was going on in the wild.

This the tank facility, their new home, and so, basically, we

caught a red hind, and we put him in there, and we set up a harem for him, and so there were caves and crevices where he could move around and hide and court with his females, and we had video cameras and a hydrophone recorder, and then we had these two accelerometers, which were there to try to record their sound, and so an accelerometer is another instrument that we might be able to use for sound detection, but it's smaller, and that's it, and so we tried to use that, because, in this fish, we can basically then use it as a tag or something like that. We can put it inside the fish and basically get a call rate, because we can follow the fish around with the accelerometer.

We tried to do that as well, in the same experimental tank, and you will see the results, and so, quickly, as I mentioned -- I mentioned that there is time, frequency, and power, and all that makes a distinct call, which we can use parameters, basically, to read this call, what is this call, what does this mean, or what makes it different from others.

Then we can use that to separate the calls, and so that's one way of looking at this data, but we can also -- That's one way of how we looked at it. We tried to distinguish the calls by their parameters, but, also, we wanted to do something that was like a blind test of similarity, and so this a spectrogram cross-correlation, where you have a matrix of similarity basically comparing images.

These two images overlay over one another, and so it's basically two ways of quantifying the differences or similarities between these call types, and one is algorithm-based, and one is based on an observers knowledge, and then we just did chi-squared tests to test for independence in time, and so now you will start hearing some of the sounds for red hind, and this is the first call type that we're going to describe.

This is the chorus, and so this is how it sounds. That background noise that you hear is basically all this yellow that you see here, and that is because there's a lot of sound, and so there's a lot of overlap of calls, and so you can't really make it out, but you can make some of them out, and so this is the first type of call that you can see or identify in a spawning aggregation site for red hind, and it is the overlap of -- There are many other types of calls, and so it is a continued sound from fifty to 450 hertz, and it's composed of those many other calls.

You will hear more sounds, and there are five, and so this is the other two. This is CAS-A. It's much shorter, and it was only recorded to be produced by males and towards females. It wasn't

recorded being done by a female towards a female, but just towards females, and we have the Courtship-Associated Sound B, which is a very common sound, again, in the spawning aggregation area, but, in captivity, it was recorded by males, produced by males, towards males or females, and so this is a more discreet call, and this would be possibly more of a display call.

We also detected grunts. What is important about this sound is that, initially, the males were not thought to be sound producers during these spawning aggregation events, but we did record them, and this is one of the sounds that they make. They can also make pulses, and so all these sounds have been differentiated and are produced during their spawning seasons, but these, in particular, can be produced by either males or females, towards a male or towards a female, and so all of that was recorded in captivity.

To see if the differences we were seeing between the calls were real or not, or were quantitatively and statistically significant, this is basically the result of the similarity matrix, comparing the spectrograms, basically, and so the blind test of similarity, and so this is a multivariate analysis, and, basically, each group that you see -- Each color is a call type, and, if they are grouped, then they are heard together, and, if there is a lot of separation, then they are different, and you can see that there is separation, with some overlap, of the calls, but they are different, and we did the same things, again, with the parameters, to see where were they different, where were the calls different and what were the parameters that made it different, and so these are some of the parameters that we chose.

Again, we see the separation, with some overlap, but there is separation, and it was quantitatively significant, the differences were, and so this is the similarity matrix of the parameters.

Again, to get the call counts from captivity and the aggregation, and so, this time, counting those spectrograms by call type, and we have CAS-A is the blue, and CAS-B is the orange, and note the chorus is in green, and so it was only recorded in the field, and it wasn't recorded in captivity, but note that the same peaks occur on the same day, and so the fish in captivity were following the cycle, or at least the acoustical cycle, that the field fish were exhibiting.

With the pulses and the grunts, again, the yellow is the pulse, and the grunts are the gray here, and there is an increase in the pulse, because there was a -- We added another male during that day, and so, basically, that could have increased the sound production of pulses, but there is also these two grunt peaks on

two different days, and so this may be showing us some of the things that I was mentioning earlier about the migration patterns and movements of females. I mean, it can be a lot of things, but this is the first time that sounds are being counted for in spawning aggregation sites, and so we need to look more into that with all the data we have from the past.

Those were daily call counts, and this basically is the hourly activity, and so, basically, it's breaking the day into four-hour blocks, and we can see that there's a peak in sound production at the same time for both captivity and the aggregation site, and those values were statistically significant for CAS-A, specifically, and so these events are discreet in time, and they have something to do with maybe synchronization of the spawning event, or something along those lines.

Similarly, the hourly analysis of calls for the pulses, this is the time block where we did most of our maintenance of captivity, and so there was a lot more activity from the fish during that time, and so we expect that peak in there, and, these two peaks that we can see over there for the grunt types, basically, we're seeing a lot of action or a lot of sound production during the nighttime from females, or possibly from females.

Last, but not least, that -- I just went through the results, and so the results were basically those questions and how we answered them. The last question was can we track an individual's sonic activity, can we follow the fish around, and so that was the accelerometer, and, because it is smaller, it can be placed as a tag inside the fish, and, in the captivity design, we weren't able to record the courtship-associated sounds, but, by holding a fish next to it, that worked, and so we were able to get the recorded sounds in the hydrophone and in the accelerometer. Again, this is a much smaller device that can be implanted into the fish, and, therefore, we can get call rates, or be closer to those call rate estimates.

In conclusion, we basically characterized the different types of sounds that red hind can produce, and we observed some of the behavioral context of those sounds produced, and we can study them in captivity, especially red hind. They were able to accommodate very well to the facility, and this is important, because, by breaking down the sound production that is going on in these spawning events, we can take into consideration or try to analyze what factors are affecting that sound production with much less variability than we were using with sound levels, but this also has other future applications. When we combine these call types with machine learning, we can use algorithms to detect these call

counts.

MIGUEL ROLON: Carlos, you have one more minute.

CARLOS ZAYAS: Okay. These call counts to -- Basically, a computer can analyze this data much quicker than a person can count all of this, and we can also put it inside gliders and drifters, which makes out the detection of these calls automatically, and you can get maps, acoustic maps, of where spawning aggregations are, what are the boundaries of that aggregation, and we can find new places that haven't been reported or are not known by scientist, by placing this information into other drifters and gliders, and so that can only help us to get more abundance estimates and find new spawning aggregation sites, and so that will be all. Thank you.

MARCOS HANKE: Thank you very much, Carlos, and I hope we have a little more time to keep going over this, please. Are you going to stay around for questions? We have one question, very quick, from Vanessa.

VANESSA RAMIREZ: Carlos, I just wanted to congratulate you for the work. I was in the MREP 2016, and I know you, and I have seen that project in Mayaguez, and so I'm very grateful to have you here presenting your project to the council. Thanks.

CARLOS ZAYAS: Thank you.

MARCOS HANKE: I want to make a quick comment. I have known Carlos since the University of Humacao, and he was a graduate of marine biology, and, from there, he went to Mayaguez, to do his study, and he is a perfect case of capacity building in Puerto Rico, and, without knowing, you are, in my opinion, the example that the students should follow, the path of getting into the fishery issues and doing jobs that are very meaningful for the fishery industry, and I am very happy and proud, and thank you very much for coming and sharing your knowledge with us.

CARLOS ZAYAS: Thank you. *(Applause)*

MARCOS HANKE: Next is the Oceanographic Connectivity Study Presentation.

GRACIELA GARCIA-MOLINER: We have a Coral Reef Conservation Program Grant that went to study the connectivity between the spawning sites on the west coast and wherever the fish spawn ended up at, and you asked for the work to be done also in the Virgin Islands, and so this is in response to that request by the council, and so a CRCP was granted to look at the connectivity between the Virgin

Islands and Puerto Rico, or wherever the eggs end up at.

MIGUEL ROLON: Can you introduce our presenter?

GRACIELA GARCIA-MOLINER: Our PI is the University of Puerto Rico in Mayaguez, with work with CARICOOS also, the last grant and this one, and so we've been using the resources of CARICOOS to look at the oceanography of the resulting areas, where they spawn and where they end up at, the eggs and the larvae, and so --

MIGUEL ROLON: I am ageing myself here, but I met this guy when he was a little kid.

OCEANOGRAPHIC CONNECTIVITY STUDIES USVI/PR

MIGUEL CANALS: Good morning, everyone. My name is Miguel Canals, like Graciela said, and I would like to thank the council for the invitation. I'm a professor at the University of Puerto Rico at Mayaguez, and I'm also one of the lead scientists in the CARICOOS project, and that stands for Caribbean Coastal Ocean Observing System, and I will explain briefly what we do within the system.

I am also a fisherman, what you would call a weekend warrior, but fishing is my passion, and so I'm humbled to be here, and I feel lucky to be able to do this research and help the council better understand what's going on with the transport and connectivity of larvae from these spawning sites.

This is work we're doing with colleagues from the University of Puerto Rico, from CARICOOS, and colleagues from the University of the Virgin Islands as well, including Sennai Habtes, which some of you will know.

These are just some of the goals. We want to explore the pathways that lead to the dispersal of eggs and early larvae from spawning sites, with a special focus for this project on marine protected areas of the Virgin Islands and eastern Puerto Rico. We want to quantify the connectivity between the eggs and larvae spawned from these MPAs with coastal environments that function as nurseries in the Virgin Islands and Puerto Rico, and we're focusing mostly on red hind and mutton snapper, but we'll also probably analyze other species, if time allows, as we have a deadline for December of 2020 to finish this project.

What is larval transport and connectivity? I would like to define what we're saying by that, just because population connectivity is a very important concept, and we're looking at larval transport and connectivity within the context of understanding what is the

probability of the larval dispersals from a source population, and so eggs and larvae coming from a well-known spawning site, and how that probability of dispersal is connected through coastal habitats that function as nurseries, and so, for example, for Nassau grouper, a shallow-water seagrass habitat, for example, in St. John, and so what is that connectivity, and we're not looking, in the traditional sense, at population connectivity between adult populations, and so that's very important to keep in mind, and I will go back to this throughout the presentation.

We are working in a couple of MPAs, Lang Bank, the closed mutton snapper area in southwest St. Croix, Grammanik Bank, and the Red Hind Bank within the Marine Conservation District, and we're also looking at El Seco in Vieques, which might not officially be an MPA, but it is a source -- It is a well-known spawning site for some of these species.

We're looking at red hind and mutton snapper, again mostly at the banks and spawning sites that I mentioned, and so, when we do this type of modeling, there is several sources of uncertainty. The first one is how good your hydrodynamic model is, and I will talk a little bit about this. I have a couple of technical slides that I will just skip over quickly, because I know we're getting close to lunch, but I just wanted to show you what we're doing on the technical side to be able to calibrate these models.

That is one source of uncertainty, and the exact time of spawning is also very important, and there is a lot of work that has been done, including some of the acoustics work that was just presented by Carlos, and that's very important for us, because it allows us to pinpoint the specific dates and times, so that we can simulate the release of larvae, or release of eggs, from these spawning sites.

Also, the behavior, and so the size of the eggs, their buoyancy, and how they behave in the days following the spawning, that's very important, because we're not just passively transporting the eggs. We are allowing for those eggs, as they mature, to become buoyant and come to the surface and migrate vertically at small speeds, but following their natural behavior. It turns out that that impacts quite a bit some of the connectivity stuff, we're finding out.

We're using a IOOS-structured three-dimensional model, and I won't get into the details, but it is the first time that that social model has been implemented for the Puerto Rico and Virgin Islands region, and this is part of the CARICOOS near-shore circulation efforts.

An important thing is, when you do some type of circulation model, you have to calibrate the model very carefully. Again, if the model is not correct, that is the most important source of uncertainty for larval modeling.

This the CARICOOS coastal circulation model, and it covers Puerto Rico and the Virgin Islands, and it's actually much bigger than this, but this is available on the CARICOOS website, and, actually, some of the fishermen, commercial and recreational fishermen, are using these models to inform their fishing efforts, and they are being quite successful, especially some deepwater fishermen, deep-drop fishermen, in the Mona Passage, who are very familiar with these products, and so we're using that same model that's been proven, that we have calibrated over the years, to kind of transport this larvae and eggs and see where they're going.

This is an animation of the currents in the Mona Passage and the Caribbean, eastern Caribbean. A couple of things here are the currents are very strong in the Mona Passage, but they're also very strong in the passages between the Virgin Islands as well as the Vieques and Virgin Islands Passage, and so those are one of the main hydrodynamic processes that affect larval transport, but we also have large-scale currents, such as mesoscale eddies and jets and other types of flows, that also create the effect of the transport of eggs and larvae.

A little bit about CARICOOS. Before 2008 and 2009 in Puerto Rico, we had very few assets to be able to observe the ocean, and so CARICOOS is almost like the Weather Service of the ocean, in the sense that we have a bunch of buoys, assets, gliders, drifters, and we deploy acoustic current profilers and a bunch of other ocean instruments to measure, in real time, what is happening with the ocean in three dimensions, and so this allows us to calibrate the models in real time and also for hind-cast simulations, when we go back in time and simulate the spawning events.

We have several buoys, and we have five buoys right now in Ponce, San Juan, Vieques, St. Thomas, and St. John, and so these are very important for calibrating our models for these studies regarding the eastern Caribbean MPAs.

For this project, I'm not going to go into too much detail, but we've done quite a bit of deployment of instruments, like drifters and ADCPs. Here are some drifters we have deployed during the spawning season of mutton snapper in southwest St. Croix, and so we have some drifters, and there is some connectivity there between St. Croix and Parguera, actually, and so we've been able to observe

that using instruments, and so these are not simulated results. These are actual observations of circulation.

Depending on the time of day you deploy these instruments, it changes quite a bit, and so, here, you see connectivity between the mutton snapper closed area and Culebra and Vieques and the Vieques Passage, and so there is quite a bit of connectivity between these areas.

We deployed an ADCP, and I'm not going to go into the details here, and I will just comment that, for -- Here, we're looking at the 2019 spawning seasons. We're looking at the full moon periods of January and February of 2019, when we had these instruments in the water. A couple of things that are important is, in gray, you will see here the days before, and so three days before, and one day after the full moon, and so that's when -- We're looking here for the spawning aggregations of red hind, and that's our first species, and we're looking at the mean flows surrounding the full moon.

You will see that, in January, the mean flow was westward, and then it switched south and eastward, and then, in February, the mean flow was northward, and I'm not going to go into other details, but just I will go back to those two periods and see the differences in the transport of eggs and larvae.

Again, calibration with -- We calibrate the model with tide gauges and with current meters, and we're quite comfortable that this is the best available model that we have right now, and that's important, because we're trying to use the best available data and science that we have at the moment, and this is not perfect, and so models are not perfect, and there is always sources for uncertainty. As long as we understand and recognize those sources of uncertainty, we can then make informed decisions.

Here, you will see a simulation of -- The currents are in red, and so you will see the velocity, and so red are high velocities, and you see these really strong currents in the Virgin Islands Passage, between St. Thomas and Culebra, and I will run that again one more time, and you will see some of the particles we are releasing from Red Hind Bank and El Seco, and so you will see how these particles faithfully follow the flow, but, also, I would like to mention that this model can accurately reproduce the flows between the islands, and those are key to understanding recruitment on the small-scale eddies and turbulence that forms in between each island, because those small-scale phenomena are the ones that kind of attract some of these particles, eggs, and larvae to the coastal environments that function as nurseries for these fish.

These are the main results, and I am just going to be showing some simulations for the full moons of January and February, and so we're looking at releases on January 17, 18, 19, and 20 at sunset, at 6:00 p.m. That is some of the best available data we have, that says that this fish, the red hind, spawns close to sunset, and I know there is a couple of hours before and after, and I will talk to Carlos and some of you to kind of -- I know it's not just 6:00 p.m., but this is just a simulation, to show you some results, and you will see a couple of interesting things.

If spawning occurs over several days at sunset, the trajectories are completely different for each day, and you will be able to see this, and so we're doing the same thing for February, around the full moon, the 17th, 18th, and the 19th, and, again, we're not just advecting particles passively. We are including the buoyancy of the eggs and some of the behavior of the early larvae and some vertical migration, from data we've had from the Nancy Foster cruises that have happened over the last decade.

Also, we have recognized the previous work that has been conducted by Dr. Rick Nemeth, Dr. Laurent Cherubin, and others in the Virgin Islands and some interesting results they've had. They have mentioned the possibility that red hind actually travel up current to the spawning locations and then spawn the eggs at the spawning site, and then eggs might be transported back onto the shelf, and so we're taking all of that information and including that into the models.

There is other possibilities as well, that eggs could be advected by downwelling currents into deep water, so that these eggs and the larvae will actually feed in deep waters and then they will be transported back onto the shelf, and so these are three eventual processes that are resolved by the models that we're presenting today.

Again, straight to the results, and hopefully you can see this, but we're releasing eggs from the red hind spawning site, and these are eggs released on January 18 at 6:00 p.m., and so right at sunset, and eggs are initially advected northward and then transported and dispersed throughout the Virgin Islands. This is a release happening January 18 at sunset. If we look at January 19, I have a simulation, or I have a movie, that I'm going to show you later, but I just wanted you to see the differences between each spawning event.

This is actually one day later, and so a difference of one day can make the trajectories to be completely different, and this makes

sense, because currents in the ocean are turbulent and chaotic, and it's almost like the butterfly effect, and so there is a lot of randomness in this process.

Then, if we go back, and we look at January 20, they start transporting east, and then they kind of go to the British Virgin Islands and the shelf and St. John, and, if we go back to January 21, we see a more type of eastward trajectory, and this is in January, and, if we look at all of the trajectories combined, then we can see a more spread out nature of the plume, and this is how we should really look at particle trajectories and larval connectivity in a probabilistic sense and not just that single episode, just because of the uncertainty of what's going on and the turbulent nature of the ocean currents.

Now, you see this trajectory right here, and there is even some connectivity with St. Croix from the red hind bank spawning aggregation sites. Not all of the flow is going to towards the west or towards the north.

If we look at February, we see it's a little bit different. As I told you before, in February, we have northerly currents as the mean flow, and so the mean flow is going north, and that's what we see in the model as well, and so these are releases on February 17, February 18, and February 20, and so they're all going north towards the islands, and, if we see all of the trajectories, again, for this month, there is no connectivity with St. Croix, but there is quite a bit of connectivity with the islands, and the model can resolve the looping trajectories of the eggs and larvae within the islands, and you can sometimes actually see that these trajectories become trapped in small embayments of the Virgin Islands, and so St. John and St. Thomas.

I am going to finish up with a couple of animations, so that you see what's going on, and we don't have any statistic results yet, and so we finished calibrating the hydrodynamic model, and we're now actually looking at this from a probabilistic sense, to estimate the actual connectivity between the spawning sites and the coastal environments, and we hopefully would like to be able to finish this by next year.

These are the simulations for the release in January, and this is a simulation for the releases in February, and so you will see that, for the first three days, we had releases at 6:00 p.m., the days before and during the full moon, and so here you see the trajectories.

We are doing this same thing for tiger grouper and yellowfin

grouper from spawning at El Seco, and we're also doing red hind from Lang Bank. We're actually doing this same thing for mutton snapper from the closed area off of southwestern St. Croix, and we're also, hopefully, doing Nassau grouper and tiger grouper from the Grammanik Bank in the east of the Marine Conservation District.

This is an update on the project results. If you have any questions, I will be happy to take them. Again, the CARICOOS project is very important, and so what's neat about this project is that -- So there's been many efforts to understand larval transport before by great researchers, and I think what we're bringing different to the table is that we have this CARICOOS project, and so we have so many ocean observing assets, buoys and instruments, that are really allowing us to calibrate the model and have great confidence in the trajectories and in the results of the circulation model, and so thank you. Do you have any questions? Thank you for the invitation, Graciela. *(Applause)*

MARCOS HANKE: Miguel.

MIGUEL ROLON: Thank you, Miguel. That was an excellent presentation. To me, when we started discussing with fishers and managers, et cetera, the closure of those areas in the Virgin Islands, people thought that you would be working for Puerto Rico. If we close there, everything would come to Puerto Rico, but, to me, it's very good news that you have been able to prove, with science, that those areas are helping the fishery of the U.S. Virgin Islands, the U.S. and British.

Also, to my surprise, with the different time and different days, and people used to assume that the sea would behave the same throughout the month, and you have proven to us that it behaves different from one day to another, between one hour and another, and the other surprise, for me at least, is the St. Croix connection, because people also think that all of this would go to the east and nothing to the south, but, here, you have proven that those fishers knew more oceanography than us. They picked that place because they can maximize their distribution to the area, including St. Croix.

MIGUEL CANALS: I think that's a very interesting hypothesis, yes. We're seeing that it's not all going to Puerto Rico, definitely. There is a strong connection with the Virgin Islands, and, actually, that connection with St. Croix has been found before by other authors, and so there is eddies and recirculation structure and vortices, you call them, in the wake of St. Croix, and it forms a retention cell, and so it's very interesting, and definitely the timing, the differences in timing between one day and the other,

and I think, yes, there is a lot of chaos involved, and probability, and it could just be that this fish spawns for several days and not all of the eggs are going to go in the same direction. They are just spawning, and we'll see where they end up.

MIGUEL ROLON: But the timing is the key. The work in Hawaii and other areas proved that the fish time their spawning with the conditions at-sea, to maximize also the spread, and this is excellent work. I believe that -- How long are you going to be working with this project?

MIGUEL CANALS: We began in summer of 2018, and we hope to finish by December, and so most of the calibration is done, and that was really the hardest part, getting the model up and running for these sites and making sure that the currents make sense, because that's the most important thing.

We are working with a couple of issues regarding the life cycle of this species, and this is very important. Like, for the mutton snapper, we need to learn a little bit more about the buoyancy of the eggs and the exact timing of the spawning events and also how this fish starts swimming, or the larvae start swimming, and at what stage do they start swimming towards the shore, because we can't resolve that, and so we include the movement of the larvae in the vertical direction, but we don't know when the fish will want to start swimming towards the shoreline to a nursery area, and so we're trying to see how we can incorporate that behavior of the larvae, but we hope to finish the statistical maps and the connectivity maps by December of 2020.

MARCOS HANKE: Thank you very much. Graciela.

GRACIELA GARCIA-MOLINER: We are also collaborating with the Southeast Fisheries Science Center, and they have been providing larvae that they have collected over the years from the U.S. Virgin Islands, and so they have been identified, in some cases, to family, but not to species, and so the council is working to try and identify the larvae to species, so that we can know where in the water column they are and at what time.

They usually coincide with some of the periods of fish spawning in the Virgin Islands, and so we're trying to basically put the little pieces of the puzzle together, but that's going to take a little bit of time, and so we're working on about a hundred larvae right now, but there are thousands of larvae that are sitting at the Science Center that we're hoping to identify to species, and that could provide information, for example, on the mutton snapper, that pre-flexion or post-flexion, where they are in the water

column at what time.

That is happening, and the other thing is that the group of scientists who are working with acoustics and the spawning aggregations have been providing, over this period of time, the dates that they think are the best dates for the spawning to take place, and so this has been a very large collaborative effort among Puerto Rico and the Virgin Islands and the Science Center, and so we're hoping that, in the near future, we'll have even more information to provide, in terms of where they actually end up.

We actually have some testimonial from way back when, in one of the council meetings, that I have to provide to you, of where the fishers from the St. Thomas area actually thought the larvae were going to end up, and so we have the drawings, and I have them in some old papers that we're just finally getting access to, and so there is some drawings of what they thought, and I think it would be very interesting to put it together with this information.

MARCOS HANKE: Thank you, Graciela. I really want to congratulate you, because it's very important for the fishing community to understand those patterns, not just by predicting how to fish, but understand how they can do a better job to preserve and to help in the conservation of the species.

I have a question that has been going around between Graciela and I and other people, and that is -- I am from the east coast of Fajardo, the east coast and Fajardo, and a lot of shorelines that are exposed to the south, on the last seven years, or maybe ten years, have been eroding, and we have the -- Also, we have the starting of the loss from the south face of the island, and you have the same process in Icacos and other places.

Is there, in your data, any information that the flow, this trend, or the intensity, the magnitude, of the current that goes from south to north has been increasing during that time, because that matches with the sargassum influx, and that's something that the fishermen really want to know, to understand that, if that's the reason, that a lot of things are changing in Puerto Rico, especially on the east coast.

MIGUEL CANALS: That's a very good question, and so we actually have had the buoys in Vieques for about eight years, or seven years, I should say, and the buoy in Ponce for almost ten years, and so we have a lot of data to look at currents, and we haven't seen any acceleration of the currents, and so I think Palominito, those issues with the ocean, have to do with storms, Maria, but also other storms, but also climate change and natural processes

associated with morphology change, and so some islands will appear, and some other islands will disappear naturally, and that happened quite a bit in Guanica, where there were a lot of islands that disappeared, and so that's a little bit separate from the concept of connectivity, but, to answer your question, we don't have evidence of a strengthening ocean current.

Now, the sargassum is something else. The sargassum has to do with algal blooms and geochemistry and, in CARICOOS, we have some experts that are dealing with that, especially Professor Julio Morel, another person to answer that, but I will have to get back to you on the sargassum.

MARCOS HANKE: Please do so, and I know that it's very important for the fishing community to address those questions, because they are connected to what you are studying. They are all related.

MIGUEL CANALS: I do want to mention that, this year, from the satellite images, it looks like the sargassum is way less than the year before, and so, looking at the locations where the sargassum that reaches Puerto Rico is at right now, the intensities, they are way low, and so this is a very unpredictable pattern.

MARCOS HANKE: Yes, and just a note on the side is thank you, Carlos, for supplying mutton snapper for the east coast of Puerto Rico and to La Parguera from St. Croix. We have Toby.

WILLIAM TOBIAS: Thank you very much for your presentation, and I find it very interesting, being from St. Croix and seeing the retainment, perhaps, of some of that larval distribution off the west end, with the eddy currents that form.

Have you tried to correlate the current patterns with meteorological events, weather patterns, weather systems, because, that way, with an approaching weather system, knowing the potential for spawning aggregation at that time to release gametes, you could predict the direction that they would go.

MIGUEL CANALS: Definitely, and so very good question. That is one of the main forcing mechanisms that the model includes, and so we have a very high-resolution wind model that we run in-house, within the CARICOOS project, and it takes into account the strengthening of the trade winds, for example, that usually happen in January or February, when you have a very strong cold front and then you have a high pressure system, and so we definitely take that into account.

That is already implicitly taken into account on the larval

trajectories, but that's interesting, because they don't spawn in hurricane season. They spawn in January and February, and I don't know if there is any relationship there, because they don't want to be exposed to extreme events, and I don't know, but that's a very good question.

WILLIAM TOBIAS: Right. We see, during that period of time, major current reversals, due to the frontal systems and strong low-pressure systems that are generated off the east coast and the frontal systems that swing down low through the Caribbean area, and, quite possibly, we see, at that time, a lot of the current variations that go typically to the east, as opposed to west.

MIGUEL CANALS: Definitely, and we saw a little bit of that with some -- Usually, you would think the particles would go westward, but, in some of the modeling and some of the data we had at St. Croix, we see these really strong reversals towards the east, which is completely unexpected.

There is, like I said, other sources of variability. In the Caribbean, we have this huge, massive-scale eddies, and they are almost like hurricanes, but in the ocean, and so those are very important for transport and connectivity, definitely. Thank you.

MARCOS HANKE: For sure we have to bring you back, because we have a lot of questions, and I have three people in the queue, and then I have to go for lunch, and please be precise. Carlos, go for it.

CARLOS FARCHETTE: Sure. I do want my mutton snapper back when they become adults, and so send them back, but this is very interesting for our St. Croix Fisheries Advisory Committee. I mean, Toby is a member of our committee, and I think, if there is any way that I can get at least those three or four slides that we can present, because we speak a lot about larval distribution and settling and all that stuff, and so, if they see this, I think it would be a great help for our committee.

MIGUEL CANALS: Definitely. I will share that, and I would be delighted also to even visit and give a presentation. Definitely.

MARCOS HANKE: Maria.

MARIA LOPEZ: Are you aware of any projects that are measuring productivity of these MPAs and maybe tying that up to the dispersal patterns that you are looking into? I am asking this question from a management perspective, and, if you were to focus efforts in some areas, in different MPAs for example, based on this, and based also on the productivity, you would want to do that on those

that will provide the most -- Act most as a source and provide most of those eggs and larvae to supply to other areas, and so I wonder if you are aware of any of that.

MIGUEL CANALS: I am not aware, and I assume, by productivity, you mean the volume of larvae or eggs that are produced from --

MARIA LOPEZ: Yes. Like what is being produced, like if it's an MPA, like an area that has been closed for a long time and it's a spawning aggregation area, and like how much it is producing, maybe based on the number of adults or whatever other biological parameters that are being -- That can be taken from there and then correlating that to the dispersal patterns that you have.

MIGUEL CANALS: What I can say is we're using all of Dr. Rick Nemeth's work, and he is, I think, the authority on that, and so we're using all of his papers, and we've been in touch with him, and so my answer would be that he would probably know better than me, but we're using all of his latest work to initialize the models, definitely. Thank you.

MARCOS HANKE: Last question from Damaris, and I would invite you, please, if you can, to stay around, because people really want to talk to you.

DAMARIS DELGADO: Thank you for the presentation, Miguel. Excellent job. I just wanted to ask you if you could do a replay of the trajectories.

MIGUEL CANALS: Which ones?

DAMARIS DELGADO: The last ones that you showed for January and February.

MIGUEL CANALS: This is the difference between each day that they are released, and then there is quite a bit of connectivity with Culebra, and on the Arrecifes de la Cordillera also, and I think it could go backward as well, and so I don't have this movie here, but we've done some simulations from El Seco, and, in El Seco, there is a lot of transport towards St. Thomas and St. John, and so I think it goes both ways. I think the grouper are ending up in the St. Thomas, and so I think there is a very good exchange.

DAMARIS DELGADO: Thank you.

MIGUEL CANALS: Thank you.

MARCOS HANKE: Thank you very much. We're going to break for lunch

now, and thank you to the presenters so far. It has been amazing and very instructive. We will come back at 1:30 sharp. Try to be back five minutes before, to make sure we don't lose any time. Thank you.

(Whereupon, the meeting recessed for lunch on December 11, 2019.)

- - -

December 11, 2019

WEDNESDAY AFTERNOON SESSION

- - -

The Caribbean Fishery Management Council reconvened at the Hilton Ponce Golf and Casino Resort, Ponce, Puerto Rico, Wednesday afternoon, December 11, 2019, and was called to order at 1:30 o'clock p.m. by Chairman Marcos Hanke.

MARCOS HANKE: Something else to mention is that we're going to have, before enforcement, Deidre, and she's going to address the council before enforcement.

OUTREACH AND EDUCATION ADVISORY PANEL UPDATE

ALIDA ORTIZ: Good afternoon, everyone. I hope you have enjoyed the meetings. We will do a short report on the outreach and education activities that we have been working on for this period. We have paid a lot of attention, and yesterday, last night, was one of the activities on the sustainable seafood campaign.

The sustainable seafood campaign is much more than just eating fish. It is that the consumer knows what they eat, when does it occur, what is the life history, and how can it be cooked so that it is good, and, traditionally, we always ask for the same species, and those are the ones that get overfished, and so we are using the approach of underutilized species, and we have prepared with that the posters that we presented in the last meeting, and we also are doing some work in the restaurants and the fishing villages.

The importance of the seasonal closures, not only for the fishers, but also for the consumers, so that they know, when they ask for a grouper that is in closed season, if they say they will pay anything for it, then usually the fishery is going to get it, and so we tried to make sure that the consumers know the closed season as well as the fishers do.

We have distributed the posters in different restaurants and fishing villages. Jeanette Ramos has done a lot with the restaurants, and Wilson Santiago has been very helpful with fishing villages, and now, as soon as we get to those places, we can find out what is the reaction that the consumers have.

We have been working with the chefs, especially because in Puerto Rico we have, and I suppose the Virgin Islands also, but we have a lot of cooking schools, and so, from the panel, we decided that probably we should give the campaign also to them and teach them how to use the fish, and that would be a good idea, and so we had the first one, and the first video is the one that those who went last night saw it, and it will be -- It's in Spanish, but it will have English sub-titles, and, if something like that can be done with the Virgin Islands and the restaurants there, we would be glad to do it.

Another chef that is working with us is Chef Cedric Taquin from Arecibo, who is doing the catch of the day, and that will be another set of videos that will be sent to the Facebook and the YouTube channels of the council.

The calendar for 2020 is already completed, and I don't know if it came back from the printers or not, and so we'll get them by January, and it's dedicated to the underutilized species and identification of the fish and also the plates that attractive with that fish. Then, last night, we had one of the fact sheets, and, for every one of the activities that we are doing in different restaurants in different fishing villages, we will prepare a fact sheet with the species that are being eaten, and we have also another fact sheet that is the code of conduct let's say for the consumer.

The consumer must know the species, and the consumer must know when it's available and when it is in closed season, because, if they don't know that, they will either substitute it for anything, or either they will claim that they have to eat that, and so that first one is done, and it's distributed in all of the activities that the council does.

We also participated with Wilson in a PEPCO, and it is the presentation of what are the principles or what are the priorities for ecosystem-based management. To me, it's very, very important, and I think I discussed it a little bit in the previous meeting, that knowing the ecosystem is as important as knowing the fish that you are taking out.

If you don't know the general biology, and if you don't know the food chains in that ecosystem, then we can put in danger the stability of the ecosystem, and so we are taking a good initiative of going in any kind of activity that we have with fishers with these principles of ecosystem-based management, and the other thing is the sustainable seafood campaign. That is when we did that, in Humacao, in the PEPCO, and that's the type of information that we are giving them, in very simple words, the concepts, so that they are aware of where they are at.

There have been meetings with fishers, especially in the Cabo Rojo area, because Vanessa has been very, very great to let us know when the associations meet, and then she asked if we can give material from the council or if we can be present there, and, this last one in Cabo Rojo, Christina Olan was the person that had the council material with all the materials, and then we take the information that we want, and then we can send them either to Vanessa or to the fishers themselves. We are trying to open up that outreach avenue to all the activities where fishers are present.

Now the fishery ecosystem plan that, as part of the outreach and education we have to work with, that Graciela gave you the update just earlier in the day, but we are still responsible for the stakeholder engagement, and, in there, this is what I presented in the last meeting, but we haven't done much else, because we had the meeting, and we were going to have a meeting with the St. Thomas group, but that was canceled, and I learned today that it was going to be in March, and so, in March, we will do that first meeting, and we will look at it as a model of how to do the other engagement, especially in Puerto Rico, where we have to see stakeholders from the federal and from the state government and from the municipality government, and so, everyone that has anything to do with fishers, we should put them in contact with this fishery ecosystem plan.

What are the proposed projects that we have for 2020? First, we want to do workshops with fishers in the communities, and the community includes not only the fishers, but it includes the people that live there, and it will also include the teachers that are teachers of the children, to work with the marine ecosystem of fisheries in the Caribbean, and the book is already printed, and we'll be working with that, beginning in February or March.

Then we are planning on two regional conferences, and they are having a lot of claims of getting that information, and the first one will be an update on the status of fisheries in the U.S. Caribbean or in the Caribbean region, where we will update the

information that was presented in nineteen-ninety-something, and that was the only one that we have had. We have never had a meeting like that, and so we are going to do that and see all the changes, not only in the ecosystem, but in the socioeconomics and in the fisheries relationships with the countries.

The other regional conference that we will be planning for 2020 is one dealing with fish and seafood chemicals, also for the region, because we are getting a lot of questions and a lot of requests for information and a ciguatera update, and not only ciguatera, but there are many other chemicals in seafood that could be -- That could make people sick, but we don't get that information.

About ten or twenty years ago, in Puerto Rico, we had the Department of Health and all the physicians in every coastal town had to take statistics on the people that came in with ciguatera, but that doesn't happen for a long, long time, and now we are hearing people from Naguabo and from Cabo Rojo and from San Juan that are claiming that they have been sickened with ciguatera. Are they the same fish? Is it the way that they work with it or the size, and so we have to put that update, and that will happen also in 2020. Now I would like to hear an update from Christina on the social media.

CHRISTINA OLAN: Good afternoon. The council has pages on Facebook, Instagram, and YouTube, and I am going to give you an update on how they are working. We have Facebook, and we have over 3,000 followers, and the goal was 3,000 for December 31, and we reached that goal this year.

Again, as before, I said that people from ages from twenty-five to fifty-four are the most that follow us on Facebook, and the favorite content is still the same as the last time that I talked to you in the last meeting, seasonal prohibitions, fishing villages, workshops, such as PEPCO and MREP, group pictures, and short videos.

We are still publishing notes that are similar to block entries, and followers continue in the inbox as well, and people are sharing the content, and I am very thankful that they are doing that, especially fishers, commercial and recreational both.

In YouTube, we are going to publish new videos, and we still have the same videos as I told you about the last time, fishing in St. Croix and in Puerto Rico, and we are going to add the video that we presented yesterday that is part of the sustainable seafood campaign. Also, we are going to include new videos about safe diving while fishing and fishing families in the USVI and Puerto

Rico. We are still producing those.

I want to give a special thanks to all the fishers that are contributing with us in the interviews and giving information, and, especially in the case of the USVI, to Carlos Farchette. I am very thankful. Carlos helped us a lot last week to do the interviews and visiting fishing villages, fishing places, families, and all the beautiful landscape that St. Croix has to offer.

That is a picture of Carlos and myself, and I also want to share a trailer that was prepared that shows the people that we have been interviewing and the places that we have visited already.

(Whereupon, a short video was presented.)

CHRISTINA OLAN: Again, thank you very much to all the fishers that contributed with us with the interviews, and, again, Carlos, thank you very, very much for all that you did for us last week.

Continuing with the presentation, we opened an Instagram account in September, and we have 277 followers, which is good, but we want to increase that number. There, we publish short videos, and, also, we are publishing Fish Fact Fridays that we also share in the Facebook page, and we also published what Alida mentioned about the consumer code of conduct, and we are using that information to create short posts. The Fish Fact Friday, for example, is in English and Spanish, and all the content is in both languages, and the responsible consumer campaign. Thank you. The new videos will be published in January of 2020.

ALIDA ORTIZ: (Dr. Ortiz's comment is not audible on the recording.)

MIGUEL ROLON: Just to announce that the next island that we are going to work with will be St. Croix for the consumer thing that we have, the sustainable seafood. Then we will go to St. Thomas/St. John, and we'll be knocking on the doors of probably Julian and the usual suspects, to see if we can put together these videos and activities.

We are already working, and Maria Falcone is conducting the video in St. Thomas/St. John, and it's the third leg of the three videos, *Fishermen: Masters of the Sea*, and they are finishing that in the U.S. Virgin Islands, the St. Thomas/St. John area. In addition, she is working on the soft tissue coral disease, and that was a video that was asked for by the local fishers of St. Thomas, to give the alert that this is happening, and you received a

presentation by Dr. Brandt at the meeting in August.

Since that time, Puerto Rico has found that the disease has reached Puerto Rico in some areas, and, as Dr. Brandt said, that disease is like the -- Usually the whitening of the coral reef is like a cold, but the one that it has now is like a boil. When it hits the tissue of the coral reef, the tissue dies, and it cannot be recuperated, and so we are going to finish that and load it up in 2020, the YouTube video, to the YouTube channel that we have, and so you will have the three videos, and you saw the first two already, and we'll continue the campaign.

We also have one that I don't know if you mentioned, Christina, the family of Naguabo, and we don't have to jump into that now, but, in the case of Naguabo, we have a family of three or four generations, and they are all divers. Even the young daughter of ten years old wants to be a diver like her dad.

It's a class of fishers that we thought had disappeared with time, and now they are back, and they had never disappeared, and so we are going to finish that video, and we mentioned the short videos on the different habitats, and that also will be finished, and it will be incorporated in 2020.

MARCOS HANKE: Thank you, Miguel.

ALIDA ORTIZ: Are there any other comments there? We could hear now from PEPCO a very short update of the PEPCO program, and Wilson Santiago will do it.

WILSON SANTIAGO: Thank you, Alida. Good afternoon to the council and the people who are here. This year, the PEPCO program has been very productive, for the program and for the fishers, too. For those of you who don't know about the program, we work with commercial fishers in Puerto Rico, and this is a program from the DNER, and our mission is to educate commercial fishers, so that can obtain and maintain their commercial fishing licenses and permits.

We educate them about the importance about filling out good statistical data and the knowledge of how to conserve the resource and following the states and federal regulations.

In 2019, we have been a very good program. From January to December of 2019, the PEPCO program has impacted eight fishing centers with assistance from different municipalities around the island. Also, Vieques Island. In Puerto Rico, the fishing villages that we have impacted through these eight courses, we have a total of 274

participants that have registered to the program, and 227 are commercial fishers from thirty-six different fishing centers around the island. We also give them an evaluation at the end of the workshop, and 98 percent of the participants rate the course as excellent, and 2 percent rate it as average.

We educate fishers that have got their commercial fishing license for the first time, and this is new in the program. We have been -- We have very good participants, and they were recreational, or they are getting out of high school, and they want to make the fishing a business for them, and commercial fishing is like a business, like I tell them, and they get the fishing license for the first time. They are reporting correctly the statistics data to the DNER, and we have better data, now that we have given the PEPCO.

In this year, we integrated the coral sickness and bleaching to the workshop, with the help of the DNER Coral Conservation Program, and we brought that to the last PEPCO, and thanks to Vanessa that helped me make it Puerto Real, and we brought Miguel Figueroa, Jr., and he helped with this.

Here are some photos of the workshop, the first one. In Vieques, we had another workshop, and, in Ponce, the fishing village that we went yesterday to the activity, in the night. In Humacao, like Alida told you, should brought the management plan, and that was a very good presentation. Thank you, Alida, for helping. In Aguada, we gave the PEPCO too, and the last one, last Wednesday, we had the last PEPCO in Puerto Real.

I want to give a special thanks to the DNER and Damaris Delgado and Dr. Ricardo Lopez and the port agents. They are the ones that make the PEPCO complete. Without them, I couldn't make this workshop.

A special thanks to the DNER Coral Conservation Program, like I said, Miguel Figueroa, Jr., and the council's social media and staff. I want to give a special thanks to Christina Olan with the social media of the council. It has been very good for the program, and we have received a lot of good feedback in the social media of the council. I want to give thanks to our sponsor, the Nature Conservancy and Conservación ConCiencia and our partner, Raimundo, the council and NOAA and the DNER. That's all. Thank you. *(Applause)*

ALIDA ORTIZ: Any questions for Wilson? Nelson.

NELSON CRESPO: I only have to say to Wilson thank you. Thank you

to be so accessible and open to help all the fishermen with all the concerns they've got. You are the key to maintain the fishermen interested in all of the products that this council is developing. Thank you very much.

WILSON SANTIAGO: Thank you. I appreciate it.

ALIDA ORTIZ: Thank you, Wilson. As well as I do from my part in the outreach and education, the communication with the Department of Natural Resources is excellent, because I know what Wilson is doing, and Wilson knows what we are doing, and we try to go in the same direction. The fisherman is the same, no matter if he comes from the federal or from the state, and so they have to understand what is the dynamics in this communication. Helena. Helena is the person doing the recreational fishers workshop.

HELENA ANTOUN: Good afternoon, everyone. My name is Helena Antoun, and I am the fishery liaison for Puerto Rico for the Coral Reef Conservation Program, and this is just a report that I'm giving the council, so that the council knows and is aware of the fishery liaison activities that are going on in the island of Puerto Rico.

Just to give a little background on what this position is, the fishery liaison position is a position that helps support the local DNER in their coral reef conservation priorities, and so, as a liaison, 80 percent of my time is going to be dedicated to Puerto Rico, working with DNER and establishing the projects that I will be working on.

What I do is I sit down with my point of contact, who in this case is Ernesto Diaz, and he and I sit down and we identify what are the top priorities for Puerto Rico and DNER, and then that's what I work on. For 2019, it was identified that there were three top priorities, ramicrusta, recreational fisheries, and DNER Rangers.

In terms of ramicrusta, it was just an overview of what the status was, but, in the case of the recreational fisheries and DNER Rangers, the priority was in education and outreach, and so I've been developing the programs for outreach and education and training, and I'm just going to give an update on where we are with the recreational fishers and the Marine Recreational Fisheries Education Program, and then I'll give you a little update on what we're doing with the DNER Rangers.

A brief program outline is we have seven topics that we cover for the recreational fishers, and they are fishery laws and regulations, and this covers both state and federal laws, regulated

marine species, highly migratory species, coral reef ecology, as well as coral reef regulations, and fishery management and how to effectively participate in the management process, and catch-and-release techniques, and I just want to reiterate that these are topics that were picked out by the fishermen during scoping meetings that I held, and these are not topics that we chose, and these are topics that they chose.

This is how the program, the full course curriculum, this is what it looks like. Now, it's not that we're going to give all of these topics all at once, but the idea is the nautical clubs will get in touch with me, and they will pick and choose what are the topics that they are interested in, and they can combine or however they feel. Like they will look at it, and they will say these are the topics we want, these two or these three, and there's more or less an estimated time that each topic will take, so we can coordinate and we can plan the event and the activity.

Last time I gave this presentation, I had already held scoping meetings with the fishers and with DNER personnel, and this is in close collaboration with DNER personnel, and, based on the results of the meetings, we developed a course design, a curriculum development, which was also discussed and shared with DNER for edits or suggestions or comments or anything, and that was a review process, and then, right now, we did a pilot workshop this past December 3 in Arecibo, and it was a very informal pilot workshop, and it was just to see how this would go with the fishermen and what their feedback was. We focused on fishery laws and regulations and marine-regulated species, and those were the two topics that we focused on.

Everybody loved it, and they said it was great, and they enjoyed it. I do need to do more pilot workshops, to get a better idea of how this sort of dynamic will work, if it will work or if we have to maybe consider other alternative means of getting this information out, but, after a few more pilot workshops, I will have more material to report on.

In terms of comments that they gave me, they gave me a recommendation of including penalties, and they said it's a good idea to include the penalties for each violation as an incentive as to why you should not do this if you're not supposed to be doing it, and so I think that's a great idea, and I'm going to do that, and one of the things that one of the participants mentioned is one of the valuable take-home information that they got out of that workshop was knowing what can be fished. In other words, understanding, having a better understanding, of what regulations there are in terms of fisheries. Any questions regarding this

section, before I move on? Okay.

Now, the second part of my projects that were identified by DNER was developing a Ranger training program. Now, let me just clarify that it's not that Rangers have not had trainings before. They have. There have been many workshops before, in the past and over the years, but the idea of this is to establish a course that is given on a regular annual basis and becomes part of the Ranger training, per se.

One of the first things that I did is I met with the DNER Ranger Commissioner, Commissioner Ferrer, and I sat with him, and he told me what he wanted and what he expected and what he understood that they needed.

We drafted up a really rough draft of the curriculum, based on what he said, and I had a very informal scoping with some stakeholders and industries, and these were just a few people that I had conversed with. I had spoken with, for example, Nelson, and I have spoken with Raimundo, talking and getting their feedback on suggestions and comments that they had regarding Ranger training.

That gave me a list of topics to create the curriculum draft, which I had sent to Commissioner Ferrer for his review and to DNER, Ernesto Diaz, and so, right now, this is where we are right now. I already did all of this, and, right now, we're at the stage of developing the presentations regarding species identification, and so we're going to do a species identification training, and, hopefully, by the time we hit April, we should have a full program, with training materials, and have this incorporated as part of the DNER Ranger training. That's about it, if you have any questions or comments.

MARCOS HANKE: Vanessa.

VANESSA RAMIREZ: Just one. I suggest, for the Rangers, that you should put in there also like the way they should interact with the fishermen, and a good example is the Coast Guard. You can use the same.

HELENA ANTOUN: I agree.

MARCOS HANKE: Montes.

JEREMY MONTES: To that point, whenever you get this kind of ironed out, when you've got your first trainings available, I would be more than willing to send a couple of my guys to sit through the course at the same time and develop those professional

relationships between the two organizations that are necessary for success.

HELENA ANTOUN: That would be great. Thank you.

MARCOS HANKE: Thank you, Helena.

ALIDA ORTIZ: As you can see, we have been very busy with the outreach and education activities, and, to me, that's the best, because we have to impact all the population and not just the fishers, but the consumers and the teachers and everyone, because that's one of the great resources that we have, the fishery, but we must all understand how it is.

Here we have a very good example of a child, a little girl, in her classroom, where it's using one of the posters that we have in the council to make her special presentation about the life cycle of a fish.

From there, probably we will get a person that in ten years might be a fisheries biologist, and why not? What do we recommend to the council or ask from the council? We request the support for the development of the activities of 2020 that we mentioned.

MIGUEL ROLON: We already decided that. It's just to inform the council that we are going to do that.

ALIDA ORTIZ: Okay, and so this is all -- These are the projects that we will have for 2020, and it will take probably all the time to do those, and so any questions?

MARCOS HANKE: I don't see questions, but I just want to highlight that that poster that the council has about the Nassau grouper had been there for three or four months, and that's my girl.

Every time I walk past it, the kids have a question about the marine environment, and, instead of using just whales or manatees and the usual suspects for the endangered species presentation that they normally do now they want to have something cool from the marine environment, local, in Puerto Rico. Next year, the teacher will do just organisms or animals from Puerto Rico, and things like that go a long way for the kids.

Thank you very much, Alida, and we will go to the next presentation, which will be a portrait of the Puerto Rico commercial fishery two years after Hurricane Maria, the impact of Hurricane Maria from Daniel Matos. We are going to ask all of the presenters to be very, very precise. Miguel is informing me that

we have ten minutes each and five of questions, please.

PORTRAIT OF PUERTO RICO'S COMMERCIAL FISHERIES TWO YEARS AFTER THE IMPACT OF HURRICANE MARIA

DANIEL MATOS: Let's talk a little bit about what happened in Puerto Rico after Hurricane Maria. I remember when I was in junior high school and in high school and we studied, in the history class, the impact of the hurricanes in Puerto Rico during the 18th and 19th centuries, and the impact at that time was very, very hard, and the population of Puerto Rico during this time -- They had a lot of needs, and they did not have food and everything.

After Maria, I remembered those lessons, and we were very close to that situation. We had a lot of problems and situations, but, finally, we are fine, and we are on the track again, and so let's see what happened in Puerto Rico fisheries for the last two years.

For example, after Hurricane Maria, we observed that many commercial fishers started to travel with their boats and trailers from the north coast and south coast, and they traveled to Fajardo, Puerto Rico, and they used Fajardo ramps and started fishing around Vieques and Culebra, and they started to land the catch in the Fajardo area, and so, in Puerto Rico, for the last four years, Cabo Rojo was the most productive municipality in landings, and, after Maria, we discovered last year, because of this very interesting migration of commercial fishers, that it looks like Fajardo is now the number-one fishing production municipality in Puerto Rico.

Also, I have to mention that, before the hurricane, we identified eighty-eight places, or sites, where the fishers arrived, or landed, and we call that fishing centers, and this number was reduced from eighty-eight to seventy, and now we have also Fajardo as the number-one municipality in fishing landings.

You see that they have eighty fishers and 410,000 pounds landed. Cabo Rojo has 144 fishers, but they caught 389,000 pounds, and then you see Rincon, followed by Saba and Vieques and Lajas and Ponce, Naguabo, Guanica, Aguadilla, Juana Diaz, and Guayama. These are the twelve municipalities reporting commercial fishing landings in Puerto Rico.

For the last twelve months, the commercial fishing statistics personnel, we were doing a lot of interviews to know how the commercial fishery recovered after the Hurricane Maria, and the interviews were heavy. It takes thirty-five to forty-five minutes, and so the fishers have to sit with us, and they have to be relaxed,

and sometimes we have to say, okay, please stop and let's go the next question, because they speak a lot of information.

The average age in Puerto Rico for the commercial fishers, after we interviewed 651 commercial fishers, is fifty-two years. By coast, and this is the east coast, it's fifty-two years, and the north coast is fifty-four years. The average on the south coast is fifty-four too, and it's a little bit younger on the west coast, fifty years old, but we need to bring more young fishers to keep the commercial fishery in Puerto Rico, because this is an old population of commercial fishers.

The income is very interesting. In the west coast, 71 percent, close to 72 percent, of the commercial fishers receive most of their income from their commercial fishery activity, and the number of dependents is very interesting too, because they are over fifty years old, but they still have -- The east and the north and also the west, they have three people depending on this income in their homes, and this is very interesting.

I hope you are able to read this column here, and I have to mention that the interviews were very difficult. Many of the commercial fishers are angry with the DNER, for many reasons, and they are frustrated, because they don't receive some FEMA help, and so we have to speak with them and convince many of them, and probably I think we are able to identify fifty or more that they reject the interview.

We know there are probably 800, or 820, or 850, commercial fishers active. After a year, we were able just to interview 650. Because, as I mentioned before, many of them do not want to cooperate, or they reject the interview, and others were very difficult to find.

Anyway, in this table, for example, the education was very interesting. Less than high school, 31 percent of commercial fishers have less than high school in their education, but 39 percent or above, close to 40, 40 percent, completed high school, and 16 percent were able to complete a college education. That's very interesting.

Another important observation we observed after Hurricane Maria was the queen conch habitat in the southwest Puerto Rico, and we observed it before the hurricane, and the commercial fishers were able to land thirty-one pounds, thirty-two pounds, of queen conch per trip, but, after the hurricane, that was very difficult, and many of them are able to catch only eight or ten pounds. However, the average is 22 percent. The commercial fishers reported to us that Hurricane Maria destroyed the habitat of the queen conch in

many places on the west coast.

In this table, we show you the pounds reported, the number of fishers reporting, and the average price per pound. For 2015, you see 91,000 pounds. After the hurricane, for the year 2018, 71,000 pounds were reported, but the price increased 33 percent, from $6.00 per pound to $9.00 per pound, and so they catch less, but the price is higher, and so it continues to be a good business for them.

The scarcity of the queen conch and the high price now resulted in the effect that many restaurants retired the queen conch from their menus, because the price is too high, and so it's very difficult to sell that. This is the most important things that I can show you, and there are a lot more, but I only had ten minutes, and so are there any questions?

MARCOS HANKE: Thank you for the presentation. Are there any questions? Richard.

RICHARD APPELDOORN: Thank you, Daniel. Could you put your last slide back up, or the one before that with the data? We're seeing a significant drop after Maria, yet there are more fishermen that are reporting conch.

DANIEL MATOS: Yes, and it's very interesting.

RICHARD APPELDOORN: So how much of the price demand is because of the scarcity versus the conch fishers themselves having to charge more just to make a living, if you will? The demand, I guess, is such that they're able to pay for --

DANIEL MATOS: I have to mention one other thing. These eighty-nine commercial fishers, many of them, after April or May, they left the fisheries, and they are working doing some yard maintenance, cut grass and everything like that, and so we identified probably twenty of them that are out of the commercial fishery right now, and maybe they will return later.

RICHARD APPELDOORN: That's very interesting, too. Thank you.

MARCOS HANKE: Vanessa.

VANESSA RAMIREZ: I just want to clarify the point of the price.

DANIEL MATOS: Vanessa, I'm glad you're here, because you can answer the question to Richard better than me. Thank you very much, Vanessa.

VANESSA RAMIREZ: That's exactly what I'm going to do. Practically, it's not the fishermen who put the price. It's the fish market owners, and, just for example, in Cabo Rojo, they are fighting between them to get more fishermen, and, every week, or every month, they get a quarter more, a quarter more, a quarter more, and so, right now, they are paying $8.00 or $8.50 per pound to the fishermen, and that's why the price is $9.00 for the restaurant or retailer.

RICHARD APPELDOORN: It's great for the fishermen.

VANESSA RAMIREZ: Yes, that's good for them, but we have seven in the same road, within walking distance, and so they have to fight for the price.

RICHARD APPELDOORN: I will continue buying it anyway.

VANESSA RAMIREZ: Yes, and we are glad of that.

MARCOS HANKE: Thank you very much, Daniel. Thank you for a great presentation. We are ready to go for the next presentation, which will be the SEAMAP and Veronica Seda.

SEAMAP-C PUERTO RICO UPDATE WITH THE USE OF UNDERWATER VIDEO IMAGES FOR FISH COUNTS AND HABITAT DESCRIPTION

VERONICA SEDA: Thank you, everybody. I'm here, and I'm the only member of the SEAMAP program for the department, and we started using the underwater video cameras in 2017 on the east coast, and then Maria hit the islands, and so we started in full in 2018, and we are still in diapers, like I said, and so we're going to just give you a little bit of what we have been doing since 2018.

We will start with the methodology. We get 120 stations per sampling period, and we used to have quadrants on the east coast, and we changed to stations, only one point, and NOAA people make their -- They stratify the two coasts by depth and habitat, using the benthic map or their universe, what they use to set it.

Right now, we are using three gears in every station, and we use handline, we deploy a longline, and we deploy the underwater cameras on each station. First, we drop the camera, and then we deploy the longline, and then we fish with the handline, and then we retrieve the longline and the camera on each station.

We also use a ground-truthing camera, where we anchor the boat and we do the handline, and so we have a better idea of each habitat

for each station, and we don't have any specific fishery that we target. This is a photo of the frame that we use, where we put two GoPro cameras looking sideways, with two lasers, each one.

What we get from NOAA is this information about -- I mainly used the coordinates and the habitat that they gave us, and we compared what they gave us with what we see in the cameras and what we get on the handline and the longline, and so every station is stratified by coral reefs or mud or macroalgae and seagrass and from zero to twenty, twenty to forty, and forty meters to fifty fathoms.

This is like an example of the images that they of the benthic maps for the west coast, and all of these light-green areas are unknown for them, and so they don't set any station on those areas, and they want us to monitor the stations that they already have information of the habitat, and so that's an example of the 120 stations of the first period for the west coast, and, by the time we started the presentation, we already had -- Like I said, we started in 2017 on the east coast, and then were like a year out of the water, and then we started in 2018 in full with the video cameras and the longline, and they we went ahead with the second period, and we started in full in 2019 on the east coast.

This is part of the images that we already have from the video cameras on the frames, and that's like the easiest images to analyze, like coral, sand, seagrass, and macroalgae, but we realize that it's very complicated, in that sometimes you have one camera looking to one habitat and another camera looking to another habitat, and, when you get the third camera from the ground-truthing, it's another habitat, and so it's really complicated.

We started making our own protocols, and we started to analyze the videos for each camera, because, in other places, they just do one camera for everything, for fishes and habitat, and so we started to -- It was so different on each place that we started analyzing -- We started analyzing each camera, and this is part of the forms that we use for every -- When we start analyzing the videos. This page is for habitat, and we fill out three, one for each camera, and this is for the species that we see during the videos.

We usually drop the camera, and we let like ten minutes, for the sediment and the fishes to come back to the place, and then we start reading for twenty minutes, and we also take some time, sometimes, to see the rest of the video, to see if there is something else that should be added to the list, and this is an example of one reading on one station.

We do all the characterization of the habitat for each camera, and then we do the reading for species to each station, and we choose randomly which camera we're going to read, and we just read one camera for fishes, because it's really -- It takes a long, long time to -- Well, it depends on the station, because there are some stations that are really murky, or nothing happens and nobody goes over there, and so you can take just twenty minutes, but there are some stations where you can find more than forty species on one station, and you need to be like two or three days on one video, only twenty minutes, and it's like pause, play, pause, rewind, pause, play all the time.

This is a comparison from what NOAA gave us on the stations, and they gave us seventy-five stations on coral reef, five stations on what they think is macroalgae, by their maps, nine stations of sand or mud, and thirty-one for seagrass, and this is what we have been reading from each camera, and you can see the difference from what they gave us to what we have in one camera and in the other camera for each station, and so that's on the west side, and this is on the east side, and it's the same thing. The difference between what they gave us on each 100 stations to what we see in Camera 1 versus Camera 2.

Sometimes one camera is just looking at sand, and the other one is looking to a reef, and so you cannot make a general classification for that station.

This is list a list of the first 120 stations that I think we did on the west side, and all the dark are species that we don't catch on handline or longline, versus fifty-six species that we saw on the cameras, but we never got it onboard, and so we don't know anything, maybe, about those species.

When we started with the cameras, we knew it was something very challenging, but we started having problems with a lot of things, and we took a calibration workshop, because there are issues with a mismatch between habitat maps and the video observations. It's difficult from small boat and safety issues, because we are doing three things at the same time in the same station, like really close, to one to each other, with so many lines in the water, and the video analysis -- We used lasers to make sure -- Not every fish goes through the lasers, and so it's really difficult for that data and to measure every fish.

It's time consuming, and it's really hard when -- We still have more than 50 percent without being read, and we have more than 1,300 videos, and maybe half of those have been read, and it's really, really hard, but we're getting into it.

The data storage was really a big problem, because we lost, like in a week, four hard drives, and it was so much data in that hard drive and that we need to recover those videos. In that case, we have help from the council, that they gave us some space to like make a backup of the videos, so we don't lose everything. Now I'm going to show you a short video of what you see in the cameras.

We start with the deployment of the frame, and that's the first thing that we do. We try to go strictly to the coordinates that they gave us, and so that's the first thing that we deploy, and usually everybody comes to the camera or it takes some time, and sometimes you don't see anything. You usually see small fishes that you don't know what they are, unless they get really close to the camera. Then twenty minutes of reading like that.

You see all kinds of habitats, without anything to see, and it can be really boring, but suddenly something appears, and you have this kind of habitat, and all these are sponges, and it's really hard to classify those, because we don't have -- We have sponges only, and sometimes we have sand with some algae, and everybody wants to get in the camera too, and you're able to see the lasers and the fishes, but that's really -- It's like one in a hundred it happens.

When you have this, it takes you a long, long, long to pause, play, pause, play, rewind, pause, play, rewind, because you need to count how many of each species start coming in the camera and when they came out of the camera. If they get closer, you can identify them, but that's really weird, that they get that close, those small fishes, and I get dizzy, really dizzy, looking at the corals moving all the time, and so it's really hard for me.

Sometimes you have some other cute things, and, curiously, that shark was seen in that station, and I'm pretty sure it was this same shark that was in two different stations one mile away from each other in the same day, but it looks like almost the same size, but there is no way to know if it was the same, and you can see the grouper left. This is a hogfish, and so there are two count, and you have to pause right on the data forms. There is just thirty more seconds of video.

I don't get dizzy on those, because nothing is moving. Sometimes it's really hard to see, when it's like -- It's not that murky, but you don't see the horizon, and you have like space between the -- Sometimes you just see this for twenty minutes or thirty or forty, and you just see this, and there's nothing to see. There's nothing moving and nothing going around, no juveniles or no

nothing, and so that's part of what we have been doing lately with the cameras.

I don't read any video. Aida Rosario reads the videos, and Fabian reads the videos, and they just ask me like what do you think about this, but, you know, we are moving forward right now, and so are there any questions?

UNIDENTIFIED: (The question is not audible on the recording.)

VERONICA SEDA: At the beginning, we kept them in a small hard drive, but those hard drives started like crashing and getting encrypted, and it took me like two weeks of trying to recover those hard drives, and then we asked Graciela -- We decided that the council was going to be the ones that are going to have the full original backup of those videos, because, after we read those videos, SEAMAP is not going to do nothing with those.

UNIDENTIFIED: (The question is not audible on the recording.)

VERONICA SEDA: Eventually, yes. I know there is a lot of information, because we only read twenty minutes, but sometimes they are thirty or more minutes of video.

JULIAN MAGRAS: That was a good presentation. I just have two questions. What kind of depth range are you guys using?

VERONICA SEDA: We have from one fathom to twenty or twenty to thirty-five or forty and forty to fifty, and we don't get deeper than fifty fathoms.

JULIAN MAGRAS: The reason why I asked that is because I see there's a lot of undertow, and so that's why I asked that question, and then have you guys ever done any videos with like chumming next to the camera, to see what kind of attractions you would get?

VERONICA SEDA: No, and the committee was thinking to bait the cameras, but they had problems on the Gulf coast, because the big fishes get into the bait, and you're not able to see part of it, because they get in the middle, and so you're not able to measure or see other species, and so we just leave it like that.

JULIAN MAGRAS: Thank you. Good presentation.

VERONICA SEDA: Thank you.

MARCOS HANKE: Richard.

RICHARD APPELDOORN: I just want to make a comment. They are doing this work while they're also setting longlines and while they're also hand-lining from the boat, and, when we were at the joint SEAMAP meeting last summer, one of the other program members came over and said that we do all of those things too, but we're not crazy enough to do them all in the same day, and so it tells you something about how hard these people are really working, both here and in the Virgin Islands. It's really an incredible effort they are doing.

VERONICA SEDA: Thank you. Thank you to Marcos and to Fabian and to Aida. They are the ones that go out and take those videos, and they do the handline and the longline.

MARCOS HANKE: I want to make a quick -- Because of this point. The whole exercise of developing how we can do it very effectively have been including students of Humacao, and the way the team works has been very professional and effective, and this is something that I am very proud to be part of it.

I just want to make that mention and the recognition to everybody that works on this project together, in the field and processing the videos and doing everything. Thank you very much, because it's an important project.

VERONICA SEDA: Thank you.

MARCOS HANKE: Thank you, Veronica. The next presentation is Histological Validation of Visual Sex Determination for Reef Fish Species by Noemi Pena Alvarado.

HISTOLOGICAL VALIDATION OF VISUAL SEX DETERMINATION FOR REEF FISH SPECIES

NOEMI PENA: Good afternoon, everyone. My name is Noemi Pena, and I'm a biologist for the DNER, the Fisheries Research Lab. Since 2006, I think, we started collecting data, gonad data, for the SEAMAP program, just to make like a quality control of what we are seeing macroscopically and then comparing to the -- Macroscopically and then compare with microscopically.

The objectives of this is to improve the gonads maturity staging identification, because, before that, it was only macroscopically, and then provide the data that managers need to have the -- To improve the stock assessment, and, also, the fisheries-independent data are critically needed to obtain essential information for fisheries management.

What we do, and what you have seen here today, is that we are like a bunch of people working different stuff, and it is important just for all of us moving together to the same direction, and so, as part of what we do in the lab, the lab component of the Fisheries Research Lab, is to keep doing the histology to have the best data available.

What we do is just to have -- Well, I am just going to talk about what we do with SEAMAP information. We get the fish collected, and then every fish is measured and then identified, the sex, and then, visually, we tell the stage of the gonad. Then that information is recorded. Since 2006, we have been collecting and preserving the gonads, to do the histology, and then we compare what we see visually and then with a microscope.

Mostly, it is very challenging to do this stuff, because what we -- This is a female gonad, and this is an ovary, and this is an immature female, and so what we see macroscopically is that the ovary looks like a ribbon, and it is very clear, and it has no blood vessels that are seen. The oocytes we cannot see the oocytes visually, and so, in that way, we can tell that this is an immature female. Then, when we see it under the microscope, we have seen the primary oocytes with the thin ovarian wall, and, in that way, we can say that this is an immature female.

Then, as the female matures, we can see here the blood vessels, and the gonads are more grown, and the oocytes we can see with the naked eye, and then we see some characteristics here of some fat around also, and, in that way, we can say that this female is maturing.

If we see that gonad under the microscope, we can see here that the oocytes -- We have seen here the primary oocytes, but we see quite a few that are developing, and so, in that way, microscopically, we can say that that female is maturing, or developing.

Here, we have a ripe female that is spawning capable, and so, here, with the naked eye, we can see hydrated oocytes that you can see perfectly macroscopically, and then you have seen here the blood vessels, also, and that's a sign that this female is totally mature and spawning capable. If you see it under the microscope, you can see all the oocytes already to spawn, and they are ready to spawn.

Here are some of the issues or the challenges that we have to face. Here is an inactive female, and you can see the blood vessels, and the ovary is like shrunken, and it's wrinkled, and so you can see here that the color is very red and very orange, and, when you see

it under the microscope, it looks like an immature female, and so this is one of the challenges that we have to face every time that we do an identification of the ovary, or staging the ovary, on naked eye.

Here, we have the primary oocytes, and this ovary is resting, or is inactive, or is regenerating for the next spawning season, and so the challenge is that you have an inactive female, but it's not an immature female. When you compare it to an immature one, the ovary looks mostly the same. This is why the microscopic information and the histology information is very important.

One of the other challenges that we have is to identify and stage, in hermaphroditic species, like the red hind that we heard today a lot of talk about the red hind, and, here, it looks like a developing female, and we classify it as a developing female by the fishers, but it's not. It's a male that has already changed sex to the male, and then it has the oocytes, some oocytes, around, and so it's not a female. It looks like a female, but it's a male.

Also, males are very challenging to stage macroscopically. This looks small and threadlike, corresponding to an immature or developing male, but it's a mature male. All the violet color, very violet color, is sperm, and it's a very mature male. This is also a mature male. It's white, and it's large, and it's firm, and so, if you put a little bit of pressure, milt is released, and here is the sperm, also.

Since 2006, the laboratory has established a quality control to assure that the data collected is the best data available. Since then, macroscopic sex and stage determination have improved. Since 2006, the error was very high, when we compare what we do visually versus microscopically, and so now the error is like -- Even though males are very hard to stage, not to identify the sex, but it's very hard to stage, and then the females, if they are resting or if they are -- If they are resting or immature, they are very difficult to stage.

It is important to establish and standardize terminology for gonad description. Right now, we are using Nancy Brown Peterson standardized terminology to do that, and so we tried to keep standardizing the terminology, and then histology is the best way to bring the most reliable gonad description, and, also, it's very important, because we have been working with SEAMAP information, but we have done a lot of work besides the SEAMAP information, and we have been working lately with deepwater snappers, just collaborating with other scientists, and we have been working with another professor, and we have been working also with providing

samples to life history information, which is very important. At the lab, we only do the histology information, but we collect all the data that the scientists need to get the best information for these species. I think that's it.

MARCOS HANKE: Thank you very much, Noemi. One question, because we need to move on, and Noemi will be around if you guys have any other specific questions. Go ahead, Damaris.

DAMARIS DELGADO: Thank you. I just wanted to recognize the great work that our staff in the laboratory is doing and congratulate all my colleagues in DNER that have been presented their work, and I'm just proud of them and what they're doing.

MARCOS HANKE: Thank you for saying that, and, Noemi, I think this is a good opportunity to invite the fishermen and that, once you guys knock on their door to have samples from very little animals, or bigger animals, that, through your guidance, it's needed, and, please, I invite all the fishermen to collaborate, because that's important information for the future of our fishery.

NOEMI PENA: I just want to point out that, also, it's very important that everyone that is doing science out there, like students and other researchers, that it is important at this kind of meeting that you get to know what everyone is doing around, and it's another way to see what they are doing around, and so it is important to see what we do.

I only work lab stuff, and I don't go to fish, and I don't know how these larvae move around the current that I learned today, and so it is important that we all join together to do the best that we can to get the best science and management possible.

MARCOS HANKE: Thank you. Thank you very much. That was a great presentation. *(Applause)* The next presenter is the ciguatera study, and it's going to be presented by Miguel del Pozo.

CIGUATERA STUDIES REPORT

MIGUEL DEL POZO: Good afternoon. Thanks for having us, and my name is Miguel del Pozo, and I'm from UPR Ponce, and, together, Joseph Luczkovich and Henry Raab, we're going to be talking about a study that we are conducting currently that is called "Ciguatoxin Detection and Model Predictions for Use in Fisheries Management in Puerto Rico". I will leave you with Joseph Luczkovich now, and he's going to be giving you a brief introduction to the project, and then I will talk later on about the anthropological side of it.

JOSEPH LUCZKOVICH: I'm Joe Luczkovich, and I'm a professor at East Carolina University, and my co-authors, as Miguel said, are Henry Raab, who is a PhD student in my lab, and Cindy Grace-McCaskey, who is here in the room with me, in my office in Greenville, North Carolina. David Griffith and Wayne Litaker are also involved, and this is an interdisciplinary project on ciguatoxin in fishes in Puerto Rico.

Many of you probably know, just as background, that ciguatoxin a fish poisoning condition that causes a neurological condition in people who have eaten it, and it's about 50,000 cases per year worldwide, and about three out of a hundred people traveling in endemic areas are exposed to this, potentially, through consuming fish.

There are lots of fish that could be involved, and at least 400 species have been named, but they usually are top predators, like barracuda, great barracuda, grouper, snappers, king mackerel, as an example, and it's in the Hawaiian islands as well as in the Caribbean ecosystems, and it's a worldwide tropical problem.

This is a map of Oahu, and some scientists there have gone around the island and looked for places where grouper are high in ciguatoxin, and you can see the red areas here show the high percentage of positive for CTX, or ciguatoxin, and so we know there are hotspots and cold spots, areas where there isn't much in the way of ciguatoxins in the fishes.

We wanted to find out if there are hotspots in Puerto Rico, and, because I work with anthropologists here at the university, we started to talk them about, well, how can we interview fishermen, to find out where they think people have gotten sick, and so we went to fish houses, and Miguel del Pozo was instrumental in lining up interviews for Henry Raab, who is the top picture there, and Miguel and Henry in a fish house in the bottom picture, and Henry is doing a fish dissection.

We interviewed fishermen at the fish houses, both in Puerto Rico and in St. Thomas, and the objectives were -- I'm going to let Miguel talk about this part. Miguel, why don't you take over?

MIGUEL DEL POZO: Thank you. Just like Joe mentioned, I want to emphasize the interdisciplinary character of this study. We are a team of anthropologists and biologists, but we are working together in a synergistic kind of way, trying to put together this study to learn more about this disease.

Talking about the anthropological aspect of it, basically, we are learning from fishers. As anthropologists, we understand that fishers are very knowledgeable, and they are the ones who engage more commonly and frequently than any other stakeholders, and so we are basically learning from the fishers ecological knowledge about ciguatera.

What we wanted to learn, we wanted to determine, as Joe Luczkovich mentioned, hotspots and cold spots in Puerto Rico, and we also wanted to determine what are the hot fish, what fishes are the most likely to cause the disease, and, in this aspect, when we were talking about hotspots, we could define that as places that fishers recognize, traditionally, as an area that will produce landings that are more prone to produce the ciguatoxin, and, on the other hand, cold spots are the opposite. It's a place where you rarely have a report, or it's unlikely to come across a toxic fish.

We also wanted to know the species involved, and we had some other questions, and I'm not going to get into -- Because of the time constraints, I'm not going to get much into Point 3 and 4, but we also had questions about if the fishers observe any relationship between environmental events and weather changes in relation to ciguatera, and, also, we wanted to explore how they feel about the traditional ways of telling a toxic fish apart from one that is not, traditional ways to test suspicious fish.

What we did is that we a snowball sampling of experienced fishers in Puerto Rico, and we conducted twenty-one open-ended interviews, and among the things we asked there is we asked them to free list the species that they understand to be hot fish, and we also did pile sorting, where we provide the fishes with fish cards, and we asked them to put them in piles, a pile of fish that are toxic and fish that are not toxic.

In St. Thomas, something similar took place, and I didn't conduct any interviews in St. Thomas. Henry did and Cynthia, but they did pile sorting with seventeen fishers and open-ended interviews with fourteen fishers.

This is a previous kind of draft version of a map that I was building about the interviews, and the dots are the locations where I conducted the interviews, and the numbers related to the dots are the number of interviews. As you can see, we conducted one interview in Cabo Rojo, two interviews in Ponce, three interviews in Juana Diaz, five interviews in Guayama, three more in Arroyo, one in Maunabo, and one in Naguabo and five more in Fajardo.

A more recent version of this map will have different colors in the dots, and the reason for that is that this dot on Cabo Rojo and the one in Fajardo should be in green, because those are places that we have identified, based on the interviews, as cold spots.

Now, the fifth spot in Guayama, that should be red, because that is a hotspot that we have identified through the interviews, and then the interviews in Ponce, in Juana Diaz, Arroyo, Maunabo, and Naguabo should be yellow, because we are not sure yet. We cannot pinpoint those areas as hotspots, based on the information we have so far, and we have to conduct more interviews, and we are planning to do that in the future. We're going to be conducting a survey with a much bigger sample in the future.

So what did the fishers say? As you can see in this chart, the names that pop up are barracuda, amberjack, black jack, hogfish, and king mackerel as well. Here, you can see how many times species were identified as hot species, and great barracuda -- 100 percent of the interviewees mentioned barracuda as a potentially ciguatoxic fish, followed by hogfish, with 86 percent, amberjack at 81 percent, and black jack and so on.

King mackerel, basically, half of the interviewees mentioned king mackerel, and then horse-eye jack, dog snapper, African pompano, schoolmaster, escolar, cobia, cero, bar jack, yellow goatfish, and ballyhoo, and I have to stop here for a second to mention that -- Can you go back, please? I wanted to mention that cobia was mentioned in an interview that took place in the south.

At the time, I didn't have, in the fish cards, any cobia, and there were no cobia in the -- The fish that they were relating to, they had none in the freezers, and I had no reception on my mobile, and so I couldn't -- I cannot say for sure if that's a cobia, and I know that there are reports about cobia in Puerto Rico, but they are very scarce, and so, judging from the description that the fishers gave me, I feel like they were talking about rainbow runners, but I have to confirm that in the future. I just left it with the common name that they used, but I need to confirm that in the future.

Now, when we compare the fishes from the hotspots and the cold spots, it's quite interesting, because, if you look at the first five species, great barracuda, great amberjack, hogfish, black jack, and horse-eye jack, you see a good deal of agreement between the fishers that were interviewed in the hotspots and those in the cold spots.

Now, when you go down, from king mackerel down, there is agreement

among the fishers from each of the spots, but not between them. If you look at king mackerel, 80 percent of those interviewed mentioned king mackerel as being a toxic fish in the hotspot, but none mentioned king mackerel in the cold spots, and the same happened with dog snapper, schoolmaster, bar jack, African pompano, and escolar as well.

JOSEPH LUCZKOVICH: Do you want me to talk about this, Miguel?

MIGUEL DEL POZO: Please.

JOSEPH LUCZKOVICH: This is work that was done in the Virgin Islands, in St. Thomas, by our team there, and David Griffith interviewed seventeen fishermen and had them do the card sort into piles, and this is a consensus analysis, which means, if you look at which fishermen, which are the red circles, and they are numbered one through seventeen, which fisherman put a given species in a pile that says "toxic fish", they are connected by arrows to the species that they identified as toxic.

All the ones on the right-side on the screen are high consensus, and they are most often chosen as a hot or toxic species by the fishers. It's great barracuda, hogfish, amberjack, horse-eye jack, yellowfin grouper, and they are all in the MDS, the multidimensional scaling, of the pile sort data, the ones in the center of the screen, the blue ones in the center.

There are some fish that are mentioned by some fishers, but not others. For example yellow goatfish and snappers on the bottom-right are -- Some fishermen say they are toxic, but not all fishermen, and other fishermen say king mackerel is toxic, over on the left-side, on the bottom, but not the same fishermen that picked yellow goatfish and snappers, and so there seems to be some disagreement about those species.

Then, all the way to the left, are the species not even chosen, or very rarely chosen, like surgeonfish, grunts, angelfish, porgies, and parrotfish. Those are all sort of lower trophic level, or they eat other things than fish, and so we're interested in how this consensus analysis amongst fishermen indicates some traditional knowledge about the pathways that ciguatoxins are coming through the food web, and we think that, the TEK, traditional knowledge, is pretty good. The fishermen know which species are toxic. There is some disagreement, but they agree on the barracuda, hogfish, jacks, and groupers.

I think the next slide is -- Here is the slide that shows the east coast of the Puerto Rico island and the sites that we selected for

our ecological sampling, because the next phase was to take our traditional ecological knowledge from these sites and take biological samples, to see if the fishermen are telling us the right species are toxic and the hotspots and cold spots are correct.

This area up in green is called CTX 1, and CTX 2 by Fajardo is an area that fishermen said is a cold spot and that not many fish there are toxic, but, down by Guayama, where we have CTX 3 and 4, we have established sites there to sample, and we're building a food web model right now, and we're using this one from Optiz for Puerto Rico from 1996. She published a dissertation on this, and it's an Ecopath model, but we can use the Ecosim and the Ecotracer modules within Ecopath to find out what pathways the ciguatoxin is traveling up the food web.

I am just going to isolate a few of these key pathways for you, and like this is one pathway that could be how the ciguatoxin gets to the hogfish, and the algae here and seagrasses are substrate for grazing snails. When we look at the stomach contents of hogfish, we see a lot of those grazing snails in the guts of the hogfish, and so we think the snails are grazing on the algae and seagrass and getting the CTX from their dinoflagellates that they consume near the base of the food web.

Another key pathway is all of the barracuda we've seen so far have been eating fish, and one of the common fish they eat is ballyhoo, and they may eat other fish, and so that larger food web model will detail all the pathways, but this is a pathway by which barracuda could be getting high levels of ciguatoxin through the ballyhoo, which feeds mostly on Syringodium, as you see here, and floating Syringodium, or seagrass, could be also having this dinoflagellate, and so we need to investigate, at all trophic levels, how this CTX is getting into the food web, but, nonetheless, with the Optiz food web Ecopath model, we were able to simulate a bloom, using a very high cell concentration now.

We're assuming here 100,000 cells of gambierdiscus with ciguatoxin at the highest levels, and so this is the worst-case scenario, but you can see that, at Trophic Level 4, the king mackerel and the jacks are getting it within three months. The groupers take a little bit longer, nine months, and this is assuming a seven-day gambierdiscus bloom. Hogfish is about ten months, and the parrotfish and some of the herbivorous invertebrates don't seem to ever reach the toxic level, which is 0.1 part per billion, indicated by the red horizontal dotted line.

If we say instead that there is a gambierdiscus bloom that lasts

for four months, that had a much more rapid increase to the top trophic levels in just a month-and-a-half for some of those top species, and so what we're doing now is we're putting out collectors.

These are based on a collecting technique in this manual from International Oceanographic Commission on sampling toxin-producing microalgae, like dinoflagellates, and so that's a picture of me diving near Guayama, in one of the hotspot areas, putting out little weights with a screen attached and a float on it, and that little float will keep it up off the bottom, and the screen will collect the dinoflagellates.

If you see over here this picture on the left, it acts just like window screen, but the dinoflagellates are there on the window screen and attracted to it, and then I go up later, after one day of letting this -- After twenty-four hours in the water, I take a sample, with a jar around the screen, and bring it back for analysis.

We did this at the University of Puerto Rico Humacao and at the NOAA laboratory down in Beaufort, North Carolina, who are collaborating with scientists there, and the collectors worked. We just did this in October, and there were cells both in the hotspot and the cold spot, but, at the hotspot, at CTX-4, there are 12,400 cells per liter, and so a much, much higher level, and there were gambierdiscus, and, now, we're still identifying the strains of the gambierdiscus, and so this is work in progress, but we hope to use this information to parameterize that food web model.

Henry Raab, for his dissertation, is actually looking at the toxicity levels of fish from different parts in the hotspot and cold spot areas, parts of the coast, and we have taken over a hundred different individual fish, about eighteen species, and we have extracted the tissues to get the CTX, and it takes a long time. It takes four days to do eight fish, but Henry is working hard, and I'm going to show you some of his preliminary data.

By the way, we're going to try to do it across all different Ecopath trophic levels, everything from the gastropods at Trophic Level 2.4 and small herbivorous fish, like parrotfish, up to the large carnivorous fish, like great barracuda, cero, and amberjacks and things.

Right now, here are some preliminary data from a map of the east coast. The top there is Fajardo, near Fajardo, and no fish were found to be toxic so far. We have looked at southern sennet,

barracuda, and dog snappers, but, in the Naguabo area, the hogfish that we looked at all have a sort of low toxicity, and there was one hogfish tested that was not toxic, but the barracuda from there was highly toxic, and then, down in Guayama, all the hogfish and barracuda were highly toxic, and the white grunt and pluma porgy were not toxic.

We are just trying to give you a little update, and we're still in the process of analyzing all of that, and I will just go ahead and summarize the conclusions from everybody.

We have identified, from fisher interviews and TEK, traditional ecological knowledge, two hotspots in Puerto Rico and one in -- Well, one is on Vieques, and one is in Guayama. We haven't done much work over in Vieques at all, but it's come out of the interviews that there's a hotspot on the east side of Vieques.

Fajardo was a cold spot, based on the interviews, and, in Naguabo and Maunabo, we need to have more interviews there, to determine if hotspots are present. There are hotspots in the U.S. Virgin Islands as well, and we were going to identify them in the future.

The species of fish that the fishermen name are great barracuda, hogfish, amberjack, black jack, horse-eye jacks, dog snapper, and king mackerel. These species are important, obviously, and we think that the fishers are actually avoiding the high-likelihood CTX fisheries, and they are not being landed in the south, in the hotspot area at Guayama, and so that's an interesting finding that we want to investigate more.

From the Ecopath modeling and the sampling for the dinoflagellates, CTX levels showed the highest toxicity in great barracuda and hogfish from Guayama, and the barracuda and other fishes were not toxic in Fajardo, and hogfish had low toxicity in Naguabo, and barracuda have high toxicity there.

The Ecopath model is showing that it takes only about three months after a bloom to get to the top trophic levels, and it stays in the fish for many, many months after that, and so it's a real concern if blooms are happening out there, and it looks like they are, that the fish are getting contaminated and staying contaminated.

We need to study further the time extent of the blooms, and that's something we have planned for the future, and we recommend to this management council that you continue with CTX testing in fish, especially hogfish and the other fish that are coming out of this study as being important from the traditional ecological

knowledge, and continued surveillance of the gambierdiscus blooms along the coast. With that, I think we'll just take questions.

MARCUS HANKE: Thank you for the presentation for everybody, for both, and it looks like there is more than one on the line, and thank you to all. Tony, did you have a question?

TONY BLANCHARD: Actually, I've got a statement. I noticed, at the beginning of the presentation, you refer to it as a disease, but I don't understand it. If they're feeding off the algae, and the algae is the problem, how would it be referred to as a disease?

Anyway, going past that, what jumped out at me was the ballyhoo. I think that you're looking at analyzing it in the wrong way. I think part of the problem is a lot of people that claim to say that there were fish poisoned is not actually fish poisoned.

It's actually food poisoning, and I'm pretty sure that Mr. Magras will back me on this, because he used to work at the hospital, and he had access to a lot of the doctors, and the only way he could really tell if it was fish poisoning is by bringing the contents that you bring up and them testing it. I think the ballyhoo might be a case of food poisoning, because I have never heard, in all my days of fishing, that ballyhoo has poison.

As for the barracuda, I think that the high-predator fish -- What is happening is they are feeding off of the smaller fish, and, because the smaller fish feed off of the microalgae, and you know the big fish feed off of the smaller fish, the bigger-predator fish are getting the microalgae in their system.

Certain places, that's where you see the hotspots, and they are not hotspots in certain places, is because what I believe is, especially in St. Thomas, because of the upwelling, what we call the ground sea, the microalgae grows ashore, in shallower water, and, when the ground sea comes in, it uproots everything, and it sweeps it off, and so there goes the microalgae.

The fish in the north of the island probably don't have the access to the microalgae that they would find in the south, which the upwelling is not a bigger deal. In certain places in the south, you find like the hot fish, and certain fish have a tendency to carry the ciguatera, and some species more likely than others, but there is no real way of looking at the fish to tell that a fish has got ciguatera or not. The only way you're going to know is by eating it, and I could verify it. I've got poisoned four times, and so I know, off of my own fish.

To the end of the day, I don't think there is no secret -- Let's say no secret potion to figure out whether the fish is ciguatoxic or not, but what we have learned to do is certain areas and certain types of fish we avoid bringing in, and we avoid going to them areas to begin with, so that we don't have the problem of poisoning people, because, at the end of the day, if I poison you, you ain't coming back to buy my fish.

Number one, it's not a nice thing to do, and, number two, it's a bad business practice, and so, if you want to stay in business, don't poison people, and that's the lesson here, and so that's how I see it, and I believe, in Puerto Rico, it might be somewhat the same thing that is happening, because a lot of the food poisoning, the stuff that you get for food poisoning, like the vomiting and the diarrhea and stuff like that, is the same symptoms you get for being poisoned by ciguatera.

JOSEPH LUCZKOVICH: Can I respond? I think that he's absolute right, and food poisoning versus ciguatoxin poisoning is a big issue. If the fish are handled poorly, and they're not kept cold, on ice, then you could have a buildup of histamines in the tissues, and that has been documented to cause similar symptoms, and so I totally agree, and it's important to know the history, and, of course, fishermen should be encouraged to use refrigeration at all steps of storage, and we want to test the ballyhoo and other fish that have been identified in this survey of the traditional ecological knowledge, using our mouse cell bioassay, which is the definitive test.

It takes a long time, and we haven't tested those ballyhoo yet, but we intend to, and so I think he's right, the questioner, and I think ballyhoo may or may not -- Still the jury is out, but it is mentioned, and ciguatoxin often gets confused with food poisoning.

MIGUEL DEL POZO: I just wanted to stress that those fish that tested positive from what we are calling a hotspot, those fish were a special request, and those are fish that, like Tony Blanchard was saying, that the fishers avoid. I had to place a special request for the fishers to bring those specimens back to shore, and so I agree that the fishers know the species that are and the places that are more prone to it, and they just don't commercialize them.

MARCUS HANKE: Miguel Rolon, and then we have to finish the presentation.

MIGUEL ROLON: Just to Miguel and Joe, thank you very much for the

presentation and the update. We will have the conference that Dr. Alida Ortiz mentioned, and so I hope that, between here and July 20, you will have more information, and we will invite you to participate as speakers.

At that conference -- We will have two. One is the status of the fisheries of the U.S. Caribbean, and the second part will be chemicals in the seafood, and the reason for that is that you have to be careful, and I am talking about the council members now, everybody that is in the room, that you don't go running like Chicken Little and saying the sky is falling because they found one fish with ciguatera.

We did that already several years ago, and the entire west coast of Puerto Rico fishery was closed for months, and the reason for that is that there was a lot of misinformation and everything, but we also had the -- You already have that in your review, the marine fisheries review, that was published by us and National Marine Fisheries Service.

At that time, we collected all the information regarding ciguatera, and we would like to do the same thing now, but about all the information that we have regarding food poisoning and histamine poisoning, scombrotoxin poison, and any other poison that you have around here, but we don't want to call it "poison". We call it "chemicals in the seafood".

This is an open invitation, Miguel and colleagues, and I hope that you can make it. If you cannot make it in person, I am sure that we are going to have equipment like this, so that you can give a presentation, and, again, the week of the Monday the 20th through Friday, and that's when we are shooting for having this meeting, and I hope that you can attend.

MIGUEL DEL POZO: Thank you, Miguel.

JOSEPH LUCZKOVICH: I think we would like to go. I heard that earlier announced, and that's a great conference for us, and we should have many more fish tested by then, and so we should have a better handle on this, and we won't -- We're not going to try to make a big deal about this. We know ciguatera has been around for a long time, and it is a problem, however, but I think better surveillance is what we need and not hysteria about it.

MARCUS HANKE: Well, thank you very much, and I would like to make a little space on the agenda for -- I would like to introduce participation from the Department of State. Deidre, if you can address the council, please.

DEPARTMENT OF STATE COMMENTS

DEIDRE WARNER-KRAMER: Thank you. I just wanted to take a few minutes before we wrapped up here, and I didn't have any formal presentations this time around, but I thought I would at least offer a few notes on some international things that are happening that might be of interest to the council in the coming year, and we'll find ways to make sure that we get you more details as they come forward.

The first is related to WECAFC, and I know you got the report at the August meeting of the commission meeting in July, which was really constructive, and there's a lot of really interesting and exciting work happening in WECAFC now to really step up what it's doing to help coordinate on an advisory basis on a number of key issues, and, of course, the council is a key partner in a number of the working group meetings, including two that are happening next week, queen conch and spawning aggregations.

One of the other things that is happening there is something that I reported to the council on last December, which is this reorientation process and the agreement of all the WECAFC members to start a process to look at how WECAFC might either evolve its whole self into being a regional fisheries management organization that can help develop binding conservation and management measures at an international level or at least have some part of its mission doing that.

The work on that is about to get going, and I don't know if I was cursed or blessed to now be Chair of WECAFC, and so I'll be in charge of that, and the first step is going to be kind of a virtual correspondence process, where all of the WECAFC members, as well as a number of NGOs, several society organizations, stakeholder groups, will be invited to provide some information on good models that they have seen for multi-lateral fisheries management, whether it's existing regional fisheries management organizations, whether it's sub-regional bodies, like the Foreign Fisheries Agency in the Pacific, things like that.

Certainly, from the U.S. perspective, we will be gathering up some input, and we definitely have heard the message loud and clear from the councils about the importance of making sure that the fisheries resources that the U.S. cares about from the wider Caribbean are covered somehow, and we know that the agreement that the members had was for sure we're talking about areas beyond national jurisdiction, on the high-seas, but there is also openness to having whatever this binding process would be to cover

straddling stocks and shared transboundary resources or the kind of coastal pelagics or highly-migratory stuff that ICCAT doesn't cover already.

We'll be gathering up some information on that, but, also, we'll be looking to get some input from all of the U.S. stakeholders, including through the council, and so keep your eyes out for maybe a letter or something from me with some input on that.

The other thing to flag is, every two years, the FAO Committee on Fisheries meets, and that meeting is -- It's a COFI year next year, and COFI will be meeting again in July, and, as always, we will take a representative of the councils on our delegation to that meeting. This year, Jessica McCawley from the South Atlantic Council will be the council representative, but there are going to be a whole lot of things under discussion at COFI that could be of interest.

COFI is the body, of course, where all of the sort of global standards, sometimes even binding international agreements, are worked out, and a lot of that tends to then filter down, both into what we do on a regional and sub-regional and national basis, but the agenda is still being finalized.

It's going to include things related to climate change, and especially fisheries adaptation and the effect of climate change on fisheries, and there is a full set of discussions underway about small-scale fisheries, and, in fact, next year is the International Year of Artisanal Fisheries and Aquaculture, and so there will be some special things really focusing on small-scale fisheries, as well as work related to IUU fishing issues, including potentially building stronger measures internationally on issues related to transshipment and access agreements and foreign vessels that are fishing in coastal countries waters.

As that agenda comes together, which it should be finalized I think at the beginning of the year, we'll make sure that we share it with the council, so there's opportunity to get feedback.

I don't expect myself to be able to be here at the April meeting, but I am hoping that one of my NOAA International Fisheries colleagues might be here, and that will be a great time to get some feedback on both of those issues, and so I'm happy to take any questions at this time, but mostly, like I said, I wanted to share that there is a number of big things happening at an international level next year, where for sure we're going to be very interested in making sure we get the right kind of input from everybody, and especially the Caribbean, where all these issues

are so inherently international. Thanks.

MARCOS HANKE: Any questions? No? Well, I want to say thank you to Deidre for including the Caribbean, and we have been historically been involved with the Caribbean-wide movements and relationships with our neighbors, and you have been very effective and good to the Caribbean Council in using this platform to try to produce something positive to the region, and we really appreciate it, and thank you very much for everything you do for us and for the resource. We will go for a break now. Thank you very much. Ten minutes.

(Whereupon, a brief recess was taken.)

MARCOS HANKE: Let's take your seats and restart the meeting, please. We are going to go now to the Enforcement Issues. Puerto Rico DNER.

ENFORCEMENT ISSUES
PUERTO RICO DNER

DAMARIS DELGADO: With regards to interventions of the Rangers, there have been no interventions from September to November. However, during this time, we have spent time coordinating workshops to Rangers, and you learned from Helena Antoun about efforts to provide workshops to them with regard to fishing regulations in a more permanent, continuing education mode.

Besides that, our biologist, Grisel and Yamitza Rodriguez, who are here with this, they have been providing workshops to the Rangers with regard to highly migratory species. We received and we acknowledged that we have received some educational materials from NOAA about highly migratory species, and so we have been sharing this information with the Rangers, and we already have provided the workshops to the Rangers in the Saba area, which encompasses Saba, Humacao, Vieques, and Culebra.

Also, they held a workshop in Arecibo, and another one in Ponce, and they will continue providing these workshops to the Rangers and providing the materials to them.

Once those workshops are finalized, we will be sharing this information with the public and try to educate the people about what's going on with the highly migratory species subject, and so that's pretty much the information that I have, and Grisel and Yamitza are here, and, if you are interested, they could give you a little bit more information about the initiative with the workshops and the Rangers.

They have provided, in the past, workshops to the Rangers regarding the identification of the species, fish species, and these things -- I know the fishers are very interested in strengthening the knowledge of the Rangers on certain things about fisheries, and we discussed this in our council meeting in St. Croix, and so we are working on that subject.

MARCOS HANKE: Thank you, Damaris. The next item is USVI DPNR.

USVI DPNR

JEAN-PIERRE ORIOL: Thank you, Mr. Chair, and so I'm going to speak just as an overview, and then I can turn it over, for any more specifics, to Director Forbes. As an overview, the U.S. Virgin Islands does continue to experience some capacity issues with respect to its enforcement branch. At this time, right now, we have a significantly low number of enforcement officers, and so we're limited primarily to doing the inspections of the individual fishers at the sale points themselves.

We are working and strategizing ways to increase our capacity with respect to recruitment and bringing in additional officers, but, at this time right now, it has proven to be very difficult, and we have a number of people that are bypassing our enforcement agency for other enforcement agencies within the U.S. Virgin Islands, but, for the specifics on the fisheries right now, I will turn it over to Director Forbes to provide some information.

MARCOS HANKE: Thank you.

HOWARD FORBES: The Department of Planning and Natural Resources Division of Environmental Enforcement goal is to provide comprehensive territorial-wide boating education and safety education for both commercial and recreational fishers in the territory and a more effective law enforcement program, which allows us to better serve the Virgin Islands and its boating and fishing community.

In following with these goals, the division has taken a series of steps this year. In December of 2018, the division hired an Environmental Outreach Coordinator, and the coordinator has provided to the division technical guidance and support for the development and enhancement of our outreach and education program throughout the Virgin Islands. The coordinator has also developed plans to expand cooperation with federal and state governmental agencies, non-profit groups, private businesses, and the residents of the U.S. Virgin Islands.

In May of 2019, we implemented Project Safety. Project Safety is an initiative that the division, in partnership with the United States Coast Guard, has taken to assist all commercial and recreational fishers in the territory to become compliant with proper safety equipment on their vessels.

The division will continue its daily patrols, but, at a minimum of once per quarter, an officer will perform a random extra check of all fish landed and all safety items on the vessel. If a vessel is found not in compliance, the division will allow the boaters twenty-four hours to become compliant.

The Division of Environmental Enforcement has developed a social media page on the Facebook platform to bring public awareness to several different communities in the Virgin Islands, and some of these communities include the recreational and commercial boating communities, the fishing community, and the everyday residents of the Virgin Islands.

The page shares information from several sources, such as the CFMC, DPNR, local and federal boating agencies, and from the NOAA Fisheries office. The page currently has 445 followers, with some post interaction with over 1,300 people in the territory. The division will expand their social media platform for Fiscal Year 2020 to reach a wider audience and continue to spread the word of boating safety and fishing updates.

Highlights from enforcement actions through the territory in this quarter, dockside fisheries inspections are fifty-nine, fishing gear inspections is eight, fishing license inspections is thirty, fishing license helper inspections is fifteen, written warning issued is twenty, and fishing citations issued is three.

In summary, we are proud to say that, this year, the division has a bigger presence in the community, not only with our safety checks and Facebook page, but also with our safety events that occurred in May in both St. Croix and St. Thomas, with partnership with the United States Coast Guard, the Virgin Islands Police Department, and other divisions of the department.

The division will continue to increase its outreach and education, not only to the boating community, but also to the fishing community. This concludes my quarterly report for the U.S. Virgin Islands.

MARCOS HANKE: Thank you, Howard. Now we have -- If there is no questions, we have the U.S. Coast Guard Report and Montes.

U.S. COAST GUARD

JEREMY MONTES: Good afternoon. I have got a report that encompasses the months of October and November. During those two months, fifteen boardings were noted in the U.S. Caribbean waters, which is a drastic increase, which is more than likely just data reporting and understanding better what the folks are doing out there, but there's been an increased amount of effort to conduct boardings at-sea.

Two notable violations were found during that timeframe. The first was in the month of October, and one of our cutters detected a recreational vessel that was both anchored and fishing within the Hind Bank Marine Conservation Area, and they were boarded, and, in the process of boarding, the operator of the vessel overtly cut his line, to make it look like he wasn't actually fishing, and he tried to hide his actions.

Unfortunately, with this case, I don't think the cutter's crew that was going to go check him out was expecting this to be a fisheries violation case, and so they weren't able to collect enough evidence and documentation for the case to pursue penalties on the person, but it was something that was noted, and then I responded to leadership down here by reminding them what the requirements are for preparation for missions and what the case documentation looks like, and also that they need to be patrolling here more frequently, because, if a guy in broad daylight is anchored and fishing, the two prohibitions inside of the conservation area, obviously there is probably a history of violations, and so we'll continue to patrol Hind Bank and the other closed areas in the region.

The second case is off of Puerto Rico. Another one of our cutters boarded another recreational vessel that was found with out-of-season and closed reef fish, and, also, it had exceeded the bag limit, the aggregate limit, for their catch, and so they had both illegal and too much catch onboard, and they were cited for that, and, luckily, in that case, they were able to have enough case documentation that we'll be pushing the case package up to NOAA here in the very near future to take care of.

On the training front, I am looking forward to working with DNER and making sure that, with the Ranger training, that we participate in that as well, and, also, I wanted to go on the record with thanking Marcos and the rest of the members that assisted with the recent Coast Guard training that we held for specifically the species identification and being able to have something to touch

and smell for the folks out there, and so thank you. That concludes my report.

MARCOS HANKE: Thank you very much, and this council has a vision that this is our responsibility to support you guys on the job that you guys do. Thank you. We have the next item is National Marine Fisheries Service/NOAA Enforcement Report.

NMFS/NOAA

MANNY ANTONARAS: Good afternoon, everybody. My name is Manny Antonaras from the NOAA Office of Law Enforcement, and present as well is Miguel Borges, Special Agent for Puerto Rico and the USVI. I've got a brief update for the council, to include a couple of enforcement actions that were issued during this quarter, as well as some training and outreach events that were conducted.

Before we go on to the enforcement actions, I wanted to provide an update on staffing. During the past I think three meetings, we've talked about staffing, and it's come up quite a bit with the Caribbean Council since Special Agent Lynn Rios retired, and, as you already know, Miguel Borges has been active in Puerto Rico and the USVI, and he's pretty much complete with all his training, and he is now working in AOR.

As of the last meeting, we had several vacancies that we were in the process of filling in the Southeast Division, which include officer positions for Charleston, South Carolina, and so, in Charleston, we hired an officer who has already reported, and we have a vacancy in Cape Canaveral, Florida. For that position, a selection has been made, and it's working its way through the HR process.

In St. Petersburg, Florida, we also had an enforcement officer vacancy, which has since been filled, and Miami has also been selected, and that position is also pending, and the big news for the council is that the St. Thomas position, as of last meeting, was still vacant, and it currently is, but we've made a selection for the St. Thomas enforcement officer, and that name is also working its way through the HR process.

I don't have a timeline on when they will report, and so, as of right now, we're waiting on a tentative job offer to be issued from HR, and, if and when that candidate accepts that offer, they will begin their field training.

Then, as far as the Caribbean goes, we have one special agent, and we previously had two officers that were slated for Puerto Rico,

and one of those two officers was moved to St. Thomas, and so the remaining officer will be filled in Puerto Rico during the next round of hires, when funding becomes available.

As far as case updates for Puerto Rico and the USVI, during this quarter, the agent in Puerto Rico, Special Agent Borges, along with Coast Guard, conducted an LMR training, and that was in San Juan, and it was a four-day training, and it was put on by SRFTC, the South Atlantic Fisheries Training Center, and Special Agent Borges was present as well, and he provided training on case package preparation and an overview of NOAA regulations, and he talked a little bit about fishing trends in the area.

We had an enforcement officer that was detailed out here for a couple of weeks, and, during that time, he and Special Agent Borges conducted a joint patrol with CBP Air and Marine on the west coast of Puerto Rico. During that patrol, they made two stops on commercial vessels, fishing near the Bajo de Sico area, and there was no violations detected, although they did use the opportunity for outreach and education.

Again, during this detail, the officer and agent did a joint patrol in St. Thomas, with CBP Air and Marine, and no violations were detected during that patrol. However, they did meet with the U.S. Parks Service Ranger, Chief Ranger, and, during that time, they discussed some opportunities for collaborative efforts in the future for St. Thomas and St. John.

We had a couple of cases this quarter that were concluded, and one of them was -- Both were actually referrals from the U.S. Coast Guard. The first one here I will talk about was an interdiction made by the Coast Guard in Bajo de Sico, and Special Agent Borges was assigned that case, and, upon completion, issued an enforcement action to the operator in that case.

The second case was an older case that was finalized during this quarter, another closed area, and you can see there -- I believe the boarding occurred less than half-a-mile inside the closed area, and, in that case, it was also reviewed, and OLE issued an action for that case as well.

Just a couple more updates here. Many of you have probably seen, on social media, that there was a turtle that was washed up on the beach with a cinderblock tied to it. That case was referred to our office, and it’s still open. It’s an open investigation.

We did have our officer and agent, along with CBP, conduct an import exam on shipping containers. After completion of that,

there was no violations detected, but I believe it was three containers that they examined. Then there were a couple, more than a couple, HMS trainings that were provided to DNER officers during this quarter, and those were done in conjunction with Special Agent Borges and DNER Biologists Yamitza and Grisel, and I want to thank you for your participation in that. I understand those were very well received.

The first one was in November, in Arecibo, and the second one was in December, in the Ponce Field Office, and it's my understanding that there is a third planned for next week, in Aguadilla. There are additional trainings scheduled for the southwest areas of Puerto Rico, and, at this time, they are focusing on HMS regulations. It's my understanding that they are going to expand the scope of those trainings in the future, to cover other species of fish.

The last thing I have here is just a slide on our violation hotline that we've had for several years, but, just as a reminder, if there are any folks that would like to report violations, you can continue to do so via the local agent. You can contact Miguel, either on a break, or, if you want to ask him for his email address, or you can always contact the NOAA Enforcement hotline, and it's a toll-free number, and it's 24/7, and it's a call center that takes the complaint, and, once it's received, it's essentially dispatched to the local agent or officer, and that's a toll-free number, and it's (800)853-1964. That concludes the presentation, if there are any questions.

MARCOS HANKE: Any questions? Thank you for your report. Do we have another MREP meeting?

GRACIELA GARCIA-MOLINER: Actually, in terms of time, Vanessa is going to give you the report.

MREP MEETING

VANESSA RAMIREZ: Thank you all for being here. I am going to present the MREP Puerto Rico. The last one was in August, just after our meeting in St. Croix, and so most of us that were there had to run from St. Croix to La Parguera, and it was a great experience, and, practically, I am going to give a summary of the MREP.

This is the new steering committee, and we just had the meeting this Monday on Ponce Plaza, and we are part of the last committee, and we have new members, also. This was the group that participated in August.

For the MREP, it was a very special group, first, because it's the first time that MREP has a lot of applications, and, this time, they had eighty-eight applications, and so thanks also to Wilson and Christina that made a big effort in giving the promotion of the event and going up behind the fishermen and asking them and helping them also to complete the application by the internet.

In there also, we can see that we have, for the first time, five generations of fishermen, and so it's very, very difficult to get together, since people that have been fishing before the last -- So people that started fishing at sixty, or sixty-five, and then we have the new generation of fishermen that are active right now and the next one, and so they are practically recreational now, teenagers, from thirteen and fourteen and fifteen years, and then they are going to be the next generation of the recreational and commercial fishermen.

This is part of the workshop that we made. As you see, the guy with the blue shirt, that's Miguel, and he's going to be the next chairman of the council, and, in that part, we were just making them part of the things that we do in here, and so it's practically -- There were someone presenting, and Miguel was just with our chairman, but he was doing the paper, just to be able to see how we feel when we are in here, and the good thing is, the first day, Miguel didn't even talk. He was shy, and he didn't talk. The last day, he took the table and said he was the chairman.

Also, it's very important that we continue supporting this kind of workshop, because, as I say, the fishermen during the time -- We know that, for a long time, we lost that communication between fishermen and agencies, and this kind of workshop practically gives us the opportunity to start again that communication, and I think it's the first time that I go to a meeting where they don't fight together.

We have recreational, and we have the agencies, and we have enforcement, and we have commercial fishermen, and they were all together just explaining the experience and talking with each one and being friends from different sides of Puerto Rico, and so it's a really great experience.

For the next thing that we have, we want to, in 2020, make also the next one, and it's going to be in August, and we are planning to make one also for St. Croix and St. Thomas, and that's in the plan, and we still are working on the dates. From what they say, it's going to be probably May in St. Croix and St. Thomas, and, if it's not possible for May, then we want to bring some people from

St. Croix and St. Thomas to the August MREP and then plan one for 2021 for the islands, also.

GRACIELA GARCIA-MOLINER: We also had the opportunity of having a number of students that came onboard for the MREP, and so a lot of networking was done between the students who need a project for their master's or PhD thesis and the fishers that were at the meeting. We had quite a number of new faces that came onboard, a lot of divers that were participating, and so that connection, in terms of capacity building, was worthwhile during that meeting.

VANESSA RAMIREZ: Yes, and there is another one, and the last one was the practice that they made at the lab, the first day, and, for the fishermen, practically, this was the number-one activity that they liked. Because they are always fishing, they know the fish, and they know that they need to tell the numbers, the statistics, and that sometimes we are asking for samples, but they never know what it's for, and so, when they go to the lab, and thanks to Noemi and all the students that were there and practiced with them, and they have this experience from the other side of the story.

After that, most of them, especially the commercial fishermen that always are like I don't want to support that, or I don't want to give samples, now they are just asking what do you need, and now we are coordinating with the University of South Carolina also, and with the DNRA, to start working with that.

Also, from that MREP, we have five people that want to be part of the DAP and want to continue their education process, to in a couple of years be here as council members, or part of the council. Thank you.

MARCOS HANKE: Thank you for your report, and I want to mention that the leadership that Vanessa brings to the table between the fishermen and the group is excellent, and, as well, Miguel Cedeño and all the participants.

It's truly an event, to see how you have adverse groups that you think will not get along, like you said, and they're leaving the room with one voice and creating bridges and friendships and common ground. Thank you very much, Vanessa, and thank you to everybody that worked on MREP.

We are now on Other Business, and we didn't have anything for that, but we have the Public Comment. Is there anybody in the public that would like to make a comment? Hearing nobody on the public that wants to make a comment, Miguel.

NEXT MEETINGS

MIGUEL ROLON: Thank you, Mr. Chairman. For the 2020, the tentative dates for the next meetings, we will have an April 28 and 29, we have August 11 and 12, and we have December of 2020, 8 and 9.

Remember that, in between, we will have meetings of the DAPs and the Outreach and Education -- All the panels and committees that we have, and we also have a meeting, a meeting that Graciela and Dr. Alida Ortiz mentioned, the one in July, the week of the 20th, and we are going to include all the DAP Chairs and all the council members in that meeting, and you will be participating with members of the public, or we will be required to have representation from any of you, because those two days, the first two days, 20 and 21, will be for the status of the U.S. Caribbean fisheries.

What we are going to do is to copy the agenda that was put together a long time ago and incorporate the new developments of the U.S. Caribbean, and certainly, between that date and this date, there is a lot that happened, and, during those times, we didn't have fishermen sitting around the table, and now we have Julian, and we have Nelson and Toby and Eddie Schuster that are the links between the fisher groups and the council.

In addition, we have members of the scientific community attending council meetings and participating more and more, and so we want to update all of that during those two days, and, following those two days, we will have also the 20, 21, 22, and 23, the meeting about chemistry of seafood, and, there, we would like to have participation of the council members.

We have a steering committee, and the steering committee is Graciela, Alida, and myself. We are the core, but we would like to have the DAP Chairs attending, and there is a lot that we want to ask you, and the Chairman of the SSC, and so that will be in February some time, and we will let you know. In January, we will send a note. Alida and Graciela and I will send you a note with a tentative agenda.

Remember that these meetings are subject to the availability of especially Dr. Roy Crabtree. He has to attend two other council meetings, plus a bunch of other stuff, and so, tentatively, the April meeting probably could change.

The one in April could be in San Juan, and, actually, Tony and I were talking about maybe seeing if we can have it in St. Thomas,

and the reason for that is that high season in St. Croix is -- The hotel is $300 to $400 per day, and so we will have it in Puerto Rico, and the one in August we will have it tentatively in St. Croix, and the one in St. Thomas probably could change, and so the next one in April will be in Puerto Rico, followed by the one in August in St. Croix. The July 2020 whatever meetings will happen in San Juan, Puerto Rico.

MARCOS HANKE: Julian wants to make a comment, but go ahead.

MIGUEL ROLON: In August, we were talking the 11th and 12th.

MARCOS HANKE: Go ahead, Julian.

JULIAN MAGRAS: Just for a little note, Miguel, the April 28 and 29, that's the week of the St. Thomas carnival.

MIGUEL ROLON: Yes, I know, but we are not going to meet there.

JULIAN MAGRAS: I know, but --

MIGUEL ROLON: Did you want to go to the carnival?

JULIAN MAGRAS: No, but that's when the fishers work the hardest, and so I'm just putting it out there, and not only that, but government officials and everybody participate in that time, and so it's just my comment, and I'm just putting it out there.

MIGUEL ROLON: No, but that's a valid comment, because we did that one time, and we even had a meeting on Good Friday, and they called us all kinds of names, and so the other week that we have available is the 20th to the 24th. Roy, is that week good for you so far, April 20th to 24th?

ROY CRABTREE: (Dr. Crabtree's comment is not audible on the recording.)

JOHN-PIERRE ORIOL: Miguel, just to piggyback on what Julian was saying, the other thing that we have to realize is that, on the St. Thomas side, the limited availability of rooms, and so, if you come during carnival week, you would have to be basically calling those hotels that are open like now, to try and block in any kind of room block.

MIGUEL ROLON: In the case of St. Thomas, we don't have a place for a meeting, unless -- We discussed that we would find some place, but, if we have the meeting on St. Thomas, that will be the December of 2020, and so, by that time, if the hotel opens, we

will meet there, but, if not Diana and I can go and scout and knock on the doors of everybody and see if we can secure a place that can accommodate a council meeting.

That place has to be also suitable for internet and reachable by fishers and the general public, and so probably Julian and Ruth and your office can help us secure that place, and, yes, you're right. If we want to meet in St. Thomas, we have to start making the reservations by January, and they do not accept reservations more than twelve months in advance, but, in January, we will start knocking on doors and asking people to have the meeting there, and so can we say, Mr. Chairman, that the meeting in April will be the 21st to the 22nd?

MARCOS HANKE: Yes. It will be the 21st to the 22nd of April of 2020.

MIGUEL ROLON: That will be in Puerto Rico.

MARCOS HANKE: Yes, in Puerto Rico.

DAMARIS DELGADO: That is the Earth Day Week.

MIGUEL ROLON: Bring a tree, and we can plant it.

DAMARIS DELGADO: At DNER, we always celebrate -- We do activities during that week.

MARCOS HANKE: Tony, last word.

TONY IAROCCI: Thank you. Vanessa, I really appreciate you stepping up to this MREP thing, and I just want to thank and applaud the efforts of Alexa Dayton, who is no longer with MREP, and she was the one who we reached out to years ago, when she was up in Maine, to try to get that whole thing down here, and it was her who brought this here and worked tirelessly to bring this together and everything, and I just want to reach out to her and tell her the council and the fishermen really -- It really helped us, and she did a great job, and we thank you.

MARCOS HANKE: Just a follow-up on that. I want to remind everybody that Helena Antoun was instrumental in the first MREPs, and she started the fire, and I want to say thank you to Helena for that, too. I don't think we have anything else, and I just want to say thank you to everybody, and we had a very long agenda, and thank you for allowing me to cut you off and make the business as sharp as possible, and thank you for the very fruitful discussion, and thank you to all. Have safe travels and everybody welcome to

Puerto Rico.

MIGUEL ROLON: And Merry Christmas.

MARCOS HANKE: Merry Christmas to all. Happy Holidays. Feliz Navidad.

(Whereupon, the meeting adjourned on December 11, 2019.)

- - -