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Caribbean Fishery Management Council
Scientific and Statistical Committee
Hybrid Meeting

August 1, 2022

Call to order and Roll call

RICHARD APPELDOORN: All right let's get started. Thank you all for being here. This is the SSC meeting of the Caribbean Council. Today is August 1st and it is 10:09 AM. Before we get started with anything else, let's do a roll call really quick. We'll do the roll call first. We have a new group that [inaudible] will be doing the transcripts. And so we need to constantly remind them who we are as they will not recognize our voices as in the past. So Walter, would you go ahead and start us?

WALTER KEITHLY: Walter Keithley, SSC member.

VANCE VICENTE: Vance Vicente, SSC member.

MICHELLE SCHÄRER-UMPIERRE: Good morning, Michelle Schärer, SSC.

JORGE R. GARCÍA-SAIS: Reni García, SSC.

ADYAN RIOS: Adyan Rios, Southeast Fishery Science Center, Caribbean Fisheries branch.

RICHARD APPELDOORN: Rich Appeldoorn, SSC Chair.

JUAN J. CRUZ MOTTA: JJ Cruz, SSC member.

TODD GEDAMKE: Todd Gedamke, SSC member.

SHANNON CASS-CALAY: Shannon Calay, Southeast Fishery Science Center.

NANCIE CUMMINGS: Nancie Cummings, Southeast Fishery Science Center.

KEVIN MCCARTHY: Kevin McCarthy, Southeast Fishery Science Center.

GRACIELA GARCÍA-MOLINER: Graciela García-Moliner, Council staff.

LIAJAY RIVERA GARCÍA: Liajay Rivera García, Council staff. Buenos Dias.

IRIS N. OLIVERAS: Iris Oliveras, Council Staff.

ALIDA ORTIZ SOTOMAYOR: Alida Ortiz, OEAP Chair.

MARCOS HANKE: Marcos Hanke, CFMC Chair.

NELSON CRESPO: Good morning, everyone. Nelson Crespo, DAP Chair, Puerto Rico.

JULIAN MAGRAS: Good morning, everyone. Julian Magras, DAP Chair of Saint Thomas/Saint John.

RICHARD APPELDOORN: Okay, and who do we have on the line?

LIAJAY RIVERA GARCÍA: Okay, online, we have Cristina Olán. Carlos, we don't have a last name for Carlos. Doug Gregory. Erik Williams. Helena Antoun. Iris Oliveras. Jason Cope. Jesus Rivera Hernandez. Virginia Shervette. Julie Neer. Kathleen Howington. María López-Mercer. Nancie Cummings. Nicole Greaux. Rachel Eckley. Sarah Stephenson. Sennai Habtes. Stephanie Martinez Rivera and Tarsila Seara. That is all.

RICHARD APPELDOORN: Thank you. Graciela, do you have some announcements on how we're going to proceed?

GRACIELA GARCÍA-MOLINER: Okay, so as you mentioned, Richard, please, this is Graciela, state your name. We only need your first name. That should be enough. We do have a new company working with us on the transcription. So that includes anyone who's listening to us and who will be participating via our- via Zoom. So please speak up loudly. And we do have two sets of recordings going on right now.

You do have internet through the courtyard conference, so 7910404. We have a new feature that Liajay has set up for us, so anyone who wants to scanMe, you'll go directly to the federal register notice. We're working on going directly to the meeting, but that's to come. Masks are not mandatory but highly recommended because of the increase in COVID positive cases here in Puerto Rico.

For all the SSC members, you have all of the presentations in your Google Drive so you will have access to that. And everything is being deposited there for you to look at. And, Richard, we have your presentation as part of the- instead of the verbatim transcriptions. So if you want to do that, that's also in the Google Drive. And I need to make some changes to the agenda, but I'll wait for you to tell me to do that.

RICHARD APPELDOORN: Were you suggesting that of the- that in the verbal transcriptions, I'm giving a presentation?

GRACIELA GARCÍA-MOLINER: The same one that you gave to the Council. So that's the one that we sent to everyone. If you need to do that—

RICHARD APPELDOORN: Well, that's a different thing. I mean, the verbal transcriptions are the verbal transcriptions which we have. No, I didn't think so. Okay. So but we will eventually have.

GRACIELA GARCÍA-MOLINER: We are working on that, yes.

Adoption of agenda

RICHARD APPELDOORN: Okay. I don't think there's a need for me to cover what we did the last time. I think we can skip that and so we will go to the adoption of the agenda. And you had a recommendation there.

GRACIELA GARCÍA-MOLINER: So a number of things have come up. Kevin will be giving us a brief presentation prior to the SEDAR 80 presentation by Nancie Cummings. You will have to also look at the terms of references for SEDAR 84. We've sent you a copy of that via email and it's in your Google Drive. But we will do the SEDAR 84 after you're done with SEDAR 80. So complete the tasks of SEDAR 80, please, and then after that- so that can be either later today, depending on how long the SEDAR 80 conversation takes or first thing tomorrow morning. We put the SEDAR stock assessment matrix first thing in the morning so that if there is anything from today that needs to be discussed in terms of the future species to be looked at during SEDAR, that's in there. And from the Science Center, we have two updates. And that would be Stephanie Martinez which will be— Kevin?

KEVIN MCCARTHY: Stephanie's giving. Sorry. This is Kevin. So Stephanie's going to talk through the- where we are with the matrix. And then for our presentation I think it's in the afternoon. Rachel is going to give an update. So those will both be relatively brief.

GRACIELA GARCÍA-MOLINER: Probably Sarah Stephenson will be covering the AM triggered for Spiny Lobster in the afternoon. No, in the morning of tomorrow. And those are the updates that I have. I don't have anything else. I don't know if anyone else has anything to add to the agenda, but that's—

RICHARD APPELDOORN: Go ahead, Todd.

TODD GEDAMKE: This is Todd. Richard, as you know I've requested for the SSC. We have a new member on board. Erik, I don't know if you're there, but it's good to virtually know that I'm in a meeting with you. Erik has just come on to the SSC, and I think it's a good time to re re-up a question I've had put in front of our Chair, Miguel, and the Council staff. And that is do we have a charter for the SSC? Do we have a charge? Do we have an outline of how our operating procedures work? I have made this request, at last count, eight times of the Chair, Council, and the director. And of those eight times, not one response has been made. So I'm wondering if Erik, as a new member, does- or, or JJ, others, did you have orientation material? Do you have anything that was given to you to explain what is going on in the SSC? I'm seeing no, so there's apparently nothing going on there. So I was wondering if someone from the staff could respond to that as part of other business, and even directly, let's use Erik's appointment as an example to how does someone get on the SSC, and that's my question. I've posted it numerous times via email and I would love for someone from staff to address that. Thank you.

RICHARD APPELDOORN: Thank you, Todd. So we will add that to other business. Graciela?

GRACIELA GARCÍA-MOLINER: So in addition to that, at the next Council meeting in August, it had been included, a discussion on specifically the CFMC advisory body's membership and code of conduct and conflict of interest. So in response to working towards what we need for the SSC and the other advisory panels, that's already included in the next meeting agenda for the Council.

RICHARD APPELDOORN: Okay, I think we still want to discuss this just to make sure that there is agreement between what is being asked and what you're saying is going to be discussed at the Council, and you know, what kinds of things we're thinking. I think I'm the one who's responded to you on that, and so I think there are ways to move forward on that and we can discuss those and make recommendations to the Council.

TODD GEDAMKE: I heard it getting bumped to the next meeting. Will someone address that at this meeting?

RICHARD APPELDOORN: No, no, it'll be under the other business category at this meeting for the Council's next meeting.

TODD GEDAMKE: Very good. Thank you very much, Richard.

GRACIELA GARCÍA-MOLINER: Right. Graciela here, so it will be added too. It will be addressed here and you can bring your comments to the Council, and the Council has already included that as part of the agenda for the August meeting.

TODD GEDAMKE: Gracias.

RICHARD APPELDOORN: So with that, any other comments or changes to the agenda? Sorry, this is Rich. Go ahead, Walter.

WALTER KEITHLY: Yes, Mr. Chairman, this is Walter. You may want to delete the approval for verbatim transcriptions since we do not have those.

RICHARD APPELDOORN: Yes, I agree with that. Yeah, and I would point out just from- that's something that Walter can do from where he's sitting but I can't read that agenda. It's just a little too small. Unless I study it really hard, I can make out the fuzziness, but I mean, I have a copy on my computer but-

GRACIELA GARCÍA-MOLINER: Do you need to see it more or-

RICHARD APPELDOORN: I can read that, yeah, but we should go back to like page one.

Okay, so without further changes I believe we're going to go to Kevin now. So if your presentation is ready for the screen, take it away.

SEDAR 80 Queen Triggerfish Assessments (Puerto Rico, St. Thomas/St. John, St. Croix)—SEFSC

KEVIN MCCARTHY: Thank you. Good morning, everyone. This is Kevin. I just wanted to go over a couple of slides before Nancie starts with her presentation for your review of the SEDAR 80 Queen Triggerfish stock assessment for Puerto Rico.

Next slide, please.

So just a couple of notes to bear in mind, and I think as time goes on, you're going to start to see, as a group, a lot of stock assessment, right? So every time we do an assessment, every SEDAR is going to be three stock assessments. One per island. So, at some point during this meeting, we'll have to decide how we and when we present the results for the two Virgin Island stock assessments for Queen Triggerfish. So we'll go through Puerto Rico today and then we'll talk about when we- you know, how and when we can present the Virgin Island ones. But one of the things I want

to kind of stress is, right now, as you all know, except for Spiny Lobster, everything is managed based on a time series of landings and expert opinion. You know, where up above or below, the mean landings for that time period. So we think what we're doing now with these stock assessments, data-limited though they are, is a step forward in management advice. So just something to think about as you review this assessment, that we think it's a solid assessment and we think it's an advancement. So just putting that out there for your consideration.

So next slide, please.

This is also a good opportunity to start to develop sort of standard practices. How long is it going to take us to review one of these things, right? So every time we do it, again, there'll be three. So as we move forward, thinking about agendas and that sort of thing for this group. When we come in, as we will, at, I think, well, we're shooting for your November-December meeting to have an updated Spiny Lobster. There are going to be three stock assessments there, so we've got to think about what, you know, what kind of time is needed in this meeting to get through all of that. So we'll learn a lot about that today. You've seen the Spiny Lobster assessment. It's an update. We won't change anything, so that may go a little quicker, perhaps than a new stock assessment. But nevertheless, it takes a while to get through the material as you'll see today, so just as we're going through the process today, I think it's going to be a good learning experience for all of us what kind of time and what kind of, you know, how we fit it into future agendas.

Next slide.

One of the things I want to put out there, because often times during these reviews, new ideas come up. Maybe you'd want to request some additional analyses, and we certainly welcome that, but I want you all to be aware of the limitations that we're going to place on our assessment biologists, in that we don't want to rush through anything. If it's simple, if we've got time to review it again tomorrow, great, we'll do it. We'll do it while we're here, but if it's a significant change or a significant amount of analyses, I'd rather arrange for a future date to review that. We already have to meet again for the Virgin Islands work because we don't want to rush. First of all, we don't- I don't want Nancie working all night, and it's really easy when you're trying and rush through something - these are very complicated analyses - to make an error when you're rushing. So I'd rather not do that, but if it's simple, you know, straightforward stuff that we can get done while we're here, we certainly welcome those. And we welcome

any sort of suggestion you have for additional analyses. We can certainly talk about it and again, if it's complicated, we'll put it forward at a future meeting.

Next slide.

So you'll see, as Nancie goes through, her presentation, there are sort of sections. You know, there'll be a data section, and then there'll be a modeling section. At the end of each of those, I think it's the best time for questions just for efficiency's sake. So she'll go through the data.

Next slide.

You'll see a slide that's colored, you know, that's this blue color. That'll be the break, and I think that's the best time for questions. If we stop and question each slide as we go, I think it's going to take forever to get through the presentation. So my recommendation is hold questions until the break in each section. Unless there's something that, you know, doesn't make sense and you need clarification in order to move forward. But I think it'd be best if we just went in, in stages otherwise, we can- being on this committee for a while, I know how we can go down a rabbit hole sometimes. So, I think that'll be the most efficient way forward. And that's all I really had and then I'm happy to turn it over to Nancie.

RICHARD APPELDOORN: All right, switch. Thank you, Kevin. I have a comment on your comments. I think you're right to emphasize that we're starting what we hope will be a new era. This is assessment number two, if you would count species so Spiny Lobsters and now, Queen Trigger. For the people on the committee who had been here a while, we have gone through the whole process of learning how to do these, not just with the data-poor methods but also the management strategy evaluations, etcetera. And so we're still learning those things. So, on the one hand, while, yes, we want to get an idea of how long this will take I think as we go through this those review periods should hopefully, become a little shorter because we will build up familiarity with the methodologies and things like that. But at the moment, like I said, this is number two. We're not going to be there quite yet, and I assume there will be lots of questions. Well, there'll be lots of breaks. I think that's my first question other than, as you said, if there's something that is not clear that would keep us from moving forward, we can ask those questions at that time. So, I'm really looking forward to this. As I said, it's a new era, and hopefully, this will put us on a much more solid footing as we're thinking about what's the status of our stocks are overall. And each new species

gives us a different window into that. It's not, you know, looking at this by species by species, but obviously, the fishery doesn't operate that way, and we're going to learn a lot through this. So thank you, Kevin. And, Nancie, if you're ready. Well, wait. Todd has a question?

TODD GEDAMKE: Yeah, just before we get into the PowerPoint presentation, just a request. Could I get a copy of the control file and the that file so I can look through that?

NANCIE CUMMINGS: The slide. Yes, you can.

GRACIELA GARCÍA-MOLINER: Wait, Nancie, you need to use the microphone. But do you want a copy of the presentation, Todd?

TODD GEDAMKE: Excuse me?

GRACIELA GARCÍA-MOLINER: Do you want a copy of the presentation?

TODD GEDAMKE: Shannon's got me under control. Thank you.

GRACIELA GARCÍA-MOLINER: It's on your Google Drive, it should be.

NANCIE CUMMINGS: Right. The presentation is in the Google Drive. I think it's a PDF. So, Graciela, it's going to be in front of me. In front of me. This is a new process. I think they're trying a system that-

GRACIELA GARCÍA-MOLINER: So Nancie's going to be our Guinea pig with a new feature that just came up in Zoom. So let's see if that works, so she should-

LIAJAY RIVERA GARCÍA: Nancie, are you connected to the web browser or [inaudible]?

NANCIE CUMMINGS: We can't have the platform on our machines. There's no one employee.

LIAJAY RIVERA GARCÍA: So I do not think-

NANCIE CUMMINGS: So then I have to present from my machine?

LIAJAY RIVERA GARCÍA: So maybe if you want to share your screen [inaudible]?

NANCIE CUMMINGS: No, I would rather be able to- I don't want to say next slide.

LIAJAY RIVERA GARCÍA: So I'll send you [inaudible].

NANCIE CUMMINGS: That actually works better because then I don't have to [crane?] my neck that way. Ahem, excuse me. So apologies. Nancie Cummings here, and I'll be presenting in a moment as soon as they give me control.

LIAJAY RIVERA GARCÍA: So you should be able to present-

NANCIE CUMMINGS: Okay. Let's see what happens. This is- okay, so are you seeing my screen right now? Let me move this slide. Yep, that's not working yet. Let me just check and see if she's made me- I'll go to the participants' window. I'm a co-host, so I should be able to share to screen shortly.

GRACIELA GARCÍA-MOLINER: Here you go.

NANCIE CUMMINGS: I'm going to put a different slide. So apologies for those on the line. We'll be beginning in a moment as soon as we get a couple of IT things worked out.

LIAJAY RIVERA GARCÍA: Okay, so do we have it on full screen? The PowerPoint?

NANCIE CUMMINGS: I can but I just want to move it to-

GRACIELA GARCÍA-MOLINER: [inaudible]. Go back.

NANCIE CUMMINGS: No, I did. I did. I did. New share?

LIAJAY RIVERA GARCÍA: Yeah.

NANCIE CUMMINGS: It should be right here under tasks. Yeah. Okay, so let's see.

LIAJAY RIVERA GARCÍA: Yep, there you go.

NANCIE CUMMINGS: Okay, great. Okay. Thanks, so let me just get rid of this over here. Oh. Okay. So, I'm in presentation mode. So, again, Nancie Cummings, Southeast Fishery Science Center. I'm part of the assessment group, and I just want to- this presentation is put together by myself and also with input from Adyan Rios and Shannon and Kevin. I apologize. So, this stock assessment under the SEDAR process (Southeast Data Assessment and Review process)- for Queen Triggerfish and it's for the island of Puerto Rico. I want to acknowledge the input particularly of Adyan Rios and Shannon Calay and Kevin McCarthy and all the data providers throughout the process.

So very quickly, an outline of what you'll be hearing will be a very brief overview of SEDAR 80, inputs regarding the data, the base model development, fits and results, diagnostics used to evaluate the base model. And those diagnostics included two types of examinations that we'll go into more depth in terms of what they are and what they mean. That's a general analysis and some profiles that we've done examining influence of various data inputs on model results. And then we'll talk about benchmarks, the stocks status as determined from this preliminary base- this base model. And then finally, we'll go into the initial setups for the projections, meaning projecting what the catch limits would be the harvest limits- the harvest amounts or quantities, the setting for those projections and the results. And then finally, in the process, we'll be talking about- there will be- at the end of the assessment session, there will be a slight discussion on the research- on the discussion of the analysis as well as uncertainties and so forth. And then finally, we'll finish with research recommendations. On the right-hand side of this slide, I'm just giving you the title, sort of a visual of the title page of the assessment.

In terms of an overview. The SEDAR 80, it's an operational assessment, and it was carried out through the process- The new development of the operational assessments under the SEDAR process includes in this new set a series of working group- excuse me, topical working groups. And for each assessment that is determined to be by SEDAR and the Council's and the Southeast Fishery Center, determine to be an operational assessment under the new process. You can have up to X number of topical working groups. They would be discussing- there would be sessions that are going to be set up to discuss certain important elements and processes regarding the species and the assessment. And for this assessment, we had three. We had a life history topical working group, indices of abundance, relative abundance indices, as well as fishing behavior and retention and selectivity workshop. Also, the later workshop, topical working group, dealt with economic- some discussions of economic concerns.

The work that was conducted for SEDAR 80 has been described in 11 working papers. There are an additional 18 reference documents. These are published outside of the SEDAR process. Most of them were. There may be some that were also previous reports that were done for SEDAR 30 and also for SEDAR 46. So, those are a collection of documents, and they're a reference in our stock assessment report. And I've also given you the link to those.

Just as a very, very quick overview, this is a slide- I'll try to set up each slide for you so that you will know what the slides

are about. So, on the top right panel is what we refer to as a Kobe, Kobe matrix visual graphic. So basically, it's giving you, on the X-axis, what the biomass per- in the year of the data point to the biomass- a ratio of the biomass at SPR30 is. And on the Y-axis is the fishing mortality rate in a year. Each of these is a general year, and you'll see we've identified the 2019 point. This would be the fishing mortality in 2019 over the fishing mortality that's estimated to be at SPR30. And this is just to give you a sense of the stock status in 2019 is. And the same, similarly, the colors mean something regarding the status, but we can go into those later in the results.

The bottom graphic is a similar slide, but each of these is just put into,- you actually just have the points here, and so we started the Puerto Rico model starts in 1983 and so the ending point is 2019. And so you see that the sort of green line or the F-trajectory. We refer to this as a trajectory because it's being trajected over time of the fishing mortality to the metric, the benchmark metric. And similarly, the biomass in a year, for example, 1983 to the biomass ratio at SPR30.

The approved SEDAR 80 Queen Triggerfish base model, was developed with data up through 2019. Where practical, the base model used the same data sets as SEDAR 30 and SEDAR 46 and we updated those time series as necessary. For example, we updated the catch time series. And also, we updated and reviewed extensively the length compositions. The SEDAR 80 assessment, it also included new data not available for the SEDAR 30 and 46 evaluations, and it had additional model parameterizations that impacted- obviously, that impacted the assessment results. For example, the new data. There was a new index not previously available to us, and that was developed from the National Coral Reef Monitoring Program. That's referred to in the model- in the- in this talk as the NCRMP, National Coral Reef Monitoring Program visual census survey index. We also included a newly developed index from the commercial fishery representing the trap fleet. You'll hear later that we also tried to develop one for the dive fleet. We also incorporated the modeling characterization of the size composition that was referred to in the stock synthesis model as generalized size composition modeling. Because we had different size of the bends that was necessary to characterize the RV- the visual census data. They were different than the composition from the trap data.

The base model found that Puerto Rico Queen Triggerfish stock was experiencing moderate levels of exploitation at the beginning of the time series, as shown. As you can visualize on this this lower graphic here. The base model found that Puerto Rico Queen Triggerfish was not undergoing overfishing because it is below

1.0. That ratio that I showed you before, I talked to you about, and that it's not overfished in 2019. In other words, the ratio of the biomass, estimated biomass from the model, to the biomass at the 30% SPR metric is greater than 1. However of note is that increases in fishing mortality have been observed since 2017, nearing the level of overfishing. And the SSB has decreased substantially in the last six years. So very quickly, without going too far into results, just to let you know that over the past three years, we've seen increases in F as estimated by the model and declines in stock biomass.

And I just want to refer you to the SEDAR 80 the terms of reference. You have those in the project folder, if you would go to your SEDAR 30- I mean, excuse me, SEDAR 80 the website and you go to the project schedule, then you will see these terms of reference. Very quickly, we're not here to discuss these, but just to say that we have five, developed a model reviewed the data inputs, and provide tables and figures of the various inputs, landings, catches, length/age compositions, life history metrics. Where possible, consider potential for improvements in the model in terms of updating the life history characteristics, updating the life history characteristics- characterized selectivity by gear where possible. Consider development of one or more index of abundance. And it was very explicitly laid out that we were asked to develop a length composition, I would say, set a time series from the coral reef monitoring visual survey data.

Finally, under four and five, this gets more into the outputs of the model, and that is we want to know what the status is given the benchmarks that we've been asked to look at. And then where possible develop projections, and that's- that was referred sometime- often as the overfishing limit projections; calculations that are required under the Magnuson-Stevens Act.

So please if I talk too fast, let me know. Just kind of give me a heads up or something. You can wave at me or something. I do have a tendency to talk fast. And also, because I realize and I respect that the SSC is under time guidelines.

So the stock management and the boundary in terms of what's being used for this assessment, this evaluation. For management purposes, there are separate annual catch limits and accountability measures that are maintained for these three separate U.S. Caribbean stocks. That's Puerto Rico, Saint Thomas, and Saint Croix. As you know the Puerto Rico and the Saint Thomas area, they're on the same one geological platform, but we do have different management regulations. Stock demographics were summarized by Saillant et al and also Shervette and Rivera-

Hernandez indicating there is high connectivity across the region with no isolation detected for fish sampled from waters throughout the U.S. Caribbean. And that was through a dissertation from Antoni 2017. I just want to really quickly; this is a plot and I think it's from the island-based fisheries management plans. These are the jurisdictional boundaries of- so we can see the Puerto Rico and Saint Thomas regions are on the same platform. And Saint Croix is on a neighboring platform and it's separated by a very large trench.

So to give you a little bit more history or background rather on the stock range and in terms of the structure, not just the management. We know we have three separate management jurisdictions, but in terms of this population structure, the connectivity, and the phylogeography of- I'm not sure what this is here. Oh yes, of two Balistidae with high potential for larval dispersal. Queen Triggerfish is documented homogenous distribution of genetic variance across the range. The sampled areas, this is from the study of that- from Antoni. The sampled areas are indicated in the squares here in blue, and we realized it was determined rather through the study that there's high connectivity across the region. The recruitment is very dependent on larval dispersal from basically 100, you know, kilometers through thousands of kilometers. The U.S. Caribbean, there's no isolation that was detected. It's a single homogenous population. And then of course, again, this information was from the dissertation study of Antoni.

The assessment history. In previous years, there is the lack of sufficient information to conduct traditional stock assessments. It required managers to implement various procedures such as scalars of landings, such as what's done through the only reliable catch series, Berkson in 2011, and then Carruthers et al., 2014. And then in terms of management strategy evaluation that we did for Saint Thomas on Queen Trigger. The SEDAR 80 stock evaluation, we went a different angle. We went out, specifically trying to use a more,- an integrated stock assessment model which would allow us to employ, - I don't want to say attitude - utilizing as much of the data as we could in a very rigorous and complicated statistical evaluation. And so that was in the sense that we wanted to get away from just using landings histories. We wanted to be able to- very quickly here, I'll finish this. But we wanted to be able to use not just the landings data but the other components that were available to us. We've gone a few more years since these earlier assessments, and so we wanted to say, "Let's try to use the composition data. Let's try to go back and relook at those commercial reports and see if we can identify an appropriate abundance index and then use the new data."

And so just quickly this table shows you that for the stock, Puerto Rico, Saint Thomas, or Saint Croix, the previous methods that had been used- and they were the main length estimators and then the reference to those. And so, you know, these are the- under methods, these refer to a statistical model that was used. The models that have been used to develop the annual catch limits were based on just catches, so these were certainly improvements as well. Okay, so this is just a quick place to take- so hopefully, you've gotten a sense of where we are and where we're going.

So the next segment is going to be just an overview of the data-

RICHARD APPELDOORN: The method- sorry.

NANCIE CUMMINGS: Yes, sir?

RICHARD APPELDOORN: Just a couple of questions- and maybe this isn't- because I know this was kind of an introductory thing, but this is where the question popped out. So you're using a lot of different data now in addition to what catch trends were like we've done in the past. But the catch trends were also integral to the analysis, so I am asking whether, for Puerto Rico, the 2005 data were used or not. Because that's been a problematic issue with us. I think because we feel the correction factor for that year was biased coming out of the East Coast which started the whole annual thing.

NANCIE CUMMINGS: Right, thank you, Rich. Yeah, thank you very much. And yes, the 2000 data were- 2005 were used. And we took the approach to using the decision that was made for Spiny Lobster in terms of the expansion factor that was applied. So that was- that would have been a- I believe that was a revised expansion factor.

RICHARD APPELDOORN: The other question I had was, again, you gave it as an introductory thing so we'll come back to it, but you described F as being moderate in 1983. The graph showed it was pretty darn high. So, the term moderate, that kind of threw me there.

NANCIE CUMMINGS: Thank you. Yeah, so before we want to go into results at this point, but, yeah. And that's- I don't want to say it's semantics, but, yes, it's high. So we can talk about that.

RICHARD APPELDOORN: Well, yeah, I guess there's an absolute scale, a relevant scale in that-

NANCIE CUMMINGS: And this is a ratio, yeah. That's not the actual level of that which you see.

RICHARD APPELDOORN: No, no, I understand it's a ratio. It's a ratio, you know, amount above whatever

NANCIE CUMMINGS: Right. Yes.

RICHARD APPELDOORN: Nelson.

NANCIE CUMMINGS: But just let me- may I- if I may finish.

RICHARD APPELDOORN: Okay, go ahead.

NANCIE CUMMINGS: Thank you. That's an excellent- it is a ratio. We'll get into those absolute scales, but I would say that we probably want to go through the data and show- get to see where we got- how we got there.

RICHARD APPELDOORN: Yeah, just so- just a reminder to address that when you get to that point in the presentation.

NANCIE CUMMINGS: Yes.

RICHARD APPELDOORN: Okay, Nelson, you had a question?

NELSON CRESPO: Okay. Thank you, Mr. Chair. I'm curious because Queen Triggerfish is not a high-demand species in Puerto Rico like snapper or grouper or lobster. How do you see a high mortality with the lack of port samplers we have and the lot amount of this species. I know everybody knows that many fishermen also are moving to do other type of fishing.

NANCIE CUMMINGS: So, thank you, Nelson, for that question. Regarding, "do we see a high mortality?" could you repeat your question? And then I have-

NELSON CRESPO: Yeah, how do you observe high mortality if the Queen Triggerfish is not a high-demand species? We don't have as many port samplers that can, you know, corroborate the landings. In the island, we only have two port samplers for the whole islands.

NANCIE CUMMINGS: Thank you. Thank you very much. So I'm going to very quickly without getting into all of the- we don't- it's nice to get into the results before we've actually gotten to the data because that's- we can move through real quick. But we had that really interesting topical working group webinar instead of- it

was that three-day webinar, and it was per island. And we heard repeatedly in there what you just told us, that Queen Triggerfish it's not a targeted fish. And after discussions that we had- I had one on one with samplers and also the previous director, DNER in Puerto Rico. You catch Queen Triggerfish whenever you go lobster fishing, you know. I mean, it's an indirect by-catch. So, to answer your question, the way we get the mortality rate is through the calculations of using of the components that we took into the model to catch data. The removals are a reflection of exploitation, and so, yes, we realized that they're not targeted. And we've also realized that we have some issues and uncertainty in the catch. So those levels of exploitation have some uncertainty in them. And so, it's all the components added together, the catches, i.e., the landings, the indices of abundance, and the size compositions. If like in the ordinary landings' calculations of removals, if you're just using landings, then they're going to give you what your assumed ideas or relative F, measures of exploitation is. In this case, the relative measures of exploitation are coming from a combined analysis of all these parts. So, in a moment, you'll see, as we go through, you're going to see the different parts: the landings, the catches, the compositions, and the indices. So you'll be able to see for yourself, in some level, some idea, and get a sense of the uncertainty.

May I continue?

RICHARD APPELDOORN: One more question from Julian and then from Todd. And since this is actually, you know, she just kind of presented a summary, we will be going through a lot of the details later in the day. So, keep that in mind when you ask your questions. Go ahead, Julian.

JULIAN MAGRAS: Yes, thank you, Mr. Chair. Nancie, can we go back to the slide that was up before with the graph? I think it was the first slide. Yes. So I, you know, I know this is Puerto Rico, but it always draws my attention when I see we use the word, overfishing. It might be nearing the level- we're going down to the last- we're going down to the last paragraph. From 2017, you've seen an increase in the harvest of what's being landed. And, you know, our markets are market-driven fisheries. Puerto Rico don't really sell all [white?]. You know, I would like to see where it sits in the top species caught in Puerto Rico. A little market is being created where there is a certain size of fish, especially in Puerto Rico, that is being landed that can be sold. So we're different in Saint Thomas/Saint John shelf. So it just draws my attention when we start to use the word, overfishing, or maybe headed that way because due to the fact that it wasn't harvested before and now a market is being created for it. We need to really,

really look at, maybe these numbers are tending to go up because there's a market being created and it's becoming a demand before we go into the area of overfishing. And then, in another slide, you had some of the studies that were done in the U.S.V.I. and Saint Croix. And just a note, there is a study out there also on the Queen Triggerfish that was done by the Saint Thomas Fisherman's Association under Dr. Olsen, where we collected a lot of the different sizes of that species. So I just want to put it on the record, so maybe you can pull that information up also. Thank you.

NANCIE CUMMINGS: Thank you very much, and when we move to Saint Thomas and Saint Croix in the few months or whatever, then that information will come in, but thank you. And I would like to thank you for giving us that new information regarding the new market that may be developing in Puerto Rico.

RICHARD APPELDOORN: Todd?

TODD GEDAMKE: Mine's a broad-based question on this. I think Kevin said that you take- you guys are taking a different tact on this and just with going through a statistical catch-and-age model and going through a different route on it. The word, complicated, was used two or three times by both of you. Can you explain the decision to go more complicated given the fact that the data are basically as uncertain and complicated as they were in previous years?

NANCIE CUMMINGS: Okay, so thank you. These are great questions, by the way. And I'm thrilled to get them. I think Adyan, she's- but I have- I have some responses that I think my division chief, also she maybe has some input she wants to make. And I apologize if that wasn't true but basically, the terms of reference have asked us- and I'll just go back to that. We got our marching orders, as my mother would say, from our terms of reference. And, you know, we were asked to use the old- as much of the data previously had been used and updated. Obviously, there's sometimes corrections to data. Sometimes, there's whole replacements of data sets or where are edits to the length data. But we were asked to consider a new set of data, the NCRMP data. And I apologize, I don't want to use acronyms if that's not okay with you guys, but we were asked to use that set of information. It had not been considered before, and we were also asked, where possible, to consider obviously the updates to the life history but also can we try to parameterize selectivity models? So that, in and of itself, says try to use some more compli- not necessarily- I don't want to say complicated, but they are more complicated. To try to use additional analysis. It doesn't mean that we would not go back at some point and also look at the mean length estimator again. Any-

RICHARD APPELDOORN: Yeah. I think, Shannon, has a comment.

SHANNON CASS-CALAY: Yes, thanks. So we have tried a number of different approaches over the years with Caribbean stock assessments, and, you know, the difficulty always was how do you most easily get the catch advice from these different approaches. And so years ago, we worked very closely with Jason Cope and a few other folks who are involved in the data limited stock assessment literature, and came upon a recommendation to try this with a simple SS configuration. And essentially, this configuration of stock assessment is quite data limited. Essentially, it uses length composition data, catch, and indices of abundance, and information about the life history. So we'll review all of that data here shortly. The advantages of this approach is that we can directly estimate selectivity of the fisheries. If there were changes in management, we could directly time-block SS so that we could accommodate those changes in management. And it produces the OFL and ABC that, through your control rule, you can use to create the catch recommendations. So it's by no means the only approach. There may be other approaches considered in the future. There may be other management scenarios in the future that don't require a catch advice, for example. That require something like rate-based approaches, which opens up another suite of tools. And so this is simply our most convenient way to produce the catch advice needed for the tiered controlled rule, but it's not the only approach that could be taken.

NANCIE CUMMINGS: So, thank, thank you, Shannon. So I'll just say one more thing, and that is, it's an integrated model. So it does allow us- it's very time-consuming, but it also allows us to use all the data in combination and the processes are interrelated. And it also allows us to incorporate uncertainty in terms of, you know, in the modeling. Thank you, Rich.

RICHARD APPELDOORN: Yeah, Todd?

TODD GEDAMKE: Okay, so just, just to make sure I get it. In terms of reference, they told you to use this, and you get the outputs that you need. My question was what are the data as- are there data differences that shows this, or is that simply a procedural? Because the data, you know, and Shannon, I mean, this basically reduces it to a mean length estimator for all practical purposes. For anyone that is going to be confused by black box, this is basically a mean length estimator with tuning based on these other factors in there. So you got catch, CPUE, life history. These are basically all of the things that were evaluated in all the previous SEDARs. And CPUE, for example, in one case was neglected or negated during one of the SEDARs because we weren't able to get it and do

it. So I'm just in- this is my fear and what I feel my job here is to pick through SS for those that are not familiar with the black box on this, and make sure that, that these pieces are looked at. So were there- I mean, you got the NCRMP, which we'll talk about later. But your catch, CPUE, life history, are these- I mean, Shervette has done a lot. So my question just is in the other data components, was there more confidence in the catch series? Was there more confidence in the CPUE? Was there a new technique or something, or were these put in and we'll go look at those? Thanks.

NANCIE CUMMINGS: I would just say that, at this point, that- again, these are great, stimulating questions. And I sort of just like to get to show you that. I mean, I'd love to just show you that, and then it's up to the experts on the SSC, the know- you guys have the knowledge and to do this, to let us show you what we've looked at and done and what has changed and what has not changed, and then you make your judgment. If that's sort of a, a fair- to me, that's a fair way. It's a good path forward.

TODD GEDAMKE: My question still stands, Nancie. Are you going to answer it or are we going to- or should we just move on?

NANCIE CUMMINGS: I think I have answered it, but Shannon?

SHANNON CASS-CALAY: Well, we will be going through each of these data inputs and, you know, specifically and you can look at the data inputs and the way that they were used. If they were asking about whether- are you- well, are you asking about- what is specifically your question, Todd?

TODD GEDAMKE: My question was what differences in the data put you down this complicated, complicated, complicated, repeated road?

SHANNON CASS-CALAY: So largely, there were new source of information that became available. You know, we have an index of abundance now that was not available in the past. In fact, we have two. We have length, length frequency information from Virginia's study that, you know, was not available to us, not in the quantity, certainly, in previous assessments. So there is a big improvement in the data availability. And the stock synthesis framework allows us to use all of that data, and also new information that becomes available in the future can be directly integrated into the stock synthesis. It is not very- it's an extremely simple configuration of stock synthesis that does boil down, in this case, largely much- very similar to what would be used in a mean length estimator. The advantage here is the direct ability for us to make projections and get the management advice and the catch recommendations

required under Magnuson, which was extremely difficult to do at the data-limited approached we had used in the past. Because we had presented several to this SSC, and although they were accepted as stock assessments, they were not directly used to create the management advice. The management advice remained catch-only based on the recent landings history alone. So it's procedural largely to move to stock synthesis. Like any catch-and-age model, it's going to be a little bit more complicated and a little bit more of a black box, but I can assure you that as stock synthesis models go, this one is configured very simply. And we can look at each one of the assumptions we've made. And Nancie has- you know, will look at those conversations in her presentation.

GRACIELA GARCÍA-MOLINER: Mr. Chair, please say your name. We have a new group transcribing. They don't know you yet, so say your name. Second, you have a comment by Jason and I think that Erik raised his hand. So all SSC members can unmute themselves, but please raise your hand and I'll let you know by doing this. Richard, look at me. That you have someone online.

RICHARD APPELDOORN: Okay. We had comments online from Jason and Erik, you're saying? And then after that, we'll be running. Okay.

GRACIELA GARCÍA-MOLINER: Yes.

LIAJAY RIVERA GARCÍA: Jason's comment is this approach also makes explicit assumptions being made which aids in exploring uncertainty.

GRACIELA GARCÍA-MOLINER: And you have Erik on the line too. I think he wants to-

LIAJAY RIVERA GARCÍA: And Erik Williams has a raised hands. Erik?

GRACIELA GARCÍA-MOLINER: He can unmute himself.

ERIK H. WILLIAMS: Yeah, can you- can you guys hear me?

RICHARD APPELDOORN: Yes.

ERIK H. WILLIAMS: Okay, yeah. I was just you know. Hello all. new member here. glad to be aboard and glad to be a part of this. And I realize you guys are getting the first taste of an integrated assessment in this region. And I appreciate all the concern and comments about what, you know, what to do with these kinds of models. I would say - and I think Jason just said it - you know, one of the ways in which the stock assessment world is headed is to use these integrated assessment models even when you have very

simplistic data. And as Todd mentioned, you know, this almost does boil down to a mean length estimator in some ways. But the advantage, I think, as Jason was sending towards, is that it forces you to be more explicit about all the hidden assumptions that normally go into, say, something like a mean length estimator. And that's the power of these integrated assessment models. It seems to be the trend in modeling now, to do that, to be more explicit. And then it forces you to explore all those things that you were fixing, and you're setting, and you're making assumptions about. You can then explore those to see if your assumptions are correct or what impact they have. So, I think you know, this is a shift in direction that the whole assessment world is headed frankly.

You know, another example, just to give an example, is production models, which you use just catch and index information. It used to be used a lot, but now most folks are steering away from those and actually putting catch and index information into these integrated assessment models, and then being explicit about selectivity assumptions and age-specific, natural mortality assumptions and all that sort of stuff then that normally would have just been hidden in the background. So, I just wanted to add that, and apologies for contributing to the conversation further, right? I would ask- I don't know. I mean, this is up to the Chair, but, you know, maybe we should let the presentation go on before we start [laughter]- we haven't even gotten to the data section yet, and I know Kevin McCarthy had asked that we, you know, try to hold questions off at breaks, but I understand everybody's anxious to comment already. So anyways, thanks for letting me comment.

RICHARD APPELDOORN: Okay, in light of Erik's comment- Reni?

JORGE R. GARCÍA-SAIS: Yeah, hello. Well, just a few comments here regarding the, first, the fishery-independent data. And of course, me being an NCRMP fish surveyor myself for the last two years I'd like to say that NCRMP surveys, a lot of habitats which are not typical Queen Triggerfish habitats, you know. And then it doesn't survey habitats that are typical of Queen Triggerfish. For example, NCRMP has a depth limit of 30 meters, and very rarely do we actually go 30 meters. 99.9% of our dives are shallower than 30 meters. And then Queen Triggerfish has a lot of habitats that are below 30 meters down to 50 meters actually. Most of the reproductive population of Queen Triggerfish, we are observing it at depths that are deeper than 30 meters. On all these habitats, that's where they are- that's where the adult reproductive populations are typically found. Actually, I was surprised not to see our mesophotic monitoring surveys included here, and it's interesting because what I can recall of it, you know, which is several years ago, is that actually Queen Triggerfish was one of those species

that we found statistical data suggesting that it has increased in the intensity over time.

Regarding the fishery-independent data what I- after, you know, doing several studies, major studies that are used throughout methodological approach for surveying fish. I'm going to say that the very large Queen Triggerfish, it would be very hard for them to enter the traps because of their structure, of their depth relative to length. The full adult Queen Trigger it's hard for them to go into a trap. So I most think that many of those really big, 40 40-plus centimeter Triggerfishes are likely not being able to enter a fish trap. So if your fishery-dependent data is very heavily oriented towards or weighted on fish trapping, you wouldn't expect the larger Triggerfish to be found there in that kind of fishery. So those are my comments, you know. I haven't seen actual- you know, we'll probably go into the, you know, more detailed data analysis on this, but those are just my preliminary comments, you know, for you to have in mind. Thank you.

RICHARD APPELDOORN: Okay, thank you, Reni. Thank you, Reni, for those comments. Yes, we are going to get into that, and as Nancie has already said, there's a commercial trap index that's being developed, so I think we'll hear about that in depth. So let's get back to Nancie, and in that case, start looking at the analysis and the data.

NANCIE CUMMINGS: Thank you, Chair. I just want to say, thank you those, those two Erik and Jason, for their input. And I just want to reiterate one really important thing is it's not always just the convenience of being able to get, oh, your catch limit advice out, but it's just being able to integrate all these components, and then to explore, you know, different maybe sensitivities on those components that you may have more uncertainty on. So sort of now that we've gotten to the end, and we kind of go back to the beginning, and we're going to talk about just briefly, an overview of the data components. And I set you up there on the right-hand side, there's just a simple graphic and it's showing you the major components that were included: the catches, the abundance indices, and the size compositions. These are the primary elements that we're using in addition to the life history inputs and information that we've received from these topical working groups. Particularly, we have the fisher working groups which help inform us on some of those comments that- questions that you had Reni or comments really on the selectivity. So, we have the catches. On the bottom axis, you see the time series. The start year of this model is 1983, and the end year is 2019. So we had landings histories on from the commercial trap fleet and the dive fleet for these for all of these years. And we have abundance indices from

one fishery that was used in the base model. There were other fisheries that were examined but the final model used the trap fleet.

We have an abundance index that is a fishery-independent index from the NCRMP, National Coral Reef Monitoring Program, the fishery survey. And we had size composition data from the National Marine Fishery Service, Southeast Fishery Center, Trip Interview Program. That's the TIP samples that you've heard about many, many times, many years for many species, and for the trap fleet and also the dive fleet. I'll get into a little bit, in a moment, regarding the other- we had some other minor gears and how were those were put into the modeling framework. And then we had size compositions as well from the NCRMP program. These break down in 2001. So again, just very quickly here, what I've already said, we have fishery landings and indices from the trap fleet, recreational landings and discards. I'll show you where we put those. Commercial length compositions from the dive fleet and the trap fleet. We have one index from the one fishery-independent index. I'm not used before. We know where it operates and we'll hear a little more about that and its depth and that sort of thing later on also. This is just a very- this is an output from SS, and at a glance, it just gives you a way, a sense of knowing, for the primary data components that we're using in the model. What they were and where they're from. There's other ways to show this tabular- but this is a very quick, succinct illustration.

RICHARD APPELDOORN: Nancie, the size of the points is the amount of data available in each year, correct?

NANCIE CUMMINGS: Yes, sir. Yes. And I just want to know- I'm not going to talk about the exploitation history in Puerto Rico for this species, how far back it goes, but the time series of data that are available that had been computerized is 1983 forward. We understand- we have a sense that there's exploitation beginning before this 1983 point, but this is- that's the critical- that's the critical point here, is that data were not available prior to 1983. So to get you now more into the modeling framework of what- of the specifics, again, 1983 to 2019. I'm going to take more time. I've decided on my delivery of the data because I know that the model is not- is SS, stock synthesis, excuse me, is sort of a new element to you folks, and so I'm going to go into more detail. If I'm going into too much detail, please let me know.

We partitioned the data in the model in terms of fleets, the removals. Where is the exploitation coming from? And these are the commercial catches, the trap, and dive. The dive catches were available as were the trap from 1983 to 2019, and, and very

importantly, you'll see in a moment when I- when I show you a history of catch by year. You'll see that the dive fleet, the catches were- we've assumed that they were zero in 1982. That's the year before the start of the catch. In other words, we assume that there was no large-scale diving going on in terms of exploitation for this- we know it's not a directive fishery, but we're assuming that catches were almost zero in those early years. We have very good evidence from the landings history that shows that the trap fleet was catching in landing Queen Triggerfish before the start year.

The value for the- we refer to it in the stock synthesis as the equilibrium catch. It's not the stock is not in equilibrium but it's referred to that way in the model. It was calculated as a three-year average from 1983 to 1985, and that was the value used to set the exploitation level in 1982. There are some recreational catches. The Marine Recreational Information Program was ongoing, operating from 2000 to 2017 in Puerto Rico. The recreational catches were added to the trap component, and this was for a few reasons. First of all, I want to go back up here and talk about your commercial catches. There were some minor catches from other gears such as nets, seines. There's even a few bottom-line catches. Those were added to the trap fleet. Excuse me, I keep saying that but that's not true. They were purported- proportioned across the dive fleet and the trap fleet according to the annual distributions of each of those fleets. Recreational catches were added to the commercial trap component. The reason being there were mainly hook and line samples and they're length frequency distributions, and you'll see those in a moment. Those distributions were very almost near a little different, slightly different, but they are almost identical to the trap length frequencies, and you'll see that as well. The length compositions were from the commercial fisheries, the trap and dive. The recreational samples, they were very restricted temporally. Over 17 years, there were only 86 fish that were sampled, and they're very near in visual perspective to the trap fleet, and you'll see that. And then we have NCRMP visual sensor survey length compositions.

So take a moment here, especially for the modelers on the call, to let you know that the early years of the NCRMP sampling- or, excuse me, surveys. Those samples were- they were bend. They were identified in five-centimeter intervals. In the later years, when the NCRMP survey went from the belt transect to the stationary point transect method, those samples became a bit- were in two centimeters. In order to handle both the partition that was available in the trap fleet from the TIP samples, and the later sampling in the- in the stationary point sampling, we were able to use the feature- I never used it in SS, and it's referred to as

the generalized size composition method. And so, we were able to take into account the variable bending. And then we had indices of abundance. We've heard before, and we know we had- we tried to use the commercial indices back in SEDAR 46. And after- I don't think- well, at that point, obviously, we didn't have as much data. That was 2014, I think it was. Now, we have more information, and we also subjected the commercial data to more extensive and rigorous examinations, and you'll hear about that later. Then we also had the visual sensor survey, and that was an index. So, okay, so in terms of the recreational catches, just to give you a sense of how much there, there were and also a little bit more about where we put- they were replaced. Those catches were pretty minor up until maybe the more recent years, and there has been some increase in the recreational catch. However, the-

SHANNON CASS-CALAY: They are not seeing the slides that are behind you.

NANCIE CUMMINGS: Hmm, they're not?

SHANNON CASS-CALAY: They're not seeing that slide you're talking about.

NANCIE CUMMINGS: Oh, well that's- is there some- excuse me, on the phone, the slides don't seem to be moving. I'm supposed to be in control, so I'm going to talk to the IT folks.

LIAJAY RIVERA GARCÍA: Is it- are you sharing? Are you still sharing?

NANCIE CUMMINGS: I was but who knows what happened? Apologies, I think a couple of us lost the internet, so I'm going to- I was told that it was only the- okay, I'd like to know from- in- on the phone if everybody saw the data slide, the graphic with the data? So, to give, give us sort of a heads up on that. hmm, it's not letting me.

RICHARD APPELDOORN: All right, everybody, we're going to start up again. So, your attention to Nancie, please. Pay attention to her.

NANCIE CUMMINGS: [laughter] Okay, thank- I'm so sorry. I think the hotel internet kicked me off and I'm told that I'm in a situation that was non-failing, so. All right, I'm just going to go back to the overall structure of the data slide that- for the model. Now, the start year of the model is 1983 to- and the end year is 2019. It'll be referred to as the terminal year. You will hear that word, terminal year, frequently. And that the fleets that were used in the model were the trap and dive fleet. Dive

catches were available- and the trap catches were daily- available from 1983 forward. The catch for 1980- the start year- or the year before the start year was assumed to be zero, inferring that there is no exploitation going on for that fleet or very little exploitation in the early year. The trap fishery was not in- considered not to be at zero catch in the 1983 year. But the value for the catch in 1983, which is referred to, in the stock synthesis model, as the equilibrium catch. It was calculated as the three- year average. 1983 to 1985. The recreational catches are available from MRIP survey from 2000 to 2017. And they were actually- the survey terminated in 2017 during- it wasn't a full year. The recreational catches were added to the commercial trap component, and that support was borne through inspection of the visual for the length frequencies. And I think we have a mic open in the room somewhere.

The length compositions were from the trap and dive fleet. The recreational length samples are very temporally restricted. Of the 17 years, only 86 fish are sampled. I will show you those distributions of the samples shortly. The visual survey also has samples. There were differing procedures used to take those samples in the early years up until the- for the years where the survey were conducted under a belt transect method. The samples were in five-centimeter bends. The other samples we had available by one- centimeter bends. There were two centimeters that were used in the model, so we used a different method to incorporate those samples into the model, and you'll hear about that later. And then we had abundance indices. If you already heard, we have a trap index and we had an index from the visual census survey, an independent index. We explored the dive index but that was determined not to be useful for the model.

Recreational catches, as I said, this is a picture on the lower left of all the catches. This is the commercial mainly and all the- until 20- 2000 rather, when we have recreational catches coming in. So you see that the recreational component was very small compared to the total component, but there has been an increase in the estimate from the MRIP survey of recreational catch in these later years. Of course, those, the number of intercepts, is also very low, so there's high uncertainty in these catches.

I would just want to say that we do have some estimate of recreational discards, and they include fish released alive. We call them dead discards often after we apply a mortality rate. We use a 10% in the model. It was not applied here. We're just showing you that the amount of discards is extreme- is very low compared to the total catch. The 10% rate, can be considered a minimal estimate of mortality.

Okay, I'd like to move into the data, the life history section in terms of the review of the data. And I want to point out something that we've included in the presentation here on the material. And that is where we are talking about one of the terms of reference that we have considered it and also this is taking that into account. So, we've listed here the term of reference, two and three, and that is to update and improve the life history information. So, on the right-hand side, basically, three graphics showing you weighted length estimates from weight on the Y-axis and length in centimeters, fork length on the X-axis. Also, the length at age calculation. This information has been derived from the estimates of L-infinity, K, the growth factors, growth parameters, from the study of Shervette and Rivera-Hernandez. And also, the coefficient variation that was applied in the model on the old fish and the young fish. And finally, a visual of the natural mortality. We've opted to use in the model, the Lorenzen M, which is a vector. It's a function of M and age, and that into the model. So, we're using age-specific MS, and I've also given you what- the target M was the estimate from the honing it out fully recruited fish. That's 0.18, and that's telling you the SSC min and max. And I just want to point out that the max on the SSC is incorrect. It should actually be a higher value. I think these are actually showing to be the same here.

So, on the left-hand side of the panel, I'm giving you the data component, and this could be a comment or decision, but basically, it's new for U.S. Caribbean and replaces SEDAR 30 and 46 literature estimates. Those were from the literature. They were not from the region, so this is considered an improvement. It's coming from a very extensive study of Shervette and Rivera-Hernandez, and that information was used as fixed inputs into the model. And that results in this fit here of weight and length. And finally, the age and growth, and also the estimates were from the same study, the Rivera-Hernandez study. Natural mortality, again, I won't repeat this. It's the Lorenzen M age specific Lorenzen M estimated using the inputs, the growth inputs from Shervette/Rivera. The maximum age in the model is 23. It was scaled using the growth curve from Shervette/Rivera, and that will be working paper 07. And this is an incorrect statement here. There was no- at this point, there's been no sensitivity on L-infinity. We've had a lot of discussion, but we have not decided what to do. I just want to- in the model, the model outputs, I want to state that biomass is measured as female body weight, biomass. And the release mortality was 10% as I noted.

Oops, can I just do this? Okay, I've added this. There's a previous, I think, a previous PowerPoint was distributed. It did

not have this pictorial of the growth, the fit to the model. And so, we've added this to try to give you a better sense for the model fit. So, what we have here are the females age observations, and the male. And then we've added- the author added in some animals from the North Carolina, South Carolina. These are in the square, the black squares. So, what you see here is that for the model fit that we have from the Caribbean data basically, it goes through about 20- 23, I think it is. So, it's- and most of the data I would say are, you know, from around- they're less than 15 years of age. We do have a few 16s and so forth. I think I have another table that'll show you that a little better. But in this SS model, we're using the all-Caribbean data fit, the L-infinity- I'm sorry, we're using the all-Caribbean with the T-0 fixed. The T-0 fix comes from the male, the male model. And so, it's the 43 centimeters for length, L-Infinity. 0.15 for K and then 0.585 for T-0. So that's just to give you- it's a reasonably good fit for the data on that was available. And it also actually did have some fish at this younger age, which is- there was kind of- that's kind of that important because it assessed actually starts- you know, it assumes once you have the data that was input into the model it actually assumes a linear fit to get to that lower age, the size that [a min?] that is how we refer to that.

Okay. Continuing on with life history, the maturity. Again, updated through Shervette and Rivera. The first age that is assumed to be mature in the model is age one. The relationship is fixed in the SS model. In other words, we do not have a time-variant change in mortal- natural mortal- or maturity. The fecundity is equal to spawning by mass. Again, equal to the combined sexes, SSB, used for the base model. And just to note the concerns on regarding the life history- the main concern is the L-infinity and so possibly a sensitivity could be considered. The L-infinity is the average size of the oldest fish in the plus group, and that's in the growth model. And again, these pictorials. Okay, the implementation of growth in the stocks of SS model, it requires the five parameters. The length of the youngest age, and that I just have to say that the study did have a fair number of fish in the lower in the zeros. So I was able to inform that. Length at maximum age, it's essentially L-infinity. The max fish size was 43 centimeters. von Bertalanffy growth parameter is required by the model and some information on the variability of size, the youngest age. That CV was 0.18. And similarly, it was the same calculation for the maximum age. These parameters were taken from Shervette and Rivera, and that's in the working paper 07 that you have available to you.

The length compositions, I just want to note, we did go a little bit beyond what had been done in the SEDAR 30 assessment and that was- and the SEDAR 46. And that was the length composition data

were subjected to sort of a statistical analysis. We realized that there were- when you look at the TIP data, we do have some information- some observations, quite a few observations, that have both length and weight, so we actually went in. Adyan Rios was in charge of this analysis, and so we went in and looked at the length-weight observations and just- and tried to identify what were basically outliers or unreasonable estimates observations from the model- I mean from the data set. So, the model that was adapted was based on an approach that was used to filter out outliers for Atlantic bluefin tuna. This, you know, it's not that relevant that it's for bluefin tuna here. It's just to say that we used that method, and that's where it was developed. So, the second part of that method it involved identifying outliers across the TIP samples that did not have associated weight measurements. In other words, if you didn't have a paired observation and you still were concerned that you may have had some outliers in the TIP data then we wanted to be able to have a more robust procedure- more- something that's not subjective.

So the length larger than the maximum length in the data set, 50 centimeters, in 19- that's 19.7 inches, are smaller than the minimum length, 14.7 centimeters or 5.8 inches retained- of the retained length/weight pairs were removed. In other words, if they were outside those bands.

Okay, going to further into the data in commercial landings, again, I want to note that the trap data represented 58%- about 58.2% of the landings, and the dive, 25.2. So, these minor catches that I referred to earlier, were 16.6%. And so, some may think that's a fair amount of removals, not to really- to be able to assign to a fleet, but there were not sufficient sample to actually go out and try to develop a selectivity refunction for- or characterization of selectivity for those other fleets. And that would be the nets some, some the seines, and some of those minor gears. They are not minor in terms of the community contribution, but they are minor in terms of the species in this area. So they were distributed, as again, I noted that's- this is a mistake. It should be they were distributed into the trap and the dive fleets according to their annual proportions. A CV of 0.1 was assigned to the commercial dive and trap fleet, and that's basically to give us some uncertainty in the estimates of landings.

The commercial discards were assumed to be zero. And we did hear this morning, I believe it was from one of our, from Julian, regarding the- you know, there's basically nothing is removed- I mean, is discarded in the Caribbean, and I also- we had conversations with some of the port samplers, and that was the general feeling from those folks as well. And that information was

also captured in the - I want to say - the topical working group on fishers' behavior that was captured in that topical working group. As I noted before, the recreational catches were added to the commercial trap, and again, you'll see just shortly some support for that. The discards were added to the trap fleet also by applying a 10% discard mortality to the B fish, B2 fish. So, what this graph does is that it illustrates that we're referring to accomplishing, you know, reflecting term of reference two in terms of updating the data. And so, the trap fleet is in blue, and the dive fleet- the removals are in red. So although the landings from the dive fleet are not zero in 1983, they're about 1- about 1 and 1.5 tons at that point, so they're about, what? 3,000 pounds or so. So, we assumed that the model for the dive fleet, that the initial F was near zero, the exploitation for this fleet. And we see that very early on for the trap fleet, that that's not so good. That that's quite large, and then so it started large, and it went down. And then there was a lot of up and down in terms of the landings for Queen Triggerfish from the trap fleet. and then there was a very major significant decline here followed by, again, an increase and then several increases over the past few years. So, we don't want to start, as I said, getting into results again, but I just want to show that this slide and these conversations reflect to you that we used all removals. We distributed the other minor gears into these two fleets, and we also added the recreational. So, we've attempted to include all the removals, knowing that we do have uncertainty. These estimates of landings from the recreational- I mean, excuse me, the commercial dive and trap fleet, they do reflect the expansion factors.

RICHARD APPELDOORN: Nancie, a minor question. What are B2 fish right at the bottom?

NANCIE CUMMINGS: B2 fish are the discards.

RICHARD APPELDOORN: Oh, okay. Thank you.

NANCIE CUMMINGS: Thank you, and that is- I probably should have spelled that out here, so thank you for that. Okay, so get- again, to show you for the recreational length composition. Just I want to show you the scarcity of data. The data began with MRIP in Puerto Rico in 2000, and basically, you know, we're from one fish to 16 fish over these years, total. And very, very few fish were sampled. And what I've done here is just I've shown you, here are the MRIP size composition, the commercial trap fleet by itself, and then the add- the added- just the additive- not the additive, but each of them separately. So just to- here, for the purposes of stock synthesis and the length composition modeling, we've carried them size composition out to 70 centimeters in the in the model,

in the population. And then what we show you with the MRIP size composition is that the peak, or the mode I should say, is about 30 centimeters. We have a slightly smaller mode in the trap fleet which you would- it was not unexpected because this shoulder here below 22 centimeters is not being captured. We see a- it's not being captured in the hand, these are hook and line samples from MRIP, so you don't see- basically, we see a few fish right in here for the trap fleet. And so, the MRIP private samples - these are private mode, are not catching, at least, they're not being sampled these small fish. And likewise, we see a few larger fish, but these are representing one fish or two fish, so are not being- are not being caught in the trap fleet. And this is demonstrated, again reflected here again, in this composite where you see both of the sectors: the trap and the MRIP.

And again, you see this reflects that mode of about 30. And again over here, with the trap, it's mostly- it's about 26, I think it is. So we felt, as a team, that this was reasonable. That although we're not getting all these, these are about six fish, I think, that we're not getting those in the trap fleet. That this was well supported to add the MRIP samples to the trap samples. And the other thing I want to point out is we don't feel it would have been appropriate to put the to put the MRIP catches- the MRFSS catches, rather, recreational, into the dive fleet. Because we know that there was a more- what we want to call culling or there was more selection going on there.

So, I'd like to just quickly- or not quickly, go through the compositions, the length compositions. And this is a lot to take in and I realize this, but what it is just to set up the slides. It's each block is a panel for each panel of data starting 1983 to 1988, and then going back to the next years and ending in 2017. This is Puerto Rico. So basically, we know that the data goes through- basically go- that catch data goes through 2019, however, the samples only went- only went through 2017. And also, this is- on the bottom axis, on each of these sets of panels, you have the size of the distribution. So, this is the proportion of fish in each of these two-centimeter intervals. And going to a larger interval was not suggested for this set of data because the larger bending, the coarser the granularity is and the less information, content you would attempt to basically smear and [eat?] the signals in the data. So, this, again, is starting in 1983 and going through 2017. And I just want to point out, especially in some years, there were very low sample sizes. So, in the case here the beginning, 40 fish, these are the adjusted sample sizes. It's going down to as low as five and six. So the data-

TODD GEDAMKE: Can you read the last five years, the sample sizes?

NANCIE CUMMINGS: Sorry, yes. Going- these are four. So 36 in 2015. These are adjusted sample sizes. If we want to get to the original sample size, we'd have to go into the data files. But basically, the sampling has dropped down. Yeah. And also, you know, in some of these- you'll see this in a moment especially to Todd here, for a second. You'll see these, the lack of fit. You'll see this later on in terms of the jaggedness in the model fit. So where it's more smooth indicates it's a better fit. So this is the trap, and we also go into the dive, and remember we're considering the exploitation on the dive fleet was low in the early part of the time series. So thus, the opportunities to have sampled those catch, any catches, in those early years is lower also because they're not landing as much. And again, here now, we do have- in 2018 and '19, we do have samples. And I hear- I just want to note that what you- I think what you see here without trying to get too far down the road in terms of results is you do see this sense of selecting the different- a specific size category, and we see that more in later on.

And then, okay, these are the annual- excuse me, these are the annual densities taken together and combined over all the years for each of these fleets, the trap fleet and the dive fleet. And here, I just want- what I do want to note, and it was the same as in the previous two slides, without going into details, we're showing you the data right now. This is a fitted composition. So these points show you the fit, so where you have this lack of fit is, as I was mentioning is- particularly in here, we have the absence of any compositions in those groups, but we'll get more into that in a minute. Overall, what you see from this composite is that you have pretty, pretty reasonable fits at least at this point in the process. These, again, are for the commercial fisheries.

And then, so the way that we structured this presentation, is to show you for each fleet, each major sector. The commercial versus the fishery independent. The data, the catches, the samples, and now the indices, and then in a moment, we'll move to the fishery independents, so then we'll show you the data in terms of the compositions and the indices. So here, this is the index, and it is referring to meeting the request to look at terms of reference 3c. And that to explore improvements in catch for effort- or catch per unit of effort information and also compositions. So, the commercials CPUE, the years that were in the model are not continuous as much as we would like them to be with two- with the start and the end year of the time series. It was determined that the data were sufficient from 2003 forward for an index. And the average trips per year was about 437 samples, and that waspositive

trips per year. It also determined after- there was a set of index webinars that I know there were some SSC members invited on those calls. And what happened at each of those calls, we actually had, I think it was, five index webinars. And they were carried out and conducted much like an IPT team, the NOAA, National Fisheries Services IPT team calls. And then there was a final where, at those calls, it was discussed the sufficiency of data, what you might do for an index in terms of the standardization, what was an approach. And it was then- finally, at the end, there was a recommendation to go forward with either a whole index, or not, not at all, or to remove certain data, years if they were insufficient. So those calls, in the final webinar, again, you have a record of that in the SEDAR 80 process, on the webinar. I mean, on the website.

It was determined that there was insufficient effort data for trips prior to 2003 to go forward with the model. And this means that, on the record of catch and effort and the axillary variables of the supplemental variables that were available were things like area or municipality of landing- or fishing center, excuse me. number- in the case of traps, the number of trap haul, number of hours for- in the case of dive, it would have been the number of dives. It would have been the number of hours per dive so that there were insufficient measures on the effort, in terms of the effort. That's the denominator, catch divided by effort, to actually have to consider an index before 2003. So, there was a little bit more s- there was more scrutiny in this. The final model was a composite model that included the proportion of positives, and it also included the positive in terms of catch-per-trip model. It's a combination model. It would determine that month was not significant in the model. So we realized we still have- we have an improved model. It's not the perfect catch-per-unit effort model yet because we still need more information. And this is where outreach comes from. Comes from the depths and from the Center and all the data samplers, support samplers. It's getting out there to those fishers and, you know, saying, "We really need this information."

Now to show you a little bit more about the model, here's the positive observations. So, this is basically in terms of the percent of positive trips, and what we do see is something we do like to see. We don't like to see lots of ups and downs and the trajectory of how many trips are, are positive trips or you have available in which to describe, you know, CPUE. We'd like to see some consistency in this. We also like, you know, 25- this basically range from about 25.5% to about 40% or so, and so it's a reasonable level of, of proportion of positives. And the final model then index is- these are the observations of the model, catch per unit of effort, and this is a- the final standardized index.

So what it does show is that it's low at the beginning of the year- I mean of the time series, 2003, and then it shows an increase to a significant increase of CPUE across the entire time series, followed by a decline through about 2016, and then a subsequent small increase. What this does is it sort of- is a graphic that shows you the behavior of the model. It's a distribution of the chi-square residuals over- in terms of the model fit. And this is the density of those, and it's shown to show you that there's not big systematic biases here in terms of the residuals.

Okay, so the second index that was available to us was the fishery independent index from the National Coral Reef Fishery Monitoring Survey. A little bit about that index. On the right-hand side, these are the areas that were sampled in terms of the different kinds of habitat. They have a very structured categorization of the habitat. This is Puerto Rico, obviously. It's just to show you that, over time, these are the habitats that were sampled. The data component then of the- I'll describe the source, the year, the depth, and the seasons. The description, the metadata paper that's available to you, that's the working paper number two from Grove et al. just to kind of remind you, and it initially started as a belt transect survey it followed up with a RVC. Let's just say remote, instead of remove. Remote visual survey, then they moved to- in 2016, there was a different, different time point when they started using the stationary point count survey. 2016 or so in Puerto Rico and then it varies by island. Also just a little bit more about the survey design. And this, I'm not trying to give you a full coverage of the survey design because the meta paper does a really fantastic job of that. Between 2000 and 2010, it was region-wide. It was mainly- it was a simple, random sample and it was mainly proportional to habitat. In 2012, it was still a belt transect survey, but it was island-wide. And now, the allocation samples was statistically improved. It was according to by species of economical and ecological importance. And the calculation of the allocation incorporated information on the variance of each of these species- or excuse me, of across the board of a suite of species considered to be economically and ecologically important to minimize the variance by depth and height and habitat.

And then in 2016 or '17, depending upon the island through the current date, it is now a stationary point count survey. So it's no longer using the belt transect method. And again, I refer you to working paper 02, and it was island-wide. It's my understanding, from the paper, that it's 30- less than 30 meters in all years, so it does not extend beyond the 30-meter depth. In 2019, now there has been some monitoring initiated in the deeper coral reef areas but extending only up to 60 meters. This is in Saint Thomas is my understanding. And the seasons, just to give you a hints- a hint

of that. Between 2001 and '10, it was one time per week with- on a two-week survey. It was in the summer, and then in the winter, it was in three locations. In 2011 to 2016, it was two times per year. I said week but I meant year. Two times per year. It was a two-week survey. And in 2016 forward, it's now two times per year but- and there are sampling variations across the islands. So, there's been some change to spatial context in terms of the survey. There's been also a change in terms of temporalness, and then but most importantly, there's been a change in the methodology from a belt transect survey to a stationary point survey. And they have done calibrations to- in order for us to be able to use this whole entire series. There was a calibration series that work that was done by the authors, and that is described in also working paper 02.

Okay, so just again it's a visual census index. The sample sizes reflect the number of paired dives. They were low in particularly in some years, and this is referring to in the Puerto Rico region. So I'll just give you- on the left-hand side, you've got the table, the number of paired dives. And we do see it has increased in the recent years, and also the resulting index in terms of the density from the survey, 2001 forward, is represented on the right-hand side. This is the mean- the index reflects the mean population density. The number per- this is I don't want to say irrelevant, but in terms of the index, this is basically a statistical- I would say a simple, classical design estimator. So it's a number per 178 meters squared, plus or minus 1 standard deviation. That's your standard deviation showing a decline in the early part of the time series followed by an increase a very large increase in the recent years.

Okay, and then the visual compositions pointing out here that in the first part of the time series, there were- I would like to just go back one slide and point something out. Remember these? so these compositions reflect in the number- this is our sampling effort basically. So it's the animals that we saw per year in those per year. And so this sample size, the effort- sampling effort is certainly of importance here. And it's starting at 2001 again. And, and these reflect that there were five-centimeter bends. So basically, you have those course sample bending. And then this is the final composite. Okay, and then again, this reflects also terms of reference two and term of reference three. So, to give you- and this is not summing up anything about uncertainty or summing up judging the quality of the data. It's just letting you know that in terms of the commercial density- sorry. [crosstalk].

In terms of the treatment of the data, we- especially the commercial catch per unit of effort samples, there was a great

deal more effort that was expended for this SEDAR 80 to try to get- to tease out what we could tease out from the commercial index for a commercial index. And then also there had not been an extensive cleaning of the- of the length frequency observations, so we actually spent a little bit more time- it wasn't that it had been ignored previously, but we spent a bit of time trying to say, "How can we not control the quality of the data but how can we identify points, length frequency observations that are true outliers?" So we spent time on that as well.

RICHARD APPELDOORN: Nancie two points. One, your previous slide, assessment model configuration, was that a good place to break and ask for questions? And secondly, supposedly, lunch is ready. it's supposed to be ready at noon. It's a little after noon now. Will this also be a good time to break for lunch and come back for questions? So I'm posing that to the group. [crosstalk]. Lunch is supposed to be available now.

UNKONWN: What time are we going back?

RICHARD APPELDOORN: We would come back at 1:00 or maybe a little after.

NANCIE CUMMINGS: Thank you, Rich. Mike, only- I'm ready any time.

RICHARD APPELDOORN: I will give you a break.

NANCIE CUMMINGS: Yeah, I'm good. I don't want- everything's fresh on their mind- on everybody's minds. And so, I'm good with either. It's up to the purview of the group.

RICHARD APPELDOORN: Well, I'm thinking questions could take a while and I'm not sure how accommodating the hotel's going to be for setting that, so I would recommend that we break for lunch. And, and sorry about the discontinuity, but then come back for questions. Vance?

VANCE VICENTE: Can I make one comment quick? It'll be quick. It'll be very quick.

RICHARD APPELDOORN: As long as you don't- as long as it doesn't- As long as the [crosstalk] doesn't break behind it.

VANCE VICENTE: Okay, I won't make it. [crosstalk]. [laughter]

NANCIE CUMMINGS: Did you say no?

VANCE VICENTE: Yeah, he said no. He said no.

RICHARD APPELDOORN: No, I said you can make it but just don't let- open a door that we can't-

VANCE VICENTE: It's something that I think is very relevant. I mean, I'm looking at the significant drop in the catch from 1983, from 140,000 to 40,000 in '86, effort- that probably has a good- I think I have an explanation for that. At least- that's- [laughter]

RICHARD APPELDOORN: All right, and we'll discuss that when we come back. All right for those of you who have not been here before lunch is directly across. If you're here for breakfast, that's where it was, but it's directly across the way. It's for our group in totality alone, so- and it's a buffet style, so enjoy. And so we'll be back- let's call it 1:10.

(Whereupon, the meeting recessed for lunch on August 1, 2022.)

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AUGUST 1, 2022

MONDAY AFTERNOON SESSION

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RICHARD APPELDOORN: Uh, I'd like to get started again before we get too comfortable not starting.

So, we had just finished, I believe - Nancie, correct me if I'm wrong, your review of the data and how that was handled. And so we are now open for questions on that section. And I realize that you know, there's questions on the data and how that can affect the assessment, so there's a question about whether to ask now or wait till you get to the assessment part, but if it's really a question about the data and the nature of the data, this would be the time to ask those questions. So, Reni?

JORGE R. GARCÍA-SAIS: Nancie, I'm just curious about L-infinity value. You set it up at 43. And why was- can you repeat- I know you made some comment, but I can't remember. Why was it that you use an L-infinity value which is smaller than the known maximum for the population- local population, as to say?

NANCIE CUMMINGS: The reason that we used the L-infinity that we did for the base model is that this was the parameter that came from the growth study, first of all, and then the data that was

used to generate that L-infinity, realized it's- the L-infinity of 43 is not as large as the same size of the maximum size observed in the population. It might be a little larger, but there's not a lot of additional fish that are larger than L-in- than the 43. And so then we also, if we want to look at sensitivities around that parameter, then we would. We could do that.

JORGE R. GARCÍA-SAIS: Okay. No, no, that may be fine, you know? Just like, I'm used to see it the other way around, you know? I mean you could see it from different [inaudible] L-infinity set up at values which we've never seen fish that big before here. So that's what I was making the comment because for me, it's amusing, you know? It's something different.

NANCIE CUMMINGS: And we can talk about that more also later, probably when it comes to the model, I think.

SHANNON CASS-CALAY: So I just wanted to add on to what Nancie said. In the SS context, L-infinity is not the largest size a fish could attain. It's just the average size of the oldest fish in the model. So it isn't the maximum observed size of the fish, for example.

JORGE R. GARCÍA-SAIS: Okay, I like that. I like it.

NANCIE CUMMINGS: Okay. [laughter] Right. And, and also, I think we noted when we were looking at the TIP samples, the trip interview samples, that there were a few larger fish observed but not many. So, we know that in the population at large that likely, there are some larger fish, but we don't know to that extent. And, and also, I've done a lot of soul-searching about this, and I'll just say that, we're going to have more conversations, which I think is good that the trap fishery is- it is the dominant fishery, and then we have the dive fishery. But in terms of exploitation, the fishery- the trap fisheries are not operating out in, you know, 100 fathoms, obviously, or probably even 75 fathoms. So the trap fishery is likely exploiting the largest proportion of big animals, and that's- obviously, there is uncertainty about, you know, if they are going somewhat deeper. And there's more conversation about where the deep fish are in terms of- you know, we know there's some effort that they're trying to look at, in terms of the fishery independent survey, and go a little deeper. So, these are the questions I think we want to talk about when we get to research questions as well and discussion regarding uncertainty.

RICHARD APPELDOORN: Get ready. And that's the fish. You'd notice that you know, your point about that being based on local data is, really important. If you notice the graph that had the North

Carolina-South Carolina fish, they were not only much older, but they also were much larger. So if you had thrown that into the analysis, you know, we would apply these things up to a much larger size that occurs here. Graciela, you are signaling people online?

GRACIELA GARCÍA-MOLINER: You have- Yes, you have, Erik

RICHARD APPELDOORN: Go ahead, Erik.

RICHARD APPELDOORN: Yeah. Thank you. So, one of my main questions, and this is probably not having been in the region long enough for paying attention, is one thing that stood out to me is I didn't get a sense of a good estimate of the uncertainty in the landings. I've heard certainly a lot of discussion that they're highly uncertain, but how uncertain are they? What kind of measures are we talking about? Are they biased? Is it an observation error? What's the sense of that?

NANCIE CUMMINGS: Thank you, Erik. I have a slide that's at the very end of the slideshow, extra slides, that talks about the expansion factor. So I would say that we don't have the Puerto Rico DNER head of statistics here. I can recap a little bit of that, and then we can move to Kevin also in terms of more- in content on this. But I want to just share that there were two systems that were used to estimate uncertainty in the reported landings over this time series. One of those was a weight-based system. It was used until probably 2005. There is a reference in the document to- I think it's Cummings and Matos-Caraballo, and there was an extensive review done of the reported landings and the need for expansion factors, reviewing the method that was used to, let's say to raise that. It was a scaler, basically. That was not on an individual catch- trip, trip basis. It was just on a conglomerate of observed weight over a time period. And there was observed at the port and then by the port samplers, and then there was a correction factor made. And for the majority of those early years, it was island-wide, so there was no spatial variability and there was no time variability.

In around 2006, the paper explicitly states the time when this began, the port samplers started visiting the major ports throughout the year, and they would observe a number of individual catches, and then there was a comparison made to the catch reports. Those are called commercial catch reports, CCRs, is the lingo. And so this uncertainty then began to be multiple times per year and across multiple ports, and it was a number of individual trips were evaluated- were examined, and then those individual trips as a conglomerate. So it would be, let's say, 10 trips were reported. The species composition was this. The total landings reported was

this. They would go back and they would match what was reported in the catch record to- across those trips for that day, for that week, for that port to what was observed, and that expansion factor then began to be fisher-based. It is still not species- totally species- or gear-based at this point, is my understanding. It is still- it's called a correction factor survey. It's done one time per year over a series of weeks and the port agents do visit the report- the senders of the- or landing them majority of the finfish and lobsters. And it is mainly- it's then process-based. It's basically a scaler. It's not an aggregate over a group of catches. Well, it's not individual, but catch- expansion factor is not- we're not able to yet raise individual catches. I hope that helps a little bit.

ERIK H. WILLIAMS: It does. Thank you, Nancie. But I guess what I'm looking at is, so stock synthesis as well as most integrated assessment models assume the landings are known perfectly, and they're not in this case. And what I'm not seeing in the report is what is the range of that uncertainty. Is there- do we think that the estimates that are going into the model are underestimated, overestimated? They're at the midpoint, but then what's the variance around those? I'm just trying to get a sense.

NANCIE CUMMINGS: Right. We're, we're assuming that they're an underestimate in this case. Excuse me. So we are assuming it's an underestimate.

RICHARD APPELDOORN: Okay. Todd?

TODD GEDAMKE: Okay. So you're assuming it's underestimates. My question is, how does this compare to the port sampling study that was just done? So your estimates in there are- we have that information for that year. How does that year work out for Queen Trigger according to the port sampling study you guys just conducted?

NANCIE CUMMINGS: Thank you, Erik, for that question as well. Thank you for that question, Todd. We don't have the individual observations available, to my knowledge, for the port sampling. I think I was told there's around 17, 18 months. So to do- and I couldn't answer it for Queen Trigger. We could probably start looking at it for the total finfish for that port, but one would have to actually- it would be tedious, and it's something that could be done in a day or a week. But I could go in and look at those individual catch records for that species and compare them one by one. And this is outside my purview. I think I would address this to, defer this to Kevin. Thank you.

TODD GEDAMKE: I'd just like to follow up that you do have, exactly every single week, an estimate for Queen Trigger. Like, not just an overall, but you have, for every single week, an estimate for the species. You also have a breakdown of Queen Trigger to the aggregate group for that time period. And if anything, what we did find out in that whole big study is that finfish are pretty much reported accurately and that the expansion factor only go- is been basically doubling the catch, which would say that the estimates being put into the model are two times what is being estimated by an intensive port sampling project. So you're looking at uncertainty of 100% reduction in it, Erik.

WALTER KEITHLY: Could you repeat that.

TODD GEDAMKE: Sure. Queen Trigger and our estimates and reported estimates are virtually identical. They track-

WALTER KEITHLY: Our estimates being [Nash mean?] fishery service estimates from the traditional port sampling method.

TODD GEDAMKE: Yes. So, we have tracking. Week by week, we're pretty much on target with what's being reported during that time period. So, what the expansion factor did was very good as the aggregate for conch and lobster, going up by twofold, but for the finfish- and Queens Trigger was the example that I presented to this SSC because it really tracks very, very well. So, my conclusion from the results of that whole entire study is that there should be no expansion factor for Queen, and we basically have the data to support that.

UNKNOWN: Good.

RICHARD APPELDOORN: Uh, Kevin and then Walter.

KEVIN MCCARTHY: So, you're right, Todd, and that was data that Nancie did not know that we possessed, so it's not on Nancie at all. So, in discussions- we knew this would come up. So, in discussions with the Science Center where we landed on this was if the SSC would like to, say, see a sensitivity run, we can do that, but we're going to need some guidance because we do have 17 months of data. What do we do going back? So, we're going to need some guidance, right, but we're happy to do that and it makes sense to do that, but, but we're going to have to have a discussion about how best to proceed given that we don't have a full time series. So that's where we landed on that.

TODD GEDAMKE: Agreed entirely. And I don't claim that our one year of data is worth anything beyond giving us some insights as

to what we should be doing with these things. So exactly as Kevin said, the suggestion there would be to then take at least for that one year and look at it and say, "Are we double [inaudible] and do a sensitivity for it?" So yeah, we can- as we look at that, we can definitely- but that- that's exactly would be my recommendation to it also.

RICHARD APPELDOORN: Okay. Walter and-

WALTER KEITHLY: Again, I'm trying to wrap my mind around all this still. You have two different methods for collecting the data: the traditional method that Kevin and all within that [mean?] fishery service that we've had, the data that we're using going back to 1982, and the method- the sampling that Todd has done just for the 17 months, it sounds like. Are you saying that with the traditional method, that it looks like we do not need to extrapolate out using for Triggerfish whereas we do for other species?

TODD GEDAMKE: Yeah. That's what I presented at the whole last SSC meeting.

WALTER KEITHLY: Well, you gave it for two species: lobster and Queen conch.

TODD GEDAMKE: No. I gave them for all, and Queen Trigger was the exact one I put up in front of this committee in addition to a few others where species ID was problematic, and Queen Trigger was done specifically for this because this SSC requested it. So if you'd like, I can send you the presentation from the last SSC meeting or- well, we don't have a transcript, but.

WALTER KEITHLY: Okay. So, you say, you know, that expansion may not be needed on Triggerfish according to your sampling protocol. So it still goes back whether your sampling protocol is more accurate than what-

TODD GEDAMKE: Than self-reported data.

WALTER KEITHLY: Pardon me?

TODD GEDAMKE: Than self-reported data.

WALTER KEITHLY: Right.

TODD GEDAMKE: So yes.

WALTER KEITHLY: Okay. I mean, but you're still based on a sample, not all population. But the question still comes down, are the

estimates provided in your analysis more accurate than the traditional method with the expansion factor?

TODD GEDAMKE: Even though I'm driving these guys crazy, I think they would probably agree, for that year, given the design, yeah, that estimate is absolutely rock solid compared to anything that exists. Now, does that apply across the board? No. But at the same time, we've got a statistically designed survey that was done to give us insights to this. And I also will do this for the Center and everything else, okay? I don't think this is critical for our- Kevin has already addressed how we're going to deal with this, so my suggestion would be to just move on because we're going to have a couple suggestions for sensitivities, and I would say let these guys get back on track and go- because the expansions- Reni hasn't dove in yet, but he's going to any second-

JORGE R. GARCÍA-SAIS: Yeah. I am, I am.

TODD GEDAMKE: -and then we're going to be here forever.

JORGE R. GARCÍA-SAIS: Well.

RICHARD APPELDOORN: All right. Kevin-

JORGE R. GARCÍA-SAIS: What you're saying now is that we need an expansion factor for all- different for all kind of fish. And is that going to vary from year to year too? I mean, was, was the expansion factor right for lobster or no? Because we have a problem.

TODD GEDAMKE: If you'd like, I can repeat the presentation and the full bay of meetings we did last time we were here.

RICHARD APPELDOORN: The discussion here is on Queen Trigger, okay, not the whole figure. So Kevin and then back to Nancie, and we move on.

KEVIN MCCARTHY: Yeah. Just a couple of things for clarification. So, the traditional sampling, Walter, as you're talking about- so this is Kevin, by the way. You're welcome. That is a Puerto Rico run project that's DNER- We house the data and we support their efforts, but that's very much a Puerto Rico-run exercise. And the reason you get into this is it the right thing to- you know, how accurate is it relative- or how does it compare to the work that Todd did? The reason you get into the species-by-species thing is there aren't species-specific correction factors, right? So, that's where the issue comes in. And in some cases, they line up pretty well either before or after the expansion, if I'm

remembering correctly, and in some cases, they don't. But you're right, Rich. We should carry on, right? I think we've got a path forward with suggested ways to handle that, and I'll put it back to Nancie or the committee for additional data questions.

RICHARD APPELDOORN: Vance?

VANCE VICENTE: Yeah. Nancie, how comfortable do you feel with the 1980s landing data for Balistes vetula, specifically between 1983 and 1986? How comfortable do you feel with that dramatic drop from 140,000 to 40,000? Because the rest, after 1990, well, it's just typical. I mean, you have this fluctuation, but it's relatively, I mean, normal for any of the species that we have looked at. I mean, there all these oscillations. But specifically, between 1983 and 1986, how good do you feel about that data?

NANCIE CUMMINGS: Thank you, Vance. So, there's the two topics that we're talking about. If it's okay with the Chair, I'd like to just provide at least my input from an, an [LS?] standpoint regarding the expansion factor and then answer that question, if that's okay with the Chair. Thank you.

So back to the traditional expansion factor system, developed by Puerto Rico DNER over this history this entire time. So, first of all, you've got a mix. You got a weight-based factor, which gets to this question you have too, developed from the early time series on weight. It was on total aggregate weight. No species included in that and not even fisheries, not even gear-specific expansion factors, not region. We know that they are variable by region. So when you start comparing those with fisher-based expansion factors that at least are based on- the comparison is on the sum of the catch across X trips divided by the sum of the observations. How many trips they actually- the port samplers essayed out- you know, evaluated. And that's treated in that paper that I'd really encourage you to look at because, like, the expansion factor is laid out, and it was part of the data evaluation workshop conducted in two thousand- I think it was '09 and '10. So you're comparing the weight-based system to the fisher-based system, so you've got uncertainty in that because you got a different metric about what your expansion factor is. Okay. That's just uncertainty. And we didn't have a good way- you don't have a good way because you don't have side-by-side comparisons to actually correct that one system to the other, so there's uncertainty.

And the other point that I really want to point out is regarding the new port sampling study, which also came out from these recommendations from our data improvement project that was conducted in 2011 and '12, which Todd was part of, and to look at

what the expansion- what the correction factor should be and start looking at the variability. So that's really important. It's my understanding the estimator is based on total catch per day and is not trip-based. So you've got- you had a little bit more different- this is just gets to the technique. It's a statistical design and it's got a statistical background to it, but still, you've got another- it's a different estimator. It's not looking at- you're just basically getting the total catch per day of what's reported versus the total catch per day which you observed. So it's another- at least you got a match, trying to match that there.

But this is a question I have out on the table because I don't know. I haven't been on the ground, but it's my understanding that a number of those comparisons were made in Puerto Rico the MER study, directionally made using sampling effort from Puerto Rico DNER. So, I have some concern that maybe we have some redundancies in how it's been calculated that the port- the field agents were assisting in these collections. And I think that gets us back to- I think at that SSC meeting last year, it was, I don't want to use the word promise, but identified that there would be a white paper and actually an independent review of that port sampling project.

So, Vance, to circle back, I think there's uncertainty in both the early data and the late data. And the other thing that's even more uncertain is the landings exploitation history back before '83 because we know we had fishing going on back into the '50s and '60s. So how much were they fishing on Queen Trigger? I don't know. I mean, lobster was being exploited back into those years, and we know that Queen Trigger is sort of, you know, my understanding is a big bycatch from the lobster fishery. So there's actually- we know that there's removals and exploitation going back into the '70s- '60s and '70s.

VANCE VICENTE: Okay, that- let me finish. So, the reason- Vance Vicente. The reason I'm asking is that between 1983 and 1986, there was an island-wide and Caribbean-wide event which has to do with the diet of this fish that we're talking about. This is the massive, die-off of Diadema Antillarum, which is a common- a dietary component of this species. The feeding habits of Caribbean reef fish [inaudible] still holds, you know, because the habitat has changed so much. But I did a study island-wide; I got a grant from [inaudible]. We did go around the whole island and estimated percent mortality of Diadema, and it was a very significant event. And I wonder where there may be a correlation of these extrageneous factor that could be used to help explain this significant, or at least, you know, apparently significant drop in catch where it has to do with the behavior, you know, feeding behavior of the species.

Just bringing it up to the table to see what, what do you think. Maybe it doesn't have anything to do with it, but- you know.

RICHARD APPELDOORN: All right. We'll take Erik online, and then- but we need to get on topic.

ERIK H. WILLIAMS: Yeah. Thanks, Rich. I'll be quick. This is just one more data question. So in the assessment, there's two indices, and what I'm trying to get at is, what is the understanding of how well those indices characterize abundance? Is there one that's better than the other? Why were both put in there? And one thing that might be computed externally is the correlation among those because when I look at them, it looks like they're diverging in the most recent years. One is going up, one's going down, which is not a good thing to put into a model is conflicting indices.

NANCIE CUMMINGS: Thank you, Erik. Nancie here. So, yes, I'm going to- I have a table, and I can share that later, but I've made um- Thanks, Erik, and Jason also for your comments on this assessment. So I've computed an- informed a table that would show you some of the pros and cons of the two indices, but I don't have it in front of me, so I'm going to do it on the top of my head, and that is looking at the trap index, we know it's a little bit more time limited because it starts in 2003 and- by a couple years, but only a couple years, whereas the NCRMP index starts a little later. But we know the NCRMP index has a very good statistical design to it. We do acknowledge that divergence at the end of the series, but it has- it is very accompanied by high CV, so it's more uncertainty in that index. But the other thing is that it doesn't go out quite as far likely to capture the abundance of maybe the larger fish because of that temporal- that spatial restriction. So that is one thing. And in terms of the fishery-dependent index, then it picks up a few of the smaller individuals. So we feel like the fishery-dependent index is capturing the total of the abundance of all the size groups and likely, some of the adults. But we also know that the trap index is not picking up the biggest, biggest, biggest fish, you know, like 50 centimeters. And there's probably not that many in the area that is being exploited. But we feel like the trap index is a good index, and it has now been subjected to some rigorous discussions and also the methodology that was used to put it together, so. Thank you.

RICHARD APPELDOORN: All right. Todd?

TODD GEDAMKE: Shannon's deferring to me, but if you have a direct follow-up on that, I'll give you the floor for a second. Just-

SHANNON CASS-CALAY: No, go ahead, Todd.

TODD GEDAMKE: Okay. I was going to make a comment. Nancie just said that the NCRMP index isn't picking up the biggest animals. The trap index isn't picking up the biggest animals. If we're going to talk- I don't want to get too far off on data here, but, you know, like Erik said, before we get into the assessment model. The NCRMP index was evaluated before the- at least the early one was evaluated before we did 30. Jeremiah and I worked a lot on that, and basically, the bottom line for our evaluation at that time, and it has expanded a lot since then. But the conclusion was it's not representative. And what we have here is if you look at the sample locations for the survey, you have isolated locations. As Reni pointed out earlier, you have habitat that is not being touched on this, and more importantly, we have information from- I mean, the trap survey on Saint Croix shows that the greatest abundance of Queen Triggerfish is well deeper than 30 meters. And we have that fully in there. You know, Julian he's sitting right over there. Ask the trap guy where he's catching most of these Queen Triggers, and he'll- you know, he's probably not going to tell us. At the same time, I think it's pretty i- when you get down to 20, 25 meters on these, you're barely touching the population of Queen Triggers.

NANCIE CUMMINGS: Thank you, Todd. Go back to the Chair if I interrupted.

RICHARD APPELDOORN: We'll let Shannon comment on that, and then we'll get your response.

SHANNON CASS-CALAY: So, I think these are all excellent observations, and of course, there are important uncertainties. And one thing I'd like to ask the SSC to do while we're discussing these uncertainties is to have kind of practical recommendations for what we could show you about the sensitivity of the model to these major uncertainties. And one that Nancie has already done is called the jackknife analysis, and it's in the document, and it's the sensitivity of the model to the use of the indices. So she's removed one index, and then the other index, and then, I believe, both, whereas the length composition data that you've removed-

NANCIE CUMMINGS: I've done both.

SHANNON CASS-CALAY: Okay. She's done all of these things. And so we can show you kind of the sensitivity of the model to those sources of data. And I want to just add one more thing about the catch because the catch is quite uncertain in the U.S. Caribbean, and we've discussed this many, many times. It's probably not something - we can correct easily at this time, but I do think

that, you know, a recommendation from this working group, for example, to look further into the MER report and determine, you know, what we can learn and whether the catch data can be improved, would be helpful. It could be something like a SEDAR procedural workshop.

KEVIN MCCARTHY: This is Kevin. We also have a CIE review scheduled for that as, as noted in a previous SSC meeting.

SHANNON CASS-CALAY: Thank you, Kevin.

TODD GEDAMKE: I just want to follow on Shannon's because it's exactly what I'm doing. Vance, if you have concerns about '83 through '86, your recommendation at the end here is cut off '86 before. Run it from '87 on. So if we could all come up with these little, um- yeah, so I'm trying to keep a list.

VANCE VICENTE: Don’t cut it off.

RICHARD APPELDOORN: Okay. Julian's been waiting very patiently. go ahead, Julian.

JULIAN MAGRAS: Julian, for the record. Okay. I'm going to comment for a second in Vance's concern. And yes, back in the '80s, when we did have the sea urchin die off, the ol' wife pretty much completely disappeared from the fishery. I'm a trap fisherman, and I know all the trap fishermen also. I was young into the trap fishery. I started my trap fishing back in 1989, so it was prior to that, but I'm a four-generation fisherman. And we did see where the highest catch has always been the Queen Trigger, it went to barely catching five Queen Triggers a trip when the sea urchins disappeared. As the sea urchins came back, the Queen Triggers came back. And we just had a small episode here over the last few months where we had a die-off of the sea urchins again, and we did start to see the decrease in the catches of the Queen Triggers. But that looked like that trend has slowed down. The sea urchins are coming back again, and of course, the numbers of Queen Trigger, which is the number one fish caught in the trap fishery right now.

So I wanted to put on the record the answer to what Todd said. And I was on a meeting with part of the, the SEDAR assessment, and when I spoke about Saint Thomas, one of the questions that Nancie did ask me was about the different depths and the bottoms and everything. Like Todd said, I do have that information in my head. You know, you catch the larger Queen Triggers in deeper waters. You catch them anywhere from 36 to 40 meters. You would catch the larger ones, and in small- like, in a harder-type bottom. The smallest-size fish, they love to hang out in what we call a grubby

bottom. Now, everybody was asking me, "Can you explain what a grubby bottom is?" It's like corally, but, you know, it's like little rocks, and they like to hang- the smallest-size fish love to hang out in, like, 25 meters of water, even sometimes, way less than that. So, it's like the species is- the larger ones, they go to the deeper water, especially when they're spawning and nesting, and then the smaller ones, they hang out in the shallower water. So I just want to put that on the record.

RICHARD APPELDOORN: Thank you very much for those insights, Julian. Walter?

WALTER KEITHLY: Yes. This is Walter. Nancie, again, the Triggerfish is just a portion of many species being caught on a trip, I would assume. Did you look to see what proportion of the catch Triggerfish represented on the average trip and has it changed over time?

NANCIE CUMMINGS: That's a good question. Now, I just want to add that we didn't go into the individual model factors that were included in the abundance index. We have slides that get to that if we need to. But I just want to say that one of the ways we identified subsetting of trips that might be targeting Queen Trigger, we know there's not a completely directed, religiously directed, targeting Queen Triggerfish fishery here. This is a bycatch of these other trips. But we used- identified a suite of species, we called them a reef guild. So identified a whole group of species, and there was language in the report on of what species were included in the reef guild. So, I'm going to defer to Adyan for the proportion, but I don't think that changed much over time, but she can follow up with that. So, we included a suite of species called a reef guild in our subsetting approach. So, we were trying to get at targeting. If- so let me defer to Adyan on that.

WALTER KEITHLY: Well, let me just- That was more to determine what you should have caught, a Triggerfish that are caught from [crosstalk] on a trip. Yeah. That's why you use-

NANCIE CUMMINGS: Yeah. Exactly. Exactly. So, so whether that contribution changed or not, let me defer to Adyan for that because she was the analyst that looked at that.

ADYAN RIOS: Adyan Rios. So, for the exploration and development of the index, we did look at proportion positive and number of trips and other elements of preparing the index proportion of a given trip calculated, but not kind of made into a graph to, like, that data, depending on- it's useful to explore and provide, but it's also, what the question or the hypothesis is to get at from

what the proportion of a given trip, there's going to be diversity in that. and I don't think at this point, we've really used subsetting methods that take into account, you know, whether you need to have a certain proportion. The proportion of Queen Triggerfish on a trip will be related to targeting, and so targeting is a topic that you want to further explore and I think would be a really good research recommendation for improving the indices is to definitely ask other questions that get at understanding the data and the fishery more so that we can use variables in the standardization that get at the factors that contribute variability that is not related to the abundance.

WALTER KEITHLY: Thank you. And that's kind of what I was thinking of or wondering that, again, much of this model's based on length composition. But that length composition may, and that's strictly may, depend on what species are being targeted. And if the targeting behavior's changing over time, could that possibly result in some findings along length composition? That's what I was wondering.

RICHARD APPELDOORN: So, I think, on the same vein JJ?

JUAN J. CRUZ MOTTA: Thank you. JJ here. To answer your question, yeah, it does change, actually, the relative composition of the catch through the years. Just looking at the landings data as it is, the proportion of Triggerfish changes through time and is some of the analysis we have been doing from an ecosystem-based fisheries approach. Definitely, the structure and composition of what is being catched in the Caribbean has changed through the years.

RICHARD APPELDOORN: Graciela?

GRACIELA GARCÍA-MOLINER: Well, you do have a comment from Jason. I don't know if he wants to chime in, Jason, or you want me to read it?

JASON COPE: If you don't mind reading it, that'd be great.

GRACIELA GARCÍA-MOLINER: Okay. So the key assumption is the equilibrium catch. It currently assumes the highest three catches go back in time to create stable population size under those catches, and thus, a much reduced population at the start of the known catch series. It will be important to test the sensitivity to the model to the equilibrium catch. I assume it will make an important difference.

RICHARD APPELDOORN: All right. I actually have a - this is Rich - a somewhat similar question in terms of what those initial catches were and how they might impact the analysis. So is this something where you start off at some initial state, which is way in the past, and through the analysis, you're actually moving toward better and better estimates as you get toward the current data, and therefore, those errors that might occur in those initial population sizes aren't really relevant? Or is this something where it actually affects the final outcome, just a procedural, um- I mean, I don't understand how the process works so that's what I'm asking.

NANCIE CUMMINGS: Yeah. So, thank you, and I actually defer to Jason on this in a moment. But just to let you know how they would calculate it, there was a slide that basically, we don't know that removals history before then. We note that it was likely, at least the 5 to 10 years before, it was not zero. The way the 1982 start year- '82 equilibrium was informed was through the average of the 1983, 4, and 5. And so your next question was, is it something that would improve in time? No. It's going to be- that's the way it- that's the error- that's the estimate of it, and that's what instructs the model.

RICHARD APPELDOORN: No, that's not what my question was. My question was, once you have that estimate as some kind of starting place, yes? So, as you proceed away from that estimate into more recent years, is the significance of that initial estimate important or not? I understand how you got the estimate, so I'm not complaining about that. I'm just wondering whether, you know, I'm thinking back to a virtual population analysis where you make a guess about something, but that guess is just to get you going because by the time you get to where you want to be, which is what's happening now, the errors are, you know, going down on that. Or is it, you know, like, working back where you're actually blowing up the error? So that was my question.

NANCIE CUMMINGS: And no, SS is actually starting the model in that equilibrium catch, 1982, and it is assuming it is known that there is very little error or no error. We've put a standard error around that catch of 10%.

RICHARD APPELDOORN: Yeah, but it's still not answering my question.

NANCIE CUMMINGS: The answer is no, it does not make it better. It is important.

GRACIELA GARCÍA-MOLINER: Got Jason.

RICHARD APPELDOORN: Okay. Jason and then J.J.

GRACIELA GARCÍA-MOLINER: Yes. This assumes catch is known. It is important in this case.

JASON COPE: This is Jason. Is it helpful if I explain that a little bit more?

RICHARD APPELDOORN: Yes.

JASON COPE: So just so everyone's clear what stock synthesis is doing, I think we're oftentimes used to starting maybe a time series at zero catch, and so we have this unfished population. When you add an equilibrium catch, you are saying that this equilibrium catch goes back in time for as long as it takes to create a new equilibrium starting age structure. We haven't really gotten to the results yet, so Nancie has not had the benefit to actually show us where we need to see here, but what you'll notice is that there's going to be an unfished dot and then there's going to be a dot on the bottom as it drops to a very low level at the beginning of the time series. That's the difference between putting it at the equilibrium catch-in or assuming it starts at unfished. And so, the answer, does this equilibrium catch matter, I'm assuming it does because it drops it so much. And if you changed it, and I think the worry here is that they had to assume in this first instance that the average catches were essentially the top three catches ever seen or recorded in the time series, and then that assumption goes backwards, basically saying they've always caught the highest amount of catches kind of in backwards perpetuity, right, until this more contemporary time where you actually have this metric catches going forward. And then the population changes from that equilibrium catch under- I'm sorry, the equilibrium population under the equilibrium catch to a more dynamic population under the variable catch. So that's- hence, my, my curiosity if we did- I think there's a lot going on with this equilibrium catch that if there was some sensitivity to that, we might gain some understanding and it would be a really easy exploration to do. I hope that's helpful.

RICHARD APPELDOORN: Okay. Thank you for those comments, Jason. Nancie, I had one other comment. I think this is just kind of reiterating something that's already been said, but it concerns the NCRMP index. You mentioned that in the early years, this is just from three locations. I'm guessing those three locations are La Parguera, Saint John, and Buck Island, so only one would apply to Puerto Rico, and yes, from everything we've heard about Queen Trigger, La Parguera, would not be a representative area for that.

And then going forward, you know, especially the last three surveys where the sample sizes has gone up substantially and you're covering things island-wide presumably a greater mix of habitats your densities are going up really high really fast. In terms of rate I guess it's- those increases are no greater than, say, the increase that occurred from 2005 to two thousand - whatever that is - six. But it is remarkable how you can have that kind of increase and expect that to be solely due to, you know, greater recruitment and growth and whatnot. So there may be a sampling thing there as well. We've already talked about throwing the sensitivity up. That's vital. Don't think I want to belabor this point any further than that. It's just a reiteration of that. Kevin?

KEVIN MCCARTHY: Yup. Thanks, Rich. This is Kevin. so just a little background, and I'll make this quick on how SEDAR works, for those of you who haven't suffered through- I mean, haven't experienced it very often. There are, for these operational assessments, there are these things called topical working groups. So, this RVC, this diver survey, was recommended for years by that topical working group. So, under the rules of SEDAR we included it. So I would encourage those of you, when you are presented with the opportunity to be on a topical working group please join and bring your expertise there because these things, I'm sure, were discussed. I wasn't on that group, but that's how we got here with that index, so just a little background. But as those of you who have that kind of expertise and know about these things, you know, that may have been instrumental in the deliberations of that group a little bit earlier in the process. So I would encourage everybody to serve on the TWGs as we call them, the topical working groups when you have the opportunity. But that's how we got here.

RICHARD APPELDOORN: Hopefully, one last comment. JJ?

JUAN J. CRUZ MOTTA: It's more a question than a comment, and it's also related to the NCRMP. Two questions. The first one is did the size composition data was used from NCRMP? And if positive, how you split the data that was in five-centimeter bins into two? Thank you.

NANCIE CUMMINGS: Great question. If I may, Chair? We were able to use metho- the developer of SS, he has a characterization routine in terms of fitting the size composition data, referred to in the manual as a generalized size composition method. So, it allows you to have different binning interval sizes, and so we use the five centimeter for that, and that's reflected in those fit plots that I showed you where you have- you know, basically, the fit is, you know is per five-centimeter intervals. And so, we recognize that

it's not as good of a resolution as you'd like, maybe, but it's what we have, and that going forward, they're doing it in two centimeters.

JUAN J. CRUZ MOTTA: Thank you.

NANCIE CUMMINGS: And so, yes, the data were used. And so that gets to also a question, I think it was, that Jason had regarding when we're- I think it was Jason, that we're able- we're not able yet to include the internal weighting, the- it's referred to in the manual as [inaudible]. But because for the generalized size composition method it's not been implemented yet. And so, I've responded to those notes, and I have, you know, basically included some texts from Ian Taylor and Rick Methot, basically. So, it had to be- we had to use the old system of manually adjusting the weightings by the recommended input variance adjustment, so.

I just want to make another point about the, the NCRMP index. And it is- you know, it was a part of a term of reference, so we dealt with it, but the other thing was- the other thing- items that we're able- you know, term of references to update the data too. So if there were any improvements since the 2013, '14 evaluations, then we want to include those new data, and, and explicitly, we have the new belt SPC, the stationary point survey. So we wanted to do that, and then we were able to go back and calibrate the earlier data. But another point is that, yes, we have restricted to 30 meters, but also, we know that we have low sample sizes in those early years. And then Rich points out goodly about the habitat differences, and yes, it was La Parguera in Puerto Rico in the early years.

RICHARD APPELDOORN: Oh, Uno mas.

NANCIE CUMMINGS: Nancie has one more point. And I mentioned this earlier. It had to do with the length compositions, it had to do with the, where we're getting the growth information from, and it's coming off of- a lot of these samples, they were fishery-independent samples, but a lot of the samples were from the fishery, and the fishery is operating in these depths. So, you know, although we know from the, mesophotic work, there are some animals out there- and that would be great for describing the population growth, but right- you know, what we have here is most of our growth data are coming from the fishery, and the TIP samples are characterized in the compositions from the fishery.

And the other point to make about that index, the commercial trap index, is that the proportion of positives, they weren't, like, rando- like, just up and down. There were no huge spikes. They

were between about 25%, and I think it was about 45 or so percent. So they were some stability to the proportion of positives, whether the contributions of this species to all the catch is varied over time. I would expect that to as the cohort strengths are varying but all the animals that it's associated with, and that's another great research question.

MICHELLE SCHÄRER-UMPIERRE: I'm Michelle Schärer. I have two minor points, but one to Nancie. But some of those traps are going deep except we don't expect the larger Triggerfish to go in them, so we wouldn't see them in those sizes. Just wouldn't come up in TIP data. Second, I just wanted to ask if there was any idea of what the reported landings for Queen Triggerfish includes other species of Triggerfish. In a Spanish translation, everything that looks like a Triggerfish is going to be peje puerco. When you go back to Queen Triggerfish, it's not necessarily that. More recently I've even seen monacanthid that's being called peje puerco. So is there any way to actually see if that is significant in these landings that you have four or five different species and not just the blue one?

NANCIE CUMMINGS: So, in the early years, they were not identified always to species, and so there was a lumping. So, in the early data, no, but as port sampling became more intensive, these are split up to species. So in Puerto Rico, we don't have the same problems that we had in the Virgin Islands where we just started the species reporting. So, in Puerto Rico, if there was a misidentification, which would also be uncertainty in catch we don't have that ability to- I don't think, to look at- correct those records.

RICHARD APPELDOORN: Okay. Todd?

TODD GEDAMKE: So the data that Nancie hasn't seen shows exactly the breakdown from Queen Trigger to gray Trigger. It's not as critical of an issue, Michelle. I definitely looked at it. If I remember correctly, you had 1,500 to 2,000 pounds of Queen a week, and gray Trigger was actually about 300 to 400 pounds. So you're looking at whatever that boils down to. It's not as critical, but my recommendation is going to be a sensitivity to account for exactly that, and that would be to take the landings of Queen Trigger which are reported. That's only one that's reported in the database. So although the forms have been modified, no, you're right. Puerto Ricans are only reporting Queen Trigger for everything. There's small other ones, maybe a few records in there, but we- so we have the breakdown of that, at least from the one that we did.

RICHARD APPELDOORN: Nelson?

NELSON CRESPO: So around the '80s, we start developing a, a trap fishery around the island, and we confirmed that by phone right now. But the reality here is that having an approved data from divers, you have to take that into consideration because the biggest in the real world are caught by divers. A huge Queen Trigger is never going to enter due to its size and the size of the funnel of the traps. It never going to get into the funnel. So you have to have that into consideration.

RICHARD APPELDOORN: Thank you, Nelson. I think I'm-

NANCIE CUMMINGS: Thank you, Nelson.

RICHARD APPELDOORN: I'm not seeing any more questions, so I'm suggesting maybe we, we get to the assessment model configuration section.

NANCIE CUMMINGS: Thank you, Chair. Okay. Now we're going to start playing with the assessment model configuration and just thank everybody for all these wonderful comments. Let me get this going. Okay.

So the model specifications it was one area. We assume no mixing. We've already heard about connectivity across the region so one season. Maturity was a function of age, combined male and female SSB, and it's really a single-sex model here. Like, we should- that's how it's referred to. As you know, von Bertalanffy the growth inputs that were necessary for the model were the L-infinity, the K, and the Lmin from the Shervette/Rivera-Hernandez model. And we implemented the model with an Lorenzen declining M at age model.

The selectivity and retention length- was length-based selectivity. It was used for the two fleets, dive and trap, and survey. It assumed constant selectivity across the entire set of years, two thousand- 1983 to 2019. Retention was assumed to be 100% and that there were no discards. The paper describes the background and gives some references regarding the support for 100% retention. And also, we've heard from several of the DAP panel Chair as well as from another couple of members about pretty much everything is retained. The discards, as I said before, were added to the total landings and applied a 10% mortality rate, and we understand that that maybe a minimum estimate. The stock was assumed not to be in an unfished condition at the beginning of the time series. It was experiencing exploitation. I reserve the right to put an adjective on the word moderate in 1983. That was the

trap fleet. The dive fleet was assumed to have minimal to zero catch in 1982. Therefore, there was an estimated initial F for the trap fleet. The way this 1982 equilibrium value was informed was through the average of the '83 through eighty- it should say '86 there. My apologies. We use a continuous F method for the estimations of mortality rates. It's recommended in the model from the developer where catch is known imprecisely and there was a small error on landings. So on the right-hand side of the panel, just want to say that we have a logistic, which is an asymptotic, assuming that selectivities starts at a low size, and it adjusts itself upwards to an asymptote and then for the trap fleet and for the visual census survey. And then the dive fleet was informed as a dome shape, selectivity function.

We did hold conversations with the port samplers and also other experts in the region regarding the selectivity of the trap fleet because I was of the opinion that it might be more dome than logistic for that very reason of animals not getting into the trap. But after- I had some extensive conversations with the port agents and with the previous director, and, you know, they continued to inform us that it's not a- first of all, it's not a directed fishery. It's caught as a bycatch. But they also had conversation- yes, occasionally an animal might get through because I'm like, "How much can they bend in the wire to get in?" And it boils down to, if they do get in, they're not going to get out. So, they're not being- you know, they're not getting out. Probably it's not a dome-shaped curve, but the other thing was that it depends on the funnel, if they can get in or not. So you, you know, depending on your animal and depends upon the- maybe if the trap construction is weak, if the wire is weak, if they can bend the gauge, they can get it. But by and large, the opinion was that they're mostly not getting in, but there's probably some animals getting in. And so, you know, I don't think we have nonrandom port sampling anymore. I think we have pretty- probably a pretty good, reasonable expectation that they're not- the samplers are not sampling the big f- or recording the big fish. So if they were getting in and they're retaining them and they're sampling them, they would be in the observations. So I'd like to s-

RICHARD APPELDOORN: Um, N-Nancie, just one question.

NANCIE CUMMINGS: Yes, sir.

RICHARD APPELDOORN: I couldn't quite understand. You said something about constant selectivity. That's over time?

NANCIE CUMMINGS: Yes, sir.

RICHARD APPELDOORN: Okay. Thank you.

NANCIE CUMMINGS: Yeah, my apologies for that. What we did to support that was that, do we need to be aware of any changes in the management that were going on in the region that would've affected selectivity? It could've- and we would've handled that by allowing a time block. But was it just kind of randomly going and start putting blocks? Because as someone pointed out earlier, this is a very constrained model. And so, the more parameters we're putting, we're just going to explain away everything. Thank you for that.

So we'll attempt to go through some of the base model results. I think I'm going backwards. Okay. First, we'll talk about the fits to the different components. And remember, we have- I think it's, what, three or four different kinds of components. And that's the landings, the catch data, two fleets, and we already told you, we put a 10% standard error on the catch, and we're addressing term of reference one, three, and four. And again, '83 is the start year. 2019 is the terminal year. As we've already gone through these assumptions, I don't want- need to be repetitive again. We know the fishery was not in- no matter what you assume for the initial year for the size of that value, the catch value, or when you start the time series, we still know in our minds that this fishery was not- was still undergoing exploitation prior to 1983.

So basically, what you have here is observed and expected landings. And as was noted by one of the SSC members, SS is assuming the catches are known. It's basically, you know, forcing the fit here. It's going to do whatever it needs to do within the guise of the standard error that we put on it to get this fit. And this is [borne?] out here. Basically, the trap is in blue, and the dive is in red.

Here are the base model fits. We'll treat this in order of indices, and then we'll move to compositions. On the left, you have the trap fleet, and on the right, you have the visual census survey. So, term of reference 3, to consider potential development and the improvement of one or more indices of abundance, we are revisiting the commercial indices because these are self-reported data, as noted by Todd, and we have a fishery-independent series, and we note the difference in time. The trap fleet starts in 2003. The NCRMP surveys- the index started in 2001. And, you know, although the index for the fishery-independent survey is mainly flat, but the variability on the fishery-independent survey is extremely high, extremely large. And we know that- we see some evidence of trending here, and we'll see that in a moment in the residuals, but we do see some overestimation, underestimation. In other words,

it's not a perfect fit for the trap fleet, either. And we do see basically a slight decline in the index from the 2003 data point and then followed by an increase through two thousand, about '13, I think this is, or '12. Okay. [inaudible].

Okay. Selectivity. Again, the trap fleet- this- excuse me. This is a graphic showing you selectivity in terms of proportion selected of the animals from three different components, and that's the trap fleet in blue, the dive fleet in this purple or lavender or whatever the color is, and RVC, the NCRMP survey. So, we're seeing as- we might expect that the trap fleet, it gets a few animals out here into smaller sizes, but the dive fleet is, in general, as we know from testimony from the fishers, it's selecting and keeping a certain group of fish- size group of fish. Doesn't necessarily keep these biggest ones, either. And then we see that the survey- RVC survey always gets- also gets some of the smaller fish, but it asymptotes out as well. So, the trap fleet and the RVC were characterized with an asymptotic increasing selectivity and asymptoted out. This is as noted by, I think it was, Jason. This is derived age-specific selectivity for the same three, two fleets and one on survey, but it's derived from the length-based selectivity taking it throughout the growth curve. And this addressed term of reference 3, and that was to consider potential for improvements in both the parameterization of gear selectivity and/or retention, and in this case, we have 100% retention. So, we did- that we're not- that really didn't even have to be put in there. And then considered the development of the length composition [inaudible] to use that to inform selectivity. So that was something we hadn't looked at. You know, I think Todd pointed out that it had been looked at in SEDAR 30 to some degree.

So then continuing on, we'll go to the length composition fits to the trap fleet. So, I just want to point out again starts in '83, and it only goes to 2017 for the trap fleet. And you can see the misfit, so it's where the- these are the data, the gray, and then this is the fitted data. So, where you have a misfit is where there is a gap between. And so, I would point out, I noticed this- I mean, I alerted you to this earlier. In the early composition fits, here's where we have about- a certain amount of misfit, a little bit of misfit here. A few years have misfit. In general, we have pretty reasonable fits to the composition data.

And this is the dive fleet. Again, it starts at a later time period, but it goes through the entire set of years. And to get to someone's point about the diverse catch and the larger fish, we do see that in here, but also, they catch a window of fish. And we also have some misfit here, so it's not fitting perfectly there, either. And then this is- to get to the NCRMP, the visual census

survey data, and that's where you see sloppy fits particularly in the early years, noting the five-centimeter binning but also noting the load number of sample sizes.

To aggregate fits over time, again, we've taken the composites from all the years for each of the sector- fishery sectors, trap and dive, with the RV- and the RVC alone, and we see the aggregate fit. So here, again, you see there's more of a selectivity- I mean, selected keeping of the fish.

Okay. So I want to just turn your attention to the fits and another statistical measure, and that is the residual. So that would be the observed from the sampler- I'm sorry, the observed reported in the sample minus what the model is trying to do. And the model- without getting into all the weeds, the model is taking every partition in the data. So, for, let's say, for the trap fleet- this is to get you down - for that year, 1983, we had- we loaded in the number of samples for each of these two-centimeter intervals for the trap fleet and the dive fleet. So it's trying to fit the observed minus the expected, and the expected is coming from the model. And you've got to take into account that the model it's doing its minimis- its fitting over across all the data components in the model. All this is taken into context with the catch and with the indices. So it's doing a lot of things, and that's when we get at why the move to this more complicated model. Well, it allows us to see the fitting of a different data component. You'll see this to the indices too. And you saw a moment ago in the catch, although the catch, just by nature of the way SS works, is fitting perfectly because that's how it's set up. But- so now you're seeing- here are the residual scalers. So basically, a smaller bubble is a better fit, and we like to see residuals that are less than two units.

So here, we see for the trap that we've got pretty good fits. What you can see here is you've got misfitting both on the smaller sizes and the larger sizes. So meaning, the y-axis here goes from the smallest fish. The binning starts at 2 centimeters, and it goes to 70. And as you see here, we don't get a whole lot of fish above- samples above this mid-40s and so in the trap fleet. And also, you saw in evidence quickly here of misfit is in these early- the middle years, like I pointed out, in those earlier fits. So that's where your worst fits are in the early years and the lower- the later- and the middle years in this- in the trap fleet. And likewise, in the dive, you see these data holidays where there was no reporting. They basically didn't have any samples from those. And it could be infer from that, that the fishery was just starting. You know the dive fishery better than me, but we do know we had some exploitation going back here, and it's just a matter

of how were the fish being sampled. And then you have this big misfit here, but we see in that later years, most of the misfitting is in the smaller sizes. Which is maybe not unexpected because maybe it's not fitting that preferred size category that they want for their merchant or their client.

And then lastly, you have the fishery-independent survey. Again, you see the misfit, larger residuals, and you see it's gotten better in recent years. So, what I want to point out is that the survey wasn't- is not conducted now in every year. I think it's maybe in the growing years, it's going to be every year, but there are still- like, this was 2015 and '17 and then '19. So we would like to see sampling every year, but that depends on resource allocations.

So let me get to here. Did I just do that? Oh, okay. Yes. Okay. So here's where I think I might've made a mess and not made pure mess, but I have an error in the way I reported the weighting. The general- using the generalized size composition method, we can't use the internal weighting with SS that we like to because the internal weighting is not subjective. You don't have to decide when to stop when you've gotten to- your observed one, as expected, doesn't change too much. You might want to say, "Oh, I need to get it equal to third digit or significant digit or two or one," but using the generalized size composition additionally is not available. So we apply the McAllister-Ianelli, which basically adjusts the sample sizes such that it's based on the variability and the observed mean length per year. So, if you have to run SS, look at your input adjustments, input weights, and then look at the final weights that are achieved by changing the input weights according to the recommended variance adjustments, and you do that until you get them non-changing. There's a lot of subjectivity in it, and that's why we really like to go to the internal weighting that has been around for a few years, but it's not yet available. It's on the to-do list of the developer.

Okay. So now we get to some of the, what you saw early on. I don't remember who talked about it. But we're looking at that catch history from the trajectory where I showed you the overview of, kind of like, what the model results were, and somebody- and I showed you fishing mortality over the fishing mortality at SPR30. And somebody said, "Oh, well, two is not- is moderate." But what we're getting here at, and I think it was the Chair, is that the summary fishing mortality for age one-plus is the total biomass killed of age one-plus divided by total biomass and it's in the level of 0.5 to 0.6 or that range. So that's why the word moderate was chosen in this case. And so, we see that it started in about that range, and then it came down to about half of that. And it

kind of was like see-sawed back and forth until the late '90s, and then it went down, and then it just shows some up and down, kind of like in this period between 1998 or 9. It just see-sawed around the level of point of that 20%. And then it shows another decline followed by a little bit of up and down this, but mostly non-varying or variable without trend. It sits about two thousand, I think, '13.

Okay. So, this is the fleet-specific mortality, apical mortality, meaning the highest mortality across all the age groups. And so, what it tells you is what you already know, is that this is the continuous F, that it started out pretty- I don't want to say moderate. This is high, and then it increased and then it went down for the trap fleet. And so it shows this up and down, but sort of between about 0.5 and 0.8 or so for the trap fleet, and then it just has continuously gone down except the last three or four years. So, what I want to say is that we also have reason to think that the dive fleet was at a lower level of exploitation than the trap fleet. One the landing's history, and then two, because, you know, basically, what you're seeing from the landing's history, you're seeing the annual, the apical Fs for that fleet. And it shows similarly - this is interesting - an increase in F from the late '90s to a high level. It almost surpasses the trap, but it doesn't, and then it follows the same trend, though, of a decline in F through about the late 2000s, and then it actually surpasses the trap F for it- apical F, rather, and then comes down again, as you see also for the trap fleet. But again, it follows the same pattern of increasing F over the past three years.

So, these are just some- okay. SS, stock synthesis, calculates the initial mortality rate for- in this scenario, this configuration, for the trap fleet. We also calculate the annual fishing mortality rates and the recruitments. And then from those estimates- and we also calculate some information regarding the stock size, systemic stock- the stock size at the beginning of the time series. But from those estimates, then we can calculate these derived quantities, and they're derived, meaning, they're derived from those parameters, but also, they're key quantities that you want to look at to see the condition of the stock over time, so it gives you those trajectories of spawning biomass and total biomass. And so, what Jason was referring to earlier is this is the level of- the estimated level of unfished biomass. So, there is quite a difference in this. So, you know, that might be suggestive of the utility of a sensitivity on that starting stock size level or fish catch level. So, this is spawning stock biomass, and then also, we show you spawning stock biomass with a 95% confidence interval. So, what I just want to say here is that as we expect- I mean, the model starts- it's a forward projection- forward calculation model

and so it's starting from '83 forward, but we see that the confidence that are on the later years is higher- is larger, rather. We also see that the confidence interval around the unfished state is very high- very large, rather.

And finally, also another set of metrics that are very useful is this. It's the mean size- or, excuse me, age of fish- of Queen Triggerfish throughout the entire time series, and it's also the number of animals for each of these age groups over time. And so the bigger bubble- larger bubble means a larger number of animals. And so what you- first thing to take on here is that you see, over time, that you do see a couple of- you see indicators of increasing numbers of recruits in these middle set of years, and you see another pick-up here around 2004 that is being basically- by the time you get to about 2011, the indication of large numbers of recruits has gone down. You don't see a strong indication maybe in this last year, but we know we have large uncertainty on that. And so, the other thing to look at- and you can follow these year classes through, which is kind of interesting. And also, this red line is the mean age in the population over this entire trajectory. And what we're seeing basically is that the stock size- stock in the early years was at about- I think we calculated this. It's about 1.1 or so, and it went up, and you're actually- you follow, and you would expect that because, you know, you see the large [inaudible]- the next year, it's smaller, now it's being fished out. And then you've got some- you've got this decline because of recruits when they're down, they're not estimated to be large until here, and then you follow those through. But- and then you actually had an increase in mean age in the population by about 2012-ish that lasted for about three years, sort of a more stable bend, and then you see this decline in the average age. We do see one- like we said, there's uncertainty in these last estimates. There's uncertainty in all these estimates, but we see that the mean age it started at 1.1 and is about 1 point- a little bit over 1.2 2 or so.

Then again, we get to other outputs that come through stock synthesis, and we get the estimated number of recruits. I just want to say that in this preliminary- the base model run that you're seeing, we put the value of steepness in the stock recruitment as a relationship is being- was being set at 0.7, and the, the variability on recruitment was set at 0.6, which this is a typical value that is used on a lot of stock assessments because it's known that estimating sigma_R, what this is referred to in the model, and the stock recruitment model is often difficult, especially when you have a population that's- you know, you don't have contrast- a lot of contrast in the data and it's already been heavil- believed to be exploited. So, you're not at a level of

unfished state, so it's hard to get an estimate of the stock recruitment function in these lower levels. So, here we have recruitments on the y-axis in this left figure, and we've got the spawning biomass here on the bottom x-axis. And I wanted to point out the 2019 point. I was asked to find it. I found it; now I've forgotten it. I think it's- oh, here it is. It's a yellow. Here. So it was about- a spawning biomass estimate of around 40-ish tons and recruits of around 500- a little bit over 500,000.

So what you see during this time series is what you see also when we look at our age-0 recruit plots. These are age-0 by year, and we see that there's a lot of variability here. We also see quickly from this plot that we have four years of estimated high recruitments. We could go back and track them on that other plot I showed you or you can track them this way also. One, two, three, four. And so over time, you know, I think, I forgot the number exactly, but it's around 3.3-something million fish in here, and these are obviously some- we see from up here, we're going to see that we have recruitment deviations that were, in this case, our recruitment deviations are- we see trending [inaudible], so we see some evidence of some bias in the estimate recruits, but we also see that the deviations are pretty similar through the middle part of the time series and they've maybe gotten a little smaller through here.

I wanted- there was a question about, to me- when I started estimating the recruitment devs. I do have a period. The data started in '83, but basically, I set them to be estimated as far back as eighty- '75. And so, because there's no data in the model, so, like, synthesis, it doesn't have any catch data from eighty- except '83 forward. It doesn't have any compositions. It doesn't have any indices. It is estimating these based off the stock recruitment curve totally, so. And Jason and Erik know better than me and Shannon, but this is what we refer to often as a kind of a ramping up and settling in of the model. I don't want to call it the burn-in because, like, I can be corrected on this. But we attempt to get some information on the stock recruitment curve from prior to back in time. And then these- the estimate of the bias adjustment is- on the deviation is calculated internally in SS according to a very lengthy research project of Methot, Rick Methot, the developer, and Ian Taylor. And they provide guidance to the model in the model results that basically helps you decide when to ramp in the bias in terms of, like a, first year to ramp it in, to start the bias adjustment, the last year to end the bias adjustment, and they give you some guidance on that. So, I showed you the 1983 point, and the 2019 point is right here. Just want to show you there. So what this is the estimate, that is, in this last year is telling you that the spawning biomass is a little

larger than it was in '83, but the recruitments are from '83 are all smaller, and that you should be able to see that here as well.

So, okay. So this is a good time- it's almost 3 o- 2:30.

RICHARD APPELDOORN: This is a good time for questions.

NANCIE CUMMINGS: A good time for questions [inaudible] people.

RICHARD APPELDOORN: And I see one from Todd.

TODD GEDAMKE: Quick one. Where'd you get that steepness and stock recruit parameters?

NANCIE CUMMINGS: Okay. So, thank you. Okay. The stock recruitment parameter, although we did carry out profiling on the three stock recruitment parameters and on the initial F, the stock recruitment sigma_R value, as I said, was chosen. We didn't feel that it could be estimated very well, and we know that if you have a data set with very little contrast and your fishery is not- I mean, your population's not in an unfished state, it's typically hard to estimate that. So the 0.6 value was basically chosen on just expert judgment of knowing how some of these assessments run and how steepness was chosen, Todd, was somewhat- it was fixed, 0.7, but it was chosen that the profile indicates that steepness was 0.6- maybe 0.65 to a little over 0.7, and the group evaluators and internal experts were indica- I mean, basically, you could set it at 0.65- you'll see the profile shortly. That's a question we think is for the SSC here is what you want to settle on for that. So, we did profile over steepness, sigma_R, and the initial recruitment R0.

RICHARD APPELDOORN: Any other- Reni?

JORGE R. GARCÍA-SAIS: Nancie, What do you think the lack of information regarding the adults spawning population on the deeper habitats affect your spawning stock biomass estimates?

NANCIE CUMMINGS: I think it likely does for the population. I mean, I know that we have at least one witness indicating that there's maybe some fishing going on there. Whether or not how much of the fishery is exploiting the bigger fish, I don't know. I know that from looking at your [inaudible]- well, you did have a question about why that was used. You know, we looked in the literature and we did see, you know, the surveys indicating that there are some fish out there and I think the sizes were given. But those were- there wasn't a time series, and that's what we need. We need a time series of surveys out there in those deeper

waters. So, I can't tell you how much. I don't know how much of the stock is out there. I tried to- in my own mind, I tried to do some silly thing last weekend of trying to estimate- you know, we've got the fishable habitat, but then you've got- you know, where are the animals? And so, you know- in the fishable habitat- you know, and where's the exploitation occurring? Maybe some of its occurring deeper, but by and large, probably the largest proportion of the trap fleet is in- I don't want to say 25 meters, but maybe they're 40 meters, you know? They're not probably all of them out there in 60, 80 meters. But if we have surveys out there, we're going to get a lot of information. That doesn't get to your question very well.

JORGE R. GARCÍA-SAIS: Because, I mean, just for the general information we barely see any fish traps whatsoever at those depths in Puerto Rico, you know? In Saint Thomas, Virgin Islands, maybe something different. I mean, overall, the fish trapping in Puerto Rico has dropped down incredibly, so even more in these deeper areas where actually hand-lifting these fish traps, it's something- it's an effort that it's seldom seen. But my guess is that the whole analysis in general may be lacking a lot of information from these deeper areas. That's my take.

NANCIE CUMMINGS: So, to get back to what you were saying, in terms of the population, but if you're not seeing the fishery out there, maybe it's not missing as much in terms of exploitation but maybe missing something in terms of what other component of the adult biomass is out there but we don't know about. It's like, maybe it's compensating for exploitation in shore. I mean, I looked at a lot of the papers on Valdés Pizzini and others, and the folks that have done the- there's been quite a few census surveys done to describe the operations of the trap fleets, actually, all the fleets, but particularly the trap fleets and the hook and line and so forth. And so, you know, they're not really pointing to heavy exploitation of it, which is what I'm hearing from you. Now, getting at the adult biomass itself too, that would be a really- that would not just help this stock. It would help a lot of other stocks.

JORGE R. GARCÍA-SAIS: The thing is that in Puerto Rico I mean, Queen Triggerfish is not a restaurant fish, okay? I mean Queen Triggerfish is being sold mostly for empanadillas, you know, like, you know, like- so it's not a prime-quality fish, so if it gets into the market, you know? It's typically not sought for by restaurants unless they want to use it for a mixture of things, you know, that is used in empanadillas. So, in that regards, you know, people are not- there is not a a Queen Triggerfish-directed fishery. And from my standpoint, you know, I mean there might be

some people that are actually fishermen that do target that species, but in general it is not a fish that you would see in the menu of the restaurants, you know. I mean, Queen Triggerfish fried or stewed or whatever. So maybe that is one of the reasons why that stock, if you want to call it like that, on the deeper waters is pretty much unfished, you know? From my standpoint, you know, in the time that we've been there, you know, dozens if not hundreds of times, you know, out there, and there's actually no-nobody fishing out there, you know? So that's my opinion, you know? That's kind of like a section of the population which is not very strongly exploited.

NANCIE CUMMINGS: Thank you for that.

RICHARD APPELDOORN: Thank you, Reni. Todd has a question.

TODD GEDAMKE: I'll again defer to Shannon to cover, but I think that Reni, your comments, you know, I agree with you on this. I think dismissing the fact that both sampling and everything might not be on the core of the population, is just a really wrong move. And I think to your comment, we don't have time series, but we have a snapshot of at least Saint Croix. Looking at the shelf in there, you've got 30% or more of them being found in those deep waters and this is data that they've got too. So, informing that is a snapshot. And I think if you- this is going to reduce to a length-based process. I mean, let's just- that's what this model is going to do. And if you're sampling and doing everything from in-shore populations, you're not sampling the core of the population, and therefore, those bigger animals are not being represented in the population, and I think that that is problematic, so.

JORGE R. GARCÍA-SAIS: Well, that's what I'm afraid of, you know? I mean I'm not coming that strongly, I feel, but it’s where I'm coming from, you know?

RICHARD APPELDOORN: Okay. Nelson?

NELSON CRESPO: Totally agree with Reni comments. And also, I wish to see in the future the Queen Triggerfish in our restaurant plates because it's an excellent fish. But now, more than that, especially in the west coast of Puerto Rico, they started developing from the past years the live baiting fish, and the people that make the empanadilla prefer to use blackfin tuna to make empanadillas because they feel like the whole fish got more meat instead peeling the Queen Trigger. You know, and start, you know, passing a hard work, you know? [laughter] You need the meat to make the turnovers

from whatever you take it, you know? They want easy way to reduce the cost.

RICHARD APPELDOORN: Julian, you have a comment related to this?

JULIAN MAGRAS: Well, I have a comment. Julian Magras, for the record. I have a comment to one of the slides that was there, in the different drops in certain years, and the question goes to Nancie. You know, I just did a little Google there on my phone, and I was looking at the different hurricanes that pass through and was that taken into consideration for those drops? Because I haven't heard anything about storms or hurricanes that may have affected the years in those drops.

And then to comment, Todd brought up twice or three times about the Saint Croix study and they are caught more in the deeper waters, you know, I can see that because Saint Croix only has a Lang Bank that's really the shallow waters that they can fish, so everything else around that area is deeper water. So maybe where those fish hang out in the Saint Croix area is because of the habitat that they have to actually live in. And, you know, I've seen several pictures by Nicky where if he baits his trap with conch guts after catching a conch, you know, the size, humongous size of Triggerfish that they catch. I'm hoping that maybe that he shared those pictures with you when you're looking at Saint Croix. I do have plenty of pictures for Saint Thomas, but Saint Thomas well, you know, we're not there. But I just wanted to make the comments on mainly strictly on those years of drops, if storms and hurricanes were taken into consideration.

NANCIE CUMMINGS: So yes, and I think 1989 was the big storm for Puerto Rico, you know? and because the storm goes through Saint Thomas, does it mean that on way, you know, hits the core, hits Saint Thomas, and the winds don't bother Puerto Rico? So, we know that that- there- especially if it's wide. But in the modeling aspect, it wasn't, and, and that is something that, you know, now is on our, you know, we're strongly encouraged to take climate into effect and environmental- also in the other environmental context in terms of storms and so forth. It was not taken into account in the model that year. But other things that have to be looked at, and I was hoping that we could get like a license history because I know that over the period of years, especially in the 2000s, there has been another set of, you know, when a storm comes through and it wipes out the trappers, and it's expensive to build these traps, and often the fishers [inaudible] is expensive. They don't necessarily build the traps back. And we know there's some also death of traps. Maybe that's not as big of a problem as the, you know, the drop in licenses, and that's where I think now,

you know, the Center, we also need to further engage with our regional office in terms of developing a license history to see how the licenses were dropped. I know that there's strong, at least, written support that licenses have gone down, so we have less effort, quote-unquote, "total effort capacity" in the fleet, in the fishery as a whole, and so.

RICHARD APPELDOORN: Okay. Marcos, and then Shannon.

MARCOS HANKE: I'll like to defer to Shannon, and I go after her.

RICHARD APPELDOORN: Yup. You go.

SHANNON CASS-CALAY: Well, you know, the hurricanes are only in the model in the sense that they impact any data, right, the length competition, the effort data, the catch data. But we didn't put any ecological indicator in the stock assessment model, although, it can be done if they can be tied to a mechanism, right? So for example, in the Gulf of Mexico, we have red tide indicators and we have estimates that they do kill adult fish, and so we use it as a episodic natural mortality that occurs in the stock assessment. But nothing like that has been done in the Caribbean to date. Now, I would say, you know, there are a number of data insufficiencies. We are certainly aware of them. I do want to remind the group that while you are certainly charged with determining whether this assessment can be used to develop management advice, what we're using today is just a time series' recent landings alone, and the landings data themselves are uncertain. So, I just wanted to keep that in mind that we're not able to construct a perfect stock assessment model and we're not able to model our way out of all of these data insufficiencies, but what we could do is show you some hypothesis testing. So, for example, you talked about maybe there are a lot of fish in deep water, some kind of cryptic biomass that we don't see in the stock assessment. You know, we could, in theory, as a sensitivity run, fix the trap selectivity at domed and get at whether the model indicates that there might be cryptic biomass. So that's something that can be explored. That's all. Thanks.

MARCOS HANKE: Thank you. I was just hoping to hear something on that line, and this is exactly the point that I wanted to give. From a fisherman perspective and talking to the DAP people, the study that Reni are alluding to, right, even though it's not the ideal one that we want to have around the island, many, many dives and so on, it's the best available information we have about the spawning- increasing the spawning potential and is observed by a scientist down in the water. And for us, it's really hard to see a study like that being passed by, not giving the weight that it

should have, or at least be a reason to stimulate more funding or more effort to get that information to the table. And this is the point that I wanted to bring to the table is that sometimes, you- there is a lot of weight in some data and there is a lot of assumptions in some data, and sometimes, we just forget to consider important information like the one that Reni observed on the deeper waters that we don't know much about it, and we need that information.

Another question that I have to the group, I saw you guys were discussing about recruitment potential and I didn't hear about Triggerfish. What are the elements that affect their recruitment potential over the years and those numbers? And for example, we have the influx of sargassum arriving since the 11 years ago and how those fits into the model and so on. And those are my observations and questions at the same time. Thank you.

RICHARD APPELDOORN: Shannon, you have a response to that, or-

SHANNON CASS-CALAY: Thanks. This is Shannon. I never say my name. My apologies. So, I think one thing that is very helpful when we come to data workshops, data scoping calls, you know, is a- we really need to put in any kind of like an ecological indicator into a stock assessment. We need to identify a mechanism, right? So, if you are saying, for example, that there is a hurricane that you would like to know how that might've impacted the model, we need to know what does the hurricane do in terms of the population dynamics, you know? Does it kill adult fish? Does it increase predation? Does it stir up potential settlement sites? You know, there has to be a mechanism that we can test in the stock assessment model. And so, I think in a- I'm hearing a lot of good work that's out there that may or may not have been fully considered, but what's often lacking when we try to populate a model is that mechanism component. Like, what action does this ecological indicator have on the population?

JUAN J. CRUZ MOTTA: A quick question to that. Has to be quantitative, that mechanism, like [inaudible] strength of-

SHANNON CASS-CALAY: It needs to be quantitative, but we at least need to know the parameter that it acts upon in the model. For example, is it natural mortality? Is it growth? Is it recruitment? And then we can start to think about how we would link that ecological indicator into the parameter estimation within the stock assessment model.

JUAN J. CRUZ MOTTA: For example, it has to be like this wind speed I mean, an increase of two in the wind speed will decrease by two the survival? That will be the way it should be phrased.

SHANNON CASS-CALAY: Right. Yes.

JUAN J. CRUZ MOTTA: So, for that, like, basic research needs to be done on the relationship of that driver and, uh- okay. Thank you.

SHANNON CASS-CALAY: Yep. Exactly. Thanks.

RICHARD APPELDOORN: So, a statistical correlation between something and something else without a proposed mechanism, you would not find useful?

SHANNON CASS-CALAY: Well, it's very difficult to use something like that because it does not have- you know, we don't know- it has to change. It has to have an action on a parameter that's estimated in the stock assessment model, essentially.

RICHARD APPELDOORN: But if you had a correlation, you would have a correlation between, you know, I don't know, temperature and something, and I'm sure that something is somewhere in the model. You wouldn't know why it happens. And of course, without that, you're taking on faith that this will continue as such in the future, and to me, that's the danger part. But I think it'd be informative, nevertheless. I think we're kind of getting a little off topic, but.

ERIK H. WILLIAMS: Yeah. Hang on. This is Erik. [inaudible]-get back into the model particulars. I had a question or a clarifying question about how the model likelihood components were weighted. So, I know there was mention of the McAllister-Ianelli method for the composition data, but how were indices reweighted?

NANCIE CUMMINGS: Okay. They were manually adjusted, Erik. According to the recommended variance adjustments for each of the different indices. So in this case, there were just two, so they were manually- and they're- Okay. So you also asked a question - now I'm remembering - why it was not just another parameter estimated for the extra variance on that, and they were. It was put on there initially, and then that extra variance was estimated to be close to zero. So then that was dropped off, but we still kept in there. We didn't have the- at the initial part, we did not use the manual adjustments. At the same time, we were including the extra weighting, the extra parameter. But when those two, for the two fleets, for the trap and the NCRMP, when that parameter-

then the estimate was very close to zero, then that was turned off, and then we actually still kept the- or added in the manual adjustment.

RICHARD APPELDOORN: Okay. Todd?

ERIK H. WILLIAMS: So what were you adjusting, then? The variance input or a weighting factor on the likelihood component?

NANCIE CUMMINGS: The weighting factor on the- hold on. Just one second. I'm sorry. The former, the variance.

ERIK H. WILLIAMS: The variance?

NANCIE CUMMINGS: Yeah. There was no lambdas, we did not use any lambdas in this model.

ERIK H. WILLIAMS: So, when you- could you go back to the index figure.

NANCIE CUMMINGS: Oh, the figure? Okay. Let me find it. Yes. Just- oops. Oh. Hmm.

LIAJAY RIVERA GARCÍA: Oh. No. Nope. go to the PowerPoint.

NANCIE CUMMINGS: Sorry. I lost my PowerPoint. Here? Wait, this one?

LIAJAY RIVERA GARCÍA: Nope.

NANCIE CUMMINGS: Oops. Sorry. Come down to it. I mean, [inaudible] right here. Right here? [Whole?] questions? Just a second. We're just trying to get back to the presentation. It was there a moment ago.

LIAJAY RIVERA GARCÍA: Yeah, I know. Is it this one? Yes. This one?

NANCIE CUMMINGS: SSC version six.

LIAJAY RIVERA GARCÍA: Is it this one?

NANCIE CUMMINGS: Yes. Okay. Can I exit?

LIAJAY RIVERA GARCÍA: No, just don't click on the keyboard.

NANCIE CUMMINGS: Yeah, but I want to go back and back. Ugh. That’s going to-

LIAJAY RIVERA GARCÍA: Okay. You can go here.

NANCIE CUMMINGS: Hmm. I think it's right- coming up. Okay. Here you are, Erik. Trap. and there was [crosstalk]-

ERIK H. WILLIAMS: Yeah. So if you're adjusting the CV for the fit should you not be adjusting that on these error bars at well so that we see the error bars of the CV that was assumed in the fit? This looks like it's just the CV- the error bar is from the actual data.

NANCIE CUMMINGS: It is.

ERIK H. WILLIAMS: And I ask that question because the big problem is that the CVs that you get out of GLM analysis are just- they're incorrect. They're not useful in terms of determining the fit in the model. They're helpful in determining the relative value of year-to-year data points within that data set, but it doesn't tell you anything about the value of that data set with respect to the whole model. So- And I didn't see in the report what are those weights? What was the assumed CV, then, for these indices over the final fit?

NANCIE CUMMINGS: It was the CV that's coming off the model, the model estimate, the input model estimate, and then that's what's being adjusted, that error on that- the CV on that. So it is-

ERIK H. WILLIAMS: Right. So what's that final adjustment look like? What is it? How- what's the final CV estimate being assumed with these indices?

NANCIE CUMMINGS: Okay. So this is- yeah. This is coming- I'd have to go back and look at a plot of that. I don't think we have that here in the presentation. Yeah.

ERIK H. WILLIAMS: Yeah. It's going to be important. There are a couple things that are starting to worry me about this assessment model. One is how the weighting of these indices occur in the model. The other is, I noticed in the composition data, you used the McAllister and Ianelli method for reweighting. The issue there is you have a lot of zeroes. You have a lot of composition points where you're fitting to z- where there's no data. At least, it looks that way. You should not be putting zero. It shouldn't be fitting to, say, those compositions that are out past 60 if you have no data at all past 60. You're actually causing a potential bias in the fitting with those compositions.

NANCIE CUMMINGS: Right. Right. Yeah. And so for where the zeroes are in the early part, there are sizes down to two centimeters actually, which I'm not sure if it's believable, but there are some observed samples down to two to four centimeters. It is these up-upper end that have-

ERIK H. WILLIAMS: Anyways, that should be checked because you really need to minimize the number of zeroes that you fit into it because zeroes have a lot of influence in multinomial data.

NANCIE CUMMINGS: You're right. A num- yeah. Thank you, okay.

RICHARD APPELDOORN: Yeah. So I think we'll be discussing this in the morning, so that'd give you some time to check your computer, Nancie, to see where you might have the plots you were referring to that would help answer that question. yeah. Todd?

TODD GEDAMKE: Erik, thank you so much. I appreciate those comments. I just wanted to follow up on what Shannon said. And I'm sorry there's a disconnect. I know Julian had a comment too. But what Shannon just said before about the correlation and looking at environmental data and plugging in, this is exactly the lunch conversation, I mean, verbatim, that we just had regarding socioeconomic information. I just think it's very important for all of us as part of this committee to recognize that where Shannon is coming from on this is where we're all kind of pigeonholed into this. It has to be a quantitative metric. So, the correlation, I mean, the details of the correlation are- if you can come up with an equation and you look at your dependent variable, yes, you can look at it that way, but you have to have basically an adjustment to an existing parameter that's going on there. And I just- I want to repeat that because we literally just had this, the same- sort of same lunch discussion.

RICHARD APPELDOORN: I have to get Nancie and then Julian. Microphone, Nancie.

NANCIE CUMMINGS: Yup. Just to get back at Vance's question about did you take into account the storms and so forth on these drops. So, in essence, that's taken care of because the participa- or the fishery, the trappers don't- or the dive fleet- they don't go out because you can't fish. And if there's been a weather storm and it's perturbed the habitat, they're not fishing, so that takes- that is taken to account in the model through landings, the landings and the reported landings, whether they're right or wrong, but that's taken into a- And then the other thing that's really important in this fishery is the declining amount of effort, and that is also borne through by- you know, I don't need to have a

license history, but if there are fewer participants in the fishery, then there's less effort, and that's- you know. So at least those two phenomena, I think, have been- they're taken into account indirectly because of the participation in the fleet. And also, you know, if the storms blow away all the traps and they can't afford to rebuild them, which we know is the case in some cases and has been in the recent years especially, then they aren't in the fishery, so there's less capacity.

JULIAN MAGRAS: Julian Magras, for the record. I was going to say s-something similar to what Nancie just said. So, you said it falls into the equation. I don't see anywhere where it's mentioned that it was taken into consideration. Every time a storm passes, sure, we have many fishers that lose some type of gear. Perfect example was Irma and María. We lost everything. Took us a long period of time to get back, and some of us are still getting back, and some of them never came back. But we go all the way back, 1989, 2005, 1995, those are all years of big storm that hit U.S. Virgin Islands and Puerto Rico. Not because it hit the Virgin Islands, it doesn't affect Puerto Rico. It does. And every one of the models that I've been watching, and I see that drop, there was a major storm that passed through there. Some fishers don't have any more traps. They go to diving when they can. Some of them lose their boats, so they have to go back and lose a boat. And all we want to ensure because this is our livelihood. We don’t want to go overfishing and all the fish to disappear because there's really nothing that's showing that that stock is in danger. And if a stock is in danger and it can be proven by data that there's a reason why it's being overfished, that's something different, but we are talking about the Queen Triggerfish, and there's nothing that's indicating that that stock is in trouble. And I continue to put it out there, every, every little bit and pieces of data needs to be included in what we're doing. And, you know, we spend so much time and so much money doing these assessments, which are great, but you know what? I would like to see - and I don't think this might be the time, maybe when we're wrapping up tomorrow - is instead of us wasting all the money to do this, before we do it, make sure we have what we needed because now at the end of the day, we're going to say, "Well, we need all of this," and then we're going to spend millions of dollars again to do this all over again, and it frustrate the fishermen. And I know it's not you, but I'm just putting it out there. Thank you.

RICHARD APPELDOORN: All right. again, let's try to keep things on point. There was a very long process to try and identify all the things and the data available and how that fits up. And as Shannon has explained, there's still lots we don't know, and we work with what we have. Shannon?

SHANNON CASS-CALAY: Yeah. I saw Kevin's hand shoot up to, and we're very likely thinking of the same thoughts. But it is one of the things that we are producing is a data triage that will actually be able to give you better information about which stocks might be assessable. And so, if there's simply not enough data, we would not move forward with the stock assessment on that species. But I think we might also need to think in the Caribbean about introducing another review step in this process, which is at the data stage. Basically, once we get all the final data, do we have enough to move forward, or should we stop at that point and just make research recommendations? Because I don't know that it's worth spending a lot of time and effort to create stock assessments if, in fact, it's the data insufficiencies that prevent you from using the work.

TODD GEDAMKE: Excellent, Shannon. I think that that's a great idea. Also, looking through the data sets in there, I think that that may get us out of the situation of forcing things when we're trying to really make an assessment and struggling with some of the inputs. Todd, by the way. Sorry, transcriber.

RICHARD APPELDOORN: All right. Not seeing any other hands. I see we're going to start a new section here. So, we're scheduled for a break, and I'm suggesting we do that now. It's 3:05 according to my computer, so 3:20, we resume.

(Whereupon, a brief recess was taken.)

RICHARD APPELDOORN: Okay. Let's get started again. Nancie it's back to you. You mentioned to me you had a response to- or you wanted to address an issue that Erik had raised. We can start with that.

NANCIE CUMMINGS: Thank you, Chair. So, I'll have another second response in the morning, but. So, I just wanted to answer to Erik what's happening with the- you probably know better than me also- is that the variance adjustment is being added to the standard deviation of the log survey. And so, I just didn't put the final- I mean, I put the finals on in the plot, but I just didn't show the- I'm going to prepare a table and show you what the initial ones were. But the data weighting is critical to this assessment, and just to also note that we really, you know, only have- we don't have age compositions in the model. We just have the length compositions and the indices, so there's very few components to weight, but. So that's what it's doing. It's adding a value to to the variance.

ERIK H. WILLIAMS: Thanks, Nancie.

NANCIE CUMMINGS: You're quite welcome. I'm sure we'll continue to be in touch on data weighing. Okay. So just as a point, though, for the group here, because we're all learning, is that it's really important to get this- I mean, maybe you don't want to data weight at all, but we know that all model components- all data components, rather, are not equal in terms of our certainty around them. And so, that's one of the reasons that we weigh because- to try to account for some of our uncertainties.

So, the next section is going to be on the work that we've done to explore the stability and performance of the model. It's just called our base model diagnostics. And we have- I'm sorry. We've looked at the stability of the model to be able to estimate or to reach the lowest likelihood value across a number of runs. And that means when we say different runs, we have gone into the model and we've told it to- for the parameters of that are being estimated, R0 is one that's being estimated, this initial Fs. We've fixed the stock recruitment parameters and we're estimating recruitments. We know we have a constraining model, but we are changing those. We are asking- allowing SS to change the parameter by 20%, and I've run two hundred of those runs. And I'll have to say that with my experience with the Gulf of Mexico, several models, Gulf of- Amberjack in particular, I've never been able to [inaudible] by more than about 10% because it- the model, you know, it can go off in unsettling places. It is also recommended that - and this makes sense - by the modeler/developer that, you know, that when you're setting up the model, you give it a min and a max value, you know, to set your bounds with changing the parameters for the model to be able to find its best solution, and those bounds need to be sensible. You don't want the model running off because it can settle into some place that's not- just not reasonable.

So, what you have here is a plot. You have four plots in three panels, and they're giving you the change in likelihood for these different components in the model, and this is the total. So, this would be across all the components, what is the total likelihood. So what SS is doing is- remember, we said it's an integrated model. It's fitting across all these different components in the model: the survey indices, the size frequencies. It's estimating recruitment. The catch- remember, we said that with SS, actually, it's almost estimated exactly, and so we are then looking at that change in likelihood. So, you see a few runs. So, this is basically 200 runs and it's basically saying there's really almost no change here. There is some change because we see that reflected in some of these runs here. So-

RICHARD APPELDOORN: Nancie, just a point of clarification. This is Rich. So is this like a sensitivity analysis of or is this separate from that?

NANCIE CUMMINGS: No, it- no, it isn't

RICHARD APPELDOORN: Okay.

NANCIE CUMMINGS: It's, basically- we call it a stability analysis because you want the model over a series- not a series, but over a set of changes, you're changing the parameter values, let's say, the initial Fs on- F on the- excuse me, the F on 1983F, 1984F. The initial F for the trap fleet, meaning that nineteen eighty-three va- eighty-two value, you want to change those by a certain percent, refit the model, keep those results, go through and do it again and again and again. And you want it to settle on the total likelihood then is- this is a change in likelihood. I can give you the number for the total likeli- but you want that number to not be changing greatly, largely. You want it to settle on the similar- you want to settle on the lowest likelihood too. In other words, my base model that I've chosen with- before jittering, my base model settled on a likelihood of X. Let's say 129 because I think that's the number that's very familiar in my mind. And you want to run your model after you jitter, you want to gather all those results, and you want to look at those, and you really don't want to find a lower number because in other words, you would say, "Well, after jittering, SS found some other best model." So that might mean that, with the base model, it might mean that it's not the best model. So-

RICHARD APPELDOORN: Okay. Thank you. I think I get it now.

NANCIE CUMMINGS: You're welcome. And I just want to say here, as you know, our basic biggest components were size frequency and then survey. Okay. So we profile- okay. So this is now a set of additional diagnostics. It's sort of the same a- it's similar to stability, but what we're doing is we want to profile- we want to hold- we want to allow R0 to change. In this case, we let it change from- we moved it from 4 to 9 of ln(R0), the log of R0. That's that recruitment, that biomass, that unfished recruitment. We want to profile over that while holding everything else in the model constant, the same, so we're not changing it. We like to see how- this is, again, the change in log likelihood. We'd like to see how this changes over this bound range. And so we also know that, again, the generalized size comp and the index data are the largest contributors to the likelihood and the overall model. So what you'd like to see is that this basically forms- finds a trough, so it's

finding the lowest change in log likelihood, and it's- for R0- I'll talk about this in a minute. The base model estimate of 6.67, right in here, or this many thousands of fish. So, you want to see the different data components converge with similar R0. In this case, it's basically- you know, catches basically fit perfectly in this. It's not part of this. It's not really factoring in.

This is the index data, and it's basically saying that- it's very hard to see this here, but it starts- it's sort of flat, has very little- it's not totally non-informative, but it does give some information because it does go back up here. So, we're seeing that in general, the index data suggest a similar R0, as does the base model, and then we also see that in the generalized size comp. That is over here. It's quite noisy over here, but then it comes down, and it's also suggesting an R0 of somewhere at least between about, you know, 6.4-ish, and it starts to go up, up here again. So, we're upholding R0 constant in the first, and then we start moving it. We start changing R0. I believe this- I had done this at 0.005.

And then similarly, we do the same thing for steepness and then sigma_R. So, what I want to comment here is that we have more noise in the in the steepness fit, which made, at least, me be a little uncertain about what was the could- the base model, actually, could it estimate steepness. And it's adjusting that steepness, at least, if you look at the data component, the impact on the change in log likelihood from the size data, that it comes down, and there is this trough. So it could be anywhere from point, you know, 0.6 to- it starts going back up here to about point about 0.7-ish, 0.68. And then, basically, the size of the index data are not on here because they were had no change. They just went on the scale. It would have to have a different scale to have shown them, but they didn't really were not informative. But you do see that for the total, which has all the pieces in it, all the data components in it reaches this at about seven point 0.75. And then for the recruitment portion, it continues to go down, but it suggests that it's somewhere bet- you know, from 0.8 to 0.85. Okay. So, I say that there's still some uncertainty in the in whether or not the model can estimate steepness.

And then for sigma_R it's the same hypothesis that you're trying to see if the model can estimate sigma_R of this parameter, rather, and what are the other components contributing to it. So, the MLE from the base model, the lowest point, was 0.974, so right in here. There was some support that the sigma_R is greater than 0.6 and less than 1.2, so you're in this, this broad region. But, you know, as we stated several times before, from stock assessments- many stock assessments it's well known that it's difficult to estimate

steepness, and particularly when you don't- I mean, sigma_R- when you don't have contrast in the data and when you- when you also don't have information on the s- on the stock back in the unfished stake- state.

Okay. And then because we have questions about what was happening at the beginning of the time series, we do know from- there's an extensive amount of literature suggesting that there was- supporting that there was exploitation going on back into at least the '70s, maybe the late '60s but we still don't really know. So, we fixed initial F and then we profiled over that different values of initial F. So, the model estimated the value of steepness at- this shouldn't say steepness. This should say initial F at 0.97. Okay. So then where we get the range from is then, you know, in our min and maxes that we've used to set the range for SS to estimate initial F with the base model. We see that, you know, it was nowhere near under 0.5, so then I we started- we actually did many profiles on this, but then we start trying to home in on this one point, on this area in here. So, it's suggesting that with the index data, again, you, you see it coming- it goes up a bit and then it tends to go down. So, the index data, again, are less informative than the overall model than are the generalized size comp. The generalized size comp is suggesting that it comes down, but it could be as high as 1.2. So, we s- we still aren't- you know, we still have some uncertainty in where the initial F is.

Okay. So, you asked a question about sensitivities. So, we know we have sensitivities in the model to different time series of data. So, one typical sensitivity that's done with SS, and its sort of one that's always done, is to take out whole years of data, and the next kind of sensitivity that's done is to remove different insets of indices if you have those. And so, what this does, it measures the relative difference between the estimated value such as your- you can choose certain values, the key quantities, spawning stock biomass, and your Fs, recruitment and other parameters so that you can basically calculate what that difference- those differences are, and you could see the impact. So, what we've done here in the blue is that this is the full data set, so then we start removing data. Here in the green, we've removed 2019. So, you could see there is some difference. So, this is going from- you have to read it on the screen. It's very hard. You can start calculating these percent differences in SSB, but we would expect some difference. And so, here- I'm not going to try to estimate these numbers just off the screen because I think it's meaningless. So, what you want to see, there's no huge- just big disparity. So, in general, we see that when we take out all of the data we still have- this point it should- you know, if it's going to line up, it'd be right up here. In other words, it would mean

that if you've taken out every- all the years from 2016 to 2019, it didn't make a difference. It would be here. So, when we take out 2016 to 2019, basically, it's saying that the spawning stock biomass from that year, for 2016, is lower than it was in the full model. And so similarly, these, I should say, these are 95% confidence intervals, they're kind of broad. If we do the same thing for absolute F- so this is F in the terminal year, and then we see that if we remove all the data- I'm going from the extreme. So here we have all the data, and here we have the extremes where we've removed 2016 to 2019. So, in the slide before, you saw that if we removed all those years, we had lower SSBs, which would, in turn, suggest that we would have higher F, and that's, in fact, what it does.

Then here, this is the same type of sensitivity, so a sensitivity to removing whole years of data, and then this is for- the metric is age-0 recruits. And so again, you know, we know that our estimates of recruits have high variability, and you saw just from thebase results, I showed you those plots of estimated recruits, and you saw those four years ahead had high variability. Okay. So here, this is the base year, and the confidence interval is what- I don't know what the word would be, moderate or whatever. It's going from about 0.2 to 0.7, so it's not small. But again, we see that going back in time, as we remove data, we actually, we have higher- larger uncertainty also, which is also not unexpected.

Okay. And then so what we've taken here, we've just taken all those various runs, so there would be one, two, three, five runs, and the blue is our base model. And I say- basically, as I showed you before, the base model was- okay, this was 6.67 or something like that, so now it's basically saying that as we remove data - this was estimated R0 - that it becomes- it's a little broader if we're removing data. So, this says the confidence interval- I'm probably stretching this discussion a little bit more than I should at this point, but it's basically moving it a little bit to the right.

Okay. And then another type of sensitivity is- I think someone mentioned earlier- I don't know who it was, but- and then that's not really important, is what's the effect on the- here we only have two indices, and some of the stock assessments in the Atlantic and the Gulf, you may have, you know, 10 indices, you know, but we only had two. So, what's the impact on a key metric such as spawning stock biomass recruits the fishing mortality on dropping data. So here, what we do is the base model is in blue and we've dropped all the indices. So, in other words, when you drop all the indices- this is, like, another extreme one. We only have the left data in there. So, if you look at this line in green, it's basically pushing this SSB up. Okay. And again, all the years of the data is

in this sensitivity because the point here is not to look at, you know, removing years of data. It's to remove an index. So we do see there is some disparity between the data sources, as might be suggested, as when the commercial trap index is removed, the estimate of SSB in the terminal year is higher. So that would be the- trap is yellow, and so actually says that if you keep the RVC index and you notice that- if you recall, that RVC index spiked up in the end of the years- I mean, the end years.

Okay. And likewise, age-0, again, these are confidence intervals, 95% confidence intervals. We want to- so I guess if- this is- you know, one of the things that we request of you is your input on the quality of these data, on these indices and compositions as to, you know, we don't see- I have to say, we don't see anything systematically going crazy here, but we do see some differences. And that's, again, the fishing mortality rates.

Okay. And then, again, our density. So here, knowing that the base model settled in here, as you drop- I'm going to go to the extreme and drop all the indices, which is green. It falls- if you drop all the indices, it does- it falls a little bit to the right of the base model, quite a bit to the right in terms of the density of R0.

So, we can take questions here. excuse me. So there's many other sensitivities that can be done, and as we've talked about, whether they're growth parameter inputs, removing data. Initially, when I was configuring the model, I did explore dropping some of the early years of the data and it didn't- but at that point, the model hadn't been fully configured, so it's not really, you know, good to say those results weren't- they were non-changing. They didn't make an impact. But at that point, we were still trying to estimate a lot of the selectivity parameters. Okay. So I take that to me-

RICHARD APPELDOORN: Well, I just- if you go back to the previous slide, just so I understand kind of how to look at this. When you dropped the trap, that's when you had the biggest change, correct? And so that would mean that the RVC is having- well, not necessarily a lot of impact, but we had that increase in the RVC index in those last three years. And so, if you drop the trap, the trap isn't basically not there to control for that, and so those little increases are then having a larger impact, or something like that. Is that, like, kind of how it works?

NANCIE CUMMINGS: Well- okay. So, the base model has settled on about six point se- let's just say that's the truth right now. We don't know if that's the truth. And then if I drop the trap- so ignore the green for a moment, if you will. Look at the red, the

yellow, and the blue. If I drop the trap, it's basically saying that- this is the median estimate, is a little higher than the base model on your R0, that virgin biomass, and it's saying that if you drop the RVC, it's a little lower. So that's your space, 6.7, let's say, versus you know, 6.5 versus - this is the median – 6.9 oh, excuse me, 6.73. So, it has- both of these- one pushes it up and one pushes it back. But remember these still have all the comp data in them, and the comp is driving the analysis, the composition data, and that's expec- I mean, that happens in a lot of the stock assessments. One thing is that you have more- the composition data, you've got more partitions, so you've got more likelihood. And Jason and Erik can, can correct me if we're goofing up.

So, I think the thing to look at this, Rich, and your team is this. If you start to back here with all these sensitivities on the- you could do all the parameters- you could do every parameter but is to look for huge disparities. You know that you're going to have possibly, there's always an opportunity to have differences, but what are you looking for are systematic, you know, indications of systematic problems, which would suggest you got some modeling configuration issues, and it could just be bad data. We did find, I think it was the Saint Thomas model, where we had a change in the recruits- the recruit profile here- this trajectory, rather, and once looking at the data, we saw that we had a really low sample size in the Saint Thomas fishery and that were all small fish. And so, it was a sampling thing. I mean, it had very, very low sample sizes. So, it could suggest- oh. I mean, sometimes- and Shannon can just maybe talk about this too, with the- I think it's yellowtail flounder up in the New England areas' big systematic retrospective biases, and that they really haven't been able to put their finger on. And the lack of retrospective patterns does not mean you don't have a retrospective pattern. It just means it hasn't been shown, you know, so this is correlation/expectation thing. So, the one thing the look at here in studying these is to look at your bans. If you drop the 2018 and '19 points, they're still within- the confidence interval is- on the top is within the base model, but on the lower end, it's outside. So, it's to look for systematic, large disparities in your point estimates. And we also just want to look that we are interested in this last point. So, we'd like- you know, because we're going to project forward, so.

RICHARD APPELDOORN: Yeah. Thank you, Nancie. The answer was buried in a much longer explanation than I needed, but [laughter] but thank you.

NANCIE CUMMINGS: I'm just trying to do my job.

RICHARD APPELDOORN: Okay. Doug?

DOUGLAS GREGORY: Yes. Thank you and thank you, Nancie. It's all very good. I would say, I do see the retrospective patterns, but I'm not- I'll leave it to others to judge whether they're significant or problematic or not, but they're there. And the final graph you gave, the density graphs, the most changed- the scale of the x-axis is very small, but it looks to me that the picture looks more dramatic than reality. But it's very nice.

My interest or concern right now is with the- I guess, your RVC, the underwater visual survey. The number- the index itself has no real resolution. The average has very small numbers of fish, and the data's highly skewed. And the graphs, in my interpretation, these graphs suggest to me that that data has little influence on the model, yet in the verbiage of the stock assessment, page 33, when you're discussing the index sensitivities, it says, "The removal of the RVC index shows the strong influence of key derived parameters on this data source. This is likely due to part of the large influence of the RVC length composition data on the overall base model fit." So my thought was if that was true, I think that index is biasing the model in a way that's larger than- has a greater influence than the data of the half. So that's my real concern, not the other stuff with the retrospective analysis, but with this index itself. It seems to me that this index is having a big influence and it has little resolution, and it has more influence than even the trap index when you remove it. To me, that's problematic. Can you straighten me out?

NANCIE CUMMINGS: I cannot straighten you out, but I can offer some little support on one thing. I do think the RVC index, it more- it mimics the, um- excuse me. It results in similar estimates of the base model than does the trap index. If you remove the trap index, then the SSB- in this case, SSB, is increased. And the comment regarding removing all the indices is just that it- again, the composition data- they're carrying the model in terms of the influence because we remove all the indices it's higher, so they don't- you know. May be wrong there. No, that's correct. Yeah.

DOUGLAS GREGORY: No, my only concern is with the RVC index, not with the trap index. Now I know we want- we like to have a fishery-independent index, but this doesn't seem to be a very good one, but it's all we've got.

NANCIE CUMMINGS: So my question to you about, you said, small numbers of fish for the RVC, do you mean the density calculation, or you're talking about the small sizes? We- what-?

DOUGLAS GREGORY: The small numbers of fish that were observed over the years and, you know, the lack of resolution in the trend. I mean, to me looking at the index graph early on, it has no trend.

NANCIE CUMMINGS: Right. I agree with you. It has little trend, but it has high variability.

DOUGLAS GREGORY: And that variability is skewed, skewed to the larger numbers of fish, which doesn't translate directly to the size of fish, but it might.

NANCIE CUMMINGS: Well, the one thing I want to point out too, and this is- I should've reported this earlier when I was talking about- it was really, in essence, a pros-and-cons question that I can't- I think it was Jason that asked us off the cuff- I mean, not off the cuff, but outside, and that was with the pros and cons. And the RVC index is not, you know, it's not 365 days a year, so it's not out there. You know, it's a systematic- statistical design. I'm sure it's a very good statistical design, but it is not- it's a snapshot in time. Yes, it has been increased in the recent years, but that's only in the recent three years. And yes, it does have low number of dives as well. So, we realize that, so it is not an apples-to-apples. And I think the question was, if the two indices are supposed to be tracking the same thing, then which one- you know, look at the pros and cons. Make a decision. I don't think they're tracking the same thing either because of the spatial distribution up to 30 meters, and I don't think they're picking up all the part of the comp- even the part of the population that's being fished on. Much less the part that we're not seeing in the deeper water. We know it's not picking up those because they're only going to 30 meters. But I only think- I don't think it's overlapping in space or time the same as the trap index. So that's my point about that. Thank you, Doug.

RICHARD APPELDOORN: Doug, I have a question just on your statement, and then we'll go to Shannon. You initially said that you're contrasting what the graphs were saying about the RVC with a statement in the text, and I think you gave a page number for that. Did you have that?

NANCIE CUMMINGS: 33.

RICHARD APPELDOORN: 33? Okay.

DOUGLAS GREGORY: Yes. It’s page 33.

RICHARD APPELDOORN: All right. Thank you. Shannon?

SHANNON CASS-CALAY: So, the sentence that Doug read out is in the report, but it is just a typographical error. It has very little influence. The length composition data may have more, but you'll see right here with the trends here in blue is the SEDAR 80 base run and in red is dropping the RVC index, and they're virtually identical. It has the least influence of the indices. So it's a typographical error which we'll correct.

NANCIE CUMMINGS: Right. But it- to extend that, neither index have as much influence in the model as do the composition data. That was the take on there too.

DOUGLAS GREGORY: Well, that resolves what I thought was a conflict from what I saw and what I read. Thank you.

RICHARD APPELDOORN: Okay. Nancie, on to the next section.

NANCIE CUMMINGS: Okay. So, the next section is just going to deal with carrying on from the base model, then into the section where we try to get some sense of stock status, and then we'll talk about the projection setups. But prior to that, you know, how to calculate stock status it depends upon your benchmarks. And so we are operating on the terms of reference. Oops. This is very sensitive.

Okay. The management definitions as specified under the status determination criteria, and they're stated in the SEDAR terms of reference for SEDAR 80. MSY proxy is the yield at F_SPR30. The minimum stock size threshold is calculated as 0.75 or 75% of SSB, spawning stock size biomass at SPR30 level. And then the maximum fishing mortality rate is the F at SPR30.

The benchmarks and reference points, these are just definitions, and these are some of the variables that go in to making those calculations. The base M was the- remember, for the base model, we had an age-specific M specified using a declining M at age from the Lorenzen natural mortality project. And the values that went for that was the 0.18 to calculate that M at age, and that's from the honing fully recruited fish. The steepness value just is not used in the projections, but it was set at 0.7. The virgin recruitment is the estimated stock recruitment parameter- again, it's not used in the projections - is that calculated recruitment at the unfished level, and that 793,000s of fish. And the unfished biomass is the estimated virgin stock biomass, and that was calculated at 487,000 tons. Yeah. And that also comes from the base model and its run, and that would be in the unfished level, not- this is not the start of the time series.

The benchmarks and reference points. These are the F at the MSYproxy. And again, the MSYproxy is the F at SPR 30%. That's the equilibrium math that achieves SPR30. That was calculated at 0.217. The maximum fishing mortality rate at F_MSY is that F, in this case, that achieves SPR30 because that is our proxy for F_MSY and it's the same value. The F_OY is 75% of the directed F at F_SPR30, and that's 0.16, with 75% of this value. I do not believe that it's specified in the terms of reference. The F_rebuild would be that F value, annual fishing mortality, that would rebuild to the stock but to SSB as SPR30 - that's our benchmark - by a rebuild year. The base model indicates that the stock is not overfished and so that it's not necessary to calculate that. And so, then if if it was indicating it was overfished, then both a rebuild year would need to be identified, and also, that F would need to be calculated. The current level of fishing mortality rate, the annual fishing mortality rate, is the geometric mean- the definition is the geometric mean for the last three years of the assessment, and that is 0.19 in the base model. The ration of the current F, which is this value, 0.19, to the F_MSYproxy then is straightforwardly calculated as 0.19 over 0.217, and that is 0.89, indicating that the stock is not currently undergoing underfishing because it is less than 1.0. The F_current to the maximum fishing mortality threshold is the same identical value because the F_current doesn't change in the calculation, and your maximum fishing mortality rate is the proxy, which is also defined as 0.217. These would be the reference points- benchmarks and reference points calculated for the mortality rate criteria, meaning the fishing mortality rate.

These are the fishing benchmarks and reference points computed for the under-biomass criteria, meaning spawning stock biomass. Spawning stock biomass to the proxy ratio is that equilibrium SSB at F_SPR30, and that is computed in this from the base model at 105. The maximum stock size threshold is 75% of that. So, in other words, to compute whether or not the stock is overfished, we basically look at 75% of that SSB at SPR30. The SSB level that was determined by the base model in 2019 was 122 metric tons. The ratio of the 2019 spawning stock biomass to the proxy, the proxy being that SSB at SPR30, that value is 1.158 or 116% of the level for the proxy. The SSB in 2019 of the maximum stock size threshold that you need to determine whether it's overfished or not is 1.543. In 2019, the proportion of the stock to the unfished level - that would be back before the time series actually starts in 1983 - is 25%. So, the model is saying that the stock is not overfished and is not undergoing overfishing, but also that the level in 2019 is 25%.

Okay. And again, you saw this at the beginning of the presentation. You saw that the Kobe plot basically gives you a trajectory of those reference points that we just showed you. The benchmark and reference points for each year through the time series is often a little hard to follow in this matrix and against the biomass metrics point. So, here's the fishing mortality reference point axes, and here's the biomass reference point axis. And we're running from z-zero to here, a 3 in terms of the ratio for the biomass, and we're going from 0 to 3.5 on the fishing mortality rate. So, where you want to be is in a green, green. Meaning here, left of this 1- this 1.0 is always our comparison axis, basically, this vertical bar. In 2019, we are right here at this little- in terms of the fishing mortality rate criteria and the biomass crite- we are above 1.0 in the biomass criteria, and we are below 1.0 in the F criteria, the fishing mortality rate. So, this is a very good place to be.

To go the most extreme, we go to the red, to this top level here. If we were above in the fishing mortality rate criteria, above 1, we'd be undergoing overfishing. And likewise, we would be far west of our MSST. We would be in the point- this would be 0.75. So that way, we would- at this point, we would be overfished. So, all of these years, the stock was overfished. In some of these years, the stock was in a precautionary state, which, for example, would be- it is not overfished- excuse me. It is overfished but not undergoing overfishing, here. In these years, in this yellow zone here, we are overfishing, but we are east of the biomass at 1.0. So, we are not overfished but we are undergoing overfishing. It was asked of me to put on this plot also the- this is the point that we were at in 1983- or the stock was at in 1983. In other words, the stock was not overfished but it was under the 1.0 in terms of the biomass being at- biomass over B_SPR greater than 1, and it was also undergoing overfishing.

And again, what we've done here is we've just taken these trajectories and we put them on a plot so that it’s perhaps more visible. So, the blue would be your stock size trajectories- sorry. Not that. So, your stock size trajectories in- at the start of the time series, the stock was under 1.0 in terms of the biomass, the biomass B_SPR30, and the F was above- so it was undergoing overfishing. This is where we are in the recent part of the time series. The green, again, these are our fishing mortality rate trajectories, and these are our biomass trajectories. So it's doing what the model said it was doing. It’s showing you what the model said it was showing you, and that was that the stock- even though it's undergoing- not undergoing overfishing, it has shown evidence that it is precariously close to undergoing overfishing, and the stock biomass is in a decline.

Okay. So from here, then you've got a base model, and certainly, certain assumptions went into that. And also, we heard the caveats regarding- the strong caveats and important caveats regarding these uncertainties in catch, uncertainties in the indices, and uncertainties in size composition. So, in order to do projections, then we have certain assumptions that have to go forward into the projection period. Now, we know the terminal year is 2019, and in order- and we also know that we don't have- we want to project forward from a time where management can do something. So, we're in 2022, I think, so the end of the data's here, so we have to have some information to project forward. So, in terms of Fs, we want to, on our projection period, we want to assume certain things about relative F between the two fleets and also selectivity and recruitment, and your M goes in on your landings. So, with these four components- and this is typical in most assessments in the southeast, at least, that we take the average from 2017 to 2019 and we use that relative fishing mortality between the two fleets, and that's held constant in the projection years. The projection years are 2020 to forward, and that can also be a question. We assume the same thing that we assume that fleet-specific selectivity that was estimated in these three years carries forward in the projection years.

And then, finally, or next to last. The recruitment estimates are from the stock recruitment curve. That's often a question when we see a particular- recent years or just a lot of decline in recruitment. You may not want to use the estimated recruitment off the stock recruitment curve because you might say that the stock is in some sort of a period of decline in recruitment because of some big environmental event or something. And then finally the 2020 and 2021 landings, so that's to get us to our projection year, those are- we set those as the average landings between 2017 and 2019, so for the trap and dive.

And then we move forward and make our projections. Sometimes, they're done for five years. In this case, I think we're showing them for 10 years. And we've included on this table here the basic quantities that you want to see in terms of recruits: the numbers of recruits, those annual F values. Remember, we are projecting forward at F_SPR30. And this was the value, that's the F that would achieve- hold this ratio constant. And then also the calculated SSB based on those assumptions, and then finally- not finally, but these metrics, SSB to SPR30, this model- or the projection is saying that basically, it's going to increase this ratio. It's going to continue to increase, at least for these 10 years, and that the ratio from SSB to MSST is going to go up just slightly. It's going to actually go up and then go up and then come down.

And then the ratio of SSB to SSB_0- remember, in 2019, we're at about 25% of SSB_0, and so it's saying that it's going to go down slightly, and then it's going to go back up. And that's in response to a couple of things. This is in response to, if I can remember- oh, we're at 25% of SSB_SPR0 in 2019, but what's going to happen is we are slightly below this right now, so it's going to let them fish just a little bit harder for a few years, and then at some point, this will come down, and then it's going to go back up after it stabilizes. And then this is the resulting amount of yield that you will get. This is the total yield. It includes- you know, we're assuming that it's all retained catch, so it's included anything that might be discarded. This is the total catch. So, it's between 57, 67 thousand pounds in these 10 years. I think that's the last one.

So that brings us to, just recapping quickly or not so quickly, some of the uncertainties. And that we've, as a team, come up with, and that is uncertainty in life history parameters, L-infinity, and also importantly, what is that uncertainty around the spatial differences in life history across the islands, because this life history set of metrics was developed from a composite set of samples for all the three islands. It was indicated that at this point in the collection stage, there's not enough samples, probably, to clearly and- I would say with confidence to estimate differences by islands. Uncertainty in reported landings, so we've heard a lot about that, and particularly, in the level of expansion factor. So, I would say that this has two parts to it, and one of those is the next bullet. The lack of historical landings for years when the commercial fleets were not in equilibrium- and it shouldn't say "commercial fleets." It really should say "when the stock was not in equilibrium" because it was being exploited at least 15 years back before this data series start.

The model uncertainties. Uncertainty in the information to characterize CPUE abundance indices includes the data quality in the recorded catch and also in the recording of effort. So, remember, this is a two-part calculation. That's the catch divided with effort. We know there are issues with the measures of that. And also, secondly, in the standardization, although there was rigorous amount of work that was done to standardize the data, we still have limited model parameterizations to explore effects on CPUE such as area fishing and more detailed measures of fishing effort, meaning in this case, and Adyan can correct me, for the trap fleet, it was the number traps pulled. So, there could be different measures that are more accurately related to catch that are affecting CPUE. And then additional model uncertainty includes information to characterize the stock recruitment function in general and such as- you saw the profiles on steepness and you

know that it's not- I mean, R0 comes has a nice trough there, but steepness does not have as definite of a trough and also sigma_R, the issues. And other considerations regarding the modeling is that, you know, the fishery was already being exploited, so we don't have really good information, solid information, on what the level of recruitment was, and biomass was in those years of lightly or unexploited state.

And then we have a series of research recommendations. I would also add here in terms of model uncertainties, you know, we know we attempted to do really good outlier detection on the length composition data. That's an extension from what was done in SEDAR 30 or 46, so a lot of work went into that to identify apparent observations. But we know we still have some questions about, you know, particularly with these questions we had on the index, the RVC versus the trap and where they're fishing as to where the- does that cover all the population. So we know we have that issue, but we, you know, we think that trap index reflects the area of fishing, the exploitation, the major areas of exploitation. And we did have some input from the audience regarding that as well.

RICHARD APPELDOORN: I think we want to break and ask any questions on the section you just finished.

NANCIE CUMMINGS: Okay. I just have two slides left. Okay. I'm-

RICHARD APPELDOORN: You have a way of killing a great presentation we had. No. Go. Two slides. We can do it.

NANCIE CUMMINGS: Okay, thank you. Yes. And so, you know, this leads us up to research recommendations. We believe that we support continued examinations of growth in particular to focus on collections of larger individuals for characterizing the basic you know, L-infinity parameter, and also to particularly look at island-specific differences. We do know, we recognize, that there is connectivity, especially in the whole of the three islands, but we also know that likely, you know, Saint Thomas and Puerto Rico are more similar given, you know- I will say the caveat to that would be issues with habitat quality, and so more physiological, considerations such as, you know, food quality and so forth that could play into growth. To support enhanced stock demographic studies, and in particular, focus on quantifying better the connectivity patterns between island platforms, develop baseline sampling, full comprehensive baseline sampling for acquisition of life history observations across a suite of species, not just Queen Triggerfish, that are harvested by the fleets and- all the fleets. To continue the SEAMAP video surveys towards developing a longer time series and to consider enhancing the survey designs spatially

and temporally with considerations of extending to the deep waters. So that was another set of data that we did look at. For those of you that did not participate in the technical working group for- the topical working group for the indices, we actually- with Michelle and the Mona Island data and also the SEAMAP video survey, we spent a lot of effort in discussion- discussing those efforts. And we feel that the SEAMAP video survey particularly should be enhanced and considered in going forward.

To consider exploration of historical fishery-independent data. We know that there's some surveys that were done in the near-shore mangrove habitats. So we know that likely, those could also have a potential for even earlier life history of the species. Finally, we had the conversation, suggestions, from, "Did you use the environmental data? Did you incorporate storm events?" and so forth. So, we know that we need more work there to incorporate oceanographic data and also the environmental indices, but more focus there has to be to- as Shannon and those were saying, to tie it to something. It has to be tied to something so we can estimate. To consider other data-limited modeling applications. To go back, extend the- this is always related to capacity also within how many people there are to do the assessments, to go back, reexamine some of the new data in context of the other data-limited model and explanations, and maybe pick up, again such as the mean length estimator. Also, to consider a management strategy evaluation. And this would be addressed to better provide inputs from the stakeholders about what they want and what they see for their fisheries. And this would not be in the context of only Queen Triggerfish. This would have to be in the context of all the animals that are being harvested by the trap fleet and the dive fishers. To explore options for estimating the historical commercial landings. This is probably one that I probably have the most- lot of interest in. Again, this is a little bit of a repeat, to extend the SEAMAP video survey towards the deeper waters. Exploration- this is a con- I believe this is a whole duplicate slide, Rich. Yes. Thank you. Thank you very, very much for all your questions.

Discussion

RICHARD APPELDOORN: Thank you very much, Nancie. It's been quite a number of hours that you've been on the stand, so to speak, and fielding our questions, and we appreciate all that effort. I have a couple of question, and then we'll see whatever everybody else has. You had mentioned that you were using 2017 to 2019 data to generate your average parameters for moving forward, and I'd like to question whether that is valid for estimating fishing mortality

given the impact that Hurricane María would've had on '17 and '18 in particular. So that's question one.

NANCIE CUMMINGS: Yeah. That question did come up, and so we thought- not we thought but it's one that can have more discussion and that those sets of years could be also changed is a sensitivity as well because I realize that, you know, the fishing was down in those years. So basically, the SSC would need to inform of a better-preferred set of years and have the evidence for why and how- you know, whether it's '15, '16, '14, '15, '16.

TODD GEDAMKE: Yeah. No, I'm really glad you raised that point. It doesn't, the meet red-face test at all. So why is it up to the SSC, I mean, that's clearly using that time period, given hurricanes and María is just clearly wrong. I mean, it's just no way you can say that you're going to project the dynamics of a hurricane into the future. So, you know, then from there, it's a question of, do we need to go back and pick other years, or not?

SHANNON CASS-CALAY: Thanks. First, this is Shannon. So we did very preliminary projections, and they were really presented as kind of a gut check on whether the model was performing the way we expected it. But we're going to have to review all of these projections settings because they are critical. So you are welcome- I agree, 2017, '18 should likely be removed, and this SSC could absolutely make that recommendation. But there are many here that we'll have to review.

RICHARD APPELDOORN: Okay. the second question I had, and you, I think emphasized this twice. I don't know if it was because it was a duplicate slide. But looking at historical landings before 1983- and before I make a comment on that, the question that that generated to me was going back to the question I had asked this morning was, is the interest in those historical landings because that initial value of catch or fishing mortality and all that stuff at 1983 sensitive to what was going on before, and therefore, the rest of the analysis is impacted? because I thought the jittering was showing that, you know, things were not too bad in- so I may be confused, so let me know.

NANCIE CUMMINGS: Rich, I don't think you're confused. It does have an impact. I mean, it does have an impact.

RICHARD APPELDOORN: Okay. As I know you've seen a lot of that earlier data, and as you know, if you look at the statistics as they were reported the peak in fishing overall in Puerto Rico is probably, what, 1978, '79, and then it came tumbling down. And then estimates of what the real catch was, was actually, in fact,

much higher. So those fishing levels, you know, unfortunately, are aggregated in many respects. You know, would've had a real big impact on what was going on. The reason we don't look at that data basically is because Daniel Matos came on to the scene in '83, and that's where, you know, he says, "I have confidence on what we were doing at that point. I don't really have confidence in what was being done before that," and so that's kind of where the line was drawn. But there was a tremendous amount of fishing, like, most of the fishing going on well before that, and so that could impact not just this thing, but everything. So that's just a comment.

My last comment or question is you talked about the issue of growth across islands, and I don't see a strong basis for that being a problem. If we looked at the spread of data you know, unless you were looking at the residuals by islands to the growth curves and finding some kind of thing that was not normally distributed around that, you know, the curve is fairly tight relative to, say, the magnitude of change that you would've seen looking at the Carolina. So yeah, there may be subtle differences, but I think they're going to be so subtle that statistically, I don't see how this is really going to be an issue, and I'd like to see you know, a much stronger presentation of data to suggest this might be a problem. You know, much as we would like to have, you know, things as specific as possible, but if I was going to put my money someplace, I don't think that's where I would have it. Trying to pin down L-infinity with larger fish, that, I might agree with you.

NANCIE CUMMINGS: Quick, quick response to the growth and looking for a hint that there might be strong difference between islands. I agree, and I do have some extra slides that we've prepared that can show you a table just of the average sizes for the time period of the samples, and there's nothing to suggest there that there's- for that period. That's the recent time period because those samples are, I think, the 2013 forward. But I agree with you about- yes. Thank you.

So basically - I just want to take this - you're saying not a strong support for a research- uncertainty on differences across island- maybe in trying to better inform the L-infinity. Yeah.

RICHARD APPELDOORN: Right, because- and not just on growth, but you've listed, you know- I don't know how many you had on the screen, but you know, a lot of research recommendations, and, you know, we're going to have to prioritize things that need to be done, and to me, that would not be our priority.

NANCIE CUMMINGS: Oh, thank you. Okay. Point taken.

RICHARD APPELDOORN: So comments from the committee on both the- I forget what the title of the previous long section was where we were looking at a lot of the results, or these research recommendations? We've mentioned a lot of things across our discussions this morning and this afternoon in terms of potential things that we might want to see, to finalize these, and so we'll have a discussion of that. And that's somewhat looking at some of these uncertainties and, well, it's always looking at those uncertainties, but also might lead to larger, longer-term research recommendations as well. So, if anybody would like to comment on it or ask more questions this is the time.

ERIK H. WILLIAMS: I'm Erik.

RICHARD APPELDOORN: Okay. Doug would you like to go first, and then Erik?

DOUGLAS GREGORY: Thank you. This is Doug. I haven't heard anything about control rule or ABC, and it's too late in the day to do that. But does the Center need any guidance from us to do some runs tonight to do projections of ABC and what they might be? I don't know what was in the terms of reference. But certainly not in the morning.

SHANNON CASS-CALAY: Rich, may I? Thank you. This is Shannon. I don't think we're ready or at that point yet with this model where we're confident in moving forward with OFL and ABC, but we will be prepared when you guys have agreed that the model is useful for management. We have a technique already to estimate OFL and ABC using the Caribbean Council's tiered control rule. And so, it's really just a matter of the SSC determining what tier to apply and the sigma_min, and then we will be able to estimate OFL and ABC relatively straightforward. But there are a number of decisions still that need to be made, and I don't think we're going to see OFL and ABC at this particular meeting. I think there's quite a bit of homework still to do.

DOUGLAS GREGORY: Okay. Sorry for jumping ahead. I thought that was the next step.

RICHARD APPELDOORN: Erik?

ERIK H. WILLIAMS: Yeah. This is Erik. Thanks. so, one issue that came up- well, there was a slight error in one of the slides. It said that the steepness was not used in the projections, yet the projections did use the stock-recruit curve, so that's the inconsistency there. But it raises an issue that when you're using

an SPR proxy and and a stock-recruit curve with a fixed steepness, they're sort of incompatible. If you had a stock-recruit curve, you have an MSY estimate and there's no need to use a proxy. By using a proxy, you're going to run into some issues when the stock gets into those lower recruitment estimates, and then things not exactly lining up with what the SPR proxy assumes. So, it's just something to be aware of. And honestly, going back to the profile, the likelihood profile on steepness, that actually looked like you have a pretty darn good estimate of steepness. That's one of the better ones I've seen. In the South Atlantic, if we had that, we'd be running with it full steam ahead and, and using MSY directly and not use a proxy. Just something to be aware of.

SHANNON CASS-CALAY: Yes. Thanks. This is Shannon again. And thanks, Erik. That's an excellent comment. So, I do agree, and that's something that we're going to have to have a decision about because the- basically, what we can do is either say, "Okay, steepness is in fact estimable from the likelihood profile," and we'll just use that MLE estimate and not use a proxy at all. We'll just use F_MSY. Or if this group does not want to assume the steepness is estimable, then we need to define a period of recruitment that we expect will continue in the short term. So those are decisions on the table for the final projections.

JORGE R. GARCÍA-SAIS: Nancie, you have a, a slide of density where you showed that- I mean, in the modern era, the density peaked around 2014, and then in the last nine years, you see a decline. Yeah, that's it. Yeah. Like, see, it's sort of a peaks, it's a spawning biomass, and I believe there's another one which is similar. But that one. I want to ask you, what do you think are the factors that influence that decline over the last five, six years, five years? What are the factors that influence that decline?

NANCIE CUMMINGS: First of all, I think that there's been a decline in effort in these years so that basically, the stock was- I don't want to say recovering, but I think was adding growth, which has continued to grow to this year. And as we've seen, as evidenced in our trajectories of F, even for the base model, with all of our caveats regarding our uncertainties in F, we see that we have an increase in F over these last few years. And we do have an uncertainty band around here, so that's notwithstanding.

RICHARD APPELDOORN: I'd like to offer maybe a caveat or different opinion on that. If you go back to the previous slide that you were showing, yeah, that one. So you have a decline from two thousand- I don't know what it is, '15 on but obviously, these things have been, you know, arcing that way before that. You showed

that the analysis was indicating very high recruitment in '97, '02, '05, and '06, which means about 2015, those fish are, like, 10 years old. And yeah, you can see the on the diagonal that you still just get those kind of larger circles going into those higher age groups until, you know, they've been fished down or just naturally die or whatever. And the recruitment isn't there to replace that, and I would say the population's going down. So an alternative explanation is that, you know, we had some really good recruitment years that drive the population up, and now we- now having that except potentially the last year, which of course, we don't see the impact of until, you know, come back in that analysis in a few more years, and maybe we'll see if it pops back up from that. Todd, was that a hand?

TODD GEDAMKE: Yeah. Just one brief comment on the decline and the N. If you look at the confidence intervals there and jack up 2020 to the upper and you take 2015 down to the lower, you get a flat curve, so.

RICHARD APPELDOORN: Yeah. Point well taken. Shannon?

SHANNON CASS-CALAY: Your, your hypothesis is quite correct, and I want to- if you could just show the actual recruitment estimates or the deviations. The deviations on the top, you'll see they're all negative for the past one, two, three, four, five, six, seven years, eight years. So that's exactly correct, the model is predicting lower-than-average recruitment in the recent time period. So, everything below zero on that top right-hand plot- I have to look at my hands to do left and right. I'm in kindergarten. But yes, see how all of the most recent years from about 2012 forward are all below zero? That means the model is predicting recruitment less than average during that time period.

TODD GEDAMKE: I don't remember. Remind me, team, on this. The 2010 there was a drop-off at that point in time in overall landings, 2010, 2011. I just remember having this tough conversation about when we started with the ACLs 2008, 2009. After that, there was a big drop-off, and I'm not sure if that's driving it. But you had a drop-off in Puerto Rico landings at that time that may have to do with reporting, may not.

RICHARD APPELDOORN: I just said there was a lot of uncertainties, and if you look at the error bars, you know. So yes, this is what the model's predicting as opposed to other factors that might be involved that the model is not accounting for.

TODD GEDAMKE: I think length is driving a lot. Do you have a plot of the length in these last 10- at least 2010 to '20 you can pop up without getting too sidetracked on the details?

NANCIE CUMMINGS: So, I just want to go- okay. So, these are- again, this is the fitted, but we would need to- from '83 to 2019, so you're looking at these years, these last 10 years.

TODD GEDAMKE: Can you translate an adjusted N to an N for me?

NANCIE CUMMINGS: This is the N adjusted by the McAllister-Ianelli, so it's going to each of these partitions, each of these strata, and it's suggesting the input N according to the recommended adjustment. So I can't really translate it to the affected N. We've had this conversation internally. Jason might be able to do that for us, if he still is-

TODD GEDAMKE: It's just, just sample size. That's all I want.

NANCIE CUMMINGS: Yeah. Oh, yes, it is. Yeah. And in particular, we- nope. In 2018 and '19, we didn't have the samples for Puerto Rico, so we don't have a good signal there. And we do have some information from the dive fleet. We're showing a little bump there. That's a bigger fish. Will not show any increased, you know, recruitment coming down the pipe here, I don't think. Again, this fleet is not targeting the small fish. It has a certain- so if you look at this aggregate this- I don't want to look at that. Apologies. here. So, if you look at this for the dive fleet in the last 10 years- I mean, the visual census, you know, you're not really- you might see a tiny bit of a spike there.

TODD GEDAMKE: I'm just trying to look at sample sizes. You had one, I believe, a bubble plot at the beginning. It looked really familiar.

NANCIE CUMMINGS: We have some other bubble plots that were removed, but we-

TODD GEDAMKE: I don't want to get this sidetracked. [laughter] Just curious about samp- because I think it's-

RICHARD APPELDOORN: There was a bubble plot.

TODD GEDAMKE: There was.

NANCIE CUMMINGS: I'm sorry. Yes. We could, just close your eyes everybody- these aren't the- oh, yeah. Those are the residuals,

which I think are good to show you. Yeah. That'll get you what you want.

LIAJAY RIVERA GARCÍA: You can go into presenter mode, and you'll see all the slides if you want.

NANCIE CUMMINGS: Okay. Thanks. Okay. So, this gives you what you- these are the bubbles. So here basically, you don't have any samples. And so, you're seeing on these recent years, this is a trap, so you're seeing a few smaller fish down in the-

TODD GEDAMKE: So, Nancie, for example, like, 2014, right, where your cursor is, what's the sample size in 2014?

NANCIE CUMMINGS: You can't see that from here. This is a residual plot. I have to go back to another plot to show you that. I can show you that just real quickly. 2014 is for the dot trap fleet, which is what we want. It is about 82 in terms of adjusted. And so it's smaller than these other year- it's actually larger than these other years. Yeah.

TODD GEDAMKE: So, Adyan, you just ballpark with tens, hundreds, thousands.

ADYAN RIOS: Adyan Rios here. Okay. So, 2014, what are we looking at? Trap? 2014 trap, 462. Probably one of the highest numbers in this list. 2018 and '19, which are not up there for trap, those have 6 and 8, so that's why they don't make it up there. So, 2015, 203; 2016, 166; 2017, down to 68.

TODD GEDAMKE: Thank you.

NANCIE CUMMINGS: Sorry. This isn't relative to proportion overall tied to the samples. So, you see these lower numbers, and you see this one is almost 10 times at 70 of the seven, so. Okay. Thank you. That was a good question.

NANCIE CUMMINGS: Last question from Todd had to do with that decline in the perceived decline in landings from 2010. I don't recall that showing up, but I want to look at it, so. I'm just going to make you close your eyes.

Okay. These are landings. And so, what you see we did have a decline in overall catch through these- and this was around the time of ACLs. This would be- ACLs, I think, was 2009 and '10, but- and then it went up. So, we don't have, like, a continued decline in landings. In fact, this was when we see fishery exploitation with the dive fleets kind of taking off.

RICHARD APPELDOORN: So, while you have that up there, we can look at what happened in 2017 and '18. All right. So, we see a peak in 2014, is that it?

NANCIE CUMMINGS: This is '15.

RICHARD APPELDOORN: And in '15 and then it starts dropping, you know, the year before María. You had a big drop. In 2017, it's the dive fishery that dropped substantially. yeah.

TODD GEDAMKE: Sorry, before I- Richard, just started "in 2017 the trap drops." This is a stacked plot. So, you can't read them individually.

RICHARD APPELDOORN: No. Well, the bottom line is- can be read individually but the top one cannot.

TODD GEDAMKE: You're right. The top one is- that drop-off right there. I mean, it looks two thousand-

RICHARD APPELDOORN: No, I was talking about total catch at that point. But I'm saying, in 2007-

TODD GEDAMKE: I'm just making the point in general for anyone that's interpreting this. Like, the blue, it looks like it's dropping off in 2017 for the commercial trap, but it's not. That's just the way it's presented.

RICHARD APPELDOORN: Right. So, but we can look at say, the dive, and from '14, '15, and '16, it's fairly constant. So, the big movement you're seeing in '16 has to be to the trap whereas the following year you can see that the dive component drops significantly, even more than what the total top looks like, so which means the trap actually expanded a little bit. And then the increases are in the last two years, again, where the dive group, not the trap. So, that might help us- inform us when we're trying to say something about what year should we use for averaging going forward. That is my point.

NANCIE CUMMINGS: This is a typical SS plot, and my apologies. We can always get another plot, if you prefer. But I just want to note that the exploitation for the two fisheries is very similar. I think, with both of them showing, you know, increases in exploitation. And in fact, the dive fleet does show larger increases in terms of the, you know- let's hope that this is larger. And then in the last year, the trap fleet may have shown

a decline, and that is likely to have been influenced by the hurricane. But this is '18 and '19. This is '17, '18, '19.

If I- where is the- over here? Where is the plot? [crosstalk].

VANCE VICENTE: Vance. In the recommendation list I saw one of the recommendations- I mean, I saw only one that deals with the density-independent factors which is a time series of oceanographic data. And I really would like to know specifically- if you can be more specific about what type of oceanographic are you planning to develop the time series that is biological, like blooms and die-offs, or physical, temperature, storms. What specifically do you have in mind?

NANCIE CUMMINGS: Thanks, Reni. I don't think that's- Oh, it was Vance. Sorry. I don't think- excuse me. I don't think that that's something that I'd want to, like, spell out a whole research project here. I mean, we can- maybe give us an hour or so, and maybe Adyan and I can come up- I'll give you some in the morning, some suggestions, but think you want to think about it carefully before you make a recommendation because there's all kinds of- you know. And we're not just kicking it down the street, but. To be better informed. And also to use the money wisely for, other critters that might be affected by similar kinds of processes.

RICHARD APPELDOORN: Kevin?

KEVIN MCCARTHY: Thanks. So, Kevin speaking. I'm looking around the table, and I'm seeing everybody pretty wiped out. But we do have a bunch of decisions that we need to hear from you all. So, I'm going to throw this out there as a recommendation. Shannon's been taking notes. Adyan's been taking notes. Nancie's probably been taking notes. I'm just relying on my poor memory. But anyway so there are a number of things that seem to be causing the group consternation. We're aware of that. So, we're going to need recommendations on how to move forward. And in general, we're going to need at some stage, whether or not you all are- have sufficient confidence in the data after discussion for us to move forward. I'm going to say, maybe we talk about that in the morning because now is not the time because everybody, as I- again, as I look around, everybody's pretty wiped out. So, we're going to put together our list of what we've heard, and if we've missed something, by all means, in the morning, let us know and just sort of go down the list and discuss each so that we can move forward or not as the committee sees fit. That's my recommendation for wrapping this up during this meeting.

RICHARD APPELDOORN: Yeah. There is a bit of burnout here. I'm wondering whether we can get from you, so we can think about this between now and tomorrow morning, a short list of what are the concrete decisions that the Center needs so we know what we need to provide in terms of those decisions tomorrow.

KEVIN MCCARTHY: Sure. So, Shannon and I were just discussing this outside. So, she's got a list, and I would also ask Adyan and Nancie, if you've got a list running. If you hear something of import that Shannon doesn't mention, please speak up. So I'm going to turn it over to Shannon because she's got the list.

RICHARD APPELDOORN: Yeah. So, this would be separate from a list of, say, recommendations or things we would like to have done because that would be- those are things that would get us to the point where we tell you, "Okay, this is what we recommend want."

KEVIN MCCARTHY: Right. So, these are the things that we heard from you that are causing the committee some concern and that we need to discuss.

RICHARD APPELDOORN: Okay. That's different from saying you need concrete decisions on some points, but I guess we'll get there. Graciela, you've been- Okay. Erik is online, and then we'll come back to this.

ERIK H. WILLIAMS: Yeah. Thanks. This is Erik. I was just going to add to that conversation a little. I think, you know, one of the things we learned from a lot of the discussion is that a lot of the, let's say, consternation about this whole assessment has to do with the data. And really, as you deal with the characterization of the uncertainty in that data, and I think that's what folks might benefit from thinking about tonight. What are some of the major things we've talked about today, data- focusing on data uncertainties, that maybe weren't characterized properly in the model or the way we would have wanted to see them characterized in the model? I think that's the starting point and I think depending on the list that we might come up with of sort of data issues, that would lead us to how to resolve those data issues. If it's short, we could probably give a quick homework assignment to the- to the Center folks and make it go off and come up with solutions. But if it's lengthy and maybe there's a topic that need more in-depth analysis or discussion, then maybe we might be leaning more towards something like an in-depth workshop to look at the data or characterize the uncertainty of the data in a more formal way. But I don't know between those two, what the outcome might be. But it does seem to me that, you know, there's some modeling issues too, but I think all those modeling issues are going to be resolvable

once we sort of get the construct of the data with a good, fair characterization of the problems or uncertainties that we have with the data. That's just my take. Hope that helps.

RICHARD APPELDOORN: Okay. Shannon?

SHANNON CASS-CALAY: Thanks, Rich. So, I've been recording kind of the major uncertainties that I've heard this group discuss, and one of them is the catch itself, of course. And so, the decisions that we would need are, essentially, are the catches biased, right? Are they too high or too low? If there is evidence of bias, then, for example, we do have a study from the MER consultants group that gives us 17 months of observations, but we would still need to know how to adjust our time series based on that MER consultants data. And so, we would need to have a decision about whether to apply, for example, a calibration factor backwards in time to adjust the entire time series. So that's one possibility. Another possibility is something, you know, more sophisticated where, you know, you actually treat somehow the uncertainty within the modeling framework and that we'd have to put some thought into to be able to describe what we would intend to do. We talked about, in the early part of the time series or perhaps throughout, some species aggregations that were occurring, and Todd brought up some work also with MER consultants that might help us address whether there are species other than Queen Snapper in this data that could be removed. We talked about the- Queen Triggerfish. Thank you. [laughter] I do so many stock assessments. We have-

RICHARD APPELDOORN: Was it Queen Conch? [laughter]

SHANNON CASS-CALAY: Sure. We do have two indices that conflict in parts of the time series, and that was noted. We had a long conversation about whether we had more faith in one than another, and there were a number of concerns raised about the NCRMP index. So, this group need to determine whether we would change the weighting of that index in some way or even remove it from the stock assessment model if you don't think it a proper index of abundance for this stock. The equilibrium catch, that initial catch in 1982 applied to the model, was discussed and how sensitive that model was at that initial catch estimate. So that's something that we could certainly investigate. And then as far as the projections were concerned, we talked about the use of a proxy when it appears that steepness is estimable in this model. This group could choose to just not use a proxy at all but go forward with F_MSY itself and use the spawn and recruit relationship in the projections. If the group wants to retain the proxy of SPR30, for example, then we have to look at the time period of recruitment that we would assume

would continue in the short term, at least, for the short-term projections. So those were the major uncertainties.

RICHARD APPELDOORN: I'm sorry. Could you run that very last thing by me again? If we're using the proxy, we need to do what?

SHANNON CASS-CALAY: Sure. If you want to use the p- see, the issue is that when you have the Beverton-Holt stock assessment- stock-recruit relationship and a steepness value fixed in the model, you know, you are basically fixing F_MSY. And so, if we want to trust the estimate, we could just use it at F_MSY, right? Yeah. If you want to retain the proxy, then when we project, we wouldn't project right off the spawner recruit curve. We would basically make an assumption that we don't know the spawner-recruit relationship. We're not willing to assume that the steepness is known, and we would just project the recruits- some expected recruitment rate into the future. So, what we usually do is take a recent time period where the data are fully available, for example, and we say, "Recruitment will continue as it has in that time period."

We also need to determine the year for those relative Fs. Nancie showed you the- we were using 2017 through '19, and frankly, it's a customary approach, but you're correct that when there's a major event that occurs in that time period like a hurricane that might change the way fishermen fish, we probably would exclude those years in the projections. Were there other major uncertainties that the group was interested in seeing an evaluation of?

TODD GEDAMKE: Okay. for me, there's two comments I want to make. One is that my gut tells me that L-infinity is driving this whole thing and I think that the von Bert and aging growth is- really needs to be looked at. I'm not exactly sure how or what people want to comment on that, but I think that, that- when this is- reduces out, that's, that's really going to be driving it.

The other thing that, Richard, for this and members of this committee, that have been on this committee forever, I have fought with a number of you for numerous times that the landings data are crap. And there's been a couple people that have come out, vehemently saying that the landings data in Puerto Rico are worth nothing. And if you remember, the ACL because the data are worth nothing, people on this committee, a number of them, decided that we should average all of the years of Puerto Rico data because they're all crap. We could submit five years' worth of SSC meetings to do that. So those members that have said that the landings data and estimates are crap really need to stand up here now because this is a statistical catch and age model. If you don't trust these landings, then you're back to snapshot. Thanks.

So I think that, you know, we're are not getting at it now, but think about how that's going to work because the driving force now is a time series. It's no longer looking at a [inaudible], and these statistical catch and age models are what we evaluated back with ACLs when they first were coming into place. And because of this committee's decision to not trust the landings data, we went very, very different routes. So now that same exact thing is on our plate right now again in this new situation. So keep that in mind as we- as we discuss the uncertainties.

SHANNON CASS-CALAY: Sorry, I was waiting so patiently. [laughter] Thank you. There's also the hypothesis that there could be cryptic biomass, and one way we considered to evaluate that was allowing the trap selectivity to be dome-shaped to see if the model then estimates cryptic biomass. It's an imperfect way, but it's a way to evaluate whether the model is sensitive to that assumption about selectivity. And then just a reminder that the current ACLs are also based on the landings history, so unfortunately, right now, it's difficult to get away from that. But one thing that the Center is working on in both the Gulf and South Atlantic regions, and we could certainly apply here as well, is what we call an interim assessment approach, which means that once you set an OFL and ABC, they can be adjusted frequently using indices of abundance. And so, in that sense, if the indices continue to increase, for example, we could continue to increase the OFL and ABC which might allow us to better- I mean, to not rely as heavily on the catch information as we do today.

JORGE R. GARCÍA-SAIS: Regarding catch - I have to address this anyhow - I think that the- our acceptance of an expansion factor into the data is actually an acceptance that there is a great uncertainty in our catch data. And just, you know, a really small example of what I'm saying is what Todd referred to this morning regarding the catch data for Queen Triggerfish. Says that, okay, so it's a variable across species, and if we would use the expansion factor on the Queen Triggerfish data, we'll be off by 100%. I mean, what else do you want to- I mean, how do you want me to interpret that? You know, I mean, if not by saying that we have a huge uncertainty on the data, you know? And that's why we attempt to reduce that uncertainty by the application-run expansion factor. Then we have variability across species. And I don't even want to think that we have that amount of variability across years. So, it's that complicated, you know? So, I mean, it's not that we believe that it's crap or not crap, you know? It's that we're trying to figure it out. We've been trying to figure it out for 20 years, and we'll keep on on this- We approach this in a different way about putting a lot of money into port sampling and things like that. It has to be like that, and we have to accept that and

then try to figure it out, a way of reducing the uncertainty in one way or another.

RICHARD APPELDOORN: Nelson, go ahead.

NELSON CRESPO: Two quick comment. I think that, Shannon, you are right. It's very important, you know, [inaudible] let the indices of abundance. And you have to remember that during the- I don't remember exactly the day, but during the 2000s, the government requested the fisherman to apply for a commercial fishing license. They had to fill the tax forms. In that moment, all the catch reports declined, and that caused a big issue in the past.

TODD GEDAMKE: What year was that?

NELSON CRESPO: During the 2000, but Pedro Rosello more or less, it, uh- [laughter] no pero cuando-

RICHARD APPELDOORN: Question for Todd. You talked about looking at the growth stuff. So I understand why L-infinity is going to be a really important factor in something that's being driven by essentially length composition. Is there something in the length analysis that, Virginia and her colleagues did that is setting off something that is why you're questioning this?

TODD GEDAMKE: Absolutely not. And I'm saying that so strongly and I'm laughing right now because as I was getting ready for this meeting, I was reading it. I'm going, "Something's wrong with this L-infinity." I can't figure out what it was. Virginia's work totally supports it. Sure, her work totally supports that value that's in there, so I- you know, we've got max individuals. I didn't understand some of the cutting of the sizes that was done, chopping over 56, but the observed max I think we've seen a good bit bigger than that. And that doesn't mean that that's L-infinity. It, it just means L, L_max. But I think that the problem that we have across the board with this is potentially a deeper population or a deeper pattern. But regardless, I'm not saying there's anything that is wrong or right. What I'm saying is that that L-infinity is critical to this assessment, and I think that, you know, Virginia's work supports forty- the 43. And if you look at the pairs that have been done over the years, 0.15, 0.18, they're all- that's about the same for K, you know? That's what it's coming up with. The problem is that if you start taking that L-infinity and moving it at all, you're going to change your F in a big way, and then you also got- I don't know. I forget how [Emmy?] and Lorenzen for the base on that. But, you know, it's also going to start- you get a feedback on the F NEM that starts getting a little crazy.

RICHARD APPELDOORN: So there was a nice opinion article written some years ago entitled "You Can't Catch a Fish With an ROV" and then someone has added an ROV where you could do that. So maybe we can send those down and pick off some of the larger fish. But in the meantime, we would like to know, for instance, well, just how sensitive this is to a change in L-infinity as a way to approach that. Would you-

TODD GEDAMKE: I'm hesitating right now because I would like to see this group have a discussion about- we have a- I think Shannon laid it out very clearly. We have to have- first, we've got data inputs that I think we need to look at, discuss, and then we can talk about recommendations. Does that- that's kind of- and I don't want to jump to recommendations because I could come up with a list of things on here. But, you know, I'm not sure if they're going to be critical, and we don't want to waste the assessment team's time.

RICHARD APPELDOORN: Shannon, it's after 5:00, so I'd like to break up for the day. Shannon?

SHANNON CASS-CALAY: Yeah. One of the conversations that came up during our development of this model too was that Virginia Shervette's data almost entirely comes from very recent period. And so, if the stock is in fact already depleted, you know, and if larger fish had been extracted by fishing removals, then the L-infinity would be too low, right, because you're not seeing a population that allows the fish to grow to be large sizes. So that's what we really don't know yet about L-infinity is if this fishing pressure was reduced, would these animals grow larger? Are these larger fish, in fact, present in deeper waters and simply not observed? So, L-infinity is a major axis of uncertainty in this model.

RICHARD APPELDOORN: So museum collections have [inaudible] a list. Todd?

TODD GEDAMKE: I mean, I think if Virginia was here right now, she's traveling, I think she would- She's traveling right now. But you know, part of the collection of this data are from very limited locations and not really that limited, but at the same time, if you are sampling in an exploited segment- I mean, Shannon's talking about if you've got- everyone here would say serial depletion. I mean, what's close to the shore? Where are these things coming from? Is it possible you have animals that are actually growing differently in two- I don't know the answer to that. But I don't think you have a full across-the-board sampling that would- I mean,

I stared at this thing last night forever, looking at this, and if you zoom in on that, the driving force is two fish. Two fish take this down to, to 430 in there. And if you take- right? If you zoom in there, those two fish, if you take your thumb and remove those two fish, you're up at 48, 49.

RICHARD APPELDOORN: Okay. Um-

NANCIE CUMMINGS: Before you close, I just- yeah. I just want to-

RICHARD APPELDOORN: Okay. Nancie, and then-

NANCIE CUMMINGS: Thank you. From, from Shannon's laundry list there, I just want to- yeah, of the data, we had two- not issues, but questions you'd might want- we have to resolve- but those are projection-related. I have- I hear fear about of six items on the laundry list. And so, I was trying to identify quick ones and easy ones, and that would be L-infinity and also exploring the impact from the initial catch in terms of that initial catch that was used to inform the 1982 point. But you'd have to make a decision what you wanted that initial catch to be. Or the equilibrium catch, um. Those would be two quick things but doesn't get to your other issues.

I think the one- um- first of all, the species that are lumped together, identified Triggerfish, you can't get back to that in time and so you'd have- only have some current years to inform you. So, that might take something else out of here, but also about the catch, the bias, I mean, in that. So, how to handle that would be a bigger issue. And then I would hope that the indices that one could- at this meeting that the team hasn't- could- of the data that's presented, you have the information, and Adyan has prepared more slides on the indices that might help decide a little bit more on that index. So that's a bit, out of the six, two are pretty quick, I think, once you could decide on a sensitivity for L-infinity. And then also deciding on the indices would be- if you can at least make some quantitative decision on whether to keep them both or just more discussion that would help you make that decision. You know, Adyan does- we do have more slides on the indices that we could show you in the morning. Thank you. Thank you.

MICHELLE SCHÄRER-UMPIERRE: Michelle, for the record. I'm just thinking that the data we're looking at is limited in depth, and I was wondering if we could look at the depth distribution on some of the trap data to know if, actually, they are fishing out there. And if they are and they're not going into the funnels, I would

suggest we find some other size data from those depths, maybe from Reni's work, just to settle that and move forward.

JULIAN MAGRAS: Thank you. Thank you, Mr. Chair. Julian Magras, for the record. I'm here sitting, thinking of how we did collections of samples for Virginia in Saint Thomas/Saint John. And something just rang a bell in- she's going to be on tomorrow you know? She's traveling today. I already texted her and tell her, "Please come on tomorrow to answer some questions," because if fishers were asked to collect samples, what's the hardest fish for the fishers to sell is the bigger fish. And if you're saying that you seen a lot of these fish at- larger fish and you're not seeing the smaller ones, it's because- this is my thinking of it. The fishers provider her with the fish that they cannot sell and sold the smaller-size fish. Now, when I collected samples for her, I gave her a variety of sizes of fish that she requested, and even to some of the very small ones that I don't like to bring in because they're undersized, she needed some of them for the study, and I brought some of those in. So it just- you know, it's just something, food for thought, that are the fishers just bringing in fish for her to sample that they can sell and keeping the other sizes. So, you know, that's an uncertainty, and I think that's a questions that should be asked. Thank you.

RICHARD APPELDOORN: Adyan, did you- Do you have to?

TODD GEDAMKE: [laughter] Do I have to? Julian, very good point. I think Virginia would be on board, and I look forward to her commenting on that.

RICHARD APPELDOORN: Okay. With that, we're adjourned until tomorrow at 10 o'clock again. Is that correct?

GRACIELA GARCÍA-MOLINER: Oh, [inaudible] the starting time. You are free to change the time. So, if you want to start earlier, that's fine.

RICHARD APPELDOORN: Well, I do have pity for our West Coast colleague, and, um-

NANCIE CUMMINGS: Thank you, everyone.

JORGE R. GARCÍA-SAIS: 10 or earlier

RICHARD APPELDOORN: 10.

JORGE R. GARCÍA-SAIS: 10, Okay.

(Whereupon, the meeting adjourned on August 1, 2022.)

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August 2, 2022

TUESDAY MORNING SESSION

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RICHARD APPELDOORN: Okay. Good morning, everybody, we'd like to get started. Today is August 2nd. This is the continuation of the SSC meeting. It's now 10:11 in the morning. And we will start again with the roll call, starting- Walter, would you start us off?

WALTER KEITHLY: Walter Keithly, SSC member.

VANCE VICENTE: Vance Vicente, SSC member.

MICHELLE SCHÄRER-UMPIERRE: Michelle Schärer, SSC member.

JORGE R. GARCÍA-SAIS: Reni García, SSC.

ADYAN RIOS: Adyan Rios, Southeast Fisheries Science Center.

RICHARD APPELDOORN: Rich Appeldoorn, SSC Chair.

JUAN J. CRUZ MOTTA: Good morning. JJ Cruz, SSC.

TODD GEDAMKE: Todd Gedamke, SSC.

SHANNON CASS-CALAY: Shannon Calay, Southeast Fisheries Science Center.

NANCIE CUMMINGS: Nancie Cummings, Southeast Fisheries Science Center.

KEVIN MCCARTHY: Kevin McCarthy, Southeast Fisheries Science Center.

LIAJAY RIVERA GARCÍA: Liajay Rivera García, Council staff. Buenos días.

GRACIELA GARCÍA-MOLINER: Graciela García-Molinera, Council staff.

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

IRIS N. OLIVERAS: Iris Oliveras, Council staff.

MARCOS HANKE: Marcos Hanke, CFMC Chair.

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

JULIAN MAGRAS: Good morning. Julian Magras, DAP Chair, Saint Thomas/Saint John.

RICHARD APPELDOORN: And online?

LIAJAY RIVERA GARCÍA: Online, we have Cristina Olán, Carlos Farchette, Doug Gregory, Erik Williams, Jesús Rivera Hernández, Julie Neer, Nicole Greaux, Rachel Eckley, Sarah Stephenson, Sennai Habtes, Stephanie Martinez-Rivera, Tarsila Seara, Virginia Rios Shervette, and that is all.

SSC Recommendations to CFMC

RICHARD APPELDOORN: All right. Thank you. Again, a reminder for people when they're making comments to please state your name for the people who have to do the transcripts for us later on. Any other announcements, Graciela? No? Okay. So, we're going to pick up where we left off yesterday. Nancie gave us a great presentation on the work that was done. It was very attentive to lots of questions that we had. And again, we thank her for that. I think we are now in a situation of, you know, "Okay. Now what do we want to do?" with the ultimate decision is going to be is this committee going to recommend that this analysis or some future version of it depending on how we go is acceptable for stock assessment purposes.

Uh, I think that the first question that I had - and I think a lot of other people had - was the assumption of stock synthesis treating the data as- the catch data as reliable and what impact does that have on this considering that we've all had qualms about the reliability of the Puerto Rico catch data. And that you know, to what degree might this affect that analysis given the assumptions? and maybe as a lead-off into where we might be able to go with this Shannon has kind of asked to- I had a conversation with her, and she had some ideas about how we might move forward and what the implications of these things are. So, I'd like to maybe get her comments on that and then we can just start the larger discussion. So, Shannon?

SHANNON CASS-CALAY: Yes, thanks, Rich. Yeah. I think we have discussed many times- and I'll agree that there is uncertainty associated with the catch data, and that isn't even entirely unique

to the Caribbean. We have similar issues in the Gulf of Mexico, particularly with the recreational fishing component. we need to do a variety of sensitivity runs to explore, you know, the performance and essentially the sensitivity of the model to different assumptions about the catch. So, we have a short list of some runs that we have proposed. You can review them and request others if you are interested in different analyses. One thing that is likely is that if we were to adjust the catch, for example, using the MER results and it was, for example, calibrated all the way back to the beginning of the time series using a constant value, it's unlikely to change the stock status from the model. It will change the catch recommendations. They will scale similarly to the adjustment that we would apply. So the reality is the catch is important to the stock assessment model. If the catch is biased, right, but it's biased in the same way throughout the time series, then the stock assessment model is fairly insensitive to that change in magnitude, with the exception that it does absolutely change the recommendations for catch that come out of the projections.

If the values have changed during the time series - and the evidence suggests that that probably is the case - that's much more complicated to model and would really require then for us to try to determine if there is a way to calibrate the catch for the time series based on reliable information. But that brings up the question of, you know, if you don't have reliable catch, all of our management approaches today do require catch estimates, including the tier four of the control rule. It relies on catch alone, in fact, and expert judgement about stock health condition.

So I did want to just mention the direction the Science Center has been heading in both- well, primarily in the Gulf of Mexico. But now we are doing research to extend this process and evaluate whether it's effective in the South Atlantic. And that is called, well we're calling an interim assessment procedure, although it could just as easily be called, essentially, an adaptive management-style procedure. And that really tries to get us away from being forced to rely on uncertain catch information for example. Because what it would do is you do need to have a stock assessment for the initial determination of what the stock is undergoing overfishing or overfished. And some idea of the catch recommendation, OFL and ABC. But after you have that, then you go with more of an adaptive management process where you look at indicators, where you look at length-composition data, and you try to look at whether there are trends in real time in the water that suggest the stock is growing or being depleted. Right? Or basically becoming in a worse condition. And then you adjust the catch recommendations based on those real time indicators on the water.

Now, the reason why it's important to have a stock assessment first is that there is a bar that we need to meet with general Council requirements, that what we're doing is consistent with Magnuson, which requires that the stock is not overfished or that it- you know, not experiencing overfishing and that you rebuild depleted stocks. And so having a stock assessment model allows us to do the evaluations needed through simulation studies to determine whether the adaptive approaches are consistent with the Magnuson-Stevens Act to prevent overfishing.

So that's essentially the requirement that we've been asked to demonstrate in the federal fisheries. But that, you know, that is an advantage. It does require us to understand the sensitivity of the assessment model to catch and be willing to accept that the assessment model could be used in this way to provide useful management advice for the stock. That is better than using catch alone, for example, in tier four. So, we could go through this list. I mean, the first item on the list is some suggestions from the Science Center about evaluating the sensitivity of this model to catch. And then we have an extensive list of other sensitivity runs as well for your consideration.

RICHARD APPELDOORN: Uh, Erik, you have a comment? Suggestion?

ERIK H. WILLIAMS: Sure, I thank you, Chair. This is Erik. So, before we dive into whether to use SS or not how we would use SS, we need to be clear on a couple things here. One is what is the purpose of a sensitivity run versus an alternate base run? So, sensitivity runs are typically used just to detect model behavior with a perturbation to some input. It- and that's it. It just tells you, "Okay, the model will shift this way or that way if you change input X or Y." That's very different from an alternate base run where we think it's an alternate state of nature but we haven't captured in the initial runs. We need to be very clear on the difference between those two because people get these mixed up all the time. An alternate base run means you actually believe that that's a plausible outcome. And that is not a sensitivity run. I mean, you shouldn't use that phraseology for that.

The other thing I'll add is, I think we all agree that uncertainty is one of the main impediments for the stock, but it shouldn't prevent us from moving forward. I mean, that's what science is all about, is one thing we can do is characterize that uncertainty fully and that's what our mission should be. And really, the only framework to do that in is an integrated analysis or an SS-type model because it basically forces us to put all the inputs in and

then we can be explicit about what the uncertainty is with all of those inputs and settings. And that will give us the full picture.

Now in the end- I haven't seen this happen yet, but maybe this could be the case- where there's so much uncertainty that what comes out the back end is- doesn't help management because it's just way too uncertain. I haven't seen that happen yet. Maybe this will be the case. I don't know. But I think that's the way we probably need to go. I mean, these integrated analyses are the state of the art for stock assessment. State of the art doesn't mean that we have to fully parameterize them. We have to have all that information. What it means it's the state-of-the-art construct that we can do a lot with, and we can characterize the uncertainty. And I would suggest that one of the things we need to think about is moving away from the delta method uncertainty characterization. It's currently being used in the assessment and probably even move away from this idea of somehow doing plus-one, minus-one sort of sensitivity runs and then somehow putting those ensembles together. In the end, that gets all messy. And move to something like what we do in the south Atlantic, which is a Monte Carlo Bootstrap Ensemble process where you actually cast uncertainty around all of your important inputs and settings and then you still caustically run the model 1,000, 2,000, however many times it takes, and what you get out is the final uncertainty distribution.

That I think is the way to go. That's just my opinion. but the problem with all of that- and I think Shannon recognizes this. It's a lot of work. A lot of work. And a lot of the work goes into just carefully characterizing the uncertainty on all those inputs. And as we've talked about, just trying to characterize the uncertainty around the catch and the landings is difficult enough. So just wanted to put that out there.

RICHARD APPELDOORN: Well, thank you, Erik for those comments. And um-

GRACIELA GARCÍA-MOLINER: So Shannon, there is a question here from Virginia. How is what you're explaining different from the interim Caribbean lobster assessment that is underway this year? Thanks. Graciela here.

SHANNON CASS-CALAY: So, I believe that the interim- we may have called it an interim assessment of Spiny Lobster. But in fact, that is an update assessment. We are literally updating the entire model. And the reason we're doing that for Spiny Lobster is that the last year of that model was 2016, and there is no index in

that model. And so, it's easier, frankly, given the fact that there are few model inputs just to go ahead and do a full update.

RICHARD APPELDOORN: So on the screen, not that I can read it, is what started out as a I think a compiled list coming out of the Science Center from based on discussions yesterday. And it's been added to by certainly by Erik and Jason and I think somebody else. Hmm? No, not necessarily.

GRACIELA GARCÍA-MOLINER: Can, can you read it now? Is it better?

RICHARD APPELDOORN: Well, I mean, we were discussing the fundamental issue of the data and the model approach. So we've heard from Erik on some things that he's recommending. But no one at the moment's talking about throwing out the stock synthesis model. So, but I'm open to, you know- we're here to discuss this, so if people have something to say.

TODD GEDAMKE: I'm not sure what to say. How we move on now is challenging on this. Erik just started out clarifying that there's a real difference between uncertainty and alternate-based runs, alternate realities. And then he ended with, "We need to characterize the uncertainty in the landings." We don't have an ability of characterizing uncertainty in the landings. All we can do is do alternate realities on it. You have an assumption on any of these time series that reporting patterns have been captured correctly. We know that reporting patterns have not been captured correctly. We know that 2015 responds right after the tax reporting. We don't have that characterized. This is the same exact discussion that we had with the ACLG. I mean, there's nothing different. Nothing's changed. The data are the same. There's no new information. There's no correction on the correction factors, on the expansion factors. We can go back and you have the head of assessment of NOAA right now, Jim Berkson. Repeatedly, repeatedly we went through every bit of this to try to figure out whether we had a reliable catch series. He developed a procedure at that time called Only Reliable Catch Series. He published that at the time, walked into every SSC meeting here, and said, "We don't have a reliable catch series in the Caribbean." I followed that up. We do not have a reliable catch series in the Caribbean. Sissinwine followed that up. "We don't have a reliable catch series in the Caribbean." Porch followed that up. "We don't have a reliable catch series in the Caribbean." We can continue, and we can repeat these conversations over and over and over. Or- and we- I mean, we have Reni, "We don't have a reliable catch series." Walter, "We have- don't have a reliable catch series."

We can go on and on and on, on this. And the fact that we're re-terming things doesn't change the fact that we don't have a reliable catch series. So, Erik's opening statement on this whole thing was SS assumes a reliable catch series. So, I don't understand how we, we go from that to jumping to, "How can we do the sensitivities?" And, and the clarification is very simple. You have to set your runs up before you get into sensitivities. You're setting the run up with a time series. Are we going to do every single possible scenario for these different runs? Or for the, the landings? You know, the- you can't.

So, the expansion factor- you know, Kevin's been fighting with this expansion factor for 15 years here trying to get clarification on what was done, how it's done. But in 15 years, we're still in the same boat on this. So, I think that we're in a really tough spot here. And I understand the desire for A, an integrated assessment model. I agree with everything Erik said. But I also want to recognize, this is a plug and chug approach. This is- we get this set up; you end up with a- but it does not solve our problem here. And I think that there's years' worth of records from every member of this committee and all the leadership at NOAA to saying, "We don't have a reliable catch series here." And I would say that, you know, if there is something that I'm missing, Kevin, Shannon, you can explain it to me, how everyone's opinion has changed over the last 10 years and no one now stands behind using this catch series, then I would- that would be great.

RICHARD APPELDOORN: Okay, Erik and then Shannon.

ERIK H. WILLIAMS: Yeah, thanks, Chair. This is Erik again. So, Todd, I hear what you're saying but I have to disagree with you. I think what- what I think you're missing is that we can characterize the uncertainty of the landings to use in, like, an MCBE process. So, if we- we know that the landings aren't 0 and we know that they're not 1 million. Okay, there's our beginning bounds. So how can we whittle that down to something that we agree is a range over which the landings are likely to have occurred? And that, you know, take for example the- we've talked about the scaler. If we believe it's anywhere from one to two times, well, there we go. We can put that into the model with a range of 1 to 2 as a multiplier and resample from it, uniform distribution between 1 and 2 and create landing streams in an MCBE process. And then we treat those all equally likely outcomes, and we get a distribution of outcomes based on a range of landings from 1 to a multiplier of 2. That's just one example.

So, I mean, I hear everybody saying that the landings are uncertain. We know they're uncertain because we have a sense of

the uncertainty, which means if we have a sense of the uncertainty, we can characterize that. We can. It may be really big, but we just need to put our heads together and come up with a reasonable range of possible landings time series, and we could code that into the model and run all those scenarios at once.

So I think just to make sure everybody's clear, what I'm proposing is you come up with a range for all of these inputs and we sample from that range thousands of times. And what you get out of the in the end is a distribution of all of the outcomes. So, it basically treats all of these scenarios as equally likely, as alternate-based runs, and what we get is a nice distribution of the uncertainty in the end. What I fear is we're putting- is how much uncertainty we put in, what we get out of the back end may be unusable. But like I said, we've done this with many other stocks, and I have yet to see a case where it's completely unuseful. I've seen some large uncertainties come out of the back end, but it does actually provide some advice that's useful for managers. But the most important thing it provides is, you know, a direct estimate of our uncertainty in this whole thing. And if we're that uncertain, we are that uncertain, and it's our duty as scientists to give that to the managers and say, "Look, this is what we know, but this is also what we don't know." So anyways, just wanted to point that out, pontificate on that a little bit. But I appreciate Todd's comments. Thanks.

RICHARD APPELDOORN: Erik just a point of clarification, your MCBE, I assume MC is Monte Carlo? E might be ensemble. But B is what?

ERIK H. WILLIAMS: Bootstrap. So, it's a combination of Monte Carloing and bootstrapping put together into a model.

RICHARD APPELDOORN: Okay.

SHANNON CASS-CALAY: So, I think Erik said that very well, and I think there are tools that we can use to address better the scientific uncertainty. And, you know, I, I do think that the Science Center has very much stood behind that concept of providing you with doc assessment information. We spent two years with you working on a control role with four tiers. Three of them are stock assessment tiers, and we intend to use them as the data improve, as the methodologies improve. So, this is clearly a process, and we are clearly, you know, not at a final state where we know, you know, the approach that we're going to use moving forward in the U.S. Caribbean. But I actually do think that the- what we have presented to you is the beginning of a very powerful framework that with some improvements that can be made at the Science Center. You know, we can bring you back something that I think is very,

very clearly, defensively an improvement over using catch advice alone, which is what you'd be forced to use without a stock assessment is the very catches you're claiming are unreliable.

TODD GEDAMKE: And therein lies the challenge. You know. You have- you have two people here that are promoting- that, that are not really that familiar with the landing series, nor have- were they involved in the discussions that we had over this for many years. We did this. And Kevin, you were here for all of that, so- and you're on the record for all of that. So, you know, with the uncertainty, you have a question of how do we characterize that uncertainty? Does anyone else remember days and days of our life trying to come up with characterizing that uncertainty? I mean, we did this before. Reni, you know, Reni will jump in here too. but you have a- you have a question here of- I mean, Shannon, you just said, will provide us with a very powerful framework. And Erik said- Nancie said there's a developer this and a developer that. You- give us a software package. I mean, that's really the bottom line. And because the data are uncertain, you do a Monte Carlo setup on it. And for those that don't know what a Monte Carlo is, you basically- what I said in my question, which didn't sound as scientific, is, "Are you going to just try every single combination?" And yeah, that's what you're saying is you, you try every single combination, and then you use a statistical way of describing it. And Shannon, I'm not saying that. That is the reality of it is that you're, basically, throwing all of it in there. And you're going to have to make assumptions that are constant assumptions in that you're going to say you have a- like Erik said, a scaler. We discussed this scaler. We said, "Is it between 0? Is it between- is it a quarter? Is it more?" you know, for Queen Trigger, we have one point in there. The question is, you know, how do you- what do you- what do you do with it? And so, Kevin, could you comment on the different- and how the opinion has changed from all of the discussions we've done previously as an SSC member and where we are now?

RICHARD APPELDOORN: Yeah, so JJ wants to comment first.

JUAN J. CRUZ MOTTA: Unless you want to reply that. Okay. Look. I don't know if this is an advantage or disadvantage. But I was not part of those discussions before about the quality of the landings data. The only thing that I have seen now is that for one year - and I know that has a lot of limitations - the data that was collected by MER says that it matches what the landings report- without the expansion. Thank you, Rich. And unless there is a specific reason for thinking that only- thinking, like, that wasn't untypical year in which for- just by chance, it matched. I could say that we still with some uncertainty, we still can use that as

a basis that perhaps the data can be used at this stage. But this is just a, a comment on the details of this- on the quality of the data. But then, I also wanted to comment on the general view brought by, by Shannon. I really like the idea that if we can come up with T0, times 0 - let's call it a stock assessment - upon which we can then do this year by year assessment, that would be great. Right? So if we can, you know, acknowledge all the weaknesses of the data we have now. But if we can come up with the times 0, I think it will be great if we could follow that route. In terms of- I see that as an efficient way. I really like the idea of using indicators or indices to follow-up on what's happening and not rely on long-term data. Thank you.

RICHARD APPELDOORN: All right. Vance and then Shannon.

VANCE VICENTE: I like very much Erik's point about- Oh, Vance Vicente. I appreciate the comments of Erik, for two reasons. I think that even though we have discussed that our data is affected by multiple factors, I think it's time to tabulate them. Like you said, characterize them. More than that, first itemize them. And then weigh them to see which ones we believe are the ones that most affect, these catch numbers. We went through a lot of hours analyzing the ecosystem-based approach. And we, in a way, itemized the different factors that, both from an economic standpoint, ecological standpoint, from pollution standpoint, a habitat standpoint, etcetera. So, in a way, we have itemized them. But I think for the purpose of this meeting, we should really tabulate them, itemize them. We will have all criticized the data, but why don't we write them down and see which ones are more important than the other? That's it. Thank you.

RICHARD APPELDOORN: Shannon?

SHANNON CASS-CALAY: Thank you, Rich. This is Shannon. I'd- you know, I think that the Science Center is obviously well-aware of the issues with catch. In fact, you know, Kevin McCarthy and I were instrumental in working with Todd and Steve Turner to fund the MER study. It's the Science Center that funded it. And the Science Center works with the Caribbean Territorial Initiative money to improve the data quality in the Caribbean through several different efforts. I, you know, I think you acknowledge the scientific uncertainty. You attempt to do the best characterization possible. And the approach that Erik is talking about is widely regarded as a state-of-the-art methodology. It is something that we could do given enough- you know, given a little time to execute because it's not part of the SS toolbox. So, what I don't- what frustrates me, I suppose, and concerns me is the notion that we leave the Caribbean with nothing to offer,

essentially, because the requirements right now of, of Magnuson to manage the federal fisheries, you know, are based on concepts of status determination and catch recommendations. And that's where we've come to trouble in the past when we brought data-limited methodologies to the SSC. Is they are informative. They help us understand whether the fishing rates might be too high, for example. But they have not given us the ability to determine a status determination overfishing, you know, overfish definitions. And they haven't been able to be extended by this SSC at least to characterize a catch recommendation. Although we did demonstrate how that could be done.

So, you know, I do think the big advantage that I think we can have in the U.S. Caribbean is to open the door to those adaptive approaches that I discussed earlier, where we can go to index-based approaches. But you've got to have something to adjust from. And unfortunately, those catch recommendations are scaled by your concept of the landings history, right? So, if we were to say, "Okay, actually, they caught twice as much as we think, on average," the catch recommendations will also scale upward. But you'll have to monitor in those same scaled units, right? So, we do recognize the scientific uncertainty. And in that sense, nothing has changed. But what has changed is our ability to bring tools to the table that can characterize that uncertainty, and also, adaptive approaches to the table to make adjustments in the future based on real time information from indices and from length-composition studies that do not require the same long-term time series that stock assessments do.

RICHARD APPELDOORN: Kevin.

KEVIN MCCARTHY: So, Todd, I was not ignoring you. I was- I, as no longer a member of this committee, I'm always going to defer to the SSC speaking before the invited guest. I agree with JJ. I agree with Erik. I agree with Shannon. And I agree with what you- I think what you were saying yesterday. What's changed is, is not the way the data are collected by Puerto Rico. What's changed is we have, albeit limited- we have an independent estimate, right, from 17 months. And what I thought I was hearing yesterday was the notion that, you know, that provides- helps provide some bounds to a range. And what I'm also hearing from Erik now is a proposal to use a new approach which we haven't used before to try and get at that uncertainty. So, I would say that methodologically, we've got a change. Information content, we've got a change because we've got 17 months of another way of estimating the landings. So, I think that those combined provide us with some new information that we haven't had before. And JJ said it and Erik said it. And Shannon said it. And I think that it's you know, going to be

informative for us. And it's certainly worth trying because you're already- you being the Council and the SSC are already using, as Shannon noted, the landings that we all agree are uncertain. But we're using them to manage. So, they're already in use. but now we've got another way of getting at some bounds and and estimating uncertainty that I don't think we've tried before.

RICHARD APPELDOORN: Walter, Reni, and then JJ.

WALTER KEITHLY: Thank you, Mr. Chairman. Actually, I have two questions. Different questions, but I'd like them both answered if possible. At the last meeting, Kevin, if I'm not mistaken, you said that the MER project had not yet been verified. And I'm trying to remember back whether you said you were trying to determine- bring in an independent committee into reviewing it or just to review it internally. So my first question is has it been reviewed yet and validated?

KEVIN MCCARTHY: So, this is Kevin. So there's money for CIE review that it has not happened yet. I think we're on- I hope we're on the calendar for the fall because there's a lot of- you know, a lot of competing folks who need that review, so.

WALTER KEITHLY: Okay, well, my point is it seems like we're jumping kind of ahead here by talking about using the MER work to scale or whatever the traditional data when it has not been reviewed yet. Okay, that's what- thank you.

The second question I guess maybe Nancie but I'm not sure. I should have written it down. Yesterday you made a comment that you thought Puerto Rico landings were systematically underreported. I think that's what you said. Am I mistaken or- I'll go on. And I think you meant after you even used the extrapolation factor. And, you know, again, there's a lot of uncertainty. Todd's correct. I've questioned the catch data, the uncertainty. But I haven't- I've never attempted to say whether systematically biased upwards or downwards. You may just have a lot of error from year to year, random error in the data. And that's what I'm trying to figure out at this stage. Thank you.

RICHARD APPELDOORN: Yeah, if- to respond to that?

KEVIN MCCARTHY: Yeah, I can respond to both of those. So, the first one is- you're right. It has- we don't have the CIE review yet. But it does provide a second independent estimate which might help us set some bounds on where we think the real landings are. Right? So, we can get it- uncertainty, we've now got two estimates of the landings, one from DNER and one from MER. So, I think we

ought to use that information as we'd use other sources of information. the systematic underreporting that's why there's an expansion factor, right? That's why there's a correction factor. It's recognized by, by DNER that there's underreporting, and that's why they developed this expansion factor.

WALTER KEITHLY: Well, if I'm not mistaken, that was included in my question. I think Nancie was inferring - and again, correct me if I'm wrong - that they were underreported even after using the expansion factor.

NANCIE CUMMINGS: It was the former. Nancie Cummings, Southeast Fisheries Science Center. The underreporting was before the expansion-

WALTER KEITHLY: Okay. Okay. Thank you.

NANCIE CUMMINGS: I haven't seen the data. So, I really haven't- I think there might be some other members- not members- participants on the calls that are very much more familiar with the state of it. I'm concerned that we- I was part of a stock assessment. I think Todd might have been there. I don't recall. It was- we did three stocks and a couple- somebody just came in off the street almost with a set of new landings data. It was in Saint Thomas, and it was lobster. And so, all of us could come up with our own set of data, and we could ask as a member of the public to consider that. So, I guess- I think the information should be vetted because all of our other data inputs are vetted through a review process before we go out to spend a lot of time. Just my feeling.

I have an idea that I want to put forth later for getting some bounds on the certainty. I love Erik's approach by the way, but it would take a lot of time, I think, to do it correctly. And I think Shannon has echoed that. But- and I- because I think that's a very sensible way of characterizing uncertainty. Catch would be one of those, and obviously some of the other variables. And I have an idea how to get maybe a bound on that but that's not- also not part of this.

RICHARD APPELDOORN: Reni, are you going to change the subject? Because I know Todd wants to respond to it.

JORGE R. GARCÍA-SAIS: I just want to make you know, some clarification here because we're talking about uncertainty of fisheries in the U.S. Caribbean. And I think that we should start by partitioning a little bit that, that generalization. I don't think that the uncertainties in the Saint Thomas fisheries is the

same as Puerto Rico, for example. I think that there's a great deal of variation between islands regarding the uncertainty of the fishery data. And the nature of the uncertainty perhaps comes from a different, perhaps- we have more, in Puerto Rico, more information, less uncertainty regarding the species composition of the catch than U.S. Virgin Islands that have perhaps a more reporting precision but perhaps in the past less species information. Nowadays they are catching up. You know, they've caught up with the new reporting forms, and perhaps the nature of the uncertainty is less in the V.I. since they don't even have an expansion factor. So, in Puerto Rico, the scenario is completely different, you know, from my perspective. Maybe I'm wrong. But from my perspective, the scenario of this variability concept, of the uncertainty concept, is completely different. You know, we have huge recreational input into this fishery which by itself carries on a lot of uncertainty because of the lack of reporting. And the commercial sector also has had its timely gaps of reporting which have also increased the uncertainty.

Essentially, what we try to do- I was not here, you know, in the physical meeting when it happened. But apparently, the first attempt for the Puerto Rico fishery to minimize the uncertainty was to build that expansion factor and build it on into the catches so that, you know, we knew we was underreporting by some percentage. So, we tried- we made an attempt to minimize that uncertainty by introducing that expansion factor. And perhaps, when we attempted to do that, it was not 15%. It was not 20. It was 100. It was huge. And now we're dealing with a monster, you know? With a monster of uncertainty. It's not a few percent, you know? It's not a 5%. It's not something that you can trim down by adjusting a model to it, you know? It's something huge which it doesn't make any sense for me to try to model- you know, try to see how the interactions of our model can minimize the uncertainty because you're starting with such a big error that it's very difficult to control, you know, mathematically.

I was very, very amused and very interested in the concept that Todd brought yesterday in saying that there is variability between species in terms of the uncertainty. And perhaps, we can use that to start by saying- it's like starting with a budget 0, you know? Start with a catch, with a real catch- with what we know is true. You know? We know there's pounds there. You know? And then see through some other exercise what species are better predicted by the actual catch. And then the others that are not readily predicted by the catch that need an expansion factor we try to readjust the expansion factor to the reality of the problems of reporting for that particular species. That's the only way I see it, you know? But, you know, I just want to make the first- I know

it's very difficult, you know? Very difficult to actually figure out, you know, what the uncertainties in the reporting cause by the lack of reporting or the underreporting or the overreporting are. But I just wanted to, more than anything else, to establish that there are difference between islands, and we should take that into consideration before we talk about U.S. Caribbean fisheries' uncertainties.

RICHARD APPELDOORN: Well, right now we're talking about Puerto Rico. Todd?

TODD GEDAMKE: A couple things. one, I would prefer if NOAA referred to this report as the NOAA report or the port sampling report. It is- you contracted me to do the report. It is your work. You've had the work for two and a half years at this point, and I'm- you know, someone said that all data inputs are CIE reviewed. Has the expansion factor been CIE reviewed? Has the main thing that does all of the data in Puerto Rico- have those been CIE reviewed? Have the other ones? No. This is- and I don't know how that works or why you're taking this stance, but this information- Nancie had all this information to come here today and do this work. She didn't have it because she wasn't given it. So, somewhere in there, you know, it took one year for them to even receive it. So, we're now at a point where I would love for you to stop doing the MER, like, putting that on someone else. That would be great. and I- you know, this is another one that if we're here doing this now, why don't we have all the available information? We had Queen Trigger spatial patterns in places. We have species composition breakdowns. This is so- but I'm not- let's not go there but, but I would appreciate that.

Reni, you made a comment about big error and, you know, I hope Erik and others recognize that I understand the power of an integrated assessment. I mean, the power of that is going to be fantastic. I do not like the idea that is being proposed in some way, that is being trinkled around of the- that we can put up what is essentially a phony assessment because we're just making something up to use as year 0 on this. We can't- I mean, if that's what we all want to do off mic and go, "Yeah, let's just put something up and get this done so that we can all move on and plug and chug from there," then great. But I don't think that what we're doing is our base-case scenario here.

So with the big error on this, we have a lot of noise in this data. And you can do the MC chain on this. You can run Monte Carlo on the whole thing and profile it. It does not ex- these are not- you know, every one of those scenarios is equally as valid as the other one. These are alternate states of reality. And if you look at the

uncertainty on this, we're not talking about uncertainty that's going to go one tiny little bit. You're talking about uncertainty that's going to be double, 2 and a half, and 50 percent below. That does not negate there being underlying trends in the data. That does not negate full declines in the data. And when you profile that MCMC, what are you going to get out of it? You're going to get a normal distribution that shows a flat thing which is going to just scale the catch recommendation. So, Shannon's been saying, "It's not going to change anything. It's not going to change anything. It's not going to change anything." Well, that's if you say the data all go just up and down in the same direction. But the fact is that we don't believe that. We know that that's not the case. You look at the beginning of the '80s in there. Where is that going to go? But you literally- if you look at that time series and you imagine those error bars that Nancie showed on some of the CPUE, you take those error bars that are half of the screen long and you say, "I'm going to model that in there." And you're going to tell me that it's just going to scale the catch recommendation? Because if you profile that, you know what you're going to get. You're going to get the most- you're going to get a series of results that you can't treat as a distribution of uncertainty. These are alternate realities. They are alternate scenarios in it. So, the fact you're going to come out with something that yeah, all it's going to do is scale it. But that does not exclude the possibility of there being trends that are underlying that we're missing.

RICHARD APPELDOORN: Is someone on the line?

LIAJAY RIVERA GARCÍA: Yes, you have a raised hand from Erik Williams.

RICHARD APPELDOORN: Erik?

ERIK H. WILLIAMS: Yeah, this is Erik again. Thanks for those comments, Todd. But I think you're a little off base in the sense that the way the integrated assessment can work with the uncertainties is we can include not just scale but time- changes in time trends. We can include correlation among the uncertainty that feeds into it. I think what everybody's missing is we've talked about, you know, just- I'm amazed at just even the conversation that occurs over the uncertainty in L infinity and K in the growth curve. Well, guess what? The integrated assessment puts all of that into one package. We put all of the uncertainty into it, and it allows us to be very explicit about all these uncertainties we're talking about and actually put them into the model. And it will spit out something. This is where I think Todd might be stretching it a little in predicting the outcome. I've

been doing assessments for 20-some odd years, and I still don't try to predict outcomes on assessments because I've been burnt too many times on that. We don't know what we're going to get. And but I think it's a tool worth using. The other thing that will- that this tool provides, which I think goes underappreciated, is it gives us a construct to look at and understand where we get the biggest bang for the buck in trying to improve our knowledge about certain things. You know, is it worth spending a lot of money to get a better growth curve estimate? Is it worth spending a lot of money to narrow down these landings? Where is the biggest bang for the buck? Well, this modeling construct can really help us answer those questions. So, anyways, just wanted to add that.

RICHARD APPELDOORN: JJ?

JUAN J. CRUZ MOTTA: Yeah. You still right that- what I like about that approach is that it allows, whatever times 0 is, it allows to propose a specific hypothesis of what we expect to, to see in the future, right? However, what I have is a question for the experts on this. And it's the following. Let's suppose we go with the phony, assessment. Like, we are out of the charts. We're saying, "Okay, we can catch millions," and we cannot. The question is, using these indices approach, can we detect that within a year and then correct our predictions? Or- Thank you.

I can answer that.

JUAN J. CRUZ MOTTA: Okay. Yeah. Any expert.

TODD GEDAMKE: Shannon, please tap me if I- This is Todd here. Shannon, tap me and correct me and chime in on this one. But I think the question here is if you come up with an assessment and you start tracking indices, how soon can you validate the results of the assessment? The big problem with indices here is a lack of, of any sort of contrast to it. So, in these fisheries, you're going to have a very, very difficult time with using CPUE to get you back at the underlying MSY. You can use it to guide the models, but you're going to have a very difficult time without massive changes in the fishery- or significant changes in the fishery. So, you're using it as an adaptive, which by the way, Shannon, and I hope- and no one in here misinterprets the fact that I have been promoting exactly what Shannon is saying for the start of my career here, for 15 years. And I think that getting to where Shannon wants to go and getting to where Erik wants to go and getting wherever the Center wants to go is where we need to be. And I don't want anyone to misinterpret my comments in that in any way, shape, or form. I just can't- it's hard to find myself on both sides of this argument at different points in time.

So, you're- initially, it's not going to be a year. You're going to have a base in there. You're going to be looking at many years. I mean and the assurance that you're going to get an assessment out of it is going to rely on better data as you move forward. So, you can use the indices. You can use mean length as super easy indicators that can be collected by a small number of people to guide your catch recommendation for the following year. It doesn't change the needs for an assessment.

So, as you move forward, we're going to have the same questions in terms of landings, removals, and you're going to need a time series of information. So, when you look at indices, you're looking at a clean set of indices. You're looking at many years for, that index to be informative for MSY. And it generally takes a contrast, a change, a drop, a fish- you know, it's a one-way trip.

JUAN J. CRUZ MOTTA: But in the meantime, can you detect, like, something is really wrong, like, unless- and then you Trigger whatever major assessment?

TODD GEDAMKE: So JJ, what we're talking about right now and what you're asking about is exactly where all of us landed on this. And whatever disconnect that I'm having with the Center right now on these things, our objective is totally, entirely the same. And it's to get to that exact scenario. Whereas you've got basically- but there's the legal end, which I'll just skip on this. Okay?

JUAN J. CRUZ MOTTA: Yes, yes, yes, yes.

TODD GEDAMKE: But you have the other end which, you know, if I were king on this, you'd basically go in and say, "Okay, we're going to start with length metrics. We're going to go average catch on it. And we're going to track length, and we're going to track CPU." So in- we did an adaptive in- I did it in Belize. We did CPUE, length, previous year's catch, catch rates at the beginning of the season. We put five indicators in there, and every season, as it opened, the computer would just run and plug and chug it. And you'd send someone out and measure and you'd look at all your indicators. And then we had a decision tree that followed that. So, you could then look at it and say CPUE is up. Length is up. And therefore, CPUE is going up. You're catching more. Your size is going up. That's real- those are both good indicators.

Okay? But the decision tree also can recognize the fact that you have CPUE going up and length going down. And that's just basic data [instants?]. Those conflict. There are conflicting signals. What do you do with that? The decision tree can then go from there

and say, "You have a conflicting signal in CPUE and length going down." For those that deal with length all the time, that's a possibly a recruitment pulse. So, you'd say, "Okay, we have to go get some other information to find out whether the mean length going down is a recruitment pulse or not." If you can't get the information, you can apply the precautionary principle and say, "You know what? We're going to sit where we are and look for two years worth of index." So, I think that every single person in this room would love for us to get to that point right there. It is figuring out ways of getting from here to there that are- they're going to form our base on this. And if we got the- I mean, the memo for NS1- if that alternate does come in in there, they're going to be allowed some more flexibility. But we're still trying to fit into the old package and the old legal guidance from NS1. Fair?

SHANNON CASS-CALAY: Yes, that is completely fair because having just participated in the redrafting of NS1, it's still based very strictly on Magnuson because Magnuson has not changed. It has not changed. And so, there is recognition of the need for additional flexibility. But the Magnuson law has not changed.

I do agree with Todd that largely we are trying to go in the same direction. I mean, what we're largely trying to do is establish some kind of defensible base line based on the best scientific information available to us at this moment. And then, we are very much interested in using adaptive approaches to introduce changes to the management based on observations on the water. And you know, some of the lingo of that is empirical harvest control rules or decision trees like Todd just said, where, you know, maybe the SSC and the Science Center or the Council, basically, establish a procedure to adjust the annual catch recommendations based on increases in indices, changes in mean length, etcetera, etcetera. But you must have some kind of a simulation framework in there to test that is consistent with Magnuson basically that it's not likely to cause overfishing and it has the potential to rebuild an overfished stock. And that's where the stock assessment or a simulation that shares the characteristics of a stock assessment comes in very handy is in demonstrating to the lawyers that we are doing our due diligence to meet the law.

RICHARD APPELDOORN: My understanding of the debate here is not putting what you just said into question at all. It's whether the approach to do that, given the uncertainties in the data, I guess using this kind of Monte Carlo bootstrapping approach, is a valid first step to get there or not. Or we just so, um- I mean, is the data just so poor that we cannot identify, as Vance was saying, what the potential problems are, list those out, and that start

trying to look at what the, the bounds on those might be. And can we then go into this kind of Monte Carlo approach? Or, you know, are we really stuck? And you know, I don't have the expertise and the models to say one way or the, the other. We have, we do have people on the committee, Erik, Jason, Todd who are familiar with these models, who are- some of whom are very familiar with the data. Others perhaps less so. But we need, at some point either a way to go forward or a determination that there isn't a way to go forward. So, with that we have who online?

LIAJAY RIVERA GARCÍA: Yes, you have Doug Gregory with a raised hand.

RICHARD APPELDOORN: All right, Doug?

DOUGLAS GREGORY: Thank you. This is Doug Gregory. I'm shocked at some of this language, and particularly, calling something phony. The first stock assessments were done 38 years ago in 1984. We- in the U.S. the only trip ticket information we had was with the shrimp fishery. We had nothing for swordfish, very little for swordfish, nothing for the reef fish, and we did the best we could- the Center did the best they could doing the models and I and others reviewing them, to put management on a solid scientific footing. Back then, we didn't even have fishery dependent indices, much less fishery independent indices. And so, it's been made every step of the way. So, we don't throw out this assessment or throw out the catches that have even been adjusted because of a known understatement. We do- I like Erik's recommendations. But we need to go forward and quit throwing bombs in the middle of this stock assessment. Thank you. I'm highly insulted by this so far.

RICHARD APPELDOORN: Yes, Todd?

TODD GEDAMKE: Doug, I apologize for insulting. I didn't mean to use the word phony, but I also would just like to point out in 1984, we didn't have Magnuson nor the legal requirements to meet up with this in 1984 when, when we were working on some other things that it was a different ballgame. I think we have a legal requirement now, and the other aspect of this is that in 1984, you didn't have 15 years worth of record of people making statements about the same data inputs, so. I feel that there were reasons why almost every member of this committee and other people made these decisions previously. And I don't feel like we- you know, that much has changed. I will say that I think that I will not comment on the rest of this discussion and let the SSC take it from here. And I think that everyone's opinion on this issue has already been on the record numerous times. So, I'll step back and let you guys do it.

RICHARD APPELDOORN: I don't think you get off that easy. um-

TODD GEDAMKE: We're fighting again.

RICHARD APPELDOORN: Yeah. I understand this. Um-

TODD GEDAMKE: So many times.

RICHARD APPELDOORN: No, no. I- you know, we have what I would say is a general recommendation of how to go to this using this kind of Monte Carlo, whatever, approach. And it's not going to be easy because we're going to have to discuss about what we think are the issues that can then be somehow incorporated into that that approach. And so, I guess my question to you, Todd, is do we have an alternative? And, you know, within the legal framework? And I hate to put it that way, but that's the framework we're stuck with. Is this either that approach or we go home? Or is there something else you can think of that would help?

TODD GEDAMKE: The argument hasn't changed. And, I understand that, you know, we have this great desire to- but we have a square peg in a round hole here. We have a biomass-based requirement, and we don't know biomass. We don't know removals. So, we can do these- I mean, we looked at simulation models. We looked at this exact- we did a recreation of landings. We analyzed- I mean, I just don't- so the- it's the idea of, is there nothing to do? Well, you're asking, "What do we do?" Do we take this set of information that has been questioned hardcore, and I have- I was on the exact opposite end of this if you remember correctly. I was the one saying, "We have to do something. We have to use this data." This is where I sat on this argument 12 years ago, and I fought and fought and fought. And I'm not comfortable arguing against this right now, but this is what the record has built from this committee is that- So moving forward here, you have two choices. You can go with- let me figure out a good word. And you can go with a- as what you suggest, a very complex, very complex model in a data-limited situation. And when we come up with the results of this, I mean you're moving forward options are to give them a charge of exploring, of coming back and saying, "Here's what you're going to do with- here's what we go with this." And that might be an easy way to do it is say, "Let's take a look at the landings."

You know, we also have to- or, yeah. We basically come to the same decision that three years worth of meetings did in 2008 to 2011 that said- I'm not even going to repeat it. You know what we concluded. You know what's on the record in there. So, the question is, how do you- you know, I don't know what to do. I think that

we're at the same situation we've been in before. And we all said, "Okay. Let's figure out another way of looking at this. Let's come up with an alternate meth- a way and use a scaler." And I don't- I wasn't comfortable with it then. I'm not comfortable with it now. But I don't think hand-waving in front of some of it to make it feel better is doing a whole lot. And moving over to, you know, where this is a model that they want to go into and use as the ability to go to the Virgin Islands. We don't have a correction factor in the Virgin Islands, so get ready for that discussion. If you don't have a correction factor on it, you've got 75% drop that is due solely to the fact that it's been in reporting- how should I phrase that? There's been a drop. There's been a change in reporting. So, and we don't have a way of correcting that.

So, my question is, you know- that's why I wanted to step out because I've already argued these things for many years. And I think that the option now is to let them go with the catch and see if, you know, if they can maybe review. A CIE review. We've got money. Does it need to be reviewed? Just how are we going to deal with this information and move forward, or are we not? So, I babbled a lot there. I don't have a good way forward. And no one has had a good way forward. So, I'm wondering now what, you know, what do we do? That's why I wanted to- I'll let you guys-

RICHARD APPELDOORN: Okay, but that's what I wanted to hear. I think we have someone. Erik?

LIAJAY RIVERA GARCÍA: So, we have a turn to speak for Erik Williams, and we also have a comment from Virginia Shervette in that order.

RICHARD APPELDOORN: Okay, and then Shannon. Go ahead, Erik.

ERIK H. WILLIAMS: Okay, you know, this is Erik. Thanks everybody. Yeah, Todd, I hear what you're saying and don't get discouraged. I mean, your opinion here matters just like everybody else's. And, and I understand- I think what we're worried about here is we're- this, this SS model construct or integrated assessment model construct is we're not bought into it yet. I don't- at least, I haven't heard back yet. I mean, this is- it needs some work and I'd like to see the work go forward. The problem is the amount of work it needs is substantial. So, this is going to be an investment on the Center's behalf on this, and we don't know if it's going to work. But I would say that this integrated analysis assessment is much like any simulation analysis you would have underpinning sort of an approach that Todd was talking about, like an indicator approach where you have a lot of metrics that are coming in and you make adjustments based on whether those things go up or down.

But in order to know how much to adjust, you have to have some underlying simulation model that tells you what your hypothesized population dynamic response is that would lead to those ups or downs of various metrics.

So anyways, they're both valid approaches. But I think that this integrated assessment is the state of the art. It is complex. But it can boil down to some very simple- it can use simple data. What I'd say is, I don't think the SSC has anything to lose to go forward with this and try to get this model to a point where we can then just say, "Okay, it's useful or it's not." I mean, it may- it may very well come out that if we put realistic uncertainties into this model, we get garbage out of it. And it's just not going to be useful for managers. I'm not taking that option off the table in any way, shape or form. That could be the outcome of this. So, anyways, just wanted to add that.

RICHARD APPELDOORN: Thank you, Erik. Virginia?

LIAJAY RIVERA GARCÍA: Yes, she made a comment in the chat. It says, "Shannon made a great recommendation of sorts yesterday, that it may be useful to have the SSC involved in the data-scoping process of these assessments. I know for life history SSC members were invited to participate. But Shannon's idea was great too, to have a review of data, meeting especially with the SSC prior to moving forward with running assessment models."

RICHARD APPELDOORN: Shannon.

SHANNON CASS-CALAY: In all hone- I was responding when I raised my hand to a comment from Todd. And I think there have been a number of steps that we have participated in, the Center and the SSC, since SEDAR 46, the data-limited assessments. And primarily, they were in building the control rule and the SEDAR 57 stock assessment of Spiny Lobster, which shared a number of the same data concerns, right? And in fact, that assessment lacked indices of abundance entirely. And so, you know, from our impression, you know, there are a number of substantial improvements that have been made since SEDAR 57, you know, to develop indices of abundance, to get much better life history information from Virginia. And, you know, there are always ways that we can continue to advance the model. It is- we can continue to improve this model. Some of them have been suggested here. But, you know, it is- I'm not trying to by any means say that we are fully confident in the catch series. But we're not fully confident in the series of removals for any stock assessment that we do in all honesty. And what the trick then is to try to develop a management system that you think is relatively robust to those important uncertainties.

And, you know, that's one reason why when the stock assessment- if we are able to produce the stock assessment and it is complete, we would continue to monitor the behavior of the population with indices to determine whether those observations on the water are consistent with the understanding that we received from the stock assessment. So, for example, you know, if we tell you that you should be able to catch 50,000 pounds of Queen Triggerfish and you catch 50,000 pounds of Queen Triggerfish and the indices are continuing to increase, that would suggest that you can catch more Queen Triggerfish than that, because the indices are suggesting that the stock has continued to increase. So, in that sense, these adaptive approaches, although they cannot verify in a short time series that your MSY estimate is correct, what it can do is say, in the short-term, "It looks like it's not correct, and so we need to adjust."

Right. So, I did want to point out that, you know, we do have a successful assessment using an SS methodology. And that's the three assessments of Spiny Lobster. Which did undergo a CIE review as well as an SSC review. And many of the same data uncertainties were acknowledged at that time. And it was not considered an impediment to using the results to try to manage the stock. And in fact, we are updating that assessment in November of this year.

JORGE R. GARCÍA-SAIS: Yeah, I sort of agree with the proposal of comprehensive review of the data before we proceed with any final decision regarding how to look at the data. But I will also pretty much like to see a comprehensive review of the expansion factor because, I mean, if- like Shannon was saying, okay, if you can catch- say that you can catch 50,000 pounds of Queen Triggerfish and you catch 50,000 pounds of Queen Triggerfish. At the end, are those 50,000 pounds real? Or are they based on the expansion factor? And then, okay, so it's with the expansion factor. So how real is that? I mean, is it a phony number? I mean based on what? I mean, here, as long as I've been here, we've never had a real discussion, an evaluation, and less, and even a validation of that expansion factors. And I keep on nailing on this because the thing is that it's not a small thing. It's a huge thing. It drives our numbers. I mean, it drives our numbers. It's not a matter of 5% adjustment. We're sometimes talking about 100% of the data.

So, I mean, any kind of conclusion based on what we have brought up a figure of landing based on an expansion factor, for me, it's a huge uncertainty. And that's where we stand right now. So, I do believe I, you know, in order to proceed with this, I think we need a comprehensive review of the data and a comprehensive review and validation of the expansion factor for Puerto Rico.

RICHARD APPELDOORN: Okay, I'll make a comment and then over to Shannon. You know, back in ancient times when this current expansion factor was developed and then subsequently modified, it was all done in collaboration with Steve Turner's group at the Center. And, you know, it was a statistically valid way of approaching the issue. The problem you're really talking about is that the results of that showed that they're missing a heck of a lot of the catch. You know, that's a whole different issue. But you're right. When you expand by something that's a high number, you are expanding any kind of errors you have in that way as well. The expansion factor was designed for total, island-wide biomass catch. It was not designed for individual species, and that's where the real uncertainty is coming in because we know from the behaviors of different sectors that they're all not behaving the same in terms of reporting. There have been issues. I mean, there were tax issues. There were protests. There were Diadema die-offs. There are all kinds of things that are happening both in the socio-legal context of the fishery and economic content and the biological systems that make some species behave differently than others. So yeah, it's a problem. But the expansion factor calculation was set up I think in an appropriate way. The problem is that hasn't been looked at in, oh, I don't know, 30, 25 years? Something like that? And so, you know, it could be up for review. If we want to go that way. So, Shannon.

SHANNON CASS-CALAY: So, Nancie reminds me that there was a SEDAR procedural workshop in 2009 to address calibration factors. But, you know, obviously, that was some time ago. And there may be new information available. In fact, there is because the NOAA report. [laughter] You know? Does it- so it may well be that it's time to suggest another procedural workshop to review the catch and make better estimates. However, I will warn you that those procedural workshops take time to put on the calendar. And so, there are assessments that are on the calendar now that would benefit from that information. But there could be a timing issue with some of those stock assessments. So, I strongly do recommend honestly, that we continue to try to improve these estimates. And if a procedural workshop is helpful, I certainly am very happy to recommend it.

RICHARD APPELDOORN: JJ.

JUAN J. CRUZ MOTTA: Thank you. JJ here. A question for the Science Center. How do you intend to use the core sampling NOAA report?

KEVIN MCCARTHY: Well, one of the things-

GRACIELA GARCÍA-MOLINER: Name, please.

KEVIN MCCARTHY: Sorry, Kevin speaking. So, one of the things that was being talked about that wasn't a full-on recommendation but one of the things that was talked about was to use those data to inform a, you know, we were using the term sensitivity yesterday. But we call it what you will. an alternate landing series. We hadn't worked out the details of that, right? But it was going to be the basis for another landing series adjusting as necessary. We'd have to figure out how to do it because we've got the 17 months that coincide. But then how do we project that back in time it's stuff to work out. So that's one way to use it. In the broader sense, right, we can look at- and in the report a lot of this has already been done, looking at various species and how does that compare to the Puerto Rico landing series as we have it. How does the port sampling compare? And some match up pretty well, and some match up when they're, you know. So, there's a variety. It's the species difference thing that we're all talking about. So, we would use it in that sense as well. But for this assessment, you know, we could have another proposed landing series based on, you know, that 17 months of data and however we figure out how to project it back in time. That's one way to use it.

RICHARD APPELDOORN: Please tell me you're thinking of the ultimate goal is to completely revamp how Puerto Rico is collecting their data based on the statistics of the sampling design that were used here and the technology and methodology so that we're not talking about using this as a one-shot deal. But that based on this, we will have a much, much improved sampling program instituted in Puerto Rico.

KEVIN MCCARTHY: That is exactly the reason for having the work done. But in using it for right now.

JUAN J. CRUZ MOTTA: Thank you.

TODD GEDAMKE: Can it be used before the CIE report is done?

KEVIN MCCARTHY: If this SSC wants to do that, it absolutely can. This is Kevin.

RICHARD APPELDOORN: Was there another comment over here? I-

NANCIE CUMMINGS: I had my hand up once.

RICHARD APPELDOORN: Nancie?

NANCIE CUMMINGS: Thank you. Nancie Cummings. I've had my hand up a couple times, and I keep lowering it. I just want to remind the group that in your repository of documents for this meeting, you have a copy of the review of the expansion factor, at least that was done in SEDAR procedures 3. It's R something- reference paper 11, I think it is. But it's the Cummings, Matos-Caraballo. And just if you look at that paper, you'll see that there was work done for the U.S. Virgin Islands as well. We never came to an agreement for the U.S. Virgin Islands. So, I would hope that if there was an update, that that work wouldn't be lost and that could be incorporated into. There was a lot of controversy, and there was a lot of work done on the U.S. Virgin Islands expansion factor. Thank you.

RICHARD APPELDOORN: Yeah, I'm sorry-

GRACIELA GARCÍA-MOLINER: My apologies, but we're trying to- we're tracking the recording because we've been having problems with it. So, we're making sure that everyone states your name, you know, speak close to the microphone because the person who transcribes this has a hard time when, you know, the volume it's reduced, etcetera. So I apologize for that, but we're tracking the recording over there.

RICHARD APPELDOORN: Oh, okay. It's your hand signals, they were not clear. Todd?

TODD GEDAMKE: Just a comment on the procedural workshop. I- that procedural workshop, Nancie, you're right. That was done. It'll take a look at the expansion factors. There's also the data improvement project, and I would hope that the Center would really look back at those before we recommend redoing it. Read it and process it and tell us whether there's anything new because with the expansion factors there's nothing new. There's nothing new to look at. And we beat our head against the wall for that forever. And I could be wrong on- but I don't think anything different has been done on that. So, you know, the procedural workshop and the data evaluation workshop, the part of the ACLG and the procedural- all three of those I feel like we've lost track of those. And there's a lot of work that was done at that time. Kevin and Nancie were on both of those, all of those and, you know, I think that, that is our basis. Rather than restart everything now, we've got most of this work already done.

RICHARD APPELDOORN: Okay, Nancie?

NANCIE CUMMINGS: Thank you. Nancie Cummings again. There's part- most of that was true, but the species work was not done at that

time. And there was, you know- there was this- in terms of the port sampling project on the- not the port sampling project but the correction factor survey that Daniel has led for many years, it should have extended to species. But I think there were implementation issues. So that part has not been done.

RICHARD APPELDOORN: Todd?

TODD GEDAMKE: And just another one for the notes too is I know you're talking about a data triage. But that was also done at that time. And that can be updated. But I know you're- because that goes through the species and samples and which species might be most likely to be able to conduct an assessment. A lot of the same language that we're talking about now too. So that's another I want to make sure that is put back on the table for folks.

RICHARD APPELDOORN: I'm hesitant to summarize because of the way the committee operates is it'll just go with that. And, it's not my intention to say this is the way forward. But I'll put it out. You know, legally we're stuck. And given that, I think the approach that Erik had introduced, as a way forward is perhaps the only thing we can look at, especially in light of his comment that something useless might be the actual result of this. And if that's the case, that's a very good indicator of where we are because then that would be saying the uncertainties are so great that you know, that's it. But hopefully that would not be the case and we won't know, as he says, until we actually run something because, as he said, trying to predict the outcomes is a losing proposition.

So it sounds like that is perhaps the way to go. And so, it's up to the committee whether they kind of agree with that sense of what the discussion has been moving forward to. And then it would be if I understand this correctly trying to characterize in some kind of quantitative sense the nature and extent of the kinds of variabilities in catch that we would like to see incorporated in the Monte Carlo analysis. And that might get over to Vance's suggestion of let's just itemize what the sources- potential sources of variability might be. And then we can talk about what the magnitudes of those might have been and then, you know, see what happens. We have a whole list of things that were in this document that's on the screen. But if we don't get past this issue of how to treat the landings data within a framework or to not deal with it all, then we're not really going to go anywhere. So, I'd like to hear back from the committee on that. So, Todd?

TODD GEDAMKE: I agree. I think at this point doing at least the next- letting them proceed with the plan sounds- let them at least put that up. But I think that I would also put out there a review

from the Center and on the landings data. Kevin is the expert. There's no one that knows more about the expansion factor than Kevin and Nancie. They are the ones that know it better than anyone else, and they should be the ones to basically make a white paper quantitative so that you can do an analysis on it, take a look at it, and just give us an opinion from there and run this. Because the scenarios that are going to come out for that landings that get fed in are going to be the most- what I think is the most critical, probably, part of it. So, I'm thinking a landings evaluation from that and just add that to the beginning. I think that makes sense.

RICHARD APPELDOORN: Todd I'm going to ask for clarification because you've used just the term landings evaluation. In your mind, since you're putting it forward, what are they looking at? Or what kinds of questions are being asked in that? Or, you know, what do you want to see come out of that? So I- we all understand what you mean by landings evaluation.

TODD GEDAMKE: Sure. I mean, basically, when you're going into the, the modeling, you have to say, "Here's your landing series, and here's your uncertainties on it." And rather than us argue about all this, let's have the people that work with these data all the time, to come up with what those scenarios would potentially be. I mean, that's really our argument is using that time series as is. So, you know, I think Shannon mentioned we can use the recent port sampling report and say, "Yeah, for Queen it's the same. So, let's run report it." That's one scenario. So, it would kind of be just a two-step process in that the review of the information that we're questioning or have questioned over the years and how that would be fed into SS. So, I'm just saying rather than dive right into it, let's have them address the concern about the landings time series before we get into actually running those scenarios.

RICHARD APPELDOORN: All right. again, point of clarification. Are we talking strictly in the context of Queen Triggerfish? Or are we talking something more broadly? So that's the first question.

TODD GEDAMKE: I mean, I don't know. It's going to be the same across the board. So, could- for Queen, right? I mean, Queen Trigger is one. So, I'm talking just Queen Trigger. I mean, it's for this assessment. Just, just Queen Trigger.

RICHARD APPELDOORN: Okay. All right. Let's switch again. The reason I ask is because there's been a couple things that have been brought up. And one is whether it's the question of what was happening before 1983 which I think was substantial. There is the

question of what was the impact of Diadema die-offs which would be early in that thing, which would not being affecting, say, other species. So that's something unique to Queen Trigger. There seems to be and- or at least an argument was made that there is- while there's not a directed fishery for Queen Trigger a lot of Queen Triggers being caught, it did not show up in your top- I forget what list- top 20 list? Uh, it's in the report. And you have the graphs there, right? but I don't think it was on the-

TODD GEDAMKE: Yeah, I'm pretty sure- I'll call it up right now. But I'm pretty sure it's con- and I don't know the directed fishery or not. But you know what? I'll guarantee you there's not a fisherman from Puerto Real that swims past a Queen Trigger.

RICHARD APPELDOORN: Well, yes. I understand that. And because of the comments being made that it's not going to the restaurants per say, but it is going into the empanadilla trade, which is, you know, is huge in Puerto Rico. And so there's a market for that if it's being used for that and therefore it becomes an important species. And I don't know if that's something that has developed recently. But I'm willing to bet it's something that developed since 1983. So, there's, you know, possible drivers that have changed relative to the use of that. But you know, I'm just throwing these things out. I think historically Queen Trigger's never been thrown back. So, if they've been catching it, they've been using it for something. And maybe that's sufficient to say, "Okay, it's been caught as by-catch throughout," and that's fine. But I- so anyways, my question is- so I think there's some things that we need to think about that might be specific to Queen Trigger in that review that have been brought up at the meeting. So, Todd and then Shannon.

TODD GEDAMKE: Queen Snapper is number six on the list for all of Puerto Rico. Queen Trigger is 10, 7- 10, 7, and 9, depending on how you categorize it. It is clearly in the top 10.

SHANNON CASS-CALAY: Yeah, so certainly what Todd suggests is appropriate. It is a very tall order, you know, I'm- to have the Science Center go back and make independent corrections to data is unlikely to be successful, right? It's really something that's going to require the participation of the territories, the participation of probably, you know, some of the scientists who are very familiar with the data collection that's going on in the territories. So, I think what we could do is move forward and discuss how we are intending to characterize the uncertainty and make sure that we understand all of the sources of uncertainty related to catch statistics that you would like us to evaluate. I think that getting a catch series that we actually have confidence

in is going to require a larger collaboration and probably a procedural workshop. So, if you want to set that as the bar, then it really does delay moving forward with the stock assessment. At that point, we'd pause the stock assessments, take them off the calendar, concentrate on the procedural workshop. And that's also possible, but it would take- you know, the SSC would have to present that to the Council and say, "You know, we essentially want to pause the stock assessments until such a time as we have a better approximation of the landings history." We'll tell Julie to wipe the calendar and put the procedural workshop on the table instead and then reset the calendar for the Caribbean.

It's not such a terrible imposition because we do have a Caribbean fisheries branch now that is relatively independent in terms of the data pulls and the analytical work. And so, it doesn't affect the other SEDAR assessments the way it used to. So, we have some flexibility. But what I don't want to do is be sent away to say, "Come up with a landing series that we all have confidence in." Do the analytical work on the stock assessment, bring it back to you, and have you still have concerns about the catch series. Because then all of the work to improve the stock assessment model is wasted.

RICHARD APPELDOORN: Todd, and then Vance.

TODD GEDAMKE: Yeah, my recommendation wasn't for you to come up with a single catch series. It's been vetted. It's to take the knowledge of the people- forget the scientists, the local- I mean, these are statistics and data. And there's no expert more than is sitting right there, you know? I mean, and so, my question's not to say to go back and determine what is. It is to say exactly what you said, Richard. I mean, do we- what about the tax year in 2015? Do we do- you know, there's multiple aspects that need to be taken into consideration, so. Mine was to get this moving and the option- the other one is the procedural workshop is what would be different than the last time we did it?

SHANNON CASS-CALAY: Well, in all honesty, I think the major difference is the new science information brought, you know, through the NOAA collaboration with MER consultants. And maybe an improvement in the spatial data. But, you know, we're still going to have a number of uncertainties. And it's very likely that at different parts of this time series, you know, there may have been different- the uncertainty biases may be different, right? We're dealing both with uncertainty and potential for bias here. And they're hard to wrap your head around. But I think that's why what we can do is outline the uncertainties you want us to address in the stock assessment framework and work with Erik Williams to bring

some of the Beaufort approach, that MCBE approach, capability to the stock synthesis realm, you know? And that does require development, right? That basically is not a tool that SS has right now in its framework, but it is easy enough to code. Where if by easy, I mean it will take us months of hard labor. [laughter] But it's possible.

RICHARD APPELDOORN: All right. thank you. Vance there's been someone on, online, waiting.

LIAJAY RIVERA GARCÍA: Yes, you have a comment by SSC member Erik Williams. He agrees with your summary, Mr. Chair, and you have a raised hand from Doug Gregory.

RICHARD APPELDOORN: Yeah, go ahead, Doug.

DOUGLAS GREGORY: Hello, this is Doug. Did you call me? I was coughing at the time. I'm sorry. [laughter]

RICHARD APPELDOORN: Yes, you had your hand raised?

DOUGLAS GREGORY: Yes, I did. I've been involved in a number of stock assessments, as I said, since '84, '86. Acadian Red Snapper in the Gulf with Nancie, way back in those early days. And stock assessments build upon one another. Sometimes a mistake is made. Sometimes the change is incremental, small increments. Sometimes it's major increments. Sometimes either the CIE reviewers or the SSC itself changes assumptions, which can flip a stock assessment from being healthy to being unhealthy. It is a whole gamut of that. And the whole purpose of this is to strive to reduce our uncertainty using what data we can use. Now what I would support is this wish list that we have before us, for the Center to go back through that, and evaluate what they can. I don't know how much work would be involved in that, but to evaluate what they can, and then bring it back to us. But questioning the catch history of the entire Puerto Rico and this is just one species. You can't just do one species. So, that seems counterproductive to me. Thank you.

RICHARD APPELDOORN: Thank you, Doug. Vance?

VANCE VICENTE: Going back to Erik's first, statement about characterization of uncertainties. Every time- I mean, I'm listening to all of your suggestions and I have been exposed to different models, which I really, you know, have a lot of problems understanding the details. I am not a mathematician definitely. I'm a field ecologist. But the way I see it, my recommendation is to itemize, what those uncertainties are. Write them down, you

know? Characterize them the best we could so that we can prioritize them. Determine which are the principle uncertainties. If it lies on the fishermen, get the fisher more involved in all of these studies that we do. That's [inaudible] if that is the problem, you know? Whichever way they need to be involved. And then second, I don't know much about the models. But I believe that each model has their pros and cons. Once we list and itemize what the uncertainties are that we believe are most important, you know, lay out all the different models and see which one addresses the uncertainties that we have determined that are important or more significant affecting the catch. That's my recommendation. Thank you.

RICHARD APPELDOORN: Graciela, procedural question. Is lunch in fact going to be ready at noon?

GRACIELA GARCÍA-MOLINER: Yes. Lunch should be ready at 12 sharp. So you have- you haven't had a break this morning. Maybe you want to take a break right now. You have five minutes left to noon.

RICHARD APPELDOORN: Yeah, so actually, that's what I- where I was going with this. Maybe we break now. We have a few minutes before lunch is ready. But that allows us to be back here at 1 o'clock. And I would suggest that we actually start with Vance's suggestion of when we're talking about the uncertainty in the datas, let's start itemizing what we mean in terms of either, you know, variabilities or biases or whatnot, and perhaps some scales of those so we can give the center some guidance when they go back to look at all this. So, back at 1:00.

(Whereupon, the meeting recessed for lunch on August 2, 2022.)

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AUGUST 2, 2022

TUESDAY AFTERNOON SESSION

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RICHARD APPELDOORN: Let’s get started again. Sorry for the delay. a reminder for everybody to give their name when they're speaking into the microphone. So, this is Rich. We have a fairly full agenda still ahead of us that we'd like to make some progress on. And so I'm looking for a way to close out our discussion from this morning and with some way to move forward and try to do that as quickly

and expeditiously as possible. We have a list of things that a lot of people have contributed to. The base of that was something presented, I think by Kevin, representing some thoughts on the part of the Science Center and then Erik added to that and others added to that. So what I'm hoping not to do is slug through that. I think, however, there's some things there that I think are fairly straightforward, clearly, the stuff that- for the most part, that came from the Science Center. They have ideas about how to handle that, or they would not have put them forward.

So, the real issue that we've been discussing, of course, has been the data and what to do about that. And I would- well, my suggestion is I would go to Shannon or Kevin, whoever wants to address this. But clearly there's some really open questions there that it would be unfair to say, "Oh, Science Center, here, deal with us." So, you know, how can we bound something down to where you can deal with it and be in a somewhat timely fashion, timely being, whatever scale we work at. And, you know, that we think will help as opposed to kind of pieing the sky stuff, which would be nice, but we really don't think we're going to get there. So, do you have some comments on that?

KEVIN MCCARTHY: Shannon, you can go. You're the boss.

SHANNON CASS-CALAY: All right. I'll go. So, this is Shannon. Thank you. And so, I think what we can do is focus on the major uncertainties, and I think there are some lesser uncertainties that we will also explore, but perhaps we can just give the Science Center the discretion to complete those explorations on our own and present them in the future. But the major uncertainty, as I see it is the catch series itself. You know what- and I would like some advice from the Science Center about kind of the range of options that they want us to explore. Because I think that of the most concern is whether the catch series could be biased. And so the plausible range of bias might be important to get some feedback on. And the L-infinity is also the-

JORGE R. GARCÍA-SAIS: Can you come again? What is the main uncertainty?

SHANNON CASS-CALAY: So, the more difficult matter to handle in the stock assessment is whether there could be some bias. So, is the true catch higher or lower than what the estimates say in a systematic way? If that is not the case, then it's a little bit easier to handle just through, you know, broadening the uncertainty range that we're using. If it's a systematic bias - and that's what the SSC wants us to explore - we could use some information about the plausible range of bias. The other-

RICHARD APPELDOORN: Okay, if I could just- clarification point. So, when you say systematic bias are you just saying whether there should be some kind of scaler that as opposed to the nature of the bias changing over the- whatever it is, 25-year time period or 20-year time- excuse me, 40-year time period.

SHANNON CASS-CALAY: So that does become very complicated, and we would need to have some kind of qualitative information about that to characterize it well, unless Erik Williams is much clever. He could well be more clever than I.[laughter] And, but I think we can certainly expand the range of uncertainty that we're examining, and we could consider applying a correction factor, for example, that's based on the work conducted by Todd and MER Consultants under NOAA contract, [laughter] trying to be correct. There were some initial concerns that I brought up with Rich about whether those first few years of the catch data, which indicate a very high initial catches, whether we should go ahead and use that data in the equilibrium catch estimate, or whether we should start the model at a later start year.

The other major axis of uncertainty in this model is the L-infinity and the natural mortality that results, right? Because the L-infinity is used to create the Lorenzen M vector, the natural mortality vector in the model. So, if there is interest in this group, we could- it's one thing to just use CVs, basically say, "Okay, we're uncertain about L-infinity, but we know the central tendency, and so we'll just expand the range." That's easy enough. If the group is again, concerned that actually, L-infinity might be higher or lower than what was estimated in a Virginia Shervette paper. For example, do you want us to explore L-infinity's both higher and lower? Is it really that you think it could be higher because of fish and cryptic biomass, right, in cryptic habitats that are not observed in that study? I suspect it's more that, that you're wanting to look at the performance of the model if L-infinity is higher than what was estimated by Virginia Shervette.

JORGE R. GARCÍA-SAIS: Yes.

SHANNON CASS-CALAY: All right. So that's probably sufficient guidance. I mean, do you want to tell us how much higher, like the maximum size observed as a proxy for L-infinity, which would be what, 53 centimeters, something like that.

RICHARD APPELDOORN: Versus- what was the L-infinity? Was 40-something.

SHANNON CASS-CALAY: 43 centimeters. Hard to drink coffee with mask on.

TODD GEDAMKE: My recommendation on that would be to look at the plots. Virginia didn't seem to have enough large individuals in the study. So, if you take out those two individuals that are below 43, if you just look at those two fish and you take those two fish out, your L-infinity, it's actually the mean estimated from the same exact data set to give you a fitted, empirical estimate. If you would just- if we're going to drop 82 and 83, let's just drop those other points too and give us a range on it. That'll get us higher. And then I would say the other one is a max observed. Just use the two. And we know that the max observed we should be an upper bound on it. So, we would look- interpret that as potentially too high, hopefully, and I think you get right in the range there. It's- I don't think your K needs to change a whole lot on it, but the L-infinity is going to really drive a whole lot.

SHANNON CASS-CALAY: And so, like Erik said earlier, there is a subtlety- a difference between what is a sensitivity run, which would only be used to explore how sensitive the model results are to a different assumption versus an alternative base case. So, which one are we actually suggesting for the L-infinity? Is it an alternative base case that would require full diagnostics, or is it basically a sensitivity run to determine if the model is sensitive to that estimate?

TODD GEDAMKE: I think this is an important one that Erik touched on before, and that maybe we should at least tiny bit revisit it, because he said, "Let's make sure that we understand the difference between uncertainty and different states of nature." You were just discussing the time series of landings as uncertainty. That's really different states of nature. So, we need to consider this. And Shannon's point is very, very important. It's, are we going to rely on a single base case and take that as truth and then do sensitivities off of it? Or are we, we saying what we've said all along, which is we don't know really which way it is? So, I think that my recommendation there is going to be to treat at least one higher L-infinity as a base case and run a little bit off of that. Once you're set up and running on this, you should be able to run sensitivities pretty quick. So, I don't think it's too much of an ask to say, "Hey, let's take a look at the higher L-infinity." I think there's a few of us gut level that think that that's probably a realistic setup. And then the complicating part is the other one, the time series. But I think Erik's comment there is very important to- and I'm not sure if everyone gets that, but I think it's a key point.

RICHARD APPELDOORN: Well, I'm going to ask just as a point of clarification. If you do a sensitivity analysis that's banding those higher suspected values and you're not getting much change, does that say you really don't need to do the other alternative state, or are these really separate things that you need to do one, then do the other? That's just is my ignorance, sorry, on the process.

SHANNON CASS-CALAY: Well, I do see that Erik has his hand up, and he may be- he is on the SSC, so I'll defer.

RICHARD APPELDOORN: Okay. Erik?

ERIK H. WILLIAMS: Yes, this is Erik. Thank you, Rich. So yeah, I think the answer is the beauty, I guess of the MCBE process is we can include the uncertainty in a growth model that actually comes from the uncertainty in the fitting of it. You know, you could actually pull out using, you know, classical methods for characterizing the uncertainty in L-infinity and K and T0, and even with their correlations among those parameters in the fitting process and just throw that right into the model so that each iteration of the MCBE draws a random plausible growth curve. And uses that as one of the alternative states of nature. I think though, to get back to sort of the question of, is this important to include, I think that's where sensitivity runs come in, is to understand what pieces of information are going to be critical to the outcome of the model. You know, if we did an- let's say we get this model sort of up and running and you put in that alternate high L-infinity and it just doesn't change anything then is it worth pursuing all this extra complication to put in a random growth function into the MCBE process? Or is it not really worth it because it just doesn't change much? So, that's kind of the distinction between how a sensitivity run can help you in determining what sources of uncertainty really need to be included versus some that maybe just they're not that important, or they get washed out by other things that are going on in the model. but- so I hope that helps with the conversation.

TODD GEDAMKE: Erik, it's Todd. That does. Thank you.

RICHARD APPELDOORN: So I guess a little bit back to Shannon. So, we haven't talked about the guidance you need for the catch yet. But I think it sounds like we're kind of set on the L-infinity approach. And is there something else before we circle back to the catch issue? And, Graciela, you have?

GRACIELA GARCÍA-MOLINER: For the record, Virginia says that they have a paper in press for L-infinity for Queen Trigger from SEUS. So, she's online if you need to-

RICHARD APPELDOORN: Sorry. From what?

GRACIELA GARCÍA-MOLINER: SEUS. Southeast US.

SHANNON CASS-CALAY: So, another issue that was discussed was actually the reference point, but those are very difficult discussions to have without a scientific basis, essentially. So, I would ask that we defer that discussion until the Science Center has a chance to actually look into it, and we can make a recommendation. And if there's simply no ability for us to make a recommendation then we might, you know, actually have to do both, but I suspect that we can look at the evidence about whether there is a plausible stock-recruitment relationship, and then look at the evidence about whether those parameters are estimable. And if they are, then we could go forward with an FMSY calculation. If they are not, then we'll retain the F_SPR30%. And then the only decision we'd have to know is, you know, does the SSC want to essentially assume that recruitment will continue as it has during, you know, during the recent time period, which might be 10 years. Now recall that during the last 10 years, the recruitment has actually been lower than average, or would you want to use the full-time series, which just basically says recruitment will continue on average as it has since 1982? Or again, does the SSC wish to just leave that to the discretion of the Science Center, and we'll come back and just tell you what we did and why we did it that way?

RICHARD APPELDOORN: Go ahead, Todd.

TODD GEDAMKE: Just question, Shannon. I think what Richard's suggesting is step one. I think what you're talking about is step two and three on this. I mean, I think what we would like to see is that evaluation of the data, how this gets set up and how it works. I think Erik just calmed my mind a little bit in some of how it will be approached. I also was kind of able to somewhat visualize how that output would look, which I haven't really been able to visualize before. So, I think that's good, but I think I would- I would be reticent to take us to making reference point decisions at this point until we get a look at what we've got and where we're going. I mean, it's going to take a little while to pick through the data on this.

RICHARD APPELDOORN: Okay. Thank you very much for those comments. I think they really help. So, let's get back to the data and what

kind of guidance we can provide the center in terms of- I think there's two questions here. One was this question of bias and the other was the question of the starting dates and the calculation of the catch prior to the start of the- whatever time series is being used obviously from the issues of the trap fishery.

And I'll start off by making it messy. We're talking about whether there's a systematic error there. Okay. We have one, I think rather really rigorous data point that suggests that our- the true catches are below what's been reported with the expansion factors. My understanding is that that would just be a scaler impact. And so, I'm not sure that's- you know, it's a question of how you use it, but then, you know, if you get guidance getting down to ABCs, you also have to interpret the catch data also with that new scaler.

So, to me the question is not one of, is there a scaler, but would that scaler have changed over time? And I don't know the answer to that, but I think there's a lot of things that have happened since 1983 and this fishery, and I'll just signal a couple of them. First of all, at that time the Puerto Rico Fisheries by far dominated by traps, that is no longer the case. Commercial diving has become very big. Traps have dropped as proportion extensively. The trap- nature of the trap fishery has also changed going from one where it was basically a reef fish focused, generally targeted fishery to one that's really targeting lobster. And of course, take the fish to come. But how they're fishing the traps and where they're fishing the traps is not the same as what was happening early in the time series.

You know, there was the question about the Diadema die-off and what impact that would have. But I would throw out that if you go back to prior to '83, all the information that we have says that catch rates, overall, were much, much higher than what they were. You know, in other words, '83 coming down to about '85 was basically a collapse of catch. And so, the scenario that has been pitched forward, although not scientifically really examined is that well, Diadema bloomed into incredible numbers because their predators had been fish, and that would be Queen Trigger among the most likely suspects in that. And therefore, if that's the case, you accept that one, that means Queen Triggers were depressed much more so way before the die-off occurred. And the die-off was something like 90, I don't know, 7 percent. It was, you know, huge. And so that obviously would had impact, but we had impacts onto the fishery way before that. And that's just, you know, affecting the beginning years so, you know.

And then we have the protests in reporting that were associated with the tax changes. And there's some question and things. I

mentioned the 2005 East Coast expansion factor seems to be wacko. And we've discussed that before, and these are isolated things, and it'd be very difficult to, you know, go year by year and say, "Okay, what was happening in this year that would affect the ratio of Queen Trigger to the rest of the catch?" Which is, you know- the question is on how we would go back and alter the scaler. So I'm thinking there are things that would affect that because of the changes in the fishery that I mentioned, but I have absolutely no idea how you deal with that and, you know, other than to shorten your time series where you aren't dealing with those kinds of issues. But, I find it a sticky problem, but I don't know if there's solutions to that. So, I'll hand it over to Todd who hopefully will straighten me out.

TODD GEDAMKE: No, not at this point, Richard. I think that Shannon's comment yesterday when JJ was asking about the ecosystem stuff is going to be repeated here in that if Diadema is of concern, what is the quantitative aspect to putting that in the time series? So- and I don't know what that answer is, and I agree with you that it will take forever to go through one after the other. But my point is that procedurally, you're going to need that to go to this with a couple other things, 2015, the taxes. For your comment about '82 and '83, the collapse of the catch, that turns into an F starting point, that is what level above MSY. So, you take the F_MSYproxy, if that's what you believe, and that's what everyone else believes, you say, "This thing was totally overfished. Given our F_MSYproxy, we're going to go two times F_MSYproxy," or three times, whatever you want to say. But you would start at, you give that starting point a reflective of that.

Um, Erik, if you're there, JJ, and a couple of others, we're asking questions about how the MCB worked. And I think that would be helpful in term- how you resample a time series to get into this. I understand how you deal with a parameter distribution. Are we talking about distributions on every single data point that can be adjusted? In other words, are we talking about going at reporting to two times reporting 50% below for each data point, and then resampling from that? And if that's the case, then this committee could say that for the year Diadema, we want the distribution for that year to reflect these biological processes and the uncertainty, and you could- so for example, your tax year, you're going to say underreporting was greater. You wouldn't want to- in that year, if you say that Queen Trigger, what we've seen is that that equal to reporting right now, so we say, yes, that's one run. So, in there one run is to take reported values without expansion. We are asking them for that one scenario. And then we go from there, which is, we believe that, but Nelson and others say, "No, no, no, no. That tax year, definitely people were underreporting

that year of everything." So, we could actually take that distribution up there. But let Erik answer if he can, on how we draw from a time series, given some of these, because I think that will determine how we provide guidance on some of this.

ERIK H. WILLIAMS: Yeah. Thanks, Todd. So, this is Erik again. Yeah, we could make the- what you're basically doing is setting up a little mini model to generate random landing streams. And so that can take any complicated form you want. If it is just a scaler, then the only parameter going in if you scale the whole time series up and down over some, you know, expansion factor. And that could be- and you put in an expansion factor with a uniform distribution, say from one to two, and then that's your landings generating model. But it can certainly get more complicated if you have more information. So, like you said, if you know a specific year was in a certain situation, yes, certainly. Let's model that specific year that way in the random generation of landings. Also, if there's suspicion of a change in a parameter, so let's say that scaling parameter's suspicion that it changed over time. Well, what's the suspicion of that change over time? Let's build it in.

It's as complicated as we want to make it in terms of trying to generate these landings, but it's also flexible enough to include every bit of uncertainty we know about. You know, there's certain uncertainties we don't know about, and those will just have to kind of guess that. But, that's great information to know some of those historical facts because you can build those in. And just to point out, I mean, I know this seems like a bad situation where you don't even really have confidence in your landings, but we actually have a case in the Mid-Atlantic where they actually used a Delphi method to create recreational landing, because they had zero data. So, it can get worse than this is what I'm trying to say. So be glad that you actually even have some sort of sense of things like a tax year and things like that. That actually helps. It helps to narrow down this uncertainty. But hopefully, everybody gets the idea that what you're trying to do is build a little submodel of how we are going to generate random landings time streams that are all viable, essentially, where it could be reasonably considered an alternate reality.

TODD GEDAMKE: Erik, thank you. Todd here. Could you- and that- by the way, thank you. That was perfect. That explained it in my brain. I could actually go to my desk and try doing it now which I wasn't able to do 20 minutes ago. In terms of results from all those different scenarios, I'm just thinking about the distribution of results and how the Center and an analyst deals with compiling all those different streams, and then they come out. So, this committee has a habit of putting a whole lot of

things on the list. So, if we're looking at hundreds or thousands of different scenarios- I mean, it's not going to be that many. Let's just say it's 10, even for that matter. Let's say it's 10 different states. How do you put weight on those in the end as to which one you go with?

ERIK H. WILLIAMS: Yeah. Good, good question. You know, the default method we use in the South Atlantic, we just assume they're all equally likely and that what we try to accommodate is with the probabilities in the sub-sampling model. So, let's go back to the scaling parameter. Let's say that we thought it ranged from one to two, but the probability of one and two probably tapers off, you know, at maybe only 25% probability at the ends, and the higher probability is somewhere around 1.5. That is a sort of self-weighting method right there because we're weighting the random generation of that data. You can do it that way. Or you could do it the other way and just assume, all right, we've got just uniform distributions across everything, and then we'll use some other mechanism to weight the runs, either you could use likelihood values; you could use all sorts of things. So, there's a tremendous amount of flexibility, which of course means a tremendous amount of decisions to be made.

But I think what you'll find is if you can come up with this reasonable landings generation model so to speak, with some sense of probability- so again, using the scaling factor, as an example, do we really think it's one to two and that one is as equally as likely as two? That's fine. If that's what we think, then that's what you would put in, and you'd allow all those runs then to be equally weighted. But maybe there's some sense that, well, two's possible, but it's not as likely as 1.5 or something like that. And that's where expert opinion comes in. It's where, you know- yeah, even discussing this with the fishermen. I mean, this is where you can really get complicated. We could- if you got enough fishermen that have been in the fishery for long enough, you know, you could put a survey out there and start to get a real good sense of what trends they thought they've seen in the data over the years and somehow feed that into your whole landings generation model. I mean, it can get as complicated as you want it to.

TODD GEDAMKE: Thanks, Erik.

RICHARD APPELDOORN: Yeah. Shannon.

SHANNON CASS-CALAY: So I just wanted to make sure it's understood that the Science Center is certainly willing to make this investment. And I do think that it does improve the state of the art. You know, it's widely recognized that approaches like what

Erik Williams is discussing are considered state of the art. But that said, you know, we'll need to talk about how to bring forward the U.S.V.I. models because they are essentially final. We have not given you the reports yet, but I assume that in many of these same changes that we've discussed here we'll want to consider for the U.S.V.I. models. And so, I'm just putting that out there. We don't have to discuss it at length today. But the reality is this will have an impact on our assessment calendars until we get an approach that is coded and can be easily maintained because right now those- we'd have to create that system.

RICHARD APPELDOORN: Julian.

JULIAN MAGRAS: Just to answer into that, I think I'm going to speak for the Saint Thomas/Saint John sector. Number one, we don't use expansion factors in the U.S.V.I. And I think that the information that has been collected for the St Thomas/Saint John sector is very extensive. And I think there's enough information there that can really show what our fishery is doing. And if you looked at the ACLs over the history of time, even to when we went to a species specific, Queen Triggers always had a category where they fell in. And it would show that our numbers are not far off of the annual catch limits compare to Saint Croix. But I wouldn't speak about Saint Croix because Saint Croix has their own island-based management plan. And we have done a lot of work with Virginia Shervette. The Saint Thomas Fishermen's Association has done a lot of study with Queen Trigger. We did study with Todd and John Hoenig, I think is his name. So there's a lot of information that I think that we shouldn't have as much of the issue that we are having here with the Puerto Rico information. So, I just wanted to put that on the record.

RICHARD APPELDOORN: Yeah. But- thank you. But the topic here is Puerto Rico. And I understand that discussions here will have impacts on what's coming down the road, but please let's deal with the issues at hand. So, I've been running through here because I had some, some data hoping that Triggerfishes were there. So at least by family level Puerto Rico's been catching- characterizing the catch data since- well, let's just go 1980. It's somewhat before that actually into the '70s. But there's some questions about the earlier data I'm just looking at. This is just proportion of the catch. Triggerfishes, as a group, were fairly constant from, there's some bumping up and down, but fairly constant from '80 to about 2000, and then it starts going up. There's a proportion of the catch. So that would suggest that there is not just a single scaler, but you have a change in the trend starting somewhere around the year 2000.

And this is an analysis that only went up to 2010. So, I don't know whether that's continued or not, but- so that's something that could be at least looked at. Is, what is the proportion of Triggerfishes in the catch and has this been reported and how that's changed. It doesn't deal with the expansion factor issues, but it would say that maybe a proportion of that is not constant, and therefore it would be a basis for how we might want to look at that change, so. And this is all- I assume this is data, Kevin, you have or, your group has. It's, you know, the same. That's where the data came from. So, all I did was looking at it was plotting that stuff.

KEVIN MCCARTHY: Yeah, this is Kevin. So, I'm not- I think the data that we have goes back to '83. So, if you've got stuff prior to that we don't. We don't. so, maybe we need to get ahold of that.

RICHARD APPELDOORN: Well, you should have all that data because it's, you know, historically been all there. You know, Nancie was involved in the- one of the data evaluation things in 2009 that looked at some of that past data, though, probably from a lumped point of view. And you know, there was a question about the confidence in that data, and that's why it's not being used for anything that we're doing now. But I've said, I was just looking at it from 1980 on, and it seems to be, you know, bumping up and down, but fairly constant until about 2000. Then there seems to be an upward trend as a proportion of the catch. And, you know, a lot of things are affecting that. So, for example, you know, Dorado really wasn't a commercial fishery until '86, '87, somewhere in there. And then it just skyrocketed up until about 2010 and then skyrocketed again. And so that's a whole new component coming into the catch of which this is a proportion of. So, you know, it's- there's a lot of dynamics going on underneath those things. But maybe these proportional catch kind of thing is just the way we can get a handle with that as a suggestion. Shannon and then Nancie.

SHANNON CASS-CALAY: So, I do think there's enough complexity that it would be difficult for us to describe exactly what needs to be done at this meeting. So, I think I would propose that we meet initially by correspondence to discuss the data we have available and what points have been made about the data to date and then maybe make a proposal for how we intend to proceed that gets reviewed through some process with the SSC. I mean, whether we ask for another hour to meet in the future or bring it to the next SSC meeting. But my concern is there's- it's unlikely in my mind that we're going to come to a decision about this in the next hour, unless we want to just be very pragmatic and just say, "Do this," and then we will try to execute that decision. But I'm hearing a

need to identify historical data that was not included in the initial model run to identify a point of inflection where the calibration's going to possibly change. And so, that all seems to require review before we move forward with the modeling process.

RICHARD APPELDOORN: Nancie, you want to answer that?

NANCIE CUMMINGS: Thank you, Chair. The electronic data, the computerized data began in 1983.

GRACIELA GARCÍA-MOLINER: Mr. Chair, so the Science Center might have that data from '83 onward, but the reports from Julie and other is from way back when- before Codremar and stuff like that. I should provide information from 1967 to 1983 to catch up. But, the thing is that they might not have the total poundage for Queen Trigger, for example. But they would have the proportion of the catch that was Queen Trigger. So, between '67 and '80 changed between 2% and 7% of the catch for those years. So, we could reconstruct it, you know, back like I think Bonsack did at some point for something or other if that's- you know, but I don't know that the Science Center actually has all that information available.

RICHARD APPELDOORN: Todd?

TODD GEDAMKE: I think that you can capture this in the starting values of the population. So, I think that rather than all the details and digging through the old reports, you know, this is where you look at it and you go, "Okay, should we look at-" I think that most people believe that it was exploited. It's exploited at what level? So, it was exploited moderately, high, extremely high. And I think that that's where we start with this. And if we find out that F start is just unimportant to the results that come out later on, then we don't have to worry about this. But if we find out that F start is critical to where this thing goes, then we go back and dig out those reports.

And I think that's where step one and step two comes in this process. We've got some data things that need to happen with it but that's the way we can take those concerns for the whole time series and all the issues and really captured in one parameter input to the model.

RICHARD APPELDOORN: So again, this is just a point of clarification. We have those first couple of years where the catch is high, and they're being used to estimate the starting point. Is there a preference between, okay, going back and looking at the still older data and seeing what that was saying and adjust

accordingly, or just, hey, we'll just start in 1985 and where we have a couple of years where the catch really isn't popping around very much at that point and start there and, you know, solve the problem by getting to some place where things were kind of stable, and then we will work there?

SHANNON CASS-CALAY: So, I can directly respond to your question. I do see Julian's hand up. This is Shannon. So, I think that is a pragmatic suggestion, Todd. It certainly is a good first step, and it is essentially- it could be the start year of the model. We could do it that way. But, you know, it could also be just in the assumption we've made about equilibrium catch, because right now we're assuming the equilibrium catch is essentially the average of those first three years of data. But we could also assume that they're- you know, we could make different assumptions and see how sensitive the model results are to those assumptions about equilibrium catch. And that's basically- the assumption we made right now is that the exploitation rate was very high in the first year because those initial landings are very high. We could make different assumptions to see how sensitive the model is to equilibrium catch.

RICHARD APPELDOORN: Yeah, that would be excellent.

SHANNON CASS-CALAY: Is that what you're getting at, Todd, basically?

TODD GEDAMKE: Shannon just asked if that's what I was getting at. Absolutely. That's what I'm getting at. I wouldn't have even taken it to equilibrium at this point for those that really- what that means is you have a fully populated age structure. So, you're feeding an age structure that is at equilibrium in. If Richard says, "You know what? Those declines are real in the last two years," and we're at the tail end of a six-year decline on this, you model a population that is experiencing that high level of F, and therefore, you'll have the size structure and age structure truncated towards smaller individuals. So that's even one step more complicated than I was suggesting now, but I think it's a very, very reasonable alternative.

You know, the problem is, Shannon, we keep talking. You're going to have a list that is forever and ever and ever. I think a starting point there. So, for the start point, I would suggest go for, you know, two or three different levels that are above. Just- I mean, let's just throw it at the wall on this and then do maybe an equilibrium and take that F value and run an age structure. And that's the, like Erik said, the population generation. That's simple calculations, but you can run that right into the beginning

and have some bells and whistles, F start value and equilibrium or not.

RICHARD APPELDOORN: Julian.

Julian Magras here. Like, I just wanted to make a little statement about the traps, and it's across all this, the different sectors. The traps have not really changed over time. What has changed over time is the material in how the traps are constructed. We still do have a certain set of fishermen, and it's the same thing here in Puerto Rico from speaking with some of the fishers that fish in a smaller funnel to catch a smaller size fish. But you do also have some fishers who do have sale for the larger fish. So, depends on how samples are being done and where they're being done is what you're going to capture coming out of that fishery. So, I just want to put it on the table because traps are still there. They've been there from the very beginning they were made out of weirs, then they went to chicken wire, now with slanted coated wire welded steel traps, but they all the same. The funnel entrances are all the same dependent on what type of fishing you want to do. It's how they're constructed. So, I don't know how that would fit into the model, but I just wanted to put that information out there. Thank you.

RICHARD APPELDOORN: Nelson.

NELSON CRESPO: Thank you, Mr. Chair. Adding to Julian words, this is through, especially on my experience in the west coast of Puerto Rico, that we are developing a project with Todd. We are using different size of funnels, you know, to see which one, you know, works better for our lobster fishery. But also, by myself, are using another type of entrance, not funnel for the trough and ramp style and everything that we copied from the Saint Thomas friends. And we don't catch too many fish because, you know, we make the funnel, you know, targeting lobster. The fish that we got is only a limited quantity because our trough is designed to the fish getting and get out, especially the ramp ones. And that's why we don't catch a lot of fish. We catch Queen Triggers, yeah, in one year, two years, maybe three or four, no more than that, because the most of the fish is not entering to the trap, is in that moment where we pull the trap, the fish is there. You know, it's coming out with the trap, but in another way, no.

RICHARD APPELDOORN: Shannon.

SHANNON CASS-CALAY: Thanks. This is Shannon. So, in summary, then the areas of uncertainty that we've been asked to explore are that equilibrium catch and whether or not it is an equilibrium in the

first year, the initial year of the model, and L-infinity, which we've been given two alternatives to explore. And then there would be corresponding changes in M related to the change in the growth parameters. So is that- I mean, those are the major axis of uncertainty in the stock assessment. So, are we satisfied that that is sufficient to represent the advice of the SSC? That's already a substantial workload.

KEVIN MCCARTHY: Shannon, this is Kevin. Did you have the catch series in your list?

SHANNON CASS-CALAY: Well, my understanding is that Todd has reduced that analysis, recommended reducing it to an exploration of the equilibrium catch. And that if we could get a lot of inference about how sensitive the model is to the catch series by just exploring the equilibrium catch. Now, I don't know if we do that exploration and find that the model is intensely sensitive to it. You know, that might cause additional concerns, right? But it seems like what Todd has suggested is a stepped approach where we begin our explorations there to determine whether reasonable management advice could be developed with different assumptions about how the historic catch series impacted that at equilibrium catch value. Is that- I'm paraphrasing Todd and he's sitting right here.

TODD GEDAMKE: Shannon, no, no, no, no, no. And I wanted to make sure that you got it. I mean, that was exactly. But, Kevin, was your question about the early time series or the main time series?

KEVIN MCCARTHY: My- I guess my question is about the main time series.

SHANNON CASS-CALAY: So, it will be both.

KEVIN MCCARTHY: Well, that's all right. And, you know, I mean there's two different things going on here. One is this F start and the conditions at start, and the rest is the whole time series. And the concern here is not the F start. It's the whole time series. And then F start is- but is- you know, as- and, Erik, by the way, I learned a long time ago never to predict what stock assessments models do. So yeah, I wouldn't- you know, almost said something that uh- but I don't- it may or may not, but yeah, two different things. F start equilibrium and then that population time series generation model that Erik was talking about with whatever input from the SSC.

RICHARD APPELDOORN: So, I'm still not clear relative to Shannon's question. And Todd's answer was that the assumptions of equilibrium

at that point is one thing, but that's separate from the question of the time series.

SHANNON CASS-CALAY: That's correct. So, Todd's clarification, you know, not surprisingly was that, of course, we still do need to address whether to apply a scaler to the time series after 1983 and whether that scaler, for example, should be a constant.

RICHARD APPELDOORN: Okay. And I would agree with that.

TODD GEDAMKE: Are you using scaler and expansion factor?

SHANNON CASS-CALAY: Yeah. I'm using scaler and expansion factor interchangeably, but I essentially mean an expansion factor. Well, I'm talking about literally, do we just use, for example, the reported landings without expansion factor?

JORGE R. GARCÍA-SAIS: I would agree with you.

NANCIE CUMMINGS: Isn't there two questions?

RICHARD APPELDOORN: I would like to see you explore, - and this just may be, you know, a mental exploration as opposed to a calculation - whether there is a basis for thinking that whatever scaler that we have now, which is basically the 2000- what year was that study? '17? No, '18 study, or whether there's- this may have changed going back since we go back 40 years. And it maybe something that says "We look at this, but there's really no basis for saying one way or the other or whatever." But I think the question needs to be at least thought about. And if there is, something that comes out of that, then, you know- and you can take a guess at how it might change and, you know, try to incorporate that with whatever kind of analysis you can put in there to see how, you know, sensitivity analysis or whatever that would uh- see how- what kind of impact that might have.

SHANNON CASS-CALAY: So, I think we've beaten it to death sufficiently that, you know, we'll need to go ahead and describe what we intend to do, but we will create that random landing submodel that Erik discussed. And we'll bring it to the SSC for approval through some process, be that the next SSC meeting or an informal- you know, a one intercessionally set up by Council staff. So, I think we have what we need to move forward, and we can bring our response to your recommendations to the next meeting.

RICHARD APPELDOORN: Okay. JJ has a question on that, and, Todd, you also. Okay.

JUAN J. CRUZ MOTTA: Yeah. Very short technical question. Perhaps Erik can answer that. For that random model, what will be the units that you will resample to build a new data series? Thank you.

ERIK H. WILLIAMS: Yeah. So this is Erik. I mean, I think what we're talking about is starting- at least starting with this initial time series of landings we have now, and then working on adjustments off of that to then generate random landings time series that are all plausible. Seems like that's the logical starting place. Unless we do conclude that there is a clear- which it doesn't seem like from the discussions I've heard, a clear scaler that can be applied right now, and that should be our sort of central tendency if we want to call it that. It doesn't necessarily mean that this will be the central tendency, because, like I said, you just need a starting point and then you build off of that. And if the way to start is with the current time series that- and then build in a scaler that ranges from say one to two, that's perfectly fine as well. I mean, what'll end up happening if you do that and you may use say a uniform distribution on the scaler from one to two, then your central tendency will actually be one and a half as the scaler. You know, that's just basic statistics. So, I hope that helps and answers your question.

RICHARD APPELDOORN: Okay. Any last thing- Kevin, you're looking right at me, so.

KEVIN MCCARTHY: Yeah. I sure am. This is Kevin. So, I think we've got our first round of tasks, and I'm hearing this as a stepwise process. So given that we're clearly going to need to reshuffle the SEDAR schedule, right? Because until we solve this, there's no sense in going ahead with anything else not to mention staff availability, you know, the capacity of staff to handle all these things. So, what is the process for saying we need a delay in SEDAR 84, which is the next one. That's Yellowtail and- Yellowtail Snapper and Stoplight Parrotfish, which is meant to begin Novemberish. And does that also impact the Spiny Lobster update. And remember this is an update of an already accepted stock assessment but does this exploration of the data at a very fundamental level change that as well? And therefore, we put the brakes on that. And then once we figure that out, I think what we need to do is have the Science Center team get together and come up with some estimates of how long it's going to take us to do this first phase of what's just been asked in this meeting for SEDAR 80. But we can get back with you on of the recommendations for that, but I need to know going forward what does the SSC think about- I mean, clearly, we need to delay 84. And what do we do about the update for 57 in light of all these fundamental questions?

TODD GEDAMKE: Is this an SSC decision?

RICHARD APPELDOORN: The SSC would be making a recommendation to the Council on- and we could just say that in lieu of where we are in SEDAR 84, that's going to require more time and has thrown in some question about the nature of the data that the Council should recognize that this would most likely push back the SEDAR agenda.

LIAJAY RIVERA GARCÍA: You have Erik Williams raise hand.

RICHARD APPELDOORN: Wait- Erik, wait. Todd, you had a quick response?

TODD GEDAMKE: I was just going to say with the- Erik, just let me jump on the lobster real fast and then follow up. Shannon, am I right that lobster's not using the time series?

SHANNON CASS-CALAY: What?

TODD GEDAMKE: Is lobster- you mentioned the lobster's not using indices, or I was not part of that?

SHANNON CASS-CALAY: Lobster is actually an SS assessment SEDAR 57. It was conducted with length frequency catch information, no index life history information. And so, it has OFLs and ABCs that were derived directly from stock synthesis. And unfortunately, that assessment model was determined year 2016. And the information we've received in 2017, '18, and '19 suggests that the landings are higher than the ACL. And so, if we update the stock assessment model, you will have an opportunity to reevaluate the OFL and ABC. If we don't update that stock assessment model, the agency will have to take action on the fact that the landings are higher than the ACL. So, that's the issue you face right now is that without that update, we can't adjust the OFLs and ABCs. But they should be adjusted because the model is now relatively old by stock assessment standards. It needs to be updated with the new information, which will give you a chance to potentially set OFL and ABC higher if warranted.

So that's the kind of problem we face is that we have an accepted model. We can update it. We could update the fishery management information, but it doesn't use the same approaches that we've just, you know, now decided that require additional thought. And so, you know, at the very least, we're going to have to put a halt or delay SEDAR 84. We could still do a strict update of the Spiny Lobster model and present it to you. I mean, it's a workload challenge, but it is something that can be done.

RICHARD APPELDOORN: Okay. Erik.

ERIK H. WILLIAMS: Yeah. Thanks. this is Erik again. I think somebody mentioned it earlier, and I'm probably reiterating some of this. A lot of this is not really the purview of the SSC, in my opinion. I mean, we're charged with science, not SEDAR schedule. What we can say is how important this analysis might be not only for say Queen Triggerfish, but if some of the things that we get out of this spawn off or spin-off to impact other species, well, then it might have a higher importance in terms of the science that it produces. But ultimately, what is the priorities in terms of analysis? That's a management decision, and that's a Science Center negotiation with the managers. I don't think the SSC should be commenting on what we should or shouldn't be doing. Just prioritizing is really all we should be doing for the managers.

RICHARD APPELDOORN: True. But we can make the Council aware that this is something they need to address.

MARCOS HANKE: Okay. Yes. I have been on the SEDAR meetings and so on. And I want to highlight what Shannon just said that there is a workload, whether she recognized the importance of the lobster. At the beginning of this meeting, she stated that it was a different stage, a different process from the Triggerfish and the lobster. There are some differences in there. I really encourage you guys for the need of the lobster fishery in Puerto Rico that is extremely important resource that suffer many, many changes and many, many controversies over time to follow up on it. We cannot leave it hanging there for too long. And I really appreciate an extra effort not to leave it hanging, the lobster- the effort to address the lobster. Thank you.

RICHARD APPELDOORN: Thank you, Marcos. Todd.

TODD GEDAMKE: Marcos, good, good statement. I feel like there's an intense amount of pressure right now being put on. We're going to have to cancel this, and we're going to have to postpone this, and we're going to have to do this- that- our job is to basically evaluate this assessment right now. And I think that, that it's- Marco's jumping out of his seat over there going, "Well, don't hold off the lobster," that's- I mean, that's an immense amount of pressure. That's not what we're tasked to doing right here.

MARCOS HANKE: May I follow up on what I'm saying is the thing is that I feel the responsibility to give the sense to the body, what we hear from the fishing industry and as a Council dynamic, what we expect, and we are looking as priorities, right? The priority-

lobster is a main priority for the Council. And we have been involved on this for a long time. If it is a matter of just putting data there and seeing the output, because we have new data, like Shannon just mentioned, that is not a huge workload, let's not mix that with this process that you guys are doing to address future stock assessments that come up, the Queen Triggerfish, Queen Snapper and other species, right? I'm just, just asking this body to recognize the importance on doing something for the lobster first keeping the schedule and doing an extra effort to do that, so. And I would like to hear the opinion of the rest of the body. I'm pretty sure that Nelson and the rest here are in agreement with my statement. Thank you.

RICHARD APPELDOORN: I think that what, you know, we- I don't have any problem with your statement. I think what the SSC is saying is that, that this is not an SSC call. It's a Council call, and you Chair the Council. So, I'm sure that the Council will treat that priority with the respect that it warrants and, you know and things will be adjusted accordingly to meet that. But that's not our decision at all.

LIAJAY RIVERA GARCÍA: Raised hand from Doug Gregory.

RICHARD APPELDOORN: Go ahead, Doug.

DOUGLAS GREGORY: Thank you, Chair. I agree with Erik that the Council makes the management decisions, but my experience is that the Council usually wants to be informed by recommendations from the SSC. And maybe we can't weigh one approach against the other today, but we can maybe get prepared for the Council having to make that decision based on updated information from the center once they look at their schedules. And we could give the Chair the authority to share our preferences as we know it now. I think that, that way we'd be prepared in case the Council does want our opinion on this, but clearly, we don't make that decision. I agree with Erik on that. Thank you.

RICHARD APPELDOORN: Okay. thank you, Doug. And, and maybe we will deal with that right at the end because there's going to be some discussion about who's going to report to the Council. It will not be me. I will be at travel. So, I would help put together that report, and we can agree about what we need to present to the Council at that time. You know, if there isn't anything else except for Michelle-

MICHELLE SCHÄRER-UMPIERRE: This is Michelle Schärer. I just was wondering if there's any approach that can be taken with the

recreational data in this is Queen Triggerfish assessment, or if we just totally leave it out of the equation.

SHANNON CASS-CALAY: So, Nancie did incorporate the recreational catch estimates, and you want to speak to that, Nancie?

NANCIE CUMMINGS: No, you're good. I'm good.

SHANNON CASS-CALAY: Okay. So, essentially what she was able to do is look at the limited link composition data we have for the recreational series. And it was very similar to the commercial trap, correct? And so they're aggregated. The landings- the removals are aggregated with the commercial trap, but they are included in the stock assessment, both the recreational landings and the dead discards.

MICHELLE SCHÄRER-UMPIERRE: Yes, I understand that. But the CVs in the recreational is the main concern as it's always been. So, I was just wondering if we want to address that or not.

TODD GEDAMKE: It's a simple one Michelle, and, and yes, make the recommendation to include recreational and take a mean value in relation to the commercial landings and jack it up by 10%. I mean, this is what we're dealing with. We're not dealing with being able to take these [inaudible] values of 40,000 pounds one year and a pound the next year. Plugging that time series in is just neglecting our scientific responsibilities for evaluating the data. So that's an easy one to do, just kick it up that the proportion is- so what you have is competing scalers here or competing expansion factors where you- we're talking about coming down with one or another, but that's the parameter. How would you incorporate that? You just put a difference in that time series of removals, and that's really what this is removals. So, you're just trying to track that and adding that recreational, and it's not- it shouldn't be a problem. So, if someone make the recommendations, these guys going to need to know, do you think it's 5%, 10%, 20%? What is the exact number that we would like that range to be checked?

SHANNON CASS-CALAY: So, may I, Rich? Thanks. This is Shannon. So, one thing just to be aware of though from the fisheries management side of the house is that whatever changes- adjustments that we make to calibrate the historical time series, you're going to have to make the same adjustments. When you monitor the ACLs, you cannot have two currencies where you create a stock assessment that gives you an OFL and ABC, and then turn around and monitor it in reported units with no adjustments. So, we'll just have to be very careful

in the way that's calculated. We don't create an apples and an oranges situation.

RICHARD APPELDOORN: Okay. I'm hoping we can close on this point then and try to get through some of those stuff that's left on our agenda, except, uh-

TODD GEDAMKE: Just a clarification, it may ease up on the center.

GRACIELA GARCÍA-MOLINER: Say your name please.

TODD GEDAMKE: Sorry. Todd. Shannon, you mentioned getting the time series model set up and bringing that back. I think that that's a pretty simple setup. I don't think we need to review the time series on that, the generation on that, but I-

SHANNON CASS-CALAY: I beg to differ because I want the SSC to bless the approach before we make the investment in all the coding that's going to be required to create this new approach. And so, I would very much appreciate the opportunity for the SSC to review it and say, "Yes, we'd like to see this. This looks like a useful exercise," or, "No, at this point, we want to abandon all hope," [laughter] because it's a lot of workload to take on if there's not any willingness in the SSC to use the results that would be produced, ultimately.

TODD GEDAMKE: Maybe I'm missing something then, because aren't we talking about basically taking the values of the known time series using CVs or some other thing, and just literally generating time series out of that, the time series generation model. There's nothing- I mean, we could both code that up in Excel in a day. So, what, what-

SHANNON CASS-CALAY: Well, yeah, and then I'll bring it here with all the work that we did to actually generate the stock assessment models again, and we'll spend another day and a half throwing the landings under a bus. And so, you know, I don't want to commit the staff time until I'm much more certain that the SSC is satisfied that we're incorporating the scientific uncertainty and the landing history in a productive manner. It will not be perfect, but if it is deemed useful to produce management advice, then I think we can make the commitment to create all of this infrastructure that's needed to run all of these. I mean, we don't have- Erik Williams' shop uses a different stock assessment model that already has all this infrastructure associated with it. We have to build it in SS. It's not impossible. It's actually not- it's time-consuming. That's it. And I am not yet confident, to be honest, that we won't be in the same situation when we present

this work again that the argument will be we don't know the landing history well enough to use stock assessments. And I just don't want to waste six months or an eight months of several people's time and effort if it's not useful for management purposes.

TODD GEDAMKE: I'm sorry. Six, eight months doing what?

GRACIELA GARCÍA-MOLINER: Say your name.

TODD GEDAMKE: It's Todd. Sorry.

SHANNON CASS-CALAY: Six, eight months doing the actual MCBE, the development of that process, and running the model, rewriting the reports, etcetera, etcetera.

TODD GEDAMKE: Okay. So- this is Todd again. I apologize because I thought you had said take the model of the time series and bring that back to us and then have us review that, and then you go back. So that was the step I thought you were suggesting bringing back. Just that one piece. And then the six to eight months being after we vet?

SHANNON CASS-CALAY: After we- after you vet the approach we are proposing to take to incorporate the scientific uncertainty in landings.

TODD GEDAMKE: I vet it. [laughter]

SHANNON CASS-CALAY: If you want to vet it now and just say you trust the Science Center to do something logical, you know, but I'm not- I'd like to see a vote on that.

RICHARD APPELDOORN: I don't think we need a vote. I would agree with you that it would be much more productive to have that conversation early, and you can go forward in peace rather than having a, a cloud over the whole process that, you know, shows up at the end. That's just not a productive way of doing things. Kevin.

KEVIN MCCARTHY: Right. I heard early on this was a multi-stage process, and I'd like to keep it that way. And step one is let's get to the point where we've got inputs for the model, the model not yet run, and we vet those. So as Shannon said, we're not right back in this same thing, same conversation in whatever time it takes. And we'll let you know about that and beating up on the landings again, and stuck. I'd like to proceed in a very methodical way. And first step is getting- got- getting buy-in from the SSC

on all of the inputs and how we're approaching the process. So, I'd like to do that.

RICHARD APPELDOORN: So, with that, can we then move on to the next item agenda, which would be Kevin again? But actually, you know, we don't have a lot of time left relative to the things on the agenda. So, I would like to know- well, either people really speed up, you know, if you have just a short presentation or should we be trying to cut a few things out to make sure we get to really important things, which I would have the AM Trigger for Spiny Lobster, one of them.

GRACIELA GARCÍA-MOLINER: So, this is Graciela. You have two items- you had two items in other business but the [inaudible] for SEDAR 84 is scratch. So, you'll recommend to the Council that you are delaying SEDAR 84, correct?

RICHARD APPELDOORN: We are pointing up to the Council that that's a likely thing that they may make a decision on. Yeah.

GRACIELA GARCÍA-MOLINER: Okay. So, you also have- and this something that since the research priorities are very important, but you don't have, except for that that you proceed to do the 10 point or so presented to the Council. One solution to that might be we're working on the implementation of the Council strategic plan. The Science Center has a, a strategic plan. So probably the best approach for this would be to bring in the comparison between the two strategic plans and see where they meet in terms of practical, items that we can bring forth. That might be one solution. And then you should proceed with the other information, presentations that you have, the outreach and education, which has been doing quite a bit of a note-taking because of your discussion here and what needs to be presented to the public, and, the very short presentations on the lobster AMs and the island base FMP. So how do you want to change the agenda in terms of that? And the other business that you have is the charter request of the SSC from the Council. Did I miss any?

RICHARD APPELDOORN: What's the what?

GRACIELA GARCÍA-MOLINER: The charter for the SSC, what is the SSC- that item of agenda that you have in the- that was added yesterday? Ah you have the national SSC, the update for the upcoming presentation. Sorry. I forgot about that.

RICHARD APPELDOORN: Oh, yes. If they can be done quickly, I'd like to get the SEDAR stock assessment matrix presentation from Kevin. And then I certainly want to see the Spiny Lobster thing.

So these are things that the SCC needs to deal with to the degree that the Science Center update is going to give us information that we need to deal with. We can have that. Otherwise, it could be postponed to next meeting and the same thing with the island-based fishery management plan and updates. So, if I'm not hearing any opposition, I ask Kevin to go ahead and quickly give something on the matrix.

SEDAR-Stock Assessment Matrix—Kevin McCarthy, SEFSC

KEVIN MCCARTHY: Thanks, Rich. This is Kevin. So I'm actually going to turn this over to Stephanie Martínez Rivera, and she's going to give the presentation on the data, matrixing data triage as we would call it. she's got a, a few slides. I think it's a reasonably quick presentation to let you know how we're proceeding with that. So, I will turn it over to Stephanie who's member of the Caribbean Fisheries branch. Yeah, I hope Stephanie's on the call. She was earlier. Thanks, Steph.

STEPHANIE MARTÍNEZ RIVERA: Yes. Good afternoon. Can you hear me?

KEVIN MCCARTHY: Yes.

GRACIELA GARCÍA-MOLINER: Yes.

LIAJAY RIVERA GARCÍA: Yes.

STEPHANIE MARTÍNEZ RIVERA: Perfect. Okay. Good afternoon, everybody. I'm Stephanie Martínez Rivera. I'm a fisheries biologist for the Caribbean Fisheries branch of the Southeast Fishery Science Center. And today I will be presenting the update of the stock assessment matrix project.

Next slide, please.

So, I wanted to start with a little bit of background. The branch has been working on these projects in January 2022, and we developed a preliminary data triage table to gather all the information available for some species. And after that first data triage table, we did a reassessment of the project to improve the process. So, with that, the purpose of this project is to develop a standard process to prioritize the species that we recommend for a SEDAR stock assessment. The objectives are to identify the federally managed pieces that have enough data to attend the stock assessment. But also, we want to identify those pieces that will benefit from additional research and data collection in order to attempt a stock assessment later in, in the following years.

This project, I think I mentioned before, will focus on federally managed species. So, we use the fishery management plan for each island to get the list of species. Then these species are divided into groups fish, lobster, and conch. And we started looking at the fish group where the species are divided by stock complex. Some of the stocks are single species and some have multiple species. And then in some of these stocks, you have indicator species. So, we use this information to prioritize the species for the data triage table.

Next slide, please.

So after that, we identify some data sources that will provide the data requirements for a stock assessment. So first, we have- or we need abundance information. And for that we can use fishery independent survey, such as the reef visual census survey, and we can also use catch rate from fishers from example, commercial logbook data. Then we need biological information such as size composition from the TIP database. We also need like history parameters, such as maturity, age, growth, and others. And lastly, we have catch information. This includes commercial and recreational landings. And for that, we have at least the self-reporting logbook data. In addition to the information, we also need several years for all this data in order to attempt a stock assessment. So, the time series are also important in this project.

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Okay. Here we go. So, after that, we develop an outline of the process and how we're going to move forward with the project. So, phase one is to organize how we add the species to the data triage table. So, we divided the species into four groups: Group A, those are indicators species, Group B, not indicators species in a single species stock, then we have Group C, which are species in a multi-species stock, but doesn't have an indicator species in their group, and Group D not indicator species in a stock with an indicator species. After that, we're going to move to phase two, which is to gather and add information to the table. We're going to start with looking at the catch information like the commercial self-report and logbook. After that, we're going to add the biological information, size comps, length comps, and life history. And lastly, we will add the abundance information available for the species. Then we moved to phase three where we going to do, we are going to conduct further research so we can focus on each species, and we can look into the special distribution of the data. We can look at the quality and quantity of the data. And also, we can start looking at any issues, concerns that are species-specific. After that, we are going to go- we're

going to move to phase four, which is develop the matrix. And with the purpose that at the end, we can get the list of species that we want to recommend to attepmpt the stock assessment and also get the list of species that need more research and more data collection in order to attempt a stock assessment.

Next slide, please.

So where are we right now in this process? Well, right now we are in Phase Two A using the Group A, which was the indicators species. So, this is an example of the data triage table. The species are listed by island and the stock complex, then we identify if the species are indicators species, or if they belong to a single species stock. So, at the end, after we complete the table, we can filter by those columns. After that we have the data available for each species. And here we are looking at the commercial landings. So, we are looking at total pounds, how many years of data the minimum and maximum year of the landings. And then per data category, we are going to add a rank column that we will use at the end to score the species. So right now, in this example, the rank means the top landed species. So, we're going to do this like explain by islands and then adding the species by each group.

Next slide, please.

So here we have an example of what the matrix would look like, and we will provide a score for each data category - so those are the columns - by each species, and the species are the rows. So, in this case, just for an example, we can look at species number two, and that species would be a recommended species to attend a stock assessment because we have available data. However, species number one will be recommended to get more data collection in the life history category. And then species number three would be recommended for future research because it's lacking, you know, enough information for this stock assessment.

Next slide, please.

Okay. Thank you. Okay. The next steps for the project will be identify more data sources to get biological and abundance information for each species. We also need to complete the data triage table for Group A species. And then, we also need to develop the matrix scoring system, and that's what we're going to use the ranking columns. At the end, we still need to develop how we're going to score them. After that, we want to develop a program to automate the data triage table so it can be frequently updated using the information from the Caribbean Research Inventory that Rachel has been working on.

Next slide.

And that concludes my presentation. Thank you for listening. And I will take any questions now.

RICHARD APPELDOORN: Any questions for Stephanie? So apparently you were crystal clear, so thank you very much, Stephanie. There are no questions.

STEPHANIE MARTÍNEZ RIVERA: Thank you.

GRACIELA GARCÍA-MOLINER: Graciela here. The Spiny Lobster AM. So, Sarah, are you online?

RICHARD APPELDOORN: Yes, I'd like to go to the Spiny Lobster AM.

SARAH STEPHENSON: Hi. Yes, this is Sarah Stephenson. I'm here. Can you hear me?

GRACIELA GARCÍA-MOLINER: Yes. Thank you.

AM triggered for spiny lobster in Puerto Rico: July 12-September 30 2022 EEZ closure

SARAH STEPHENSON: Okay. I believe you have the pres- Oh, perfect. Okay. I'm going to try to go fast. This is just to give you an update of the- we implemented an accountability measure closure this year for the Puerto Rico Spiny Lobster stock. So, I was just going to explain how that happened.

Next, please.

At the beginning of the year, we usually compare landings to the ACLs, and at the beginning- whoop, at the beginning of 2022 the new FPMs, the island-based FMPs were not in place yet. They had been-

LIAJAY RIVERA GARCÍA: Hold on, Sarah. It seems like it has an automated transition, so I'll have to figure it out how to stop that.

SARAH STEPHENSON: Oh, sure. Yeah, I believe it did that to me last time.

LIAJAY RIVERA GARCÍA: Is it that one? Oh, no.

SARAH STEPHENSON: I think it's the one before that.

LIAJAY RIVERA GARCÍA: Okay.

SARAH STEPHENSON: So it was two before that.

LIAJAY RIVERA GARCÍA: Okay.

SARAH STEPHENSON: Then- yeah, this next one.

LIAJAY RIVERA GARCÍA: Okay.

SARAH STEPHENSON: As I was saying, the island-based FMPs were approved by the secretary, but they haven't been implemented in the regulations yet. So, at the time that we did ACL monitoring, the regulations that were in place were the ACLs that were set under the Spiny Lobster FMP, and the AM process under that FMP says that we look at the most recent three-year average, and we compare that to the ACL, which is in place, which was the one that was set under that amendment to that FMP. So, the available landings at the time that we did this monitoring process for Puerto Rico were the years 2017 to 2019 and for the U.S.V.I. was 2018 to 2020. There is a clause that says the AM would not be applied if the Science Center determines that data collection or monitoring efforts improved. And then if NMFS determines that that overage resulted from increased catch rather than from improved data collection, an AM would be applied. And the process for applying the AM just reduces the fishing season for the stock by the amount necessary to prevent landings from exceeding the ACL again. And then the required fishing season reduction- it works backwards in the year, so it starts on September 30th and moves earlier toward the year.

Next slide, please.

So based on those landings no AMs were Triggered and thus no AMs were applied for Saint Thomas/Saint John, or for Saint Croix. but based on the 2017 to 2019 average landings for Puerto Rico, the Spiny Lobster stock exceeded its ACL by a little over a 100,000 pounds. And so, the fishing season reduction that was applied for federal waters is July 12th through September 30th. The season will open again in federal waters on October 1st. State waters remained open during this time.

Next, please.

The ACL monitoring under the island-based FMPs, which we have the final rule, we've completed the proposed rule process. The final rule is expected to be implemented soon. It's in with GC being reviewed so the monitoring process under the island-based FMPs

will use a spin up of landings in comparison to the ACL. So, it uses a single year of landings followed by the subsequent single year of landings followed by a two-year average of landings followed by a three-year average landings, and then thereafter a moving three year. So, we'll just be for- if the FMP is effective for next year, we would compare the single year of landings that are available to the ACLs. As specified in the FMPs the regional administrator in consultation with the Council can deviate from those specific time sequences. So, the specific years that were listed in the FMP as listed on this slide are expected to be updated to reflect more recent landings. So, we wouldn't start with a single year of landings from 2018. We would start with whatever's available at the time of implementation.

Next slide, please.

This group worked on an amendment based on the SEDAR 57 Stock Assessment. And that amendment is also being- the regulations for that are being developed. we expect a proposed rule soon to go out, which will have a comment period. So, in that amendment, we updated management reference points for Spiny Lobster based on the stock assessment and application of the controls, the Council's acceptable biological catch control rule that was included in each new island-based FMP. We also are going to revise the AM Trigger for Spiny Lobster stocks. So, it won't use that spin-up process. It will use just straight three-year average of landings. So just so you know the status on that amendment, since you did work on it, help work on it, the Council took final action in August of last year and were preparing those proposed rule and associated rulemaking documents.

Next slide, please.

And just as a quick refresher to actions in the amendment, the action one which modifies the Spiny Lobster OFLs and ABCs you worked with the Science Center to develop those OFL projections, and you- the SSC recommended both a constant catch approach and a variable catch approach. And you recommended those to the Council, and the Council selected as their preferred, the constant catch approach. So that means that for years 2021 to 2023, which is what the projections were from the Science Center and the assessment a constant value for both OFL and ABCs, and then the Council set a constant ACL from those values. You also, as the SSC put a reduced value in place for years 2024 and later in the event that an updated assessment to that SEDAR 57 stock assessment and the subsequent rulemaking that would be required were not in place in time. So that's what the second row, the 2024 plus is for. So, you can see that there's a constant value for each of the OFL and ABC

values for the years 2021 to 2023. And then there's a little bit of a drop for 2024 and forward. So, this is a table straight from the amendment. That's available if you would like it. Just let me know, and I can- I can get it to you.

Next slide shows the ACLs that were set from those values. So, the, the same thing. You have a set ACL value for three-year period, and then another one set for 2024 and later until we can get the updated assessment from the Center accepted by you, recommended to the Council, and then put through a subsequent amendment for rulemaking. So, this is what we will monitor to once the amendment is effective, and they will basically overwrite the ACLs that are in the island-based FMPs.

Next, please.

The second action in the amendment as I mentioned, is just going to change the Trigger for- so the, the years of landings used in comparison to the ACL. So instead of that spin-up process, that protracted spin-up process, we're going to just use the three years- the most recent three years of landings to evaluate whether an AM is Triggered. So, an AM would be Triggered if average landings exceeded average ACLs that are in place during those years and then of course, similarly before the years of landings can be used to account for best scientific information available, for instance, if we get updated assessments or such.

Next slide, please.

So just quick next step so you know, as I mentioned, we will hopefully have a proposed rule with, up to headquarters and an open public comment period soon. There will be a fishery bulletin that goes out that's announces that. the Science Center, as they mentioned, are developing updated OFLs and ABC projections using that SEDAR 57 assessment model which I believe Shannon said will hopefully be to the SSC to review later in the year Novemberish. And then the Science Center data branches working with Puerto Rico DNER to get commercial landings from 2020 and later. I don't know if you know, but there was a little bit of a delay due to the implementation of an e-reporting system. So that's why back at the beginning when I said that the years that were available, that's why Puerto Rico didn't have 2020 landings data, commercial landings data available. So, the data branch gives us updates as to what landings are available. And I believe that's my last slide. So are there any questions?

Discussion

RICHARD APPELDOORN: Thank you, Sarah. I'm not seeing any hands up, so yes Nelson.

NELSON CRESPO: Yeah. Thank you, Mr. Chair. I think we have a problem here regarding the numbers. First NOAA [enforcement?] already have knowledge of what is being entered legal lobster from the island to Puerto Rico. And they are reporter here on the trip tickets. This is under investigation according to the info we have. NOAA knows there is something wrong, but they don't have the necessary staff to attend this issue. Also, DNR either with only two port samplers nine to five for the whole island is, so they don't have enough data, you know, or enough personnel to support the accuracy of the landings. So, I think that we have a great opportunity to involve the commercial fisherman that are interesting to cooperate and try to create a group of commercial fisherman port samplers. If that fisherman's- you can training well. They can know, you know, how to manage the product, bring the information that you really need like, for example, the project that Todd and us, we are doing- you know, taking picture from the lobsters or maybe something more simple is going to help us to attend the issue of running over the ACLs, because I'm pretty confident that most of this data is not true, that the DNR of, of Puerto Rico is providing to you.

RICHARD APPELDOORN: Nelson, you said that they're aware of this problem?

NELSON CRESPO: Yes.

RICHARD APPELDOORN: Okay. Because obviously someone has made a decision that the overrun is real, and it doesn't sound like they've at least responded to your concerns about that. And you look at the overage, it's a 30% increase in what the ACL is. And we set the ACL pretty high to begin with. So, you know, you have to ask whether this is something that the fishery has the capability of actually doing in that kind of short term. But this has not been presented to the SSC, so, I would share your concerns.

GRACIELA GARCÍA-MOLINER: The regional office actually wrote to the secretary of the Department of National and Environmental Resources requesting further information because we are missing that percentage of the landings that are part of the e-reporting. Science Center has been trying to incorporate that data into the actual landings information, but we are behind. And actually, if those data are included, it covers about 20 to 30 percent of the additional landings that, that they would be reporting for Puerto Rico. So, it's a very serious, but it's an ongoing solution that we're trying to find, to incorporate, that information into the

landing. So, you know, it goes back to- right now, it's a head-on collision between the update for the Spiny Lobster, the accountability measures that just went into effect in the EEZ only, but still that it's- you know, it impacts the livelihood of the fishers and basically shifts the fishery for Spiny Lobster in the area. So, we are at a very specific crossroads. And this is the main- or one of the main fisheries in the EEZ in Puerto Rico.

I think María or Sarah can answer. I don't think that they've received a response from the DNER. There have been some changes, on those that are the heads of the DNER. So, I don't know what the status of that is, but yes, we've been made aware of the many situations with the Spiny Lobster. Thank you. That was Graciela talking.

RICHARD APPELDOORN: Yeah, but the closure went into effect.

GRACIELA GARCÍA-MOLINER: July 12th, and it will go on until September 30th this year in the EEZ around Puerto Rico. So, basically, the west coast, any Spiny Lobster fishery that was off in, you know, well for traps, around Tourmaline and, you know, Boya 4 or someplace like that, that's closed.

RICHARD APPELDOORN: But that was done even though there's an outstanding question of the reliability of the data contributing to that.

GRACIELA GARCÍA-MOLINER: Well, the accountability measure are written the way they are so that we keep track and monitor what we can. That information comes into the Science Center, goes to the regional office, regional office, the re-regulatory agency, and they have to act. So, we've talked, and we discussed the issues with the Spiny Lobster. We requested additional information to see if there is anything else that could be done. There are a number of studies that are going on regarding selectivity, regarding differences in the fisheries, etcetera. But at this stage, you know, the AMs had to be- were Triggered.

LIAJAY RIVERA GARCÍA: Nelson was first but María López has a raised hand.

RICHARD APPELDOORN: Yeah. María, go ahead, because Nelson's in conversation.

MARÍA LÓPEZ-MERCER: Okay. Thank you. So this is María López with NOAA Fisheries SERO So yeah that is correct, Graciela. So, I mean, we do have a mandate to monitor the ACLs, as Sarah said. And when we monitor these ACLs every year, if there's an overage, then we

have to implement accountability measures, and we use the information that we have available, right, and that information has been provided by the DNER to the Science Center. And, you know, we made those determinations based on the process that, that Sarah explained before. Now, obviously, we were trying to obtain the most recent information. We was 2020 for Puerto Rico, but that was impossible for the issues that Graciela mentioned. We have been dealing with this for a while, and I appreciate all the Science Center's steps toward getting that information. But unfortunately, we didn't get that information by the time that we needed to make a determination. Now, with that said, we used the information from the most available- most recent available years, which is 2017, 2019, and show that average.

Now for- when we make this determination in our office, we also communicated, we send a correspondence to the secretary of the DNER, explaining that we were going to close the fishery for the reasons that I just said. And then we're also requesting compatibility of a closure to state waters because, you know, obviously there is an understanding that most of the harvest of Spiny Lobster occurs in state waters. At this time, we didn't receive- we have not received any communication back from the DNER. However, I want to note that during the next Council meeting, we will- that this will be one of the topics, and maybe there will be an opportunity to provide a little more information. And just to reiterate, I mean, we monitor with information we have available. And of course, if there's additional information that the DNER has or information that comes from all the projects that are being done to enhance the data collection that we have with the- all of that is absolutely well received because, you know, that's the purpose. But so far, this is what we have right now. And we have a mandate to, you know, to close the fishery. The landings are exceeded. Thanks.

RICHARD APPELDOORN: All right. Thank you. Nelson, you have a- Or one of you.

MARCOS HANKE: Just a follow up when María says- this is Marcos Hanke. I was speaking to Nelson. The fishermen are asking how they can support you guys with information that is lacking. Information that is emergency information, things that are needed now. We are going to still stumble on the DNR roadblock or information that never gets to us or is too late or is deficient. We have been spend-spending two days over that hump. And the fishermen, the industry, are requesting the support from the Science Center, from the SSC, whoever, to design a sampling protocol or something for a subsample team, a group of fishermen that have the ability and the desire to collaborate with the process to provide this

information. For me, that's a no-brainer. I just want to highlight that because looking from outside and going to the Council meeting, I want this group to know how this step is so important for the Council process and- Nelson?

NELSON CRESPO: If you let me Mr. Chair, I just want to add.

GRACIELA GARCÍA-MOLINER: Name? Say your name.

NELSON CRESPO: Nelson Crespo. Don't misunderstand me that we at the Council, for certain species, we want compatibility regulations in the future, but that have to be, you know, on a way that is well done. With everything we have now, I don't think- we cannot go through compatibility regulation because it's going to be unfair to the fishermen. In this scenario right now, this does not affect me in the west coast of Puerto Rico, the closure from the lobster, but from the people of Fajardo, they're going to get a big hit. So that is very important to determining how we are going to collect the information. How we are going to, you know, clean all the data we got in order to do, you know, a better or to reduce the uncertenty we have right now.

JORGE R. GARCÍA-SAIS: ¿Pero por qué?

NELSON CRESPO: Because in the west coast of Puerto Rico, the most of the lobster fishery is in the coast around the coast. But the people from Fajardo, they're fishing more away from the nine miles from shore.

JORGE R. GARCÍA-SAIS: But what María is saying is precisely that they are looking for DNER to support the enforcement to be done across the- state waters as well.

NELSON CRESPO: We have an enforcement.

JULIAN MAGRAS: Julian Magras for the record. They- you know, I've been watching the lobster fishery for Puerto Rico for a very long time. And over the last six years, they have overran the ACLs five times. So, what that is telling me is that there are a lot of animals out there. And I strongly believe that some assessments and some studies need to be done once again to see if this fishery can handle a higher ACL than what was given to them. I know we pounded this to death a few years back, and the numbers that was there was actually way larger than what was given to all the fishermen, both U.S.V.I. and Puerto Rico. And I don't think you would be harvesting the lobsters if they were not there. There are certain things that can be measures that can be put in place. And Nelson's been preaching this forever is to get rid of the trammel

nets that fishing the lobsters in shore. And the local government has not been supporting him in passing that rule. And I think that should be a recommendation that comes from this committee to the Council to put it on a record, to request from the local government to implement that. But, you know, to do compatibility right now in this process at this time, you're going to really, really hurt the economy and the fishers in Puerto Rico. I'm not saying that down the line that compatibility can't work, but to try to get it to work right now during this accountability measure that has just been implemented, I think it'll be detrimental. Thank you.

LIAJAY RIVERA GARCÍA: You have a raised hand from María López.

RICHARD APPELDOORN: María.

MARÍA LÓPEZ-MERCER: Thank you. María López, NOAA Fisheries. And just- I just want to make the point that we need to remember that the ACLs and the monitoring, our sales, they are done with combined data from the state and federal waters, right? So, our mandate is to, you know, make sure that, you know, the resource is healthy. So, in the sense that we are close in the fishery, because the ACL is exceeded, then that request for compatible closure in state waters, which is something that is completely outside our jurisdiction, right - that's all you can do - comes from that because those landing- this is not exclusive to federal waters. This is something that is the ACL and the monitoring, and those landings come from both federal and state waters. And of course, you know, we all support anything that can be done to, I mean, we hear you. We- you know, fishers are saying that, you know, there's bigger lobster, and there's a lot of lobster, and there's a lot of things, but that's not what we have in our hands. So, it will be great if many efforts can be done to provide the information that is needed to continue collecting information for the lobster and see what it's doing, you know, like what the assessment did a couple of years ago. Thanks.

RICHARD APPELDOORN: Thank you, María. it's 3:13. Can we just take a 10-minute break or 3:25, back at 3:25?

(Whereupon, a brief recess was taken.)

RICHARD APPELDOORN: So, we're trimming down the agenda substantially to try and give some time here to the discussion of the research priorities from the SSC. So that's going to be the next item. and do we have that list? Now, there was a list that was grouped into categories. Do you have that version?

LIAJAY RIVERA GARCÍA: Pardon?

RICHARD APPELDOORN: The one that's grouped into categories. It was in my presentation. Yes.

LIAJAY RIVERA GARCÍA: That one?

Discussion: SSC Research Plan Recommendations to CFMC

RICHARD APPELDOORN: Oh yeah, but you can go straight to the next. That's just the intro- okay. So that's where we got actually started with the recommendations. So just to recap what we did in a very brief amount of time last time was that each- you know, I tasked everybody to name, - and I forget the exact number - three priorities that they each had. Sometimes it was more. Sometimes it was less. And we just got those on the screen and that was about as far as we got. They were grouped into a number of headings which were: improved landings data, collection of biological data for life history, effort estimation, EBFM, prepare for H2 flexibilities, monitoring the surveys, socioeconomic data for management. And that last one included a couple of items that Tarsila gave to me because she was not at the meeting at that time. She had to sign off early. And so, since it is a list of just whatever we kind of came up with, I felt it was totally legitimate to have her give me those things to add in, even though it was after the meeting. So, there's no priority here in terms of how these are listed because we never got to that stage or priority. The only thing that was done was to group these into kind of subject headings.

So this I think, having looked over this list, is a pretty good starting point, actually - the question then would be did we miss something important? There's always lots more that we would like to have. So, I'm not looking for adding things to this list unless we really miss something that is really important. Do we have too much here? Is another way of looking at that. Again, this was, you know, not quite everybody's wish list because it was limited to a number- just a couple of high-priority things for each person. But you know, can we cut this down? Should we cut this down? And then finally, we should try to prioritize as much as possible and maybe that's by bullet item, maybe that's by category. I don't know, but that's what we're here to discuss. We have about an hour and a half, which is more than we've had in the past. And so I don't know if you want to- we'll go through the list on the slides, and then we can talk about how we want to proceed, whether it's by- you know, within each group because that's how it's ordered on the slides, or whether you want to see the whole thing up there which would be hard to read, but technically possible. So let me just go through these, and then we'll cycle back to them.

So under improved landings data, something we have been struggling with, obviously, we had analyzed the MER report for Puerto Rico landings, which should now not be called the MER report. To improve port sampling, to look at expansion factor estimation and application, and look at questions of generating length compositions, because there was a lot of data collected via photographs that can be used for that that has- I don't think been done, but it's available. So it would be a wealth of data that could go into the system. Second bullet on that was improved landing's data collection via digital tools. And we had a presentation last time about some of the digital tools that have been used in terms of not only just measuring species, but actually identifying species via machine learning to recognize species. and this would all improve the speed and accuracy of the catch analysis by port agents.

Next one is evaluate digital formats for reporting and validate versus paper reporting. Right now, Puerto Rico, for example, is using both. And so, if we had some comparisons there, we could make some recommendations about how to move that forward and make things even better. The last one was a port study of landings in the Virgin Islands, which I think is already underway. So, hey, we've met one already.

Next slide.

The next subject area was collection of biological data for life history and population parameters. And the bullets there. Improved biological data collection via digital tools, again, sort of follow up on what we had in the first slide. And give timely prioritization of collection by species. Okay. And this is where I think the SEDAR matrix is going to be able to target those species. So, then we can say, okay, these are the species we want to have this life history information for specifically. And so that's the review and formalized stock prioritization process. So that's sort of ongoing too, I would guess. Yes, Kevin? Effort estimation was just the one bullet, develop alternative methods for estimating effort- or efforts as it's written.

Next slide?

A number of bullets coming out of EBFM evaluate the effectiveness and impact of closed areas. It's been a priority complaint among Council members for a long time. And so that's one research area. Develop habitat maps from existing NOS multibeam/LiDAR data, which would facilitate a lot of the- well, facilitate a lot of stuff. Review of status of spawning aggregations within closed areas,

evaluate the closed season relative to spawning seasons, investigate the functional ecology of our habitats and construct an electronic species habitat database. And you will all recall that we had very limited discussion about what some of these meant. And so, we could expand on that if people want.

And there's another- next slide.

Prepare for the (h)(2) flexibility. Again, this is the ability to use indicators, track indicators, to help assess whether stocks are increasing or decreasing. We had some discussion about that application under the still necessary requirement for ABCs and OFLs. But assuming that this is something that's coming, we should- it was to do the simulations to make- you know, that would allow us to say, "Okay, here's some really promising indicators that would help us here in the Caribbean."

How to incorporate uncertainty into defining ABCs and OFLs. does that sound familiar from this morning? And again, collect life history information which would be necessary to put into those alternate approaches, especially length-based ones, which would need, you know, good growth history to ground those in quickly L-infinities. Monitoring and surveys. Monitoring program of fish populations in closed areas because otherwise they're not being assessed through fishing activities, because they're closed. An increase in cooperative fisheries-based surveys and train and delegate fishers for fisheries monitoring activities. I think this is the point that Nelson was making earlier Today.

And I think there's one more slide.

Socioeconomic data for management. Determine the economic values of fisheries that can be used in assessing benefits and costs of alternative management measures. Have periodic systematic collection of data to provide a baseline and comparative basis for social impact assessments. And research to assess and integrate local ecological knowledge into decision-making.

So those are all the things we came up with last time. My quick count says there's 21 of those. A couple of those, as I mentioned, the study of landings in the Virgin Islands and the stock prioritization process are already underway. So that would take us under 20. Are we missing anything? Do we have too much? Maybe that's kind of the first start, unless somebody has a question on what a bullet actually means. In which case I'd ask the person who put that up there to expound on that. So, Michelle?

MICHELLE SCHÄRER-UMPIERRE: This is Michelle Schärer. The only thing I was wondering if when we're talking about landings, we're talking about commercial and recreational.

RICHARD APPELDOORN: Yes.

GRACIELA GARCÍA-MOLINER: So, to put the recreational fisheries- Graciela. Uh, ouch. [laughter] that's my punishment for having been bothering you with your name all day. To put the recreational fisheries in context, the Marine Recreational Information Program, MRIP, it's looking to revive the data collection in the U.S. Caribbean. So, the first conversations have to do with governance. And that's really on the local government's side of things of- you know, for example, the recreational fishing licenses and permits, etcetera. And the Virgin Islands already has a voluntary recreational fishing license in place that you can, you know, get for free via the internet. So, that effort's ongoing, but at this stage, I don't think that there is any actual recreational data being collected at all. So, after 2017, not in Puerto Rico and in the Virgin Islands, not since a long time ago. So, conversations are happening, but it really has a lot to do with the actual governance of the program within the local governments.

JUAN J. CRUZ MOTTA: Yeah, JJ here. I think that's very important to bring that to the list. I mean, not to be very specific about the recreational data, because as our preliminary findings on the conceptual models for the U.S. Caribbean shows that’s one of the main concerns of fishers not represented in the DAPs is that one. That we don't know how much the recreational fishery is taken out of and how much is that contributing to total landings. Thank you.

RICHARD APPELDOORN: So are you recommending that we make a specific bullet or- because I don't see- when we talk about improved landings data collection via digital tools, that would certainly include recreational landings. But a separate bullet might be determine recreational landings.

JUAN J. CRUZ MOTTA: Yeah. Or perhaps just being explicit about the landings and recreational and- yeah, let's see, and commercial. I mean, because all the bullets below will apply also to the recreational company.

RICHARD APPELDOORN: So, you're saying just make the grouping improve commercial and recreational landings data?

JUAN J. CRUZ MOTTA: Yeah. yes.

GRACIELA GARCÍA-MOLINER: Well, Liajay it's getting to the bullet. Grisel Rodríguez from the Fisheries Research Lab is actually conducting some- she keeps track of the tournaments because by by law, you have to do that. You have to, tell NOAA when the tournaments are occurring, etcetera. But she's also doing some, Kevin will tell you.

KEVIN MCCARTHY: This is Kevin. So, Grisel is getting started with a survey design project that's specifically going towards the recreational fleet in Puerto Rico. And in the U.S.V.I. DFW staff along with Science Center staff we're working on a survey design there, in the Virgin Islands, that would include commercial rec for hire, the whole works. So we've done effort surveys in- well, we- the DFW staff has done effort surveys in Saint Croix and Saint Thomas. They're working on Saint John. It's a bit of a challenge to get folks over there and do that work. And then they will begi- and they finish those initial effort site usage surveys building off of some work that had been done previously and updating it. And so those are complete, and they're going to start pilot surveys in Saint Croix and Saint Thomas in the very near future. So that's the update on what's happening there. And of course there's still work going on in Puerto Rico and on very specialized parts of the fishery. You know, the initial work had been done. And so, there's ongoing work to sort of whole fill some areas that needed additional work.

Right. Oh, right, right. And JJ and Todd are going to be working with some students to help with that work. And we look forward to getting those folks hired pretty soon. You've got one identified, right, and on the lookout for a second.

GRACIELA GARCÍA-MOLINER: You have to let Liajay know. You wanted separate bullet for the recreational information.

JUAN J. CRUZ MOTTA: Or just be a specific that when we talk about improved landings, it includes recreational. That's all. I mean, it's-

RICHARD APPELDOORN: So, the group title, would be, improved commercial and recreational landings data?

JUAN J. CRUZ MOTTA: Yeah. That's it.

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. And charter. And charter.

KEVIN MCCARTHY: I'm sorry. I missed the question. This is Kevin. Oh, it wasn't directed at me. Thank you. Thank goodness.

RICHARD APPELDOORN: Any other comments on items within this grouping? Michelle.

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. I think some of these may sound like not research, like sort of wish list. So maybe saying, you know, support, steps to improve support sampling, that type of language to make it sort of more specific.

RICHARD APPELDOORN: Well, the heading is just the grouping heading. It's the bullets underneath that are the research recommendations. Yes, Sennai.

SENNAI HABTES: Was that for me, Rich? Sorry, I couldn't hear you.

RICHARD APPELDOORN: Yeah. Did you have a hand up?

SENNAI HABTES: I did. Yeah. So, I just wanted to add that, although it's not part of the survey design for port sampling, the U.S.V.I. is- DFW is moving towards both electronic reporting for commercial landings as well as for recreational landings while we're designing the new rules and regulations for recreational fishing. And under that requirement, charter fishers will be required to submit logbooks and are going to be required to, you know, submit catch reports somewhere to the commercial fishers. That's an ongoing process because the infrastructure is not currently in place within the Virgin Islands, but we're working on identifying contractors to develop that. And in addition, I just make one comment regarding the research recommendations. I believe the Council could really benefit in particular from when you have recommendations that require more coordination with the territorial and local government agencies that you put specifics, meaning what outcomes that you request to see from those types of pro- like products and, and programs, because we currently do work fairly closely with the CFMC. You know, through a lot of the other technical panels with the exception possibly of the SSC, though. I'm always in attendance. I think the problem is there's a lot of nebulous recommendations regarding the type of work, research projects you would like the Council to fund within those jurisdictions. I think, you know, getting specifics from the SSC for the things that you'd like to see with actual outcomes listed would be very beneficial for the Council members. With that, I'll go back to being quiet.

RICHARD APPELDOORN: Yeah. Thank you, Sennai. Those were good suggestions. Along those lines, I mean, I was trying to kind of- had that when I was presenting some of the bullets in my first go round but we could add that kind of correction focus to the list here if we wanted to do that. But it would be something like when

we're talking about improved landing data collection via digital- via digital tools. You know, the desired outcome there is to increase the efficiency and speed of - what do you call it? - port sampling. Efficiency, speed, and accuracy of port sampling. Yeah, Michelle?

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. Are we talking about here visualizing a port agent doing this, or is this specifically for the self-reporting part of the landings data? I'm not quite sure.

RICHARD APPELDOORN: This is- um- it actually could be- let's just take what you put there out. Yes, it could be both because we discussed a number of things and that require a fair amount of research before you could actually implement them. So, we had a presentation last time about the kinds of tools that were being developed with the cameras and everything like that. But then you have to- you know, what's the best way to implement those to work with the fishers to, you know, get through the catch quickly and efficiently and hopefully more accurately. But there's also things that were talked about that are further into the future, but technically possible. I don't want to call these the big brother approaches. But, you know, there would be a camera that would be mounted on a boat if that would be possible. And as the catch came in, the camera would be recording it, and there would be software, artificial intelligence software, that would be saying, "Okay, you just caught these species of fish. Their sizes were this." And you come back in the port, and the data's all entered and whatnot. So there's obviously a lot of research would need to be done. I would think both technologically and sociologically in terms of the ethics of all this and whatnot to get that into a functional reporting system. So, there's, I think, a lot of research in a number of ways that digital tools could be used before they go forward. And some of the questions are going to be, should we do something like this or not? You know. Go ahead.

MICHELLE SCHÄRER-UMPIERRE: Yeah, this is Michelle. I would add to that for the calculations of the correction factors. We need to improve that.

GRACIELA GARCÍA-MOLINER: Would that be that bullet - this is Graciela - under expansion factor estimation and application?

RICHARD APPELDOORN: Yes. Although that’s specific to that report, but obviously, you know, the sub-bullet means this is where we want to be able to go with- in adopting a more rigorous statistically designed sampling program. And that's really what that study was about, you know. Where do you need to be? When do

you need to be there? How much effort do you have? You know, how long do you need to be there? Etcetera. In terms of the statistical design. Then the digital tools, now that you're there, how can you make the best of the time, your time, and minimize the fisherman's burden to get the information you need and get out of there?

And so again it's specific to what that report is saying about how, in this case, Puerto Rico, can revamp their sampling protocols to get better estimates, statistically valid estimates, of what the catch is going to be. And again, with the length composition, we're talking about data that's already been collected, but not analyzed for those purposes, but it's there, and it's a lot of it. And so, those three sub-bullets are specific to that report. So, unless we, you know- we could go in and, like I said, under each sub-bullet say, "Okay, here's why we're targeting research for that." But I think that can get fairly lengthy, but that's okay.

GRACIELA GARCÍA-MOLINER: But you- we discussed the possibility of procedural workshop for the expansion factor. You don't want to include that here?

So, you know, you've discussed the possibility of a procedural workshop for the expansion factor, assign corrected landings, etcetera. I mean, that might be something that, you know, gets priority bullet after your discussion of the SEDAR 80. Outside the MER and outside everything else, just- yeah.

RICHARD APPELDOORN: Well, the first bullet is addressing the fact that the study that was a research project. And the research was collecting the data to determine how we can improve the port sampling. Until that is analyzed and gotten to the next step, it still represents research that hasn't been done that it's needed. So that's independent of the points you're making, which are still valid.

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. So, what I heard this morning is we might need to look at correction factors or expansion factors on a species-by-species basis, and that would improve our estimates moving forward. So, if the result of the analysis or other things that we need to know about- because this keeps being a bump in our road, and will continue to be forever, right, it appears. So, if it's quicker, more efficient, that's great. But is it more accurate and more precise? I think merits its own bullet.

RICHARD APPELDOORN: Your bullet would be what?

MICHELLE SCHÄRER-UMPIERRE: Michelle again. Improving the correction factors or the expansion factors for our fishery.

LIAJAY RIVERA GARCÍA: Could you repeat, sorry, so I can write it down here?

MICHELLE SCHÄRER-UMPIERRE: Improving the expansion factors for Puerto Rico, I guess, because the U.S. Virgin Islands doesn't need them.

RICHARD APPELDOORN: By this, do you mean changing the way Puerto Rico calculates their expansion factors. Research that would lead to that, or- because the study that was done provide- you know, needs to be analyzed to see whether they would agree that the comparisons between- catches between reported landings in that study would indeed be a basis for calculating species-specific expansion factors, but that's a one-shot deal. You know, what we want to see in the not-too-distant future is a program implemented in Puerto Rico, and of course, following the same kind of studies in the Virgin Islands, where they're generating that level of data every year. And when you're doing it at that level every year, you will have your species-specific catches with estimates on the variabilities and everything like that. And maybe we don't even need expansion factors at that point, but. So, to me, that's all embedded in the first part. So, I'm asking you whether the second one is separate from that. As I said, you know, some different way that Puerto Rico is calculating their expectant factors now-

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. I'm not read up on the report that Nancie was mentioning of what had been done to evaluate the correction factors previously. But I think it would be in the interest of this committee to actually evaluate those- how they are collected, if they are sufficiently replicated, all these little details to have more confidence in that in the future.

RICHARD APPELDOORN: Well, this is very slow progress here.

MICHELLE SCHÄRER-UMPIERRE: Maybe the word is evaluate and not improve, the research is evaluated.

RICHARD APPELDOORN: Okay.

JORGE R. GARCÍA-SAIS: How about validate the applicability of expansion factors? I'm not sure anymore.

MICHELLE SCHÄRER-UMPIERRE: This is Michelle. The applicability is one thing, but I'm actually thinking more of the process of what

goes behind making that happen year to year and how that affects all our decisions and all our timing at this committee.

RICHARD APPELDOORN: So that would go back to the previous wording. Yeah. I don't think we should wordsmith this too far. I don't think we should- you know, we've just spent I don't know an enormous amount of time already, and we're just in the first grouping here. You know, we have 45 minutes left. So, I'd like to move on to the next group if that's okay. Julian.

JULIAN MAGRAS: Before you move on to the next group, since you're not going to discuss the other two items there, when we see initiate the MER style study for the U.S. Virgin Islands. Well, the Saint Thomas/Saint John fisherman have said for a long time that we would like to see at least 40 samples compared from that study to actual 40 samples of the regular port sampler sampling that same catch and see what the difference is. Because we don't use expansion factors. And I have seen- in two reports, I've seen two different set of numbers that can be up, can be down. Some of them can be very close when using the expansion factors for Puerto Rico. So, before we can move forward, I'm requesting that we do some kind of pilot study to see if that process actually is going to work the correct way moving forward.

RICHARD APPELDOORN: So, I understand that that process is already- Kevin says that study is- uh, is- no, in the Virgin Islands is-

RICHARD APPELDOORN: No, it's not.

KEVIN MCCARTHY: The pilot study is already done in Virgin Island.

JULIAN MAGRAS: Where was the pilot study done? Not in Saint Thomas/Saint John, because they never came to my fishing town to do anything. So, were we excluded? And, Sennai, at least, you're on the call. And, Nicole Greaux, you are in the call because we haven't seen any of these people down at the main fish and village in Frenchtown. So, wherever these studies are taking place, it would be nice to have included, number one, your DAP Chair, who's one of your top fishers. So, and the representative for Saint Thomas/Saint John, where was I when all of this was taking place? Because this would be a real insult to me. Why am I actually sitting here to discuss this if I'm not even purview to what's going on? And this has been a serious problem.

RICHARD APPELDOORN: Yeah. we're getting out of line.-

JULIAN MAGRAS: Yeah. All the landings [crosstalk]—

TODD GEDAMKE: Julian, I just have to respond. If you would like, I can actually call up the number of times we sampled you in 2014.

JULIAN MAGRAS: Not with no cameras.

TODD GEDAMKE: Doesn't matter. This is a pilot study for landings, and this is also why you don't want MER in this stuff. It involves personal aspects.

GRACIELA GARCÍA-MOLINER: Sennai.

TODD GEDAMKE: It's already been done.

LIAJAY RIVERA GARCÍA: Raise hand from Sennai Habtes.

RICHARD APPELDOORN: Yeah. So, I'm going to reiterate a point that Kevin made is that survey is now- I don't know if it's actually underway, but it's been approved and is going to happen, or is already happening in the Virgin Islands to do the level of sampling comparable to what was done in Puerto Rico in 2018 plus. So, Sennai go ahead.

SENNAI HABTES: Thanks, Rich. Sennai Habtes for the record. So, Julian, the MER's pilot study was done in 2014, 2015. I was not with DPNR at the time. That was under our predecessor. It was a different director. I have seen the study. We have used the information from that study to inform the direction where we're going with the involvement of the SCFFC and meet regularly with Kevin. And when we get to the point where we will be implementing the new techniques, I can promise you, I will be reaching out to you. We will make sure that this study covers the spatial distribution to involve you with the port samples, as well as both Frenchtown, as many of the other ports, where fish come into the territory. When we get to the point where we have protocols written up to put into implementation, I will happily reach out to you, and we can sit down and discuss them prior to implementation.

RICHARD APPELDOORN: So, maybe it'd be helpful to well, put a little- a few little things. Well, yes, I'd like the recommendation.

JUAN J. CRUZ MOTTA: The NOAA Port Sampling Report.

RICHARD APPELDOORN: Okay. So, to edit this, we- in the first bullet there, MER is going to be replaced with NOAA Port Sampling.

TODD GEDAMKE: Richard, if I may, could you please leave that on there? Graciela has to add something to the record here, and it's

going to really be significant related to this comment. So, I will be abstaining from the rest of the day, and Graciela will read that into the record at some point in time, but I cannot be suggesting any comments related to MER right now. Thank you.

RICHARD APPELDOORN: So I still want to change that language. Port sampling report. Yeah. Same change there.

JUAN J. CRUZ MOTTA: You have that report at hand, right?

RICHARD APPELDOORN: Yes.

TODD GEDAMKE: I would just like it on the record right now that I am not suggesting any changes from MER to anything else until this is all cleared up.

RICHARD APPELDOORN: So, noted. Thank you. So, what I'd like to do is under that first- or actually at the end of that first bullet add some kind of symbol indicating that, um-

GRACIELA GARCÍA-MOLINER: Right there?

RICHARD APPELDOORN: No. After landings. Yeah, I mean, we could just leave it with that because that's something that Kevin has informed us is something that's going to happen. He said, "hopefully, it'll be in the fall." The money's been approved. So, while it remains a research priority it's one that's being attended to or planned to be attended to. Okay. The same thing applies to the last bullet. Well, yes, just so we keep in mind.

GRACIELA GARCÍA-MOLINER: And we have an okay from Tarsila and Sennai.

RICHARD APPELDOORN: Sorry. We have what from Tarsila? Hands ra-

GRACIELA GARCÍA-MOLINER: Okay. So, we were having issues with the projection. So now it's taken care of. Sorry.

RICHARD APPELDOORN: So let's go to the next slide. All right. Collection of biological data for life history and population parameters. Okay. Improved biological data collection via digital tools and timely prioritization of collection of species. That could also take that asterisk because we just heard a presentation that NOAA is in the process of doing that.

So does anybody have any comments something you think we really miss, something that really is not important? yes.

VANCE VICENTE: Yeah, I-

LIAJAY RIVERA GARCÍA: Nombre.

VANCE VICENTE: Vance Peter Vicente. [laughter] Okay. Richard, last time we spoke about recommendations I made two suggestions, and I don't see them- I don't see either of them there, so. Well, one of them is I emphasized the lack of biological information regarding feeding habits, you know, stomach content, and as well as not only taxonomically, which doesn't have to be taxonomically. A real good picture of the open gut, you know. With a high-definition camera, you can tell whether the fish has been eating a crab, lobster, worm and polychaetes and ostracods or whatever. Doesn't have to be that most detailed. But we, from what I've heard of the samples that have been collected, the stomach contents had been left to spoil. They were not analyzed because they just get spoiled. And that's not a good excuse for not finding out how these fishes are sustaining themselves and reproducing themselves. If you don't need, you don’t reproduce.

RICHARD APPELDOORN: Okay. I'm going to ask you to hold off on that because that's really perfect for the EBFM category stuff. So, when we get to that make sure that we have that covered, because I think what you're saying is really interesting idea. But let's just do it by category if that's okay.

VANCE VICENTE: Yeah. Well, yeah. It's, uh- I don't know. The second aspect, I mean, it- not only the- if you look at it only from the diet composition it is biological, but if you look at it- analyze the food habits using stable isotopes, that will tell you information about the ecosystem. What were the primary producers that produce that biomass, as well as other information that you can get from stable isotope, which will give you a more ecosystem type of information.

JORGE R. GARCÍA-SAIS: About the first one, improve biological data collection via digital tools. Can we be a little bit more specific, you know, maybe examples or what is it referring to?

RICHARD APPELDOORN: I defer to the person who suggested that, but that might an editing version of what was initially suggested. So, it could, for example, include what Vance was just talking about, in terms of,, say gut contents, in the same way we're using- potentially using cameras to identify species of fish, you can spill the gut contents and use cameras to identify at least at some level things that are still intact. Vance, do you want to include something specific under that bullet, or is that within that bullet? you know, we- yeah, I would say that, you know, when

these were first given, it was just a list, right? And so, there was a subsequent trying to at least get these into some categories, so the Council could understand, you know, where these things were fitting in and whatnot. But, um- so that's a less than perfect process, but.

JORGE R. GARCÍA-SAIS: For example, I can think about, you know ichthyoplankton identification, the photographic comparative image, whatever. I mean, that's being done for ichthyoplankton, you know. But I don't know what, you know, what specifically we are prioritizing there. You know, like we have any idea of what we want.

VANCE VICENTE: Yeah, no, no. Reni, what I see under biological condition, I agree with you that we should be more specific. But specifically, I mean, biological data, the size of the fish, the condition of the fish, whether they have ectoparasites, how they look. Do they look good, they look bad? You know, skinny, fat. You know? That kind of information. In addition to close-up- but cameras are so cheap nowadays, and you get such a high resolution, not like back in the '60s and '70s, you know, when we started doing ecological stories, you know. But you can get very, very refined details from photographs, from close-up photograph of a freshly open stomach. You're not looking at intestinal stuff. I mean, just, just the stomach picture. What does he have? You know, to grab- just like Randall did back in 1967. You know, he took all the gut content and put it out in the dish. It's approximately 40% worms, 30% sponges, 20% ostracods, 5% polychaetes, you know. Very simple. Just to see what the hell they're hell their eat, what the heck, I'm sorry, eating. What are they eating?

RICHARD APPELDOORN: Well, yeah, but you could do the same thing in the sense that you're expanding gut content or gut collections, if you will, in the same way that you have otolith collections or gonad collections. And then you're running that through genomics to find out what was in there, whether you can identify it or not, the genetics will show you. So, you know, we could talk about digital tools. We could also talk about genetic tools. We have someone on the line?

LIAJAY RIVERA GARCÍA: Yes. We have Sennai Habtes with a raised hand.

RICHARD APPELDOORN: Sennai.

SENNAI HABTES: Thank you, Mr. Chair. Sennai Habtes for the record. I think you guys- I apologize if I'm overstepping. I think particularly in working between territorial agencies, which

collect a lot of the data, as well as the federal agencies, what really would be beneficial would be a prioritized list of species and specific biological measures that you are recommending for the CFMC for the Council to prioritize so that we have these things when we are writing grants within Puerto Rico and the U.S.V.I. for developing sampling programs. Understanding what are those biological specific data points that we need to collect. And I believe that is part of what the SSC needs to recommend to the Councils. We should be done every year in your research recommendations, because honestly, what I'm seeing at present is this larger list that we all want all of these things for research in the U.S. Caribbean. But then how do you turn that into specific recommendations that will improve both stock assessment, monitoring, and management for our region?

RICHARD APPELDOORN: Yeah. Thank you, Sennai. So, I'm recommending that the first bullet there is improved biological data collection, and then we'll put period, and then- or let's go to a parenthesis rather- and then e.g., using digital or genetic tools. So digital or genetic tools. And therefore, it's an example. It's not an inclusive list. And then I think Sennai what you're- what Sennai was suggesting is, okay, let's be specific about the nature of the biological data we would like to have collected. So, this is going to be- well, I would say otoliths, but it's going to be hard parts for aging. But it's also going to be length composition. It's going to be gonads. It's going to be, as we get an EBFM, stomach contents. It's going to be- I don't know. There's lots of other things that you know, habitat associations and whatnot, but that's really not what this particular bullet is looking at. Yeah, Shannon.

SHANNON CASS-CALAY: Yeah. You've mentioned genetic tools, but there are some very promising work being done right now with DNA methylation-based approaches to determine age. So that's- yeah. And if that was proven to be effective and for tropical species in the Caribbean, it's relatively cost-effective.

RICHARD APPELDOORN: Anyway, after the parenthesis you know I don't know, put a colon and say age and growth. Age and growth, reproduction feeding habits. All right. That feeding, not eating although they're the same thing. You know, there's other things we would like to have in terms of distributions and habitats, but I don't think they fall particularly under that bullet. Does anybody want to comment on that, uh? Maybe in addition to reproduction put maturation. So one is looking at maturity then the other one's looking at seasonal cycles and fecundity and that kind of stuff.

Okay. If you go to the next slide.

DOUGLAS GREGORY: Rich, this is Doug. If we go to the slide from the last slide, the very last item. You know, the one that says effort, I want to make a suggestion. Right. Effort estimation. Let's put fishing effort estimation. I mean, we know what that means, and I would say develop alternate estimation methods or just make effort singular instead of plural. And take out the last three words if that's okay with everybody. Thank you.

RICHARD APPELDOORN: Yeah. Thank you, Doug. I actually totally missed that. We had that other category down at the bottom and because it was off the screen at the time. So, thank you for that.

So now the next slide then to EBFM. And as we mentioned last time just for background is that this is our knowledge base. Now there is a whole EBFM process going on that will be identifying further research needs and suggesting potential indicators, which will then have to be evaluated themselves. So, this is kind of where we are now, but in the future, we expect- in the not-too-distant future, we expect this might change or be added to substantially. So, JJ.

JUAN J. CRUZ MOTTA: Thank you. And also, I would like- JJ here. confirmation from Sennai on what I'm about to say. EBFM includes a lot more than is there obviously. So, if we're going to, you know, put bullet points, and we will need like three or four of those slides, which is not the intention. So, my suggestion would be perhaps what we could do with this section is call it ecological aspects or something like that. Because I believe in the TAP, EBFM TAP, we are going to develop specific research recommendations for EBFM. Can you confirm that Sennai? He's gone. Yeah, he's not there. But anyhow, we can develop those research recommendations specific for EBFM in that technical advisory panel.

The other thing that I was going to suggest here is, I don't know if it would be worth to make a special section for spawning aggregations because it needs a specific attention. I don't know. It's very important for the Council. So perhaps to separate that. Thank you.

LIAJAY RIVERA GARCÍA: Sennai is back in the web, so maybe Sennai can answer now.

SENNAI HABTES: Yeah, I'm here but I didn't hear the question. Apologies. Sennai Habtes for the record. We had someone step into the office that I needed to talk to.

JUAN J. CRUZ MOTTA: JJ here. Yeah. I was asking if we going to develop this research recommendations for the- specific for the EBFM in the Caribbean. Thank you, Sennai.

SENNAI HABTES: Sure. So frankly, I would say the largest one is the lack of data management and coordination infrastructure within the U.S. Caribbean for dealing with ecological data necessary for building ecological models. There is no academic or governmental agency currently within Puerto Rico or the territories that has the ability to manage all that. And so, we really need to put the work into, and I think, you know, it's been- you know, this is the second year I've made that as a recommendation to the Council. I think it would be beneficial if the SSC do the same. But we really want to have time series for ecological and biological data necessary to do ecological-based fisheries management in U.S. Caribbean. Someone needs to be working on building the management infrastructure that's necessary to do that. And I think that needs to be a priority research recommendation. So, it's both a coordination between federal managers that have developed this infrastructure and the regional agencies to develop the right management infrastructure to handle all of this data. Otherwise, we will continue to go through a process of building up time series for four to five years and then losing all of that information and then changing the way it's collected, then it cannot be used in effective management.

RICHARD APPELDOORN: So, I'm not disagreeing with you. At the bottom of our list is a statement that there needs to be an MOU between the Council, the Science Centers, and the territories for monitoring data collection activities. And the kinds of data you're talking about are a large part of that. You know, we have mandates to collect landings data. We don't have mandates to get all the kinds of ecological data that are affecting our stocks that we're referring to. So, I'm supporting what you're saying, but I'm also asking, you know- that's something we need to have happen, but it's not a research issue.

So, I think we need- you know, JJ was, I think, making a distinction between EBFM and ecological aspects. And I'd tell you I'm uncomfortable with that because you know, EBFM is supposed to be taking into account ecological aspects. So, there are things that are specific to the process that the TAP is doing. But there are other things that are there that, you know, eventually the TAP will give, probably, more comprehensive guidance on but we don't have it yet. So, let's see. I'm recognizing- Vance, you had your hand up? Someone over there did. Yeah. So recognizing Vance, and then you-

VANCE VICENTE: Vance Vicente. Looking at the second item, second point, develop habitat maps from existing NOS multibeam, LiDAR data. I would expand on that. This, I would put develop and improve existing habitat maps using a recent ROV data recent, recent expedition, such as the Nautilus, which has provided a magnificent benthic photograph of our sea floor in deeper areas. And by using monitoring transects, which have been conducted in different parts of the island, specifically, by Reni Garcia and myself for the last 20 years. And we can really improve these existing maps. The ones that have been produced by NOAA have been very useful specifically the biography maps, but are too general to help in making decisions, management decision, development decisions. And we have a lot of existing information giving very specific details about what are the primary producers, the corals, what is the state of the corals, how the populations of corals have been affected throughout this last decade, specifically about the tissue loss disease and others and there are records. At least I keep records, I'm sure that Reni also does, about how specific locations have changed in terms of a habitat components, habitat community, community structure, benthic community structure.

And also, if you can add or expand a little bit on the functional ecology of our habitats. That's why I would include as an example analyzing fish tissue samples for stable carbon isotopes, which will give you information, what are the primary producers that are responsible for the fish biomass that we are observing. Especially, if we want to specify an indicator species, just to give it a priority, that can provide information, not only about feeding habit, fish behavior, but also about ecosystem components, especially at the bottom of the food chain, which is the primary producers. And just to refresh your mind, I mean, the kind of information that this has been going on since the 1980s. But by looking at the stable isotope, you can tell whether that biomass, that fish biomass, the primary producers responsible are specifically seagrasses. In some cases, the specific species of seagrasses macroalgae, [rhodophyta?], whether it's mangrove derive. So where the energy source that contributed to the production of that biomass comes from? And that's why I'm repeating in this meeting because I think it's something that is very simple. Just take a fish sample, tissue sample, freeze dry it, and send it to a laboratory. I think there's one in Texas, is one of NOAA National Marine Fisher Service, at that time, which was being run by Roger Zimmerman. He did a lot of this. And we did it for the Laguna Joyuda. We also used this stable isotope ratio to determine, you know, connection of food chain connections. And that's it. Thank you.

RICHARD APPELDOORN: So, I want to make a correction to what was just written. All the stuff you added put that after LiDAR data. So, exploration mission, survey transect data go after existing NOS multibeam/LiDAR data. And then you'd add the "and." So after LiDAR data, you need the "and." Yeah.

GRACIELA GARCÍA-MOLINER: Sennai on the line.

RICHARD APPELDOORN: Sennai?

SENNAI HABTES: I lowered my hand. I'm good.

Other Business

RICHARD APPELDOORN: Thank you. So, I don't think we're going to make it through this list with 10 minutes to go. So, I actually want to- I think some of the others are fairly self-evident, evident in terms of monitoring and whatnot. But I'd like to go to the socioeconomic data as quickly as possible because I don't want our colleagues to think that-

So I guess I'm saying Walter and Tarsila - she's online - why you're thinking about that. JJ wanted to add something to monitoring surveys, which I think is a good idea. So, let's just pop back to that quickly. Next- the previous slide.

LIAJAY RIVERA GARCÍA: Which one? Next one?

GRACIELA GARCÍA-MOLINER: Previous.

LIAJAY RIVERA GARCÍA: Previous?

JUAN J. CRUZ MOTTA: Yeah. JJ here. So, yes, basically- no, no, the, the following. Yeah. In that one delete close areas because we-

RICHARD APPELDOORN: But I would say add open rather than- enclosed and open areas. And then a new bullet.

JUAN J. CRUZ MOTTA: Increase video methods to-

RICHARD APPELDOORN: Develop. That's a research thing. That's a research thing, develop video methods.

JUAN J. CRUZ MOTTA: For surveys. For fish surveys. Thank you.

RICHARD APPELDOORN: So back to socioeconomic, Walter, do you have anything you want to, um- I mean, you're the expert here?

WALTER KEITHLY: No. This is Walter. I'm satisfied with what is up on the board. Thank you.

RICHARD APPELDOORN: All right. So, I would like to- well, not that I would like to. There are some- two issues that are that need to be dealt with. One is a suggestion that the SSC recommend to the Council that they develop guidance and a charter for the SSC. And if we want to do that, we need wording for that as quickly as possible. Although Graciela says that this is already on the agenda for the meeting, but I don't know what that means.

GRACIELA GARCÍA-MOLINER: So we do have Jocelyn D'Ambrosio she is online. So, she can add. Jocelyn?

JOCELYN D'AMBROSIO: Yes, hello. So I'm going to- can everyone hear me? Is it all right if I speak about the charter for a second? I don't mean to jump in.

RICHARD APPELDOORN: Yes. Go ahead.

JOCELYN D'AMBROSIO: Thank you. So, the SSC's mandate is obviously established by the Magnuson-Stevens Act, so the rules of the SSC are outlined in that act. And I think the Council's thinking just generally about standards of conduct for advisory bodies. But I know we've talked about charters, for example, for the technical advisory panel. And that to me has more importance because that's something that the Council created. The SSC has very specific roles defined by statute, so. And I believe that the SOPPs also speak about SSC information. So, for example, number of members- and the SOPPs, sorry, are the statement of the operating policies and practices that the Council put together. So, I believe those speak to the SSC as well, but we can look at that and see if they're- to make sure that everyone on the SSC has a copy of that. And then anything else developed on you know, conduct, you know, maintaining professionalism, etcetera, that we develop for the Council's advisory bodies is circulated. I do have thoughts also on conflict, but I'll hold those until that comes up as well. But at least on the charter the SSCs roles are again, outlined in the Magnuson Act, and it's pro- being the Council's scientific advisory body and providing scientific advice and recommendations to further the Council process.

RICHARD APPELDOORN: Yeah, the Magnuson Act is fairly vague on that. And a number of the Councils do have materials that they provide to the SSC members that expand on those things and give them more context. And I think what the recommend- the suggested

for the recommendation is that similar information be developed and provided for, for the Caribbean Council for its SSC.

TODD GEDAMKE: Since this is- sorry, since this is- this is Todd. Since this is directly related to my request, I hate to be the topic of the end here, but my question is simple things. How does the nomination process work? What are their term limits? I mean, these are things that the other Councils write up for their SSC. You know, I watch the composition of this SSC change. I watched someone resign and put another person in their place. When I left as a NOAA employee, I was told that I had to resign. No, I don't have to resign because I'm an individual. So, I'm just wondering what the rules are. Like, and these are not the overall overarching things. These are just the current rules. So that was my request. Everyone can read Magnuson. We all have that. But this is operationally. What do we do in this house? And how do things happen? You know, we're going to go to conflict of interest next here. What happens if someone gets removed? How does that work? You know, I mean it- how does someone get removed from the committee? These are rules. That's not in Magnuson, but we've seen that happen here.

RICHARD APPELDOORN: Yes. Go ahead, Doug.

DOUGLAS GREGORY: Yes. I just wanted to mention with the Gulf Council, the SSC members serve at the pleasure of the Council, and the Council can remove somebody without calls or- you know, at any time, and it can also appoint someone. There is like a number of paragraphs in the Council SOPPs that relate to the SSC, and also there's guidance from National Fishery Service about SSC and advisors. I think Jocelyn was referring to it. That's packaged with advice to the whole Council about conflict of interest and stuff like that, but it's basically- you know, that's the way it works with the Gulf, and people have been removed, you know, without calls before. Thank you.

RICHARD APPELDOORN: So, that's good to know. And I think then what we're asking for is a package of information out of that that can be given to the SSC so, you know, they're aware of that. And I don't think that this is a difficult thing to do. And it's a reasonable request. Graciela, do you have somebody, or is it you?

GRACIELA GARCÍA-MOLINER: Jocelyn.

LIAJAY RIVERA GARCÍA: Jocelyn.

JOCELYN D'AMBROSIO: Well, thank you. So I pulled up a recent version of the Council SOPPs, and there's a section on the SSC

that has its objectives and duties that talks about their requirements under the law, the requirements for having- who can serve as a member, electing a Chair, and then holding the meetings subcommittees of the SSC. So, there's that information in the SOPPs. And as Doug said, you know, the SSC members serve at the pleasure of the Council. If the Council, um- so that means the Council can remove persons or add persons. If the Council's interested in specifying some additional procedures for that, the Council can consider that. But right now the operating procedures talk about persons serving at the pleasure of the Council. So, we can make sure that everyone has a copy of the operating procedures. There's one wrinkle there, which is we have an approved version of the SOPPs and then another version of the SOPPs that has been submitted for approval, but hasn't been approved. So usually what I do is I just check both versions and see if there's any differences between the two. And a lot of the Councils are in a similar position and just use the last version the Council approved. But we can make sure everyone has a copy of that. And then I believe, you know, one of the things we're going to talk about at the Council meeting is just in general, if they want to add to their SOPPs or otherwise or a handbook, anything about, you know, how person should conduct themselves at meetings, that would go in those documents. So, we can talk about other information that would be helpful for the advisory bodies to have and then including potential conflicts of interest information. So that's something that I've been talking with Miguel about and looking at. And we're going to have just a brief discussion at the upcoming Council meeting as to how the Council wants to address any policies. But as appropriate, I can speak about that here too. Thanks.

RICHARD APPELDOORN: All right. If we could get that, the SSC members, could get copies of that, I think that would go a long way to filling the gap. And you know, if after reading those, we feel that there's something else we would like to know, we can come back to the Council and say, "You know, what about this? Or what about that?" So, if the operating procedures can be sent out to the SSC, that would be great.

Okay. Final item. Graciela, you have something to read into the record from Virginia. Go ahead.

GRACIELA GARCÍA-MOLINER: So, during the discussion this afternoon, there was a comment on the chat from Virginia Shervette, and it states- and I'm going to read quoting from the chat. "Was Todd suggestion that his MER study be referenced as a NOAA study, sincere. To me, that would seem to mask what some could perceive

as a major conflict of interest. Todd, as an SSC member, also benefits financially from the promotion of his contracted work. As a member of the public, watching this discussion is concerning related to conflict of interest issues. And if I see this, other must too. I truly mean no disrespect with this comment, but I could see this being a potential issue." Thank you, Mr. Chair.

RICHARD APPELDOORN: Todd.

TODD GEDAMKE: All right. So, this is déjà vu all over again. We've done this once before. We've done the data triage before. We've evaluated expansion factors before. In 2016, we had very contentious arguments about what to do with the ACLs and what to do with about the buffers. I voted to put a slightly larger buffer on the U.S. Virgin Islands ACL. So did John Hoenig. In 2017, we were both removed from the SSC committee and the Virgin Islands- director of the Virgin Islands Fisheries accused me of conflict of interest that time. Jocelyn reviewed the case at that time and said there was no conflict of interest in that point. And so, I thought that case was done. Now, Virginia Shervette is currently flying out of Saint Thomas and Saint John. She just parroted the exact phraseology from the 2017 argument that was put in front of the Council. And I would just like to make a point that the report that we are discussing is step three in the 10-year data improvement process.

We started with a design in 2014. We started with a pilot study in 2014. What we're referring to now is a report that Shannon told me I was not allowed to distribute at one point in time because they owned it. That's the level that we were at on this. Now that has been changed, but they own that product. That is their product. In this case, that report, I am a field biologist. I am implementing and collecting weighing fish. We don't refer to the TIP data as Jesus's samples or Luis's samples, because all we're doing is telling him to go to the dock. NOAA approved every single step of this process from the design to the pilot study, to the techniques and methodology being used, and monthly evaluating everything we've been doing. So, I think that- anyway, I am going to abstain from any discussions related to this. Jocelyn, I would appreciate a gen- not appreciate. I need a general counsel review and a statement regarding any work that I'm doing in the Caribbean. And if the Council would like me to resign in any of these, I am happy to do that, but I'm not going to get potshotted in these situations. And I would like to point out that Virginia Shervette is in the Virgin Islands today. She's flying out today and has just repeated the same things. And Julian can tell you exactly where she is at the moment.

JULIAN MAGRAS: She's not in the Virgin Islands. I can tell you that.

GRACIELA GARCÍA-MOLINER: Jocelyn online.

RICHARD APPELDOORN: Yes, Jocelyn.

JOCELYN D'AMBROSIO: Okay. Thank you. So, regarding conflicts of interest a lot of what people have been talking about seemed to me like were concerned about people's objectivity. You know, if they've been involved in research, are their objective in making recommendations? And so, I agree that there's maybe been some confusion about, is there a financial conflict of interest? Is there something else that would interfere with objectivity? But in the statement that was just read, you know, it says that Todd, as an SSC member benefits financially from the promotion of his contracted work. That seems very attenuated to me. I'm not really entirely sure how there would be a financial benefit from promoting the work. And that's what, when you're looking at financial conflicts, you- there's various standards that apply in different context to figure out how there might be a financial consequence of a particular action.

So, there aren't financial conflict of interest standards that apply to the SSC when they're having discussions, but there are certain conflicts of interest standard that will come into play when the SSC is conducting a peer review, for example, of scientific information. So, the national standard 2 guidelines have some conflict of interest information in them to ensure the objectivity of peer reviews. So, what I'm working on is kind of trying to compile a document that has the pertinent law on when the SSC conducts a peer review, what do the national standard 2 guidelines say about financial conflicts? what do they say about financial disclosures for SSC members? Because there are Magnuson Act requirements for financial disclosures, and those apply to the SSC and as well to the Council members. And those are used for Council members for some of those conflict standards that apply to Council decisions. For the SSC, again, those Magnuson provisions regarding conflicts don't apply to the SSC. So, we're sort of looking at these other practices, for example, those national standard 2 guidelines on peer review. And other Councils have policies on how the SSC might make a best scientific information available for termination, taking into account similar considerations about if there's a potential financial benefit, if the person was involved in the research.

So that's something that I'm looking at and trying to put together so the Council will have something to look at. But under those

standards, for example, for peer review - let me see; I'm trying to look at it here - one would look at whether the peer reviewer would be impaired in their objectivity, or it could concreate an unfair competitive advantage, and that could be either a financial or some other conflict that might be considered in the peer review policy. Personal financial interest might be considered in peer reviews. And so, persons might be asked under those guidelines to excuse themselves from peer reviews. But even in the peer review context, the guidelines say if the reviews require highly specialized expertise, persons might just be asked to disclose that information, and they'd say the conflict side is unavoidable because there'd be no other person that could participate in the review.

So there's- again, those are just in one particular context, and then we might be able to draw from those how the Council wants to respond, if there's potential concerns relating to someone's objectivity either because they're involved in research or because they could benefit financially. But I think we don't want to just, you know, assert that someone's benefiting financially. We want to think about if that's a reasonable statement. And so those are things that I'm trying to compile for the Council to consider and how they might want to develop a policy for what should happen when the SSC is conducting a peer review, just sort of setting forth the national standard 2 guidelines. If they're making a determination about best available science, how do you want to make that determination? I think in all cases, if you've worked on a particular matter disclose that you've worked on the matter, if you think that then maybe you shouldn't recommend that further action be taken to support that matter, then you can recuse yourself. But I don't know that that means that there's a financial conflict of interest. It's just a question of, is there objectivity issues if you were to recommend research that you'd been involved in. And I'm not saying that there are objectivity issues in any of this. I'm just saying those are considerations that we would have just taking into account through relatedness.

So I know when we were reviewing scientific research and how that might affect management advice for changing closed seasons, some of the researchers that were involved in that recuse themselves from making a recommendation, but they still participated fully in the discussion. I think what we have to keep in mind here is that the person serving on this SSC are here because of their particular expertise, because of their participation in research and the reason, because of what they can contribute to the conversation. So we want to be able to leverage that, to hear from persons about their work and to take that information into account and maybe if there's a vote and we think that it might be- you know, whether

we're going to recommend something directly related to that person's work, that person might want to recuse themselves, but we have to be careful about accusing people of conflicts and making sure that we're just disclosing and seeing if there's any potential issues, you know, from an objectivity issue standpoint from a financial standpoint.

But again, I do want to stress that folks are here on the SSC. They're selected on the SSC by the Council because of their expertise in the area because of their experience. And we don't want to stifle that. We want to hear from people about the work that they're doing. It just might be we get to a final step about making a recommendation, and someone says, "You know, I participated in this study, so I'm not going to recommend we take step two in my study." But from what I'm hearing too, we're talking about maybe a step two that another entity would do. So, these are all fact-specific inquiries, but just things to keep in mind about ensuring objectivity and in terms of whether the guidelines or the act speaks directly to it, there's some guidance again for peer reviews. And we can use that maybe as a basis for some policies about when the SSC makes recommendations or when the SSC is deciding what's best available science.

RICHARD APPELDOORN: Miguel, and then Shannon. Keep in mind, we're already after 5:00, so let's- and Todd. Okay. Miguel?

MIGUEL A. ROLÓN: Okay. Thank you, Richard. Just a couple of comments. Mostly, they were covered by Jocelyn, but I best, the Council- what the Council is trying to do is to get the best advice, put it in writing so everybody will know what it is. We have to be cautious about conflict of interest and anybody accusing any member of the Council or the SSC of the conflict of interest. Some people- you know, sometimes we use conflict of interest lightly, and you have legal consequences for anybody involved on both ways. So why we want to discuss this in the Council meeting. And probably before the end of the year, we will have a specific documents that everybody will have on the subsite in the webpage so you can take a look at it. The conflict of interest language for the Council member is very specific, and it's extended to other bodies. But I believe that once we get the- actually, we are also looking at the letter that was written by the Chair of the SSC, had three questions that we need to answer. And the idea is to make the process as transparent as possible, and also to allow the members to participate without any fear of being subjected to accusations without any foundation. Thank you, Mr. Chairman, but we want to solve this by the end of the year or before the end of the year. And rest assured that we will send and distribute this, the outcome, in writing to everybody involved. And it will be in

our webpage for any member of the public, any member who wants to take a look at it. Thank you.

RICHARD APPELDOORN: Thank you, Miguel. which one of you wants to go first?

TODD GEDAMKE: I'll go. I'm just going to repeat my request. Jocelyn, is there any way I could get a letter or plea that- from GC? This is the second time I've been accused of conflict of interest related on the same work. It's pretty clear to me this is unfounded. But I need a letter at this point or something that clears me. And we can maybe use this so other people aren't putting these things out. It's to my financial benefit to stop volunteering on this SSC and going that route. So, I would like to continue to participate in this SSC and volunteer my experience in here, but if that's not the way that we want to go then, uh- but, Jocelyn, can I please get a letter from general counsel on this?

JOCELYN D'AMBROSIO: Yes, we can work on something. And, you know, as I said, at the outset, it seems like some of these claims are, are very attenuated as to there being any financial interest. It seems difficult for me to understand how recommending that certain types of validation be conducted would financially benefit someone when there's no decision before this SSC. The SSC wouldn't fund that project. The SSC wouldn't authorize that project. The SSC would recommend that the Council, you know, recommend to other entities that this be a priority, and it seems many steps removed from many next steps to fund that project. And then there's no decision that this body is making as to who would do that. And my understanding is that recommendations about extending research in the U.S.V.I., you know, I guess maybe were made before realizing that some of that research was ongoing by other entities. So it seems, seems to be difficult to understand how there'd be a financial consequence. We can, you know, look into that and see if there's anything that that I've missed. But my, my initial reaction is that I don't see any conflict here of financial conflict.

There's also- you know, when talking about peer reviews, for example, the guidelines talk about something that might interfere with someone's objectivity so if you're- if someone's recommending a- we recommend this priority, and it's something that someone really wants to do, well, maybe you're not an objective person to recommend a priority, but I don't know that, again, it's going to have any consequence of like the SSC's not making a decision about how the priorities are carried out. So, it's just- I think disclosure is all that really needs to happen here when you say, "You know, I'm doing X research. I think that this is really important. I know that it's important because of my own involvement

and recommend that this continue. And, you know, I don't know who would do it or what entity would do it, but I recommend this, this research because it's research that's needed." And that again is, is exactly why the Council wants to have persons with the expertise of everyone on here on the SSC so that they can say, " I've done this. I've seen this problem. And I think that these are the next steps that the Council should encourage others to do." But it seems again, very attenuated to me that that there be a specific outcome relative to you in this example for financially or otherwise. But we can see about specific letter response on that front.

TODD GEDAMKE: Thank you.

SHANNON CASS-CALAY: Thank you. This is Shannon. I just wanted to do a very quick correction to the record, because this is a verbatim transcript. So, the contract that was in place has very specific language about the ownership of the work product, and it is owned by the Gulf States and the Contractor, and they are free to distribute it. The only thing it's subject to is data confidentiality standards. And so, it is in fact owned by MER Consultants and Gulf States, not by NOAA.

RICHARD APPELDOORN: Thank you. It's now 5:18. I would really like to close this meeting. I'm not seeing any objections to that. So, I want to thank everybody for their participation through this late hour.

Oh, I will not be at the Council meeting. JJ has volunteer to present on my behalf. Okay.

Thank you all for being here. Everybody online, thank you for your comments. Erik haven't had a chance yet to meet you, but your initial initiation here has been impressive. So, thank you. And we will- I assume are going to meet again in the fall before the December meeting of the Council. Thank you.

GRACIELA GARCÍA-MOLINER: Thank you.

RICHARD APPELDOORN: So, the meeting is adjourned. It is now 5:19 according to my computer.

(Whereupon, the meeting adjourned on August 2, 2022.)