TABLE OF CONTENT

Call to order and Roll call..... 2
Approval of Verbatim Transcriptions..... 4
Adoption of agenda..... 7
SEDAR 80 Queen Triggerfish Introductory Presentation—SEFSC..... 7
Review SEDAR 80 Queen Triggerfish Assessments Term of References 18
SEDAR 80 Queen Triggerfish Puerto Rico—SEFSC Presentation on sensitivity runs requested by the SSC..... 34
SEDAR 80 Queen Triggerfish Puerto Rico—SEFSC Presentation on sensitivity runs requested by the SSC (continued)..... 49
SSC Guidance (recommendations) for additional analysis including projections to finalize SEDAR 80 QT PR..... 56
Finalized SSC guidance recommendations..... 113
SEDAR 57 Spiny Lobster Update Assessment Progress Report— SEFSC 126
Review TORs SEDAR 84 yellowtail snapper (Puerto Rico and St. Thomas/St. John) and stoplight parrotfish (St. Croix)..... 127
Appointments of SSC members..... 144
Island-Based Fishery Management Plan and Amendments Update... 146
National SSC (August 15-17, 2022) Update..... 149
Outreach and Education Advisory Panel Update..... 160
Other Business..... 166

- - -

Caribbean Fishery Management Council
Scientific and Statistical Committee
Virtual Meeting

October 4, 2022

The Scientific and Statistical Committee of the Caribbean Fishery Management Council convened via webinar on Tuesday morning, October 4, 2022, and was called to order at 10:06 a.m. by Chairman Richard Appeldoorn.

RICHARD APPELDOORN: Good morning, everybody. We're just waiting for a few more members of the committee to sign on before we get started.

GRACIELA GARCÍA-MOLINER: Richard, Vance is trying to connect. Reni will be here later this morning or this afternoon, and Michelle said that she was going to join us as soon as she could this morning, but you already have six out of 11.

RICHARD APPELDOORN: So, nothing from Tarsila or Todd?

GRACIELA GARCÍA-MOLINER: No, I'm sending them texts right now.

Call to order and Roll call

RICHARD APPELDOORN: Okay. Why don't we get started even though there are a few people who haven't signed on yet? Good morning, everybody. This is the virtual SSC meeting. It's October 4th, 2022. It's 10:06 AM.

Before we get started, I want to read the rules of conduct for the meetings. Starting with, either Graciela or Liajay you do this, provide the information for people to be able to connect to the meeting. Although, if they're listening to this, they're already connected.

GRACIELA GARCÍA-MOLINER: Richard, the Federal Register was sent, and it published the ScanMe Code, QR code that you see there will go directly to the Federal Register announcement of the meeting. It was published on all of the social media that the Council has. There has been distribution of the announcement for the meeting widely.

RICHARD APPELDOORN: Okay. So, participants are reminded that they should mute their microphones until they are recognized by the chair to speak. Participants can indicate that they wish to speak by using the chat or raising their hand in the reactions feature.

The chat will be monitored to identify people who wish to speak or who need assistance with technical difficulties. The chat should not be used to address the Council, committee, or panel to make public comments unless permitted by the chair. Sidebar conversations and comments made in the chat will not be read and will not become part of the record unless permitted by the chair.

When you have been recognized to speak, please state your name for the record before making any comment or addressing the body. All speakers are expected to conduct themselves in an orderly and civil fashion during the meeting. This means speakers' comments are expected to address specific agenda items and refrain from making personal tasks against others.

Any conduct that interferes with the expeditious and orderly process of the meeting may be subject to an individual being removed from the meeting. Such conduct may include but is not limited to improperly speaking without being recognized by the chair and behavior or remarks that are discourteous, disrespectful, or disparaging.

In participating in today's meeting, all participants have been deemed to accept these rules of conduct.

With that, we move on to the roll call starting with the Members of the SSC. This is Rich Appeldoorn SSC chair. Now let's call out names. Hopefully, I have everybody on my list. Doug?

DOUGLAS GREGORY: Doug Gregory's present.

RICHARD APPELDOORN: J.J.

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

RICHARD APPELDOORN: Jason.

JASON COPE: Jason Cope, SSC. Good morning.

RICHARD APPELDOORN: Todd.

TODD GEDAMKE: Todd Gedamke is present.

RICHARD APPELDOORN: Walter.

WALTER KEITHLY: Walter Keithly is present.

RICHARD APPELDOORN: Eric.

ERIK H. WILLIAMS: Yes. Erik Williams is present.

RICHARD APPELDOORN: Michelle.

MICHELLE SCHÄRER-UMPIERRE: Buenos días, Michelle Schärer.

RICHARD APPELDOORN: I have something, I assume it's from Tarsila saying that she's going to have issues because of her teaching schedule. Is that correct, Graciela?

GRACIELA GARCÍA-MOLINER: Yes, that is so, and Jorge García sent a message saying that he'll be here at the Council office as soon as possible, this morning or around noon at the latest. Vance is having problems connecting to the internet, and those are your SSC members.

RICHARD APPELDOORN: Okay. Then can you read off the other attendees that are linked in or present in the Council room?

LIAJAY RIVERA GARCÍA: Okay, so participants in Zoom, starting myself, Liajay Rivera, Adyan Rios, Carlos I assume this is Carlos Farchette, please confirm.

CARLOS FARCHETTE: Yes, Carl Farchette.

LIAJAY RIVERA GARCÍA: Thank you. Julian Magras, Jay Grove, Jesus Rivera Hernandez, Julie Neer, Kate Zamboni, Kevin McCarthy, Marcos Hanke, Martha Prada, Nancie Cummings. Nathan, may we have your last name, please?

NATHAN VAUGHAN: Yep. Vaughan. I can add that to the thing. The chat.

LIAJAY RIVERA GARCÍA: Thank you. Nelson Crespo, Nicole Greaux, Refik Orhun, Sarah Stephenson, Shannon Calay, Virginia Shervette. That's it for now. If I have skipped anybody, please speak now.

GRACIELA GARCÍA-MOLINER: Mr. Chair, Graciela here. If I may, please remember to state, at least, your first name when you start speaking, you will see the transcription. We're trying to get someone to transcribe the meetings and it's very hard when we don't have the name of the person because we don't, we are trying new companies, so they don't know us. Thanks.

Approval of Verbatim Transcriptions

RICHARD APPELDOORN: Next thing is the approval of the verbatim

transcriptions, and those are from, which meeting?

GRACIELA GARCÍA-MOLINER: This is for the last meeting of August 1st and 2nd. You should have seen either in Google Drive or received, some of you, a copy of the five or six documents that were presented to us by TranscribeMe. It's divided between the morning and the afternoon. It identifies the person by number, you know, S1, 2, S13, etcetera. So that's one of the reasons why we're trying. We will welcome all comments on the trial with TranscribeMe. It does have repetitive documents because they sent us everything, even if they only changed, for example, the font. When they changed something, they kept sending us the new version. There should only be four documents that you should have received morning and afternoon for each of the days. We're trying to figure out how to deal with the new companies that we are testing. We still owe you the April 2022 meetings. We had difficulty with the recording of that meeting, but we are doing our best to get a transcription out of both the Zoom recording and the official recording of the meeting. So, we still owe you the April minutes.

Everyone knows what I'm talking about, right? The documents that are in Word, that's your verbatim transcription of the August 1-2 meetings.

LIAJAY RIVERA GARCÍA: The transcriptions?

RICHARD APPELDOORN: Yeah, I would like to postpone approval of that. I'll apologize for my, not having looked at it, but I haven't been with email for several weeks now following Fiona. I have not been able to download it and take a look at how the new system is working. So, if that works for people, I'd like to actually delay that approval.

GRACIELA GARCÍA-MOLINER: We have everyone muted, so please unmute yourself on the other side when you want to speak or raise your hand and we'll unmute you here.

RICHARD APPELDOORN: Okay. I'm not hearing any objections, so I would go back to the agenda, unless—

GRACIELA GARCÍA-MOLINER: Richard, excuse me. You have two hands raised, J.J. Cruz Motta and Kate Zamboni.

RICHARD APPELDOORN: J.J.

JUAN J. CRUZ MOTTA: I just wanted to support the chair's suggestion. Thank you.

RICHARD APPELDOORN: And the other one was Kate.

KATHERINE M. ZAMBONI: I wanted to introduce myself. I am with NOAA general counsel in the southeast section, and I just wanted to remind the chair that you are in charge of the agenda. So, if you wanted to not approve that item or skip it or remove it from the agenda for now you have the discretion to do that.

RICHARD APPELDOORN: Thank you. Kate. Does this mean you are replacing Jocelyn?

KATHERINE M. ZAMBONI: Like she's not coming back, and I do want her to come back, but I'm going to keep the seat warm until she returns.

RICHARD APPELDOORN: Okay. Thank you very much. So, let's go to the agenda which is on the screen before you.

GRACIELA GARCÍA-MOLINER: Mr. Chair, point of order. Are you approving the verbatim transcriptions, or do you want to move it to do it later?

RICHARD APPELDOORN: I want to do that later because I haven't had a chance to be able to look at the new system.

GRACIELA GARCÍA-MOLINER: Okay. So, does anyone have any items that you want to change on the agenda?

RICHARD APPELDOORN: Yeah, I think there's been a couple of things that have come up since we've put the agenda together. One was suggested specifically by J.J. relative to the report from the national SSC meeting,

GRACIELA GARCÍA-MOLINER: J.J. has raised his hand.

RICHARD APPELDOORN: Yeah, go ahead J.J.

JUAN J. CRUZ MOTTA: Good morning, J.J. here. I would like to request that case study eight, which was a presentation we gave at the national SSC be moved to the presential meeting, and basically be removed from this agenda. Thank you.

RICHARD APPELDOORN: Yes, I have no problem with that. I think it's important that we do hear that presentation, but we should be giving it a substantial period of time so that we can discuss it. That's a very interesting thing. It will also come up again in the context of another new item, and that's control rules and climate and there was a fair amount of overlap. We have seen some of the

stuff that was presented in the national SSC and this topic of control rules and climate.

Another thing that has come up in the interim has been the, what do you call it, the tentative listing of Queen Conch as threatened on the endangered species list. Okay. That's now out for public comment.

GRACIELA GARCÍA-MOLINER: Richard you also have the risk policy. Risk policies.

Adoption of agenda

RICHARD APPELDOORN: And so, these will be as time permits. So, are there any other requests or suggestions for alterations to the agenda?

If not, is there any opposition to adopting the agenda that is now presented?

Okay. I'm not hearing any opposition. So, the agenda is so adopted.

So, the first piece of business it's going to occupy a lot of our time for this meeting is SEDAR 80 Queen Triggerfish. The committee will remember that we had substantial discussions about this for the assessment that was done for Puerto Rico. We came up with some suggestions we would like to see done either in terms of analysis or looking at different scenarios.

So, let's go ahead with that. Who's presenting the introduction there?

SHANNON CASS-CALAY: Hi, Rich. I believe I will.

RICHARD APPELDOORN: Okay, thank you, Shannon. Go ahead.

SEDAR 80 Queen Triggerfish Introductory Presentation—SEFSC

SHANNON CASS-CALAY: Okay. I wanted to just begin by acknowledging that this has been a very large team effort. So, while I am going to present quite a few of these presentations, this is work that has been conducted by Nancie Cummings and Adyan Rios, Kevin McCarthy, and Nathan Vaughan. So, this has been a group effort. I wanted to begin by introducing the control rule for the U.S. Caribbean and just reminding people how we developed catch advice for Spiny Lobster.

You can move forward one slide.

All right, the objective of this initial presentation is to demonstrate the methods that could be used to estimate stock status and to develop catch limits for Queen Triggerfish in Puerto Rico. Using both your Caribbean control rule as well as an ensemble approach to incorporate major scientific uncertainties.

We would also like to seek additional guidance from the SSC to further refine the SEDAR 80 base case as needed, or the ensemble membership.

Next slide.

Okay. So many of you have seen this a number of times, and for those folks, I do apologize, but this slide serves as a handy reference slide for all the acronyms that we tend to use in fishery management.

We have the overfishing limit, which is the level above which the stock is considered overfished. So that's the OFL. The acceptable biological catch, which is a level set by the SSC, typically uses their control rule to account for scientific uncertainty. Below that, is an annual catch limit or the ACL. That is the catch level set, typically, by the Council that if exceeded will invoke accountability measures such as fish enclosures for gear restrictions.

Um, and below that is the annual catch target or ACT, which is used by some Councils to account for management uncertainty or to achieve optimal yield in the fishery. This is all terminology that we do use with some frequency.

Okay? The focus of this conversation will be on OFL and ABC because that is the SSCs, prerogative.

Okay. So, I will start this presentation by walking you through Tier 3 of your control role, which is typically used for data-limited stock assessments. The condition for use of this Tier- and this is in the new island-based fishery management FMP.

The condition for use is to, these are for relative data-limited stock assessments or for stock assessments that are very out of date. They produce status determination criteria, those include the maximum fishing mortality threshold, which is the level of fishing above which overfishing is occurring. It's typically set at FMSY or its proxy FSPR30, for example, the minimum stock size threshold or MSST, that is the stock level below which the stock is considered to be overfished and by your control rule MSST is

set at 75% of the SSB at SPR30.

The MSY is a maximum sustainable yield. So that is the largest long-term catch or yield that you can take out of a stock every year in perpetuity under prevailing conditions. That is what we are attempting to achieve through fishery management.

Next slide.

Okay. So, a Tier 3 stock assessment in the Caribbean can produce both OFL and ABC. So, your OFL again is that annual catch that occurs when you are fishing at FMSY or its proxy. The ABC value is the acceptable biological catch, which must be equal to or reduced from OFL to account for scientific uncertainty and to reflect what the Council considers to be the acceptable risk of overfishing.

The scientific uncertainty in the Caribbean control rule is determined by the SSC, and in Tier 3, you have chosen to set it at 2*Sigma_min where Sigma is scientific uncertainty and the Sigma_min that the SSC has used in the Caribbean Spiny lobster assessment is 0.5. So, you've used two times a Sigma_min of 0.5 in Tier 3.

The acceptable probability of overfishing, we often call P* and it has- in this Caribbean Council, it has been assigned by the Council, essentially, and it is typically, they asked for values of P* between 0.4 and 0.5, which means that they're accepting a 45% to 40% probability of overfishing.

For those of you who are familiar with other Councils, this is a little bit different in concept because what we've asked the SSC to do is focus on the scientific uncertainty, which I'll show you is the width of the PDF, essentially, on the overfishing limit. Make sure that it contains what you consider to be a valid estimate of scientific uncertainty and allow the Council to focus on the probability that they're willing to accept overfishing. So those two responsibilities are quite separate. The way we have exercised them in the Caribbean. I'll show you how this functions in this presentation.

Next slide.

All right. So, first I'll talk about how we calculate the annual OFL. A stock assessment, even a data-limited stock assessment, such as those used for Spiny lobster and Queen Triggerfish can produce a point estimate of the annual OFL. So, in this example, which is completely hypothetical, the point estimate, or the maximum likelihood estimate, as we sometimes call it, I have set

it at 100,000 pounds.

Next slide.

We, in stock assessments, use the variance in the data inputs and in the modeling parameters to produce a range of estimates. We do this, essentially, through a variety of processes such as bootstrapping a stock assessment or by inverting the Hessian matrix, which is essentially creating that PDF on the estimate of OFL.

What you see here now, in the blue, is a range of values of OFL that could be produced for a stock assessment and then the cumulative frequency function. This we call a PDF (probability density function) on OFL, and the point estimate is typically the median of this distribution. Here it's shown with the red bar at 100,000 pounds.

So next slide.

All right, so once you have your point estimate or your median of the OFL, and you have established the range by bootstrapping a model or by resampling process, some methodology by which you have characterized the scientific uncertainty in that model, and produce the PDF, you can then calculate the ABC value, the acceptable biological catch.

In the Caribbean control rule, two factors determine how large the difference is between OFL and ABC or the magnitude of the reduction. And those two parameters are the Sigma_min that you've chosen and the P* value.

So first, let's just look at the P* value in isolation. That is the probability of overfishing.

Next slide.

All right. Just a reminder that by convention, the highest legal P* value that an SSC could use is 0.5, which would have a 50% probably of overfishing. A cautionary note, that would set your OFL exactly equal to ABC. It should only ever be considered for a very data-rich stock assessment when you can assume that scientific uncertainty is negligible.

In fact, most Councils have chosen to use P* values much lower than that in the range of 0.3 to 0.45, which would give them a 30% to 45% probability of overfishing, and they've done so to create a buffer between OFL and ABC to avoid triggering overfishing over

fish determinations. So, to avoid triggering fishery closures, for example. You would like to have a buffer between OFL and ABC that accounts for your scientific uncertainty.

Next slide.

All right, so what is the effect of the P* itself, right? Now this, again, is just in isolation. So, in this case, I've created a PDF on OFL that has a Sigma_min of 0.36. So, this is, what's considered to be, a relatively data-rich Sigma_min, which has been essentially borrowed from the Walston approach, which is a procedure applied to data-rich stock assessments.

When I am showing you here is a red arrow that's at the 50th percentile. That's where you find OFL, at the 50th percentile. And that is a hundred thousand pounds because this is an example and I fixed it there, right? Now, if you were to use a P* of 0.5, you're setting OFL equal to ABC and there is no reduction and no buffer, which is the first row on this table.

If you move down to the yellow arrow, which is set at the 40th percentile. That corresponds, this is the 40th percentile, to an ABC of 91,283 pounds. In this case, ABC is 91% of OFL and you get about a 9% reduction, which can be considered a buffer. And you'll see when you get down to levels as low as 0.25 or 25% probably of overfishing, you're reducing that further. So now you've got about a 22% reduction between OFL and ABC.

This is one way that you can create a buffer between OFL and ABC. But in general, in this Council, we have suggested that P* essentially be retained as a prerogative of the Council with the understanding that it is not to exceed 0.45 and that the SSC focus instead on the width of the PDF, which I will show you now.

Okay, next slide.

So that percent reduction that I just showed you depends on both the width of the PDF, which we're calling Sigma_min and on P*. This plot shows you the percent reduction or the- It's the actual fraction that ABC is of OFL, right? So here in this first teal line, when it connects to the Y axis, you see a value of about 0.8. So, that's saying that ABC would be about 80% of OFL there, or about a 20% reduction. That would be at a P* of about 0.25.

What I'm showing you here, in this chart, is that the different colored lines actually show you different widths of the PDF. The one on the top that's in the teal is a Sigma of 0.36, which is relatively data-rich, and then increasing the width of that OFL as

you move down to what could be more data-poor assessments. The largest PDF here is us is actually a Sigma of 1.44. You'll see that the buffer you get, as you move from a probability of overfishing of 0.5 to 0.25, the buffer you get can be quite large because you have expanded the size of your PDF. So just a reminder that in the Caribbean Council you have, typically in Tier 3, used a Sigma_min of 0.5 times two. That's roughly, where this green line shows up on the figure, would be your percent reduction between OFL and ABC that you have typically applied in, well, that you have recently applied to the Spiny Lobster assessment, for example. And you have used a probability of overfishing of 0.4 to 0.45. That shows you kind of the reductions between OFL and ABC that this control rule produces.

Next slide.

Just another example to put more concrete numbers in front of you. In this completely hypothetical case, again, let's assume we're going to use a Tier 3 stock assessment. We're going to use a Sigma value at two times Sigma_min and the Sigma_min of 0.5 like you did, I believe, for Spiny Lobster. This shows you from the stock assessment, a hypothetical example of the OFL that is produced for each year and the ABC that would be calculated from that OFL, and the percent that ABC is of OFL. So, that's a 22% reduction, 78% ABC is 78% of OFL. That's how your current control rule works and we have already, essentially, assumed that in Tier 3 the scientific uncertainty would be quite large. And so, we already have increased that Sigma_min to 0.5 to account for, essentially, a stock assessment that has considerable scientific uncertainty and then expanded it further by applying two times Sigma_min. You're already using a PDF on OFL that is expanded in your Tier 3 control rule, even if you use a base model that does not fully include all the relevant scientific uncertainty.

Next slide.

I think that's it for that presentation. So I just wanted to be very clear that when we put together that control rule with the SSC, it was understood that in the Caribbean we have a number of, let's put it this way, the stock assessments are relatively data-poor, and we have a number of major scientific uncertainties that were not accounted for by typical stock assessment models, and in particular by data-limited stock assessment models. So, we did make an effort to create a control rule that accounted for the scientific uncertainty, at least in a way that as we improve our scientific uncertainty, we can move up into Tiers that make that Sigma_min smaller, right? But in the data-limited Tiers, it has a considerable amount of scientific uncertainty built into your

control rule.

So, before I start with the ensemble modeling approach, I just wanted to make it clear that from the Science Center's perspective, a valid way to move forward with SEDAR 80, could be, to establish what you feel is a relatively appropriate based model and move forward with your Tier 3 control rule. That is one possible decision that SSC could make.

With that, I will stop this introductory presentation and give you a moment to ask any questions you might have.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Jason Cope.

RICHARD APPELDOORN: Yes, go ahead, Jason. Yeah.

JASON COPE: Thank you. Shannon, great presentation. I hope that- that was very useful for me to see and hopefully for everyone else. I just wanted to confirm a couple of things. You point out that the Sigma_min is 0.5, does that mean it is 0.5, or does that mean at a minimum it's going to be 0.5, *but* whatever the assessment says in its standard deviation for OFL, whether that comes out of one model, or it comes from an ensemble. If that's larger, say it comes out at 0.6 for an ensemble model or something like that, then the Sigma_min would be 0.6 and not 0.5 and that would be used in the control rule, is that correct?

SHANNON CASS-CALAY: I think that's entirely up to the SSC, but yes, that is what we were- I think the SSC was attempting to say that the PDFs that are currently coming out of stock assessments are much smaller. And so, they do not account for the scientific uncertainty as we understand it. And so, there was a need to expand that to a plausible level of scientific uncertainty.

If in fact, we found the stock assessment model produced a larger Sigma_min than that, we would use it directly. That's what I think- but I think that decision is up to the SSC as well.

JASON COPE: Great. Perfect. That's excellent. Yeah, I just wanted to put that out there to make sure that that was on the table and that other SSC members understood that that is a possibility that 0.5 isn't- I guess what I would just want to raise here is that there's important work being done on the characterization of uncertainty by the stock assessors. And if we just went with 0.5 and totally ignored that through the work of ensemble modeling and other ways of gaining more understanding of that uncertainty, we'd be missing something. So, I just wanted to make sure, and confirm

with you that that was a reasonable assumption of something that the SSC could consider.

Then my second clarification was, I think earlier when you were talking about the maximum, basically, the SPR30% here times 75% was another reduction? Was that right? Was that the minimum stock size threshold based on that Tier three assumption that you take whatever the value is and reduce it by 25% and that becomes the minimum stock size threshold? I just want to confirm that or clarify it.

SHANNON CASS-CALAY: Yeah. So, we would estimate the spawning stock biomass level at MSY, right? or its proxy. Now, because there are natural variations, say in recruitment and natural mortality, there are always deviations above and below that level that are not due to fishing precisely. Right? There are natural variations in biological conditions, and so what the Magnuson Act allows is to set a value below that level that you can now call your overfished threshold, right? Your minimum stock size threshold, and that you can essentially allow the stock to deviate between MSST and the level that supports MSY without requiring management action. But as soon as your stock gets below 75% of the level that supports MSY, then you are overfished and you must create a rebuilding plan that rebuilds that stock back up to the level that supports MSY within 10 years, if possible.

JASON COPE: That's great. Yeah. And again, I just wanted to highlight that for the SSC members, for us all to understand that there are multiple dimensions of uncertainty going on here that have been built into these rules for this Tier. One is on the overfished side and the other one is for setting ABCs from OFLs. Thank you so much.

SHANNON CASS-CALAY: You're welcome.

LIAJAY RIVERA GARCÍA: Mr. Chair, you also have raised hands for Michelle Schärer and Doug Gregory in that order.

RICHARD APPELDOORN: Okay, thank you. Michelle?

MICHELLE SCHÄRER-UMPIERRE: Hi. Good morning, Shannon, thank you. That was very useful for me. I just had one question regarding something you mentioned that was management uncertainty, and I suppose it doesn't really get into our purview, but maybe you could explain a little bit about that.

SHANNON CASS-CALAY: Sure. Usually, that is the Council's prerogative to decide if they want to further buffer, right? If

they want to be even a little bit more, I'll say the precautionary word, and try to buffer for the fact that, for example, if you set an annual catch limit, it could be exceeded if you have a fishery that is not well monitored in real-time. Or other reasons why your management measures are as not as effective as you expected. And so that's up to the Council to determine if they want to further buffer to account for those sorts of issues where management is not as effective as expected. Did that kind of answer your question? That was a lot of rambling.

MICHELLE SCHÄRER-UMPIERRE: Absolutely. No, that's great. Thanks.

SHANNON CASS-CALAY: Thanks.

RICHARD APPELDOORN: Okay. Doug?

DOUGLAS GREGORY: Thank you, Chair. Thank you, Shannon, that is a good presentation, I expect you'll see it in the go-off pretty soon.

I have a basic statistics question. It's kind of embarrassing, but I know Sigma is standard deviation, but what is Sigma_min at 0.5 on the PDF? Is that halfway between OFL and zero? or approximately?

SHANNON CASS-CALAY: So essentially what we're saying is that rather than actually using the CV of the PDF that comes directly out of the stock assessment model, right? We're going to abandon it and use a Sigma_min, a minimum level of scientific uncertainty. It's actually a Sigma_min that's applied to all three. Tier one, two, and three of the stock assessments have the same Sigma_min value. It doesn't come from the stock assessment process at all. In fact, right now it's borrowed from a manuscript by Privitera-Johnson, which is actually an update of the Ralston approach.

Without getting into excruciating detail, it's a North Pacific process where they looked at all of the stock assessments that they had that had been conducted numerous times. They looked at the between assessment levels of scientific uncertainty, both in the stock assessment historical period and in the projections in the Privitera-Johnson approach. What they found was, that for data-rich stock assessments, if you include the projections, the actual Sigma_min that you get, if you do the stock assessment multiple times over a number of years, is about 0.5. And so that's the Sigma_min that the Caribbean Council SSC adopted as their data-rich Sigma_min.

Now that's only used, that way, in Tier 1 for data-rich stock

assessments and we have never used an assessment in that Tier yet here.

Tier 2 is for stock assessments that have reliable information, about two of the three major components. So, the major components are catch, length composition data, and indices. If you have at least two of those that are high quality, you could move to Tier 2 and then you use a Sigma_min, you use the Sigma of 0.5 times 1.5.

In Tier 3, which is for data-limited stock assessments. It's 2 times the value of 0.5. But that Sigma_min value is just a replacement for the stock assessment scientific uncertainty, that comes from the Privitera-Johnson manuscript.

So that was a lot to say, and I can go back and recover any part of it if I left you a little confused.

DOUGLAS GREGORY: Basically, what I'm- I don't know how the graph on slide 11 is created. You know, a Sigma_min of 0.5, if you multiply times two to get one, I don't know what a standard deviation of one is. I guess it's the graph on slide 11.

And if that's too much right now, that's fine. You could send me something by email later or send it to Rich and he can send it to the full SSC.

I mean, it just sounds- it seems too abstract in the way we're using it.

SHANNON CASS-CALAY: Yeah. So, I think technically you're asking me about the distinction between standard deviation and CV, I believe. Essentially, I think what we're using is equivalent to a CV min.

JASON COPE: And that's because, if I can just pop in, the OFLs are on, usually these are on log-normal space. So, the standard deviations that we're talking about are actually log-normal standard deviations, which are approximated by CVs. That approximation kind of gets lost when you get above 0.2, certainly above 0.5, but that's why we kind of use them interchangeably and it can be confusing.

I think the other, Doug, I don't know if this is helpful, but that original Ralston approach, you can think of this uncertainty in biomass, and they looked across assessments and people who did the assessments, they did all this looking and they quantified what's the uncertainty around spawning biomass across all of these

assessments?

Shannon, you have a really good plot figure, I think it's probably maybe a couple of slides earlier where you just have the distribution of OFL. The original analysis was a distribution of spawning biomasses from which they calculated in log space the standard deviation. It used to be 0.36. The Privitera-Johnson and Punt work did the correct thing and moved to actually doing what Shannon's showing here. That's showing a distribution of OFLs, not spawning biomass because the OFL incorporates other uncertainties. It incorporates the uncertainty in your reference points. This is, let's call it, a more correct, for what we care about, representation of uncertainty. They found that in this distribution of OFLs, across many assessments, it was around 0.5.

When in saying that it's around 0.5, as Shannon noted, that would be data-rich, you just kind of trust all the uncertainty that's coming out of your one reference assessment. But because these are more limited in data, we are assuming there's more uncertainty that's not being captured. And so, there's this very rough approximation of just saying, let's just double whatever Sigma we're going to use, whether it's 0.5 or if it's something even bigger that's coming directly measured out of a particular assessment that we care about, let's multiply it by two and then apply the P* control rule to that.

The multiplying it by two is consistent with other places that do it in the country, but it's also arbitrary. It's not based on anything specific. I don't know, maybe that's part of the confusion here, but know that that part's arbitrary, but the Sigma part is not arbitrary. It's based on these past studies to set a minimum and then the opportunity to use an even bigger one if the assessment was able to characterize more uncertainty.

Hope that's helpful.

DOUGLAS GREGORY: Okay. Thank you. I'll let it go.

RICHARD APPELDOORN: Are there any other questions from the committee?

GRACIELA GARCÍA-MOLINER: No other raised hands. We don't have anything on the chat and no other raised hands.

RICHARD APPELDOORN: Okay. So again, thank you, Shannon, for what I thought was a very excellent presentation and intro to what we're going to be addressing. Are you going to be presenting the next presentation?

SHANNON CASS-CALAY: Yeah, you can't get rid of me that easy. I think I am.

RICHARD APPELDOORN: Oh, no, I much prefer to have you. Thank you.

SHANNON CASS-CALAY: All right, so we can start the next presentation. They're attached, the two.

LIAJAY RIVERA GARCÍA: Yeah. Hold a second. All right. Let me know if it is this one.

SHANNON CASS-CALAY: Nope, that's the third. So, it's okay. It's actually appended to the first presentation.

LIAJAY RIVERA GARCÍA: Let me know now. It's just that they all have the same format. Shannon, can you see it now?

SHANNON CASS-CALAY: Yeah, I think it's still not that one. Sorry. If you open the first one, which is the introductory presentation. It begins about 13 slides in. It has another title slide, but it's directly. Sorry to cause confusion.

LIAJAY RIVERA GARCÍA: Oh, okay. In the same file. Got it.

SHANNON CASS-CALAY: Okay. That is it.

LIAJAY RIVERA GARCÍA: Sorry about that.

Review SEDAR 80 Queen Triggerfish Assessments Term of References

SHANNON CASS-CALAY: No problem. All right, so this gets more complicated. Are we ready? I will do my best to explain this in a concise and non-technical language. And very happily. I have Nathan Vaughan, who's listening in, and can help us with any technical details that I might butcher unmercifully.

This is now towards an ensemble approach. This is another way to incorporate scientific uncertainty into your calculations of current stock status and sustainable yields or catch advice for Queen Triggerfish.

There's a big disclaimer in this presentation. This is intended solely to illustrate the concept and should not be used for management advice without further refinement.

You may recall that we met in July of 2022, and we did provide the SEDAR 80 stock assessment report for Queen Triggerfish in Puerto

Rico. At that meeting, the SSC expressed a number of concerns about sources of uncertainty that had not been addressed sufficiently in the stock assessment, including the initial equilibrium catch that we assumed, the steepness values, the L infinity, and historical landings, and by that, I mean, the MER series versus Puerto Rico DNR.

So, in this ensemble approach, we'll show you how you can incorporate a major scientific uncertainty into your management advice. In this particular case, we're showing you the initial equilibrium catch, and there is a reason for that. It's because it is quite sensitive in the model, and so it does, by that incorporation alone, it is a major improvement to the inclusion of scientific uncertainty in the stock assessment.

Next slide.

All right, some background information. The landings records that we had available to us for SEDAR 80 for Queen Triggerfish in Puerto Rico began in 1983. We have testimony from the fishermen and some SSC members as well, that historical landings prior to that period, although not well quantified, may have been significant. All right? So very clearly there had been historical landings of some magnitude that was not well known. The initial stock assessment structure, basically, the initial catch that we assume in a stock assessment, can have a significant impact on the final model estimates both of the current stock status and the sustainable yields.

So, in order to account for that source of scientific uncertainty, we have put together an ensemble modeling approach and we will use it to demonstrate this concept, essentially.

Okay. Next slide.

We did use the Queen Triggerfish model in this case as an example, but I wanted to make sure it's understood that any final results are pending and will be presented in November because we still have a number of decisions to make before we can be assured that the base model is considered final.

The methodology that we applied, is that we conducted an initial search across a range of initial equilibrium catches, ranging from 20 to 150 metric tons in one metric ton steps to identify the range of initial catches that were supported by the rest of the data in the model, based on the model log-likelihood function. So, the likelihood that's produced by the model.

Once we had established that initial search and we had found the level of initial equilibrium catch that was most likely, given the other data in the stock assessment model, we ran a much coarser grid of 10 metric ton intervals to estimate all of the model outcome results, under a range of constant catch projections into the future.

We are showing you a grid in metric tons because that does match the model units. But where necessary, we have converted those metric tons into pounds so it can be more easily understood.

Next.

Now, this is hard to visualize, but I have a graphic coming up in a moment that should help. For each of these ensemble models that we created, we weighted them by their likelihood. That formula is shown here now.

We weighted them with a 0.5 variance expansion factor. Some of you who are more familiar with this procedure are more accustomed to that value, 0.5 being one. This was done because it is more equivalent to the two times sigma_min. But it is something we would like to receive feedback on because we could do it differently if you don't think that's sensible.

Okay. So, we can now produce, using this approach, the expected equilibrium landings, all of the relevant Magnuson-Stevens, status determination criteria, and reference points. We can also estimate the current fishing mortality and the current running stock biomass and provide stock status estimates, including the probability of the stock being overfished, that overfishing is occurring, and that the stock is in a healthy condition, neither overfished nor undergoing overfishing.

Next slide.

All right, so now more pictures, less words, hopefully. All right, so this is a graphic that shows you the initial search we made from 20 to 150 metric tons, I think. And so, we've converted this here to pounds, so it's easier to understand. But what you see here is a surface with a large trough, right?

On your y-axis is the negative log-likelihood of the stock assessment model. On your x-axis is that initial equilibrium catch assumption. What this shows, is that the surface is highly estimable, that in fact, values between 100 and 150,000 pounds of initial catch are most probable, because they have the lowest log-likelihood. And so, where that big red arrow is, is about the

maximum likelihood of this function. It was about at 127.9 thousand pounds. So that's the most probable initial catch.

When we ran the coarser grid across these initial catches, we weighted those models in our ensemble by their likelihood essentially. So, models with much lower or much higher initial catches were included but given far less weight because they're less probable given the other data in the stock assessment.

So hopefully that is clear, but if not, Nathan's on board to help us sort that out.

Okay, next slide.

This is actually the PDF of OFL that you get out of this ensemble approach. So, it's no longer a point estimate it is a pdf. It is actually narrower than the PDF that you're assuming in your Tier 3 stock assessment. I can't recall exactly what it is, but it's significantly narrower than a CV of 0.5, but it does show you that your 95% confidence intervals on OFL, the overfishing limit are between 65 and 123,000 pounds.

Your blue line here is the mean of 88.6 thousand pounds, and your red line is the median of 86.7 thousand pounds. That is OFL.

Next slide.

Now, this is a figure that I'm not sure we've walked through frequently or ever in the Caribbean council. Perhaps we have. But this is basically a phase plot diagram that shows you your current stock status. You can see here the full suite of scientific uncertainty. Each one of these dots is an individual estimate that comes from the ensemble modeling approach. Basically any- this is hard to do without being able to point. Any value above the horizontal line at one. Right?

So, any value above F/FSPR30 is a stock that is experiencing overfishing. All those are in red. Any value that is to the left of the MSST value, which is 0.75 times or 0.75 SSB/SSBSPR30, those are also in red. That is a stock that is overfished. The yellow is actually when you are not overfishing, and you are between the level that supports MSY and the MSST value. So, you're not overfished, but you're in that cautionary area where you're lower than what supports MSY as well. And then where you want to really be is in that healthy green area, right? Which is not overfishing and not overfished. In this case, the ensemble says that you have about a 61.7% chance that you are not overfished. You're in that healthy green zone, right? You're above the level that supports

MSY and you're not overfishing.

You can go ahead with the next slide.

When you look at your Magnuson and Stevens, this is the table that is produced from the ensemble now, not from a single base run. You can see that your current level of fishing is about 79% of the level of FMSY so you're not overfishing. That's the 0.79 that's in bold green. You're also not overfished. You're about 1.49 times the level of MSST. Your responding stock biomass is well above the level that supports MSY and even above MSST. Or well above MSST, and also above the level that supports MSY. So, What I'm really showing you here is that, very much like a base model, we can produce these same MSRA benchmarks instead of discrimination criteria from the ensemble approach as well.

All right, next slide.

You can also use the same approach to project and to develop the catch recommendations. To do this, essentially what we've done is we've created constant catch projections in a range from five metric tons to 70 metric tons, for 100 years to assure that equilibrium was achieved. The projection settings that were used were the same, I believe, the same as what was attempted for SEDAR 80. The relative F between the fleets was the average from 2017 through 2019. The terminal year selectivity patterns were used. We used the recruitment derived from the Beverton-Holt stock-recruitment relationship. Steepness is still fixed at 0.7 in this ensemble approach as it was in SEDAR 80. The landings in 2020 and 2021, you know, we don't have from this ensemble approach. So, we had to make an assumption about them and they were fixed at a recent three-year average.

Next.

All right, so now this is a plot that we like to call chicken feet. I'm not sure- well you can see why, but because we have to amuse ourselves somehow because we do very, very mathematical things. But the first plot that you see on your left is the trajectories at each constant catch level of F/FSPR30. So, you'll see the value of one with a heavy black line and that is the overfishing threshold. And so, any constant catch projection above that line is suggesting overfishing will occur. Right? So, the ones in yellow and green are all suggesting that if you fish at that constant catch level, it will be overfishing.

The ones that are typically in the purple colors on that same figure suggest you will not be overfishing. You have a high

probability at those constant catch levels that you will not be overfishing. And so, from that first panel on the left, it supports constant catch values of roughly, you know, looks like roughly 85 to 88,000 pounds will not be likely- well, they will have about a 50% probability of overfishing. Values less than that have a lower probability of causing overfishing.

Now you see the same thing on the right-hand side. But now you're looking at the SSB/SSB at MSY, the proxy, that was used. So, values above one, you know, suggest that the stock is above the level that produces MSY at that constant catch level. And values below one, say the stock will be depleted below the level that produces MSY. It shows you the same result. Essentially, the constant catch scenarios that allow the stock to remain above the level or at the level that produces MSY range for about 85 to 88,000 pounds in this example.

So, I think it's clear, but I'll just point out again that those projections that we did at constant catches of 130,000 pounds and above are shown in those yellow colors. It's just trying to make it clear that those show very clearly a high probability of overfishing and that the stock can be expected to continue to decline below levels of support MSY.

All right, next slide.

Provisional catch recommendations. So, we tried to find a constant catch level that you could take each year that would make sure you don't exceed a 50% probability of overfishing. And so, using this provisional ensemble, the OFL could be considered to be the line in blue, which is the 50% probability of overfishing. And it occurs at a catch of about 82,700 pounds over the next five years. That would give you about a 50% probability of overfishing. If you wanted to then reduce it by a P* value, you know, the P* value that maintains a 40% probability of overfishing is shown in the orange line, it's about 77,000 pounds.

So basically, this was based, loosely, at least on something close to a base model for SEDAR 80. The recent landings had been about 78,000 pounds for this species. And so, this ensemble, although provisional, suggests that catches at the current levels appear to be sustainable under current conditions.

Next slide.

That's it. So are there any questions about that approach,

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Jason

Cope.

RICHARD APPELDOORN: Yeah, go ahead Jason.

JASON COPE: Thank you, Rich. Thanks again, Shannon. Another really good presentation. My question about the projections forward was, was that you all projecting the actual ensemble forward or taking the recommendations of the ensemble and then applying it to the base model? I think it was the former, but just clarify it for me.

SHANNON CASS-CALAY: That was literally projecting every single member of the ensemble using the entire, you know, all of the constant catch scenarios. It was very, it is quite cumbersome and rather time-consuming

JASON COPE: Great. Yes. Exactly. And that's what I wanted to point out to members of the SSC. What they're doing here it's really interesting and it's not formalized in a very easy way. They're running many, many, many, many stocks synthesis models forward, instead of just one. Because a stock synthesis is not set up to do ensemble modeling.

So, this is a lot of work. I appreciate it. Thank you.

RICHARD APPELDOORN: Thanks, Shannon. This is Rich. I'm a little confused about how this is different. I understand the ensemble part in terms of generating the normal values that you would get and you had the probability density function etcetera. Then, I'm a little lost about why you were doing all these projections.

SHANNON CASS-CALAY: Well, it's interesting, Rich, because as it turns out, we're not entirely certain that all of the constant catch projections will be necessary for the future. When we started this process, we mirrored it on what we often do at ICCAT for the highly migratory species assessments. You know, they create a probability table that at each level of constant catch, and each year, they want to see the probability that the stock will be undergoing overfishing or be overfished.

But you know, it may be that the requirements of the Caribbean control rule could be satisfied using an ensemble approach for a stock that's not overfished by just the FMSY equilibrium projection and by the F rebuild projection of a stock that is overfished.

So maybe we can simplify this approach in the future so that all the constant catch projections are not required. But it did allow us to create the chicken feet graphics that we call, that kind of demonstrates the concept and allows you to see very visually, you

know, where the constant, what level of constant catch is maintaining the stock at the level that supports MSY and not producing a likelihood of overfishing.

RICHARD APPELDOORN: Okay. I sort of understand that, but I'm not sure that's exactly where I was going. Could you go back a couple of slides where you had a, I think you had a PDF distribution? Yeah, that one.

So, this is looking very much like the single model approach output, yet this is for the ensemble, correct?

SHANNON CASS-CALAY: Right. So, this is the ensemble and it's, you know, it's weighted, the members of that ensemble are weighted by their likelihood. It does produce a relatively narrow PDF. Now, if we added additional members to the ensemble, you know, that PDF would become larger.

Um, it would also be larger if we weighted them equally, for example. But that would probably be inappropriate because we can show you that they aren't equally likely, the ensemble members.

RICHARD APPELDOORN: Right. I understand this and from something that looks like this, we could use the same approach that was done before applying P* and a minimum variance, correct?

SHANNON CASS-CALAY: That's correct.

RICHARD APPELDOORN: Right. So, the next slide was like- thank you for presenting that, because I hadn't seen that before. It's really interesting. It kind of shows a different view of these kinds of uncertainties that we're looking at. So anyway, those are good. It's the next one, I think where you're listing the table of all the values. Is that correct?

So, this is just reiterating the kind of using the ensemble approach, but in the same way, we would use the single model approach. And so, it's after this point that you lost me as to why you were, or how the chicken feet were being- is going beyond what we would normally have done using the control rule that we have at the moment.

SHANNON CASS-CALAY: So, I will try one more stab at it, and then I'll invite Nathan Vaughan to jump in if he thinks there's more to the story. But, you know, when we initially did this, we were- I think what we were trying to do is give the SSC an idea of the constant catch level, that would allow them to have a certain probability of staying in that green quadrant where you are not

overfished and not experiencing overfishing.

But that's not really consistent with Magnuson because Magnuson only requires that you, if you are above the level that supports MSST, the requirement is to prevent overfishing from occurring. There is no requirement until you fall below MSST to rebuild the stock. Right. And so, we were concerned that what we were trying to do was a little bit more conservative than was necessary under Magnuson-Stevens. For the stock and the condition that this one is in, where you're already in a healthy stock status, your only requirement is to avoid overfishing.

But I will let Nathan jump in if he thinks there's something else that would help inform this discussion.

RICHARD APPELDOORN: Well, I think I understand what you're saying in terms of you're going to a next step that we had not looked at before, which is not just trying to avoid an overfish state but to actually see where we should be in a more, presumably, stabilized situation.

LIAJAY RIVERA GARCÍA: Mr. Chair, I don't know if you want Nathan to speak up. He is muted, but you also have three raised hands. Cruz, Doug Gregory, and Jason Cope in that order.

RICHARD APPELDOORN: Okay, J.J. just called away from his desk, so he's coming back now. So J.J., you have a hand raised.

JUAN J. CRUZ MOTTA: Thank you. Yeah. Shannon, thanks a lot for both presentations. Definitely helped me a lot- understand a lot of things, I think. My question is very general. These ensemble models, when were they developed or when they were first reported in the literature and when was the stock that they were applied to? I mean, what type of stocks were the ones they used to develop these things or to apply this? thank you.

SHANNON CASS-CALAY: I should have done my homework J.J. I cited the reference in 2019. I think it's Winkler et al which is the first time we used it for ICCAT. Essentially, we've used this number of assessments now for ICCAT in a slightly different configuration. There are lots of ways to do ensemble modeling, but I think, I'm not certain how many different groups do ensemble modeling. It's certainly gaining traction as computational, power of computers becomes more accessible and faster, it's more possible to do it. It simply wasn't very likely- we could never have done this 10 or 15 years ago with the computers, we had available to us at the time. I'm not sure, honestly, when the first ensemble models were used for stock assessment purposes, but in my experience,

they are mostly used right now for ICCAT, and that started in about 2019 with the Bigeye Tuna stock assessment and has been used for several assessments since.

JUAN J. CRUZ MOTTA: Thank you, Shannon. The basic recent approach last decade or last five years

SHANNON CASS-CALAY: I would say so. Although, you know, sometimes I'm surprised, maybe some very enterprising person used them much sooner than I expected, but we've only been using them recently in the southeast.

JUAN J. CRUZ MOTTA: Thank you, Shannon.

RICHARD APPELDOORN: I think Doug, you were next.

DOUGLAS GREGORY: Thank you, Mr. Chair. This is Doug Gregory. Thanks again, Shannon. That's quite an analysis and very intensive I can see. In this case, you chose the initial equilibrium catch to be the basis for the ensemble. I assume in other fisheries there could be a different uncertainty, let's say stateness, natural mortality, that you could ensemble or even have two or three different things that you can ensemble, which would be a lot of work, but it definitely goes more to capturing uncertainty than things we've done in the past.

In the slide prior to this one, slide 21. In this case, this seems to me, the range of uncertainty in the assessment that is being captured. I think this is- If we could go back to slide 21. That one. I mean every point is a run. I don't know how you could capture uncertainty any better than all these runs that you did. What, from 20 to 150 at one-time increments? That's amazing.

So, I can see a reluctance to try to do this in a more extensive way with multiple topics of uncertainty. But boy, this looks good. I don't think the projected catch projections would represent Sigma, but this graph would if we need to use it. It seems to me, the way this has been done, we really don't need Sigma anymore because, I think, that's part of- the vertical lines that you have in the catch projections that go from, I think, red to green.

I guess I haven't got a question yet because this is pretty overwhelming, but I applaud you all for your efforts and for bringing it to us. Thank you.

SHANNON CASS-CALAY: Yeah, thanks, Doug. I did want to correct one thing because I said it incorrectly. There is some resampling within the runs. So, what you see here is not just individual model

runs, but also resampling. So, we didn't run quite this many. Nevertheless, we did run many.

Then the other thing I wanted to bring up is that it came up during the previous SSC meeting that there is another approach called MCBE, Monte Carlo Bootstrap Estimation and it is another way of incorporating a great deal of scientific uncertainty into stock assessments on many different model parameters or data inputs. It is something that we would also like to accomplish. It is not a routine that's available in SS right now. We are seeking funding to assist us with creating that functionality for SS. Erik Williams is very familiar with MCBE. It's similar to ensemble modeling in a sense and it's been applied to almost every South Atlantic assessment for many, many years. So it is, it is still an active research interest of the Science Center, but it's just not something that can be done as quickly as what we've been able to do here using another approach.

So, I did also want to answer Doug, and then I'll stop talking. But yes, it is possible to include other axes of uncertainty in this approach. The way we're doing it right now requires a full factorial analysis. So, the more factors we include know it becomes not only very time-consuming, but also it actually starts to become computationally complex because we fill buffers on machines, for example. You know, we literally fill the memory of computers with the runs that we need to save in order to do the resampling. And so, there are some challenges with this approach as you include more axis of uncertainty. There are ways around that, you know, the ICCAT way, we have an approximation that we use that looks visually identical essentially to this approach that we're showing you but has some approximations to account for the fact that they include three or four different axes of uncertainty in their methodologies. And so, they don't do the full factorial analysis of all possibilities combined.

DOUGLAS GREGORY: Thank you. I appreciate it.

RICHARD APPELDOORN: Was it, Jason, next on the list?

JASON COPE: Yeah. I have three topics I want to bring up and it relates to all of what we're talking about, but Erik, I saw your hand go up. I'm wondering if you had a direct comment on something that was said, and then I should let you speak first, and then I'll go into my stuff.

ERIK H. WILLIAMS: No, I didn't, Jason, so go ahead.

JASON COPE: Okay. great. Yeah. Well, one thing I- Doug, I think

you mentioned something about Sigma. The whole point of these types of analyses is really to get us at a better understanding of Sigma because what it's doing is it's characterizing more of the uncertainty that one model alone couldn't. I think this becomes extremely complicated very quickly because we are still, even with all of this work, really just looking kind of under one model's specification across one thing, which is that initial catch, but you could conceive of looking- asking yourself, what if all of the life history parameters were a little bit different. It goes beyond just the factorial stuff, right? It goes beyond just a basing assessment. It becomes really complicated. It's basically multiple basing assessments on top of each other to do it properly. And it's very difficult.

So, I think we definitely need to appreciate that we are going to be taking baby steps on this for quite a while. And also, the fact that when requests are made for models like this, as Shannon's pointed out, they aren't trivial, so they have to be carefully crafted and given a lot of time to be revisited and revised, so that's another thing that we'll have to balance.

One thing that did pop into my mind, Shannon, that might be able to expedite the forecasting in the future without having to run so many models, is that we could definitely trick synthesis into an initial R zero value that would mimic your ensemble's median value, and then push things forward that way. Um, and you can specify Sigma into the future and so forth. There might be some tricks to expedite part of this, but a lot of it is still just going to take a lot of time.

Then lastly, maybe, and then I'll be quiet, give Erik some time. I don't know how much we want to go into it. I was just curious about the setup with the likelihood. You mentioned the 0.5, you were hoping maybe to get some discussion on that. I was just curious if that even matters. If you used one, used 0.5, or if you did the- basically it sounds like you are kind of correcting for uncertainty based on the two times Sigma_min. But if we just did that on the outside, let the likelihood speak for itself, and then on the outside, take whatever OFL distribution comes out of it and then apply the two times Sigma_min P* rule to it. Given it's a constant. I just didn't know how much it actually even matters. And if you knew- if you did any tests like one versus 0.5 and if it really did change results much.

And I guess lastly, the P* coming out of the ensemble model, do we have an idea of what that would be for the OFL compared to the base model itself? Thanks.

SHANNON CASS-CALAY: So, I'll answer the first question first. Whether we use 0.5 or one, it does impact the mean somewhat, right? And we think that's because using the 0.5 actually puts a little bit more likelihood into the higher and lower initial catch values that were used in the ensemble. And there's a tail towards the higher end that is not completely symmetrical. I think it changed by 5% or 10%. We think the mean if you use 0.5 versus one. I don't know that it matters a lot. You know, basically, I think when we use 0.5, we spread that distribution out a little bit further and put a little bit more likelihood into the more extreme values than the straight-out log-likelihood formulation would have assumed.

Now that second question. I can't recall if it was a CV of 0.25 or a CV of 0.12, maybe Nathan can remember what the CV was on that PDF of OFL.

NATHAN VAUGHAN: Oh. I'm not sure of the exact value. I can try and take a look at the notes.

SHANNON CASS-CALAY: Okay. It was considerably smaller than 0.5. I think when we looked at it, we thought it was a CV of maybe 0.25 at the most, and maybe smaller than that.

JASON COPE: If I could follow, just quickly, up with that because that's very interesting. You would expect, if you are collecting for every single one of those many models you're running, if you're collecting the uncertainty in each of those models, because at the very very end, ideally, you'd be wanting to, basically, take PDFs from every single model that you have, weight them, and put them together. They should certainly add up to more uncertainty than just the base model itself. So, I'm wondering if there's a step here that still could be discussed at some point on- maybe this is just taking the likelihood point estimate. So, off the likelihood profile, the point estimates of each of those, and you just so happen to have a decently actually informed parameter that you're looking at. Looking at that likelihood profile that’s not extreme. You just happen to have a decently informed one, which means you're going to have actually a lower Sigma coming out of it. The point estimates are not what wants to be put forward. We need to be putting forward the whole PDFs for the OFLs in every single one of those models, then waited by their likelihood.

So just something to throw out there. Don't have to discuss it now, but maybe that's a missing step that would add a little bit more bulk to the ultimate uncertainty coming out of this analysis.

SHANNON CASS-CALAY: So, I think Nathan would like to respond to that question.

NATHAN VAUGHAN: Yeah, thanks. Jason, you're totally right. And that was what we did. So, I used, within each model that runs, all the different starting initial catches. I do resample from the full probability density function coming out of the model. So, the joint likelihood of FMSY current F current spawning stock biomass and the target spawning stock biomass and the catch. So, all of that is accounted for in the resampling.

I did like 10,000 resamples within each model, and then all of those 10,000 from every model were aggregated and then resampled from, based on their weights to get this final plot. So that's incorporated. When Shannon was saying that the likelihood was smaller, we were talking relative to the Sigma-min approach. This is still narrower. This is a much wider likelihood than what would come out of the base model itself without the uncertainty due to the initial catch. So that was the confusion. Thanks.

JASON COPE: Great. Thank you so much. Makes sense.

LIAJAY RIVERA GARCÍA: Mr. Chair, you also have a raised hand from Erik Williams.

RICHARD APPELDOORN: Go ahead, Eric.

ERIK H. WILLIAMS: Yeah, thanks, Rich. Shannon, if you could go back to the likelihood profile plot or the presenter, whoever's got control of the presentation. I can't remember which slide number that was.

GRACIELA GARCÍA-MOLINER: Can you repeat which slide you want, Erik? Thank you.

ERIK H. WILLIAMS: Yeah, the likelihood profile slide. I can't remember what number it was. It's back, it's further back. It's probably in the teens right there. That one. Yep.

So, a couple of things to be cautious about here. You guys are weighing by the likelihoods. One assumption of all of that is that the model can correctly identify the parameter of choice. That's not always the case. In particular, we see this a lot with starting biomass or starting values are often ill-defined. In this case, you have what looks like a nice smooth likelihood profile, but that can trick you sometimes. So, you know, be cautious in taking this whole approach and relying on the likelihood weights.

The other thing I would say is when I look at this, I don't know, something doesn't seem quite right with me. In the sense that if

I look at this and use an AIC of plus or minus two likelihood values, I see a range that looks like it's going to be between 75 and then all the way up to past 200, maybe. Again, I'm picking points off of a plot, but your range was much smaller than that. And so, I'm curious what's going on there? You know, and you don't need to answer it and look at it right now, this is just something to be cautious about. You know, one check is to always compare the hash, the inverted hash, and SD estimates for this parameter to your likelihood profile. Make sure those things are kind of matching up and there are some reasons why they don't sometimes, and that usually is a sign of some issues with the model.

So, I guess I just want to say that don't get too attached to weighing things by the likelihood. There are a lot of catches to that, sometimes, that actually will inhibit further advancement of this method. Because I think this method is a great step forward. You guys are on the right track. This is an incredible improvement in terms of characterizing uncertainty but recognize there are some sources of uncertainty that you can't use likelihood weighting for because they're fixed parameters and things like that. So just notes of caution going forward.

The last thing I'll say is it is unfortunate. I hate to hear it, but it is unfortunate when you guys are potentially limited by software constraints. I hate to hear that. But I guess that's the nature of SS. And maybe we will wait to see if FIMS is on the horizon and can expand possibilities and capabilities. But that's all I wanted to say. Thanks.

SHANNON CASS-CALAY: Yeah, thanks, Erik. And you know, your concerns are certainly warranted. We have been discussing a number of these issues as well. We certainly recognize that there could be complications that arise with any uncertainty that we're attempting to explore. But also, when you're trying to add additional uncertainty to the stock assessment model.

There are certainly occasions where you will not get a clean likelihood profile. It will not be possible to use it. And we're also concerned about interactions that may arise as we continue to explore this approach. So, we agree that your concerns are quite warranted, and we will keep them in mind. And I think Nathan wanted to jump in too.

NATHAN VAUGHAN: Thanks, Shannon. I don't know how to raise my hand for some reason on this.

Um, I was just going to agree with what Erik said. This is the- little bit of confusion is that this is the initial catch. So,

this is the weighting on that initial catch value and the plot that we showed with the tighter range is the equilibrium estimate of MSY. So that is tight. We do weight- all the models, from 50,000 pounds initial catch up to 300,000 initial pounds catch, are all included in that model. And there is a fairly wide window there that has some weight. We didn't show that plot, but that is used. We weren't originally planning on the weighting like that. It's just that it showed that it was so, it had such a nice curve that we decided to use it. And also, it didn't, it gave us an estimate of where we should be putting that initial catch, which was saying we didn't know.

So, in the future, yeah, we're worried that we will need to go to like a fixed equal weighting ensemble where we pick the sort of best guess values for a range. But in this case, we were able to use the model outputs to help inform the answer.

RICHARD APPELDOORN: So, I have a question. It's more of a curiosity and it's not trying to point any fingers or be critical. It's just, I don't understand. So South Atlantic has been using these, what do they call methods for a while? Does South Atlantic fall under Southeast Science Center? and so why is it that whatever their approach is not something that we could do here? Is that just because we're so data-poor that that approach is not yet available to us? As I said, I'm just curious without pointing fingers at anything.

SHANNON CASS-CALAY: Yeah, I think right now what has happened really is that before our realignment we had a geographic structure, right? So, the Beaufort Laboratory had its own center and its own director, and we were under the Miami Laboratory. And so, Miami went towards stock synthesis and Beaufort has stayed with the Beaufort assessment model, which their team created. Their team has created the functionality over many, many years. And so, there's no reason why we couldn't use a model like BAM, the Beaufort Assessment Model in the Caribbean if the data were sufficient.

Um, I think that the suggestion to add the MCBE functionality to stock synthesis is a good one and we're, you know, we're certainly going to try to do that. We're also attempting to standardize more approaches as we, now that we have realigned and we're under a single, kind of unified division structure, we are attempting to figure out how to utilize all the tools that have been developed by staff over the years and come upon some standard practices and procedures.

I think what you're seeing is just the evidence that we're not

fully realigned yet, and we still have some methodologies that exist in one place, but not others. But all of that, you know, is under evaluation right now. We're trying to bring that full functionality everywhere that we conduct stock assessments.

I see Erik's got his hand up, so I will certainly let him speak.

RICHARD APPELDOORN: That was a good explanation.

ERIK H. WILLIAMS: Yeah. Thanks, Rich. So, yeah, just to fill in too. I mean, Shannon's giving the politically correct answer. The reality is, we have not had time- as she said, we've developed. our Beaufort Assessment Model software system over 20 years now. And we're very inbred in the sense that we have not taken the time to make it user-friendly in any way, shape or form. So, to actually pass that on to somebody else would be a nightmare. It would take people a long time to understand what we do. We just haven't had the time to sort of generalize it and make it more user-friendly because we just are frankly cranking through assessment after assessment and just getting it done.

We've had the same people working on this model for the 20 years almost. And so that's been a benefit. It'll all come to an end probably at some point when I retire and others retire and then nobody's going to be able to pick it up because, as I said, we have not set it up in a way that's very user-friendly, unfortunately.

RICHARD APPELDOORN: All right. Thank you very much. Any other questions? If not, I think there is a third presentation next. Is that correct?

SHANNON CASS-CALAY: Yeah, there's a presentation or two about sensitivity runs and I'm not sure.

LIAJAY RIVERA GARCÍA: Let me know if it is that one, Shannon. Model sensitivity?

SHANNON CASS-CALAY: Okay. This is the one about MER runs that Kevin will go through. There's another one that we'd like to start with.

LIAJAY RIVERA GARCÍA: Okay. Hold on.

SEDAR 80 Queen Triggerfish Puerto Rico—SEFSC Presentation on sensitivity runs requested by the SSC

SHANNON CASS-CALAY: Perfect. Okay. All right. So, Nancie did most

of the work for this presentation, so I want to make sure that you're all aware of that. Thank you, Nancie. So, we need to go through several decisions in order to finalize the base model for Puerto Rico Queen Triggerfish that we either will use to produce ABC advice, or we will use as the ensemble-based model. Whichever, you know, however, we are directed. Let me just get this cat off my desk. Okay. I'd like to walk you through kind of those decisions that we see. There may be others that arise.

At your August SSC meeting, you discussed a need to understand better a variety of things, including L infinity, the steepness value, that initial equilibrium catch, including the start year applied to the model that traps selectivity and that catch series, meaning MER or Puerto Rico DNR.

We can use an ensemble approach to incorporate major sources of model uncertainty, but we can't include all of these, right? So, we need to make some pragmatic decisions where we can and where we cannot, we can, you know, we can decide whether to include those as axes of uncertainty in the ensemble itself.

I do want to point out that for all these sensitivity runs that we're about to show you, the NCRMP index was removed as we believe the SSC decided in August.

Okay, next slide.

Just a reminder, this is an analysis you saw in the report of the SEDAR 80 assessment. So, this is the effect of the removal of the NCRMP index. In fact, the effect of dropping all of the indices, essentially, one at a time. So, the comparison that you're looking for is the SEDAR 80 base model in blue, and the dropping of the RDC or NCRMP index in red. And so, you'll see both in the spawning stock biomass and in the fishing mortality estimates, the blue and the red lines lie virtually on top of one another.

There is very little sensitivity in the model of dropping the NCRMP index, and that is because, as you may recall, the CVs on the NCRMP index are very large. And so, the model essentially did not fit it well. And so, removing it has virtually no effect. Just a reminder, you've already seen that.

Next slide.

Okay, so for all of the remaining comparisons, we ran these models without the NCRMP index.

Next slide.

Okay. So, the first set of sensitivity runs that we wanted to show you involve different assumptions about the initial catch. So, the same concerns that we addressed through the ensemble approach in the previous presentation. The SSC had requested three different sensitivity runs to explore the sensitivity of the model to that initial catch assumption, and they were to start the time series that F equal to zero in 1983. Assuming there are no catches before 1983. That is the line shown in green.

Starting the assessment model in 1945. I'm not sure if that was an SSC request or something we made up, but we have done one where we start the model at a zero catch in 1985 and create a linear ramp of increasing catches until the first observed catch in 1983. That one is shown in yellow. A model that starts in 1985, which is a period of much lower catches, in the red is that model which has an initial catch of roughly half of the SEDAR 80 base case. So rather than 50 metric tons, something approaching 23 metric tons of initial catch by starting the model in 1985.

What you can see here in the spawning stock biomass, is that the level of initial catch is quite sensitive in this stock assessment. Now the most unusual one is the one that starts at catch equals zero in 1983. It shows extremely kind of implausible results, frankly, and shows essentially that you're nearly at, what you're at condition before 1983 unfished, and in fact, you actually had even more stock biomass in the mid-2010s and then just a precipitous drop 2020.

Now, we don't believe that this model is plausible because there were many, many records from the fishing community and from this SSC and the Appeldoorn paper that suggests that catches were well known to be higher than zero in the fifties, sixties, and seventies. So, this was run because it was of interest as a sensitivity run, but we do not believe it is plausible.

The other stock assessment models that are more of interest are shown here in red and yellow. They do indicate that the model is sensitive to initial catch. You see that also in the next slide where we look at the fishing mortality and the recruitment that comes from this model.

So, the fishing mortality itself, in the terminal years of this model, as the stock biomass declines and you take the same catches out of the model in the historical period. The model that begins in 1985 shows increasing fishing mortality in the terminal years of the stock assessment model.

The two models, the one that starts in 1945 and ramps the stocks up linearly to 1985, and the SEDAR base perform similarly. So, we do believe that the model is relatively sensitive to the assumption of initial catch, and this could be addressed and has been in the proposed ensemble approach.

I think the benefit of the ensemble approach is that it relieves us from the responsibility of having to create an assumption. We can, you know, we can essentially explore a variety of initial catches and weigh them by their likelihood.

Next slide.

This one is a little bit surprising to us, I suppose. The SSC did request two different sensitivity runs to explore L Infinity. The concern was that the L infinity that comes from- well basically if you are sampling from a stock that has already experienced a great deal of fishing pressure, then your L Infinity might be lower than from a stock with less exploitation. And so, there were two sensitivity runs requested. One was to add samples, about 25 samples from North Carolina and South Carolina. That's shown in the red line. The second was just to remove about five outliers from the SEDAR 80 samples and see how influential they were to the resulting growth curve.

Now, you see a great deal of sensitivity here to the addition of the North Carolina, and South Carolina samples. I state again, there were about 25 of them that were added. What has happened here, is actually not that it changed the growth substantially, in fact, the L infinity values were very similar. But what happened is, within those 25 samples from North Carolina and South Carolina, there was a handful of fish that were much older than the ages that were observed in the U.S. Caribbean. In fact, one of those fish was age forty which is nearly doubling. I think that the SEDAR 80 assumed a maximum age of 23, I recall. I think Nancie will correct me if I'm wrong. And so, it has increased our perception of the maximum age using the samples from North Carolina and South Carolina, which means that the natural mortality, which is based on the growth and the maximum age, had to be re-estimated and it is roughly half of the natural mortality from the base case.

And so, this red line that you're seeing here shows a stock that is in far more depleted condition. I'll just be frank. So, the blue and green lines are the SEDAR 80 base case with five outliers removed. They lay virtually on top of one another. So that does not have any influence on the stock assessment model. By adding the North Carolina and South Carolina samples and getting a fish that is much, much older in those samples, we had to re-estimate

the natural mortality rate.

This has caused the perception, in this sensitivity run, that the stock, rather than being at about 20% of its unfished condition, as you see on the right-hand panel in the terminal year, is now down below 10% of its unfished condition. And so, I'll show you. The next panel shows you fishing mortality and recruitment. So, you see that same sensitivity in the fishing mortality, whereby adding the North Carolina and South Carolina samples, you see a stock that has much higher exploitation in the terminal year approaching about 40% of the standing stock being removed by fishing in 2020. And also, much lower recruitment on average than the SEDAR 80 based case.

And so, what is very clear is that adding that North Carolina, South Carolina data, the model is very, very sensitive to that. And it's because of the higher maximum age and not the L Infinity at all. The L infinity was almost identical. And so, our recommendation is that this is further explored as a research recommendation or at least discussed very carefully because the implications are strong. I'll leave it at that and then you can discuss it.

Next slide.

The dome shape trap selectivity was also explored. You may recall that in the SEDAR 80 base case, again shown in blue, the trap selectivity was assumed to be logistic, which is unusual in the sense that one might expect that very large animals might not be able to enter a trap, and so, therefore, it could be a dome-shaped selectivity that we'd expect. But in fact, the length composition data that we had available to us in SEDAR 80, showed that most, well, almost all of the fish that were present in the link composition data, from any source in that assessment model, that they could in fact fit in the trap and that they would be retained in the trap. I think what you're seeing here is that regardless of the shape that we assumed, be it dome-shaped or logistic, the results aren't extremely sensitive to this assumption. There is some sensitivity here.

Next slide.

You see some sensitivity in fishing mortality and recruitment. It is not overwhelmingly sensitive to this model or this assumption. We support retaining the logistic, SEDAR 80 selectivity pattern or justifying the change. So, if you, if you do desire to change to a dome shape track selectivity, we just ask that you make sure that the rationale has been well justified.

Next step.

All right. Lastly, maybe not lastly, but next. The effect of steepness. So, we did explore a steepness of 0.6 and steepness of 0.8. Now, the steepness is essentially a measure of how quickly the stocks can reproduce. How relatively (unintelligible) somewhat. So essentially a steepness of 0.8. There's less of a relationship between the spawning stock and the recruits that they produce. At a steepest of 0.1, there's no relationship at all. With a steepness of 0.2, there's a very strict relationship between spawning stock, biomass, and recruitment. So, in any case, we've explored only the base model here at 0.7 and 0.6 and 0.8 around it. These happen to be selected because of the likelihood profile that Nancie ran for SEDAR 80 supported values of roughly 0.6 to 0.8. So that was the basis for these three runs. It shows you the model is sensitive, just this assumed steepness, which is quite expected.

Next slide.

If you use the lowest steepness values of about 0.6, that we put here in our sensitivity runs, it gives you the more depleted stocks with the higher fishing mortality. The steepest value of 0.8 conversely shows you a less depleted stock with a lower fishing mortality. I think that's correct. So, the model is sensitive to this assumption. We could either, you know, fix it at the maximum likelihood estimate that was found in the base run. You may recall that the likelihood profile from the base model suggested that this was estimable. Or we could explore this in the ensemble

You can go onto the next slide if there's another one.

LIAJAY RIVERA GARCÍA: Well, we are trying, but seems like it, it is stuck.

GRACIELA GARCÍA-MOLINER: We are running into a little bit of technical difficulty here. Hold on a second.

RICHARD APPELDOORN: Well, while they're waiting. Shannon, you increased the steepness and that is several things, right? Saying you're a little bit less.

SHANNON CASS-CALAY: I think Jason says that's the last slide.

LIAJAY RIVERA GARCÍA: Yeah. Yes. That is the last slide. Number twelve.

SHANNON CASS-CALAY: Okay. Can you go back just one slide? I'm

just anticipating Rich's question. Go ahead, Rich.

RICHARD APPELDOORN: Oh, I just want to make sure I had it. Obviously, you know, it almost looks like a linear, not quite, but you're changing the steepness and you're changing the results either up or down. Um, so what was the- When steepness goes higher, it's having what effect?

SHANNON CASS-CALAY: Yeah. You could see here on the right-hand panel that shows you, essentially, the spawning stock biomass over the spawning's of biomass at unfished condition SSB zero. You can see that in the terminal year of the stock assessment 2020, using a steepness value of 0.8 results in an outcome that says you have about 30% of the standing spawning stock biomass, 30% relative to the unfished spawning biomass, whereas at the steepest of 0.6 sends you down to about 15% of that unfished condition.

The base model was run at 0.7. 0.7, I think you were at about 20% of your unfished spawning biomass. Actually, the maximum likelihood estimate from the SEDAR 80 run that we presented to you in August supported a steepest value of about 0.75.

So, you know, we could essentially run with the maximum likelihood estimate that is supported by the base run, assuming that it is estimable once we reconfigure it or we could run an ensemble approach and incorporate it the same way we incorporated initial catch.

LIAJAY RIVERA GARCÍA: Mr. Chair you have a raised hand from Erik Williams.

RICHARD APPELDOORN: Go ahead, Erik.

ERIK H. WILLIAMS: Yeah. Thanks, Rich. So, you're estimating steepness in the model. But clarification, are you still using the F30% as the benchmark for the OFL?

SHANNON CASS-CALAY: Yeah, we talked about that in August too. At the moment we are, that is probably something else we still need to make sure we all agree to, right? Because yes, steepness is estimable in this model. This likelihood profile supports steepnesses between about 0.6 and 0.8 with an MLE of 0.75. But, you know, if we agree that steepness is estimable, we still have fixed Sigma R. R not is estimable. We have assumed a Beverton-Holt, we have not explored a Ricker hypothesis. That's still an open question is what I'm getting at. But for this, for what we've done to date, we are still using SPR30 as a reference.

ERIK H. WILLIAMS: Yeah, and just to follow up on that. So,

depending on how you do the projections you're going to end up with a mismatch. Because a steepness of 0.75 does not equal an SPR30. It could be in this case, but I kind of doubt it. There is a one-to-one relationship between the steepness value and an implied SPR value. Depending on how you do your projections, if you're using the stock recruit curve to project future recruitment, then you're not going to match- your OFL's going to be off because you're using an SPR-based OFL, yet you're using a stock dynamic situation that is going to tend towards FMSY, whatever that is for the steepness of 0.75. If you want to stick with the SPR benchmark, then you have to sort of ignore the stock recruit curve in projections, and that'll get you back to your SPR levels that match. I know. Hopefully, that makes sense.

SHANNON CASS-CALAY: Yeah, it makes sense to me, Erik. It's something, I think, before we leave this meeting, we need to clarify what does SSC would like us to do because there is some basis. I mean, we have not run yet, what we consider the final base model for SEDAR 80. But if it performs similarly to what we presented in August, we do expect the steepness is estimable. So, we will have to come to an agreement about how to project and what references to use.

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

RICHARD APPELDOORN: Yeah, go ahead, Eric.

ERIK H. WILLIAMS: Yeah, thanks, Rich. I didn't want to keep interrupting. You know, generally, the hierarchy is, if you can estimate steepness and it looks like your likelihood profile suggests it's well informed, then that's always considered the superior benchmark to go with because it's the direct measure of FMSY, it's not a proxy for it. So that's just sort of the thinking there.

SHANNON CASS-CALAY: And that could be done. So, if the SSC agrees, that can be done.

RICHARD APPELDOORN: Could you just elaborate on the "it" so I'm making sure I'm following the conversation?

SHANNON CASS-CALAY: So essentially rather than- one typically uses a proxy if they don't believe that the spawner-recruit relationship is estimable. And so, we very often use FSPR30 as a proxy for FMSY. Right? But in this case, at least some part of this spawner-recruit relationship does appear to be estimable. So, we have an idea that the steepness is well estimated. What we don't

know really is whether the shape of the function, the functional form itself, is well estimated. So, we could look at the relationship between the- you know, the model-estimated relationship between spawning stock biomass and recruitment.

If the group agrees that we know enough about the stock to assume that the steepness can be estimated and the spawner-recruit relationship is trustworthy, then we could move forward with just using FMSY directly without a proxy. The other side of that is if this group deliberates and finds that they do not trust a spawner-recruit relationship, and one reason for that can be, for example, this stock may benefit from down current spawning, right? This stock may actually mix with other stock units of Queen Triggerfish at the larva stages. You know, and some of those recruits may actually come from downstream, in which case, you know, maybe we don't have reliable information about this spawner-recruit relationship. In which case, you know, we might actually fix steepness much higher, like one, and say there is no relationship between spawners and recruits, and therefore we will use a proxy and assume a steepness of one.

So that's kind of the two extremes that this SSC could consider.

RICHARD APPELDOORN: Okay, thank you. Any other questions for Shannon?

JORGE R. GARCÍA-SAIS: Yes, sir. Rich, Reni, right here? The question is I would like to know a little bit more, if you can elaborate, on the effect that using age information from, or L infinity, from North Carolina, would affect the model. Can you elaborate a little bit on that?

SHANNON CASS-CALAY: Oh, yes. I can elaborate. So, a picture would be worth a thousand words, but I don't have one conveniently available. We might be able to develop some graphics before tomorrow morning. What has happened really is that in those 25 samples that Virginia Shervette collected from North Carolina and South Carolina, that we included in this sensitivity run, there were a few fish that were much older than anything we'd seen in the Caribbean, right? So, they were 40 years old rather than 23, which is what we see in the Caribbean. When we calculate the natural mortality at age, in stock assessments, we use the length parameter, the growth parameters, L Infinity, K, and T not. And then we use TMAX, the maximum age, to scale the function. And so, what has happened is that the growth, when you add those 25 fish from North Carolina and South Carolina, the growth parameters don't change much at all. Like they're visually almost indistinguishable. But what has changed is our perception of how

old- how long these fish can live. At least in North Carolina, right? And so, it says, these fish can be much older than what we see here in the Caribbean, therefore, it gives you, it lends credence, the model says then, these fish can become much older, but they don't here, in the Caribbean, because the fishing is too high and it has caused the population to juveness. Essentially, it means you fished out the older members of your population and left only the young ones.

So, what the question really is in front of this SSC is, is there sufficient evidence that these two populations could be different biologically, right? That if you reduce the fishing pressure in the U.S. Caribbean to essentially allow the stock to grow quickly, would you in 20, 30 years start to see evidence that these fish can live much longer in the U.S. Caribbean?

So really what you need to decide is, are these two different stocks that have very different biological characteristics, one which can grow much larger and reach much older ages? Or is this essentially the same species with the same biological characteristics that have been subjected to very different levels of fishing pressure?

And those are your two hypotheses. But what you have in front of you right now is pretty limited information. I think our recommendation was that this would need to be studied in much more detail before we would overturn decisions made within the SEDAR 80 Data workshop process, where they did consider what the most appropriate information was for the U.S. Caribbean.

I know Virginia's on the line, and I know Nancie knows a great deal about this as well. So, if you have additional questions, please, I can step aside and let other experts speak as well.

JORGE R. GARCÍA-SAIS: No. I recall that some time ago, perhaps within a year, I guess. There was a presentation by somebody here at the council. Actually, I believe it was a presentation to the SSC. Somebody researching otoliths for the determination of age and growth of Queen Triggerfish. I was wondering if you had considered that data to compare with the values that were used for the North Carolina set.

SHANNON CASS-CALAY: So, I'll first see if Nancie- is Nancie willing to take that question?

LIAJAY RIVERA GARCÍA: So, Mr. Chair, you have Jesus with a raised hand?

RICHARD APPELDOORN: Yeah. Does this mean Nancie does not want to comment on it?

SHANNON CASS-CALAY: Well, I think Jesus is one of the co-authors of the paper, so that's probably why. Yep. Perfect.

RICHARD APPELDOORN: Okay. Jesus.

JESUS RIVERA HERNANDEZ: Hopefully you hear me.

LIAJAY RIVERA GARCÍA: Yes.

RICHARD APPELDOORN: Yeah, you're fine.

JESUS RIVERA HERNANDEZ: So yeah, we do the age for North Carolina and South Carolina. We also do the age for Puerto Rico and Virgin Island. That was the data that we used in the model because the previous data was a spine and was seven years. We run different grow parameters with that data, with the older fish also, and like Shannon said we don't see any difference basically one millimeter up or down.

I will just want to make sure that you understand that our age work and reproductive work were basically describing what the fishers catch and we accomplish our objective. But we went further, a little bit further outside our objective, and tried to find older fish and younger fish that fishermen hadn’t caught. That is in the report of the SEDAR. We are being presented with this many, many times. We know that we don't have too many older individuals, but it's because the fishery doesn't go- at least in Puerto Rico, the fishermen don't go too deep for getting the fish. And in the Virgin Islands is trapped. In comparison with the North Carolina and South Carolina fish that the target is big groupers, hook and line. So again, it's an unexploited fishery there. The Queen Triggerfish are really rare. And this is why we have so many samples because there was a situation of “what is this? Okay, you need it? Yes.” That is why we have it. And again, you going to discuss that Reni I will most welcome later about the work and I don't know.

And also, we always repeat the same thing. We try to get funding to do an independent study with hook and line and traps in Saint Thomas to get the bigger fish, but we don't get it. But again, we have that problem we just described what's being caught and any of the tree islands have different preferences on the size of the Triggerfish. So yeah, we can explore later with somebody, and we ask for the fisherman. And sometimes the last meeting for the SSC and before the meeting of the SSC, we just kept saying that there will be bigger Triggerfish. We go to our fishermen, and they don't

see any Triggerfish bigger than 20 inches. Fishermen that have been catching Triggerfish since the price per pound was 15 cents. So, we have a lot of fishermen with a lot of experience in this fishery that have never seen a Triggerfish bigger than 18 inches. And in my last presentation in (unintelligible), they almost see me like I am crazy when I ask for a Triggerfish of 18 inches. So maybe the fishermen or maybe the Queen Triggerfish, older Triggerfish are not operating in the area that the fishermen are targeting.

So yeah, basically that is the answer for how many presentations we have been doing about our age work. And again, if you need any more questions, we can do them back later, but the intention is for the explanation of the models.

RICHARD APPELDOORN: Oh, a question for anybody who can answer it. For these older individuals, you're saying the L infinities are about the same, but what about the K values? Are they also about the same?

VIRGINIA SHERVETTE: Hey, this is Virginia Shervette for the record. Yes. The K values were the same. They were within the confidence intervals from the original K values. Same with the L Infinity. They overlapped significantly, or a lot. They overlapped a lot.

They might have been different by- the K value differed by maybe 0.0 something when we added the North Carolina-South Carolina fish, which in my expert opinion is not appropriate because those were fished from a very deep-water habitat where they catch, offshore North Carolina, where they catch very large Tilefish on the slope. And so, the K was different by 0.0 something. And then the L Infinity also was off by maybe less than like two points per size.

Part of the reason why that's the case is just the nature of having a very large data set. Of size at age fish from the Caribbean, right? We had over 2000 fish in the model. And so, when you remove the five largest fish or the five oldest fish, as Shannon and Nancie explained in one of the sensitivity runs, that's not going to impact all those other data points. So, it's not going to move that L infinity or change that K value very much at all. And the same with adding 25 fish from a totally different region that has different habitats. And also, you know, we, we also see these latitudinal gradient trends with maximum size for several of the species that occur here in the Caribbean and also occur offshore, North Carolina-South Carolina, where you see maximum age increase, you see maximum size increase as you go up in latitude.

RICHARD APPELDOORN: Thank you, Virginia, are there any other questions?

DOUGLAS GREGORY: This is Doug. Yeah, I had my hand raised, but just briefly. I was going to say what Virginia just said. My main concern is that we know there are latitudinal differences in some life history parameters with a lot of different species. And I don't see the appropriateness of including some fish from North Carolina with Puerto Rico. Thank you.

RICHARD APPELDOORN: Yeah, thank you. I have to agree with that. Any other comments? We're looking toward lunch, so. I want to make sure your questions are answered, but I don't want people to go too hungry.

Okay. Not hearing anything. I'm suggesting now your break for lunch.

GRACIELA GARCÍA-MOLINER: Yep. Wait, hold it a second. You have Michelle raising her hand.

RICHARD APPELDOORN: Michelle, go ahead.

MICHELLE SCHÄRER-UMPIERRE: Hi. Thank you, Mr. Chairman. I just wanted to mention that in the deep-water work we've done with Kate Overly we have seen very deep Queen Triggers. We don't have size estimates on them, but we will soon with the life history project. So, you know, maybe we're not seeing those fish in the sample because they're like in between where the fisheries operate. But perhaps those bigger fish are there. They're just not enough of them in this sample.

VIRGINIA SHERVETTE: This is Virginia Shervette. I'd like to speak to that. We actually included information from Kate's sampling as far as the maximum depth that Queen Triggerfish have been collected from her video survey work. That is all actually in our working paper. If you would like to review it and have that information.

RICHARD APPELDOORN: Thank you. I really would like to break for lunch now. Any other last comments? So, if not it's 12:34 or thereabouts, I'd like to break for lunch for a little bit over an hour. I'll say meet back at 1:45. We are now on break. Thank you.

GRACIELA GARCÍA-MOLINER: Thank you. We'll see everyone back at 1:45.

(Whereupon the meeting recessed for lunch on October 4, 2022.)

- - -

OCTOBER 4, 2022

TUESDAY AFTERNOON SESSION

- - -

RICHARD APPELDOORN: So, I'm back. Are we ready to start again?

GRACIELA GARCÍA-MOLINER: ¡Hola, Richard! Let's see. Well, everyone- I mean, there is quite a number of people logged in. I don't know if they've come back from lunch.

LIAJAY RIVERA GARCÍA: Maybe they can raise their hand to know that they're online. I see Jason Cope online. Shannon Calay too. Erik Williams, also with his hand raised. Kenny McCarthy. Rachel Eckley, Kate Zamboni, Jesus Rivera. Thank you, everybody. We need to have at least the SSC members online. So, if you haven't raised your hand yet. Oh, I see J.J.'s hand is raised Walter, Jason, and Erik. Okay. And Michelle.

GRACIELA GARCÍA-MOLINER: Richard, you have seven SSC members.

RICHARD APPELDOORN: Forum is half? The forum is at least half?

GRACIELA GARCÍA-MOLINER: Who are you asking in the back?

RICHARD APPELDOORN: I'm asking if seven meets the quorum.

GRACIELA GARCÍA-MOLINER: Yes.

RICHARD APPELDOORN: Thank you. Alright, so let's get started. Again, and with the committee's permission? I wanted to return to something that I forgot to do in the very beginning, and this is because I didn't realize Jocelyn had been replaced by, not replaced, but Kate was helping sit in for Jolyn. This goes to a question that occurred at the end of the last, toward the end of the last meeting, where there was a suggestion, a conflict of interest with respect to Todd Gedamke and his company MER Consultants. We had asked legal counsel to examine that situation to see if there was indeed a conflict of interest. I was wondering whether Kate could comment on that because Todd had officially removed himself from many discussions until this was re resolved.

KATHERINE M. ZAMBONI: I raised my hand, but Mr. Chair, this is Kate Zamboni for the record. As you know legal counsel did advise the Caribbean Fishery Management Council in its response to you,

to respond to your letter. You received a letter from the executive director that was reviewed by Jocelyn and myself, and I believe that resolved all the issues, but of importance, part of the message that we hope to send is that, if there is a concern about a participant having a conflict of interest, there are more appropriate mechanisms for raising those rather than in the course of a public meeting. Oftentimes I think people don't quite fully understand what it means to say that somebody has a conflict of interest, particularly in a body such as this one. I think it's going to be pretty rare that we're going to find real direct financial conflicts of interest and that's usually the way that term is used in other settings. But there's going to be additional guidance coming. I think we're going to have a presentation or at least a discussion at the council's December meeting on a potential guidance document for further consideration.

If you have any additional questions or if I can elucidate any further, please let me know.

RICHARD APPELDOORN: This was not with respect to the letter. This was an issue that occurred in the last SSC meeting, and it was brought up to the council in the report from the SSC to make a ruling on one way or the other.

KATHERINE M. ZAMBONI: It's really not our role as general counsel for NOAA to rule or make a determination for an individual whether or not a conflict exists. As I said, we can provide guidance to help individuals make decisions if they think there's a conflict that may need to be disclosed. If an individual has a particular question with a specific set of facts the Department of Commerce has an ethics legal department, and they have a team of attorneys that that's what they do. They can analyze specific factual situations to determine if somebody has a conflict of interest. But I will say, based on the information that Jocelyn and I had, and I, you know, it has to be caveated with that because if we don't have complete information, I'm not sure that our opinion matters. I don't believe we thought there was a conflict.

RICHARD APPELDOORN: Okay. Thank you. And with that, we are going back to a fourth presentation on the Queen Triggerfish. Is that correct?

SHANNON CASS-CALAY: Yes, Rich. That is correct. I believe this one is by Kevin McCarthy.

KEVIN MCCARTHY: Yes. This, she did all the hard stuff, Rich.

RICHARD APPELDOORN: And she did it very well.

KEVIN MCCARTHY: She did. She did.

RICHARD APPELDOORN: She's hard to follow. Okay.

KEVIN MCCARTHY: I know I'm feeling the pressure. Before I get started, were there any lingering questions or questions that came up over lunch from any of the previous presentations? We can take a few minutes to address those while they're still on everybody's mind. If not, I'm happy to move forward with this. See, well, I'm not the Chair, that's all I had to say.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have, Michelle Schärer, with a raised hand.

KEVIN MCCARTHY: I do see someone with a raised hand.

RICHARD APPELDOORN: Sorry, who?

LIAJAY RIVERA GARCÍA: Michelle Schärer.

RICHARD APPELDOORN: Michelle, go ahead.

MICHELLE SCHÄRER-UMPIERRE: Yeah, I just went back to the report that Virginia mentioned and still had the same question of how many of the aged Queen Triggerfish were from depths greater than a hundred meters.

RICHARD APPELDOORN: Yeah. I don't know if she or Jesus are currently online to answer that, but we can raise that question later on.

MICHELLE SCHÄRER-UMPIERRE: No problem.

RICHARD APPELDOORN: Okay. And with that Kevin, I think you're on.

SEDAR 80 Queen Triggerfish Puerto Rico—SEFSC Presentation on sensitivity runs requested by the SSC (continued)

KEVIN MCCARTHY: All right. This is Kevin McCarthy. Thanks, Rich. So, I'm going to walk us through some additional sensitivity runs that we were requested at the last meeting.

You see several names there associated with this work. I want to add one more. Stephanie Martinez Rivera did a lot of the, if not all of the data prep for this particular analysis. So just to get her on the record.

Next slide.

What we're talking about here is the use of another port sampling data. You're going to see it referred to as the MER data, just for ease of having a clear reference to something else other than the DNER data. You've seen presentations on this in the past. So, we're just going to use that terminology for this presentation.

What we did was to come up with some alternative landing series based on the ratio of MER landings to the total DNER either, we sometimes call it the corrected landings or the expanded landings. They mean the same thing in this context. What we did was to apply a ratio of, again, that DNER corrected and expanded landings to the MER landings over the entire time period that we've got DNER data, which is 1983 to 2019 in this case.

A couple of caveats to that or things you should be aware of. We did update the 2019 correction factors to the DNER data presentations you've seen in the past. That correction factor was not available at the time that the report was done. Those have been updated now. The other caveat, I suppose, is we're assuming, when we apply these ratios, the total landings weren't gear specific. We're assuming that those ratios are appropriate regardless of gear. We did split out the data into gear specific when we used it. We did come up with two methods to calculate those ratios.

Recall that the MER data was over a period of 17 months when there was a full survey in place. There was one complete year of data, which was 2019. So, we got a single ratio for Queen Triggerfish from the 2019 data MER and DNER. Then we applied that ratio across all the years of the DNER data. So that's one landing series.

We produced two other landing series. We looked at the monthly landings for that period, August 2018 to December 2019, and split out the DNER data into monthly data. We still used the expanded or the corrected landings for the DNER data and we got a ratio. We got those 17 different ratios and then we looked across all of those and we picked the 25th and the 75th percentiles of all the distribution of all those ratios. And we used each of those to generate a time series of landings.

Next slide.

Okay, so what you're going to see is, we're going to refer to the MER A, the MER B, and the MER C, which the A means it's the 2019 single value applied across the time series. Then, the B is the 75th percentile of those monthly ratios. I didn't correct this

slide. The MER C is the 25th percentile, not the 75th. That's a typo. You're going to see those terms A, B, and C in some of the plots. That's just what they're referring to. It's going to be pretty obvious; I think in some of the plots.

Next slide.

So, here's what the landings look like when you apply those ratios. No major surprises here. You know, it's just the scaler of the landings. This is for the trap fleet. The landings used in SEDAR 80 commercial trap are in black. The gray is the 2019 time series. Once those ratios are applied the- Or the ratio from 2019, once that's applied, gold color, and the teal color is the 25th percentile. It's as you would expect simple scaler. And that 2019 ratio time series falls a little more closely to the 75th percentile, but it's in between the 25th and 75th.

Next slide.

So, this is the dive. Recall that the dive time series begins in 83 as well. There's a presumption in the trap fishery that there, as we've discussed repeatedly through this process, were landings in the trap fishery before 1983. We estimated a 1982 value for the trap, but for the dive, it's presumed to be zero and that the fishery began during the time when we've got data.

Next slide.

Okay. So, when we look at a sensitivity run, looking at spawning stock biomass for these four different series, you can see the base in blue. A, B, and C are green, yellow, and red. Again, as you would expect when you've got a scaled landing series, you're going to end up with this sort of scaled estimate of SSB. Also looking at the presumed unfished spawning stock biomass, which are those right next to the Y axis. That's all those points there. Those are also, as expected, just scaled against the base model. Each time you lower the presumptive landings you're lowering the estimate of SSB.

Next slide.

So, when you look at a fraction of unfished biomass, you see very little effect for each of these runs. It's as expected based on the data that we had in the previous slide. Nothing surprising here.

Next slide.

A very little effect from this scaling in F, in the fishing mortality, across all the runs. That's it, short and sweet. Any questions about this? I see one hand up from Walter, but I'm not the chair.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Walter.

WALTER KEITHLY: I'll go ahead and speak anyway, Kevin, there may be some problems with the chair connection. I asked this at the last meeting. You were going to have a review of the DNER analysis and findings. Has that analysis been conducted yet?

KEVIN MCCARTHY: Sure. So, there are two things that are happening. One, I have no control over and one I have semi-control over.

The first thing is a CIE review, which I have no control over. My understanding is that is on the docket for a review in the fall. So that part of it has not been done to the best of my knowledge. The part that I have, and I say this is semi-control. I got some money to hire an analyst through CIMUs, through the Cooperative Institute, run out of the University of Miami, specifically to look at, not just the MER data, but all of the work that we're doing down there. That money has been moved over to CIMUs, and so we're in the process of hiring someone. That's just beginning. If you know anybody that needs a job, who's got some, a little bit of statistical and programming traps, I've got a CIMUs job that we're going to advertise very soon. That's just beginning. So that's going to be a longer process than the CIE review because we're going, I presume, that we're going to dive into the data a bit more than a CIE review might do. But things are moving forward on that.

The short answer to your question, after that long response, is they're not, not yet.

WALTER KEITHLY: Okay. Thank you. And if I have just a follow-up. I was just curious. A follow-up question a little bit more directly related, the expanded or the SEDAR 80 landings that you showed for both the trap and the dive fisheries both exceeded the MER figures that you adjusted going back. I'm trying to figure out why that might be the case. Is it simply that the expansion factor that was used may be high in that one case, for the one year or the 18 months that you used, or 19 months that used to backcast all of these analyses?

KEVIN MCCARTHY: So, I mean, we can go back to one of those. I'm not sure which slide it was, but the ones that had the landings

time series. A couple back. Yeah, that one's fine. So, the MER estimates were always lower for Queen Triggerfish, right? So, this is Queen Triggerfish specific. Those were lower than the DNER expanded landings. That's why it's downscaling everything, right? Is that what you're getting at?

WALTER KEITHLY: That's what I'm getting at and I'm trying to figure out why that might be the case. I'm just wondering whether imply- Well we don't know that the MER figures are correct either, but on the assumption that there's a problem with the DNER data set, would the problem be primarily in the expansion factor that's used for Triggerfish?

KEVIN MCCARTHY: I mean, I don't want to speculate on others, you know, without doing a thorough review in the same way that we're going to be doing to the MER data. But with this new hire, that's something that we can do. We haven't done it yet, so it's hard to say. It's hard to know what could be going on there. The reality is those are the accepted landings for better or worse, but those are the accepted landings and always have been. And that's what all of the management decisions that have been made by the council are based on. So that's where we are. Now, whether or not they're quote "correct" relative or the MER approach is more correct, you know, awaits review. But we do have, with this new hire, we should be able to look at both of those.

WALTER KEITHLY: Okay. Thank you.

RICHARD APPELDOORN: Kevin, as a follow-up. So that everybody is aware, the expansion factors in Puerto Rico are across all species by coast.

KEVIN MCCARTHY: Correct.

RICHARD APPELDOORN: I assume you took the coast part into account when you were doing-

KEVIN MCCARTHY: Yes, these are (unintelligible) specific expansion. Yes.

RICHARD APPELDOORN: All right. So, my other question is, just looking at the graph here, I think it's the potential. You looked at this for 14 months, on a monthly basis, and you did that for traps and diving. Yes? Spearfish included.

KEVIN MCCARTHY: Yes.

RICHARD APPELDOORN: So, what kind of variability are we seeing

month to month? You know, obviously, that's going to be greater than what you would get if you pulled over some of the year, but I'm looking at our 75th percentile thing looks to be like twice the 25th percentile. So, it looks like whatever the ratio is on a month-to-month basis, it bounces around quite a bit. Was there any consistent trend there? Or-

KEVIN MCCARTHY: I'd have to go back; Stephanie did all this work and I have seen all of the information that it includes. Unfortunately, I don't, off the top of my head recall, other than, yes, it bounces around. I think that's fair to say. I can't say whether or not there was a trend because I just don't remember it well enough. But we can-

RICHARD APPELDOORN: Yeah. It would have to be a strong trend, otherwise, it is bouncing around a lot and in a short time frame, you know, you don't really want to push that data very far.

KEVIN MCCARTHY: Yeah. You were, cutting out a bunch, Rich, at least on my end.

RICHARD APPELDOORN: Okay. What I was commenting on is, that if you didn't see a really strong trend then it's probably not worth pursuing this further, because it is a short timeframe of data. There's going to be a lot of variability associated just with the fact that there are short time frames, and the total length of the frame is also fairly short as well. So, unless there's something really obvious, there's probably nothing to pursue unless we had a lot more data.

KEVIN MCCARTHY: Yeah. I don't recall, but I can certainly have Stephanie have a look and if she's not on the call I can send her a chat fairly soon so that we can answer that question more definitively.

RICHARD APPELDOORN: Yeah. What you can certainly see in the data here is that the upper and lower bound, especially the upper bound approaches the gray line a number of times. So, it's obviously not a consistent ratio. It does vary from month to month. But again, unless you had a really strong trend there, the data time series is just too short.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Shannon?

RICHARD APPELDOORN: Yeah. One last question, and maybe Shannon wants this. If we're estimating that the biomass is actually lower or the catch is actually lower, then what was used in the original

base model, is that then suggesting that the OFL ABCs, that come out of that will be correspondingly lower?

KEVIN MCCARTHY: Do you want to answer that, Shannon, or do you want me to?

SHANNON CASS-CALAY: Yeah, I mean, Sure. I mean, Kevin knows the answer to this as well, but the answer is, yes. The yields will also be lower. Furthermore, you will then have to monitor the catches in the same currency. So, you'll be monitoring catches that are lower in the units of the MER estimates, which are lower. And so essentially, at the moment, because all we have right now to hang our hat on is a single ratio to reconstruct the time series, it doesn't impact the estimate of stock status at all. It only impacts your idea of the magnitude of the spawning biomass and the yield, right? But the yield is in a new currency. Essentially, this doesn't get you anywhere right now because we can only apply a single concept back in time. So, I think that the most appropriate course of action is to go ahead and proceed with a review of this data to determine if this is in fact the best available science, and if so, how we would estimate historical landings more appropriately.

KEVIN MCCARTHY: So those questions are part of the larger issue of trying to get the best landings, size, composition, etcetera data that we can get. If we implement a new survey, which allows for the collection of better data, then we're going to have to consider how we don't lose our time series of existing data.

So, it's a big question and we're certainly trying to tackle it. But a big step forward would be getting the information out of that MER study that was specifically targeted towards getting the information that will allow for the design of a better port sampling survey. So, we're making progress, but we do have to be aware of all of those caveats as things move forward. We don't want to lose information from the past by not being careful about taking that time series into account and coming up with a way to not lose it.

RICHARD APPELDOORN: Any other questions on this from the committee? If not that I think concludes the presentations. Excuse me.

KEVIN MCCARTHY: Mr. Chair?

RICHARD APPELDOORN: Yes, Kevin.

KEVIN MCCARTHY: We’ve got a couple more slides. I don’t know if

this is where we are in the agenda, but we've got a couple more slides that are essentially a list of decisions, guidance, that we need to get from the SSC. One for Puerto Rico and one in anticipation of the U.S. Virgin Islands assessment for Queen Triggerfish. Granted, you have not seen that information yet, but there may be some decisions we can make at this point that might guide some of that work.

RICHARD APPELDOORN: Yeah. Thank you, Kevin. I was going to say it's now time to start actually deliberating and answering some of the questions that you have. So, if you have a list of specific things that you need answers for, we can just go down that list.

SSC Guidance (recommendations) for additional analysis including projections to finalize SEDAR 80 QT PR

KEVIN MCCARTHY: Sure. Great. Next slide. There we go. There's Puerto Rico. There's one thing that's related to well- It's not really six, we needed a seven, but I can bring that up once we go through all of these. It has to do with the landings in 2021 and 2022. We can tackle these six first.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Jason Cope.

RICHARD APPELDOORN: Jason?

JASON COPE: Yeah. Thank you, Rich. This is Jason. Maybe just a note on number five there with steepness. We had gotten into the discussion about the reference point as well. I think that needs to be part of the discussion along with steepness as the biology and the reference point. We should try to get as consistent as possible. So maybe just a note there when we get to that point.

KEVIN MCCARTHY: Thank you.

RICHARD APPELDOORN: You'll probably have to remind us of that when we get there.

JASON COPE: Yeah, no problem. And maybe just a general question, how do we want to tackle this? I will say I certainly have opinions on all of these, and I do not want to dominate things. How best should we go through these six here?

RICHARD APPELDOORN: Well, I'm sort of presuming these, well, these were sort of done in the order that they were presented. I am not sure whether deciding on one is based necessarily on making a decision about something lower down the list. But we can just start

going down the list.

Maybe I'll just start it off by, this is a question for Shannon. Your presentations were really good, but could you give us a two-sentence summary about what is the difference between going with the control rule base or the ensemble analysis? We heard that ensemble analysis can be quite overwhelming computationally.

SHANNON CASS-CALAY: Yes. This is a complicated question because the ensemble approaches, including the MCBE approach that Erik and the South Atlantic crew do, are widely recognized as the state-of-the-art process for incorporation of scientific uncertainty as to stock assessments. And so, to some extent, that is the state-of-the-art, right? I think the tradeoff is really throughput, right? It's as we improve upon our ability to conduct complicated analyses and to better incorporate uncertainty, we can do it, but that may require us to reconsider some of our stock assessment schedules to make sure that as we are creating automation, that is required to do this more efficiently, we can still continue to produce the results you're looking for. So, I think what I would say fairly as a fellow stock assessment analyst is, you know, the ensemble model is a more sophisticated approach that probably better meets many reviewers' expectations. What we have attempted to do with the control rule is incorporate a similar or even larger amount of scientific uncertainty directly in the control rule. So rather than spending the time it takes to fully explore the scientific uncertainty and an ensemble model we just literally build it into the control rule itself to create that same buffer.

And so, you know, the control rule does facilitate quick and efficient analyses that could be conducted with a higher frequency of provision of information to the councils, right? The ensemble is a more sophisticated approach and that way, perhaps, more admirable in some fashion, but it's not going to give you a very different outcome. The only concern that I have is as we explore additional axes, I call them, of uncertainty, such as if we put in steepness or natural mortality, do we exceed the capability of our current analysis just computationally or do we start to encounter unexpected interactions that require additional evaluation?

So, you know, I'm not really answering your question except to say it really is mostly about the efficiency and throughput of the process. The more we complicate this, the lower the throughput a fishery management advice will be for the Caribbean until we have our automation more fully completed than it is today.

RICHARD APPELDOORN: So, a question, and I'm not sure if this is for you but I'll ask you. We have an ABC control rule that we've

set up and that can be used with the base model. Are we saying we're going to use the same ABC control rule with the ensemble analysis? And what we're doing is talking about different levels of variance that might be included in those.

SHANNON CASS-CALAY: Well, see that's where it gets quite complicated because if the sigma that comes out of the ensemble is wider than our control rule, it could be used directly, right? If it's narrower, as the one is right now, and you desire to expand it, then in some senses it was unnecessary to do the ensemble analysis. We could have just used the base that it was and used the control rule directly.

So, it's kind of a strange situation whereas you do the ensemble analysis, you're probably moving up through the tiers. You know, you're better incorporating the scientific uncertainty into the stock assessment, but you're not improving the data that the stock assessment was based on. But if we take an ensemble model with a CV of 0.36, say, we expand it to two times Sigma_min with a Sigma_min of 0.5, then we could just as well have used the base model then, I think, rather than the ensemble and the ensemble loses some of its value.

RICHARD APPELDOORN: Well, I guess it's more of a, perhaps a legal question. We have the ABC control rule with a sigma_min. The ensemble analysis potentially would not use that. So, would we have to actually alter the ABC control rule to even look at an ensemble analysis in that way in the first place?

KATHERINE M. ZAMBONI: Mr. Chair, this is Kate Zamboni at this point, I think we're just looking for- The request is just for recommendations, so just to provide input on what the Science Center is asking. I don't think you have to change any rules, I don't think there's any legal constraint on the choices here. Just to provide this input.

RICHARD APPELDOORN: Thank you, Kate. Jason, you had said you had issues with everything, did you want to come up with your concerns?

JASON COPE: I do, but I think Erik had his hand up before me, so I'll let Erik go, and then I'm happy to comment.

RICHARD APPELDOORN: Hey, Erik.

ERIK H. WILLIAMS: Yeah. Thank you, Richard. Thank you, Jason. Yeah, so Erik Williams. I was just going to circle all the way back to one of Rich's original questions. I think we do need to answer number one first because it is going to have implications

for how we deal with two through six on this list. So, I just wanted to make sure that that's clear. And I wanted to make the distinction between what we need for A versus B in decision 0.1.

So, for A to work we really just need a model that captures what we believe is the central tendency of all the uncertainties and all these options that are in there. So, we want to make sure we're getting that central tendency and then we, using the ABC control rule, will essentially apply an uncertainty level that we assume to go with that.

B is a little different. B if we want to go to the route of B then we have to make sure we're encompassing all of the sources of uncertainty. It gets complicated if those sources of uncertainty are not centered around, sort of, a base run because then you get into the discussion of, "okay, you're doing an ensemble weighting of the final estimate and it may not agree with," say, a base run. And so, you have to deal with that issue.

I would say right off the bat. The other thing that we need with B is, Shannon did a good job of explaining this. As you go up the scale of adding features to the ensemble analysis, you're in theory getting a more complete characterization of the uncertainty. I would say right now it's at a very low level in terms of completeness of characterization of the full uncertainty. In fact, I would dare to put a percentage, it's probably around, it's only characterizing probably 30 to 40% of the total uncertainty that might actually exist in this model. Before we move on to actually using an ensemble, you'd want to get that much higher. You'd want to characterize more of the important sources of uncertainty before you actually use it.

Again, I will state, though, that is the way to go. It is where we probably should go, particularly for this region where you have a lot of uncertainties. And so, I think, as the analysis stands now, it's not there. It might require a fair amount of work, it's my take, to really get to that higher level of characterization of uncertainty. But I just wanted to make sure we understood the distinction.

If we're focusing on A it's a different thing. We want to make sure that the model is sort of characterizing that central tendency and not so much worried about all these errant runs that might take the model in one direction or another. We want to capture that central tendency. I hope that helps people wrap their minds around the distinction between A and B and how we might make that decision of which one to go forward with.

And I think the last point, Shannon also very, very clearly articulated that if you go the route of B it is going to require quite a bit more work. Then there's that worry about the delay and all that. And so, is that all worth it right now? You know, what is the management urgency for this species that I don't have a sense for yet? So, thank you.

JASON COPE: This is Jason. I'll go next. Everything that Erik said, he said that very, very well, and I absolutely agree. And in placing on top of that, what Shannon had mentioned. The point of the ensemble model is to be able to replace the estimate coming out of the base model, which we would presume would be an underestimation of uncertainty with a better characterization of uncertainty for our control rule, Sigma. I'm still confused why the ensemble model would be presenting less uncertainty than the base model. I really don't understand how that's even possible. So, there would be some discussion there. I think it's very clear at this point that A, is the way to go and B is the way of the future and because of the hard work that they put in to show us how B works, we have a really good understanding of how to get that operationalized for a future time where it's more appropriate and there's more time to dig into it and do it. So, I think it was really, really amazing that we have that information at hand here to make this, I think, pretty clear decision that A is going to be the way to go.

And the other reason A is the way to go is that we do have that precautionary control rule put in for just these moments where we understand there's a lot more uncertainty than we're prepared to characterize. Therefore, we have a two times Sigma_min rule and we have a default sigma_min of 0.5. So, whatever's coming out of the ultimate base model, Erik has pointed out, there's a bit of work to just identify a base model that properly centralizes our feelings of best fit and uncertainty characterization, and then go from there to apply the control rule. But I don't know. I'm just going to put it out there. I think it's pretty clear that A is the way to go, but we've been presented with some wonderful information to understand how B can be the way to go in the future.

And I think that brings us to item two. Just want to point out, I don't recall the base model that was presented back in August, but this likelihood profile shows that there's a pretty good amount of information in the initial catch. And so just going with A, that A model, that base model, reference model, should, if it doesn't already, have the MLE associated with that initial catch as part of it. And I just don't recall if that was discovered after doing the profile or if the low point in the likelihood profile is also in the reference model MLE, I'll stop there for right now.

SHANNON CASS-CALAY: So, Chair, I can respond. Okay, so I'll make one correction first. I think there was a misunderstanding when we compared the Sigma that comes out of the base model for SEDAR 80. It's actually much smaller than the Sigma that comes from the ensemble. What is larger still is Sigma_min, right? Right now, the ensemble is smaller than Sigma_min, but still, it's a much larger Sigma than what comes out of the base model, which is closer to a CV of 0.1 typically for our stock synthesis.

Then with regard to your second question, the initial catch is not an estimable parameter in stock synthesis. It's data, essentially. We could not profile the equilibrium catch. We could profile what's called the initial equilibrium F, but unfortunately, that profile is conditioned on the fact that we've already specified our assumed initial catch. So, it's not freely estimated which is why we had to go through this exercise of the ensemble model of actually creating that profile of the equilibrium catch, which is a product created outside of stock synthesis. It runs with stock synthesis, but it's actually fixing that initial catch each time. It's not automated.

So, there is a parameter, initial F, that we did a likelihood profile on, but because you've already fixed, you assumed initial catch, we don't think it can be considered freely estimated. We could be incorrect about that.

JASON COPE: Yeah, no, no, I think you're right. I think you're right about that. And that all makes sense. I guess the question becomes, that likelihood profile that the ensemble model is using, do you feel like it's actually informed in a way that it would make sense, now that you've done that profile and you've found a minimum likelihood value at initial catch? would that be a recommended initial catch to use? or is there some worry about using that likelihood profile to determine that for a reference model?

SHANNON CASS-CALAY: So, we think that that's, I mean, Nathan brought up that same concept. We need to first identify what we are going to consider the base model, and then we could repeat that analysis. The minimum value there could well be a better estimate of the initial catch than what we can get out of stock synthesis. So, it could be better informed by doing that profile of the initial equilibrium catch. Is that the question, Jason? Did I answer it?

JASON COPE: Yeah. Yeah. So, what you're saying is, and I totally agree, because there are other issues like M, right? The next

thing, not so much L infinity, but natural mortality. There are other really big important decisions, selectivity, etcetera. You have to nail those things down. This item that you're talking about here isn't one that you can include in that search. So, you've nailed it down and then you'd have to do this second step of a profile over that to find where the model would, where the data and the models and that particular model specification would support the most that initial catch. And that seems reasonable to me, I was just checking in to see if that also felt proper with the assessment team and others.

SHANNON CASS-CALAY: Yes, it does. You know, it's kind of what we expected to do. To be honest, there is some concern that we have, that the value of steepness is going to be correlated with the initial catch, equilibrium catch. And so, you know, we had expected, honestly, to profile across both steepness and initial catch to see if, in fact, there is a sweet spot that is informative. Now, if there is not, of course, then the only option would be to essentially equally weigh various steepness outcomes. Or to fix steepness at some value, such as the MLE from the likelihood profile, the stock assessment itself.

JASON COPE: It's funny we've almost inverted the list here a little bit. It's almost, we have to get at steepness, selectivity, natural mortality, these things before you can really get back to the initial catch treatment. Maybe we put the initial catch- I guess in general though, this idea of first specifying a model with all these other parameters and then revisiting that initial catch through a likelihood profile to find if there's information still there based on the model specification, the steepness, and the etcetera, etcetera. Though you are estimating steepness and it was getting you a value that didn't seem unreasonable. So maybe that's not such a big deal.

(Some of Jason's comments were not audible.) The model specification side and items three through five, first. Does that sound alright with folks?

RICHARD APPELDOORN: You asking to bypass two for the moment?

JASON COPE: Well, it sounds like two is a second-level exploration that's predicated on model specification. So that means the setup of the model, which I think items three through five and six, to be honest, because that scaling of the adjusted catches, right? You want to get that. That's going to matter too. So, items three through six seem to need to happen first.

I'm also fine with just saying for item two, I don't think the

ensemble model- I don't know, it's good to hear from other folks. The ensemble model doesn't seem to be the preferred way to go. So, we're talking about a base model and that base model would then find an initial catch based on the model specifications of items three through six and the rest of the stuff. So, I'm not sure if we even need to talk about item two anymore, as long as there's an agreement that that's how it would be found, through a likelihood profile based on model specification.

RICHARD APPELDOORN: Any other questions from the committee on that?

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a comment from Erik Williams. He agreed with Jason. That will be a good approach. Pin down other inputs before using model to help with the initial catch decision.

RICHARD APPELDOORN: Okay, Thank you. So, let's go to item 3. L Infinity.

LIAJAY RIVERA GARCÍA: You have a raised hand from Erik Williams.

RICHARD APPELDOORN: Okay, go ahead Erik.

ERIK H. WILLIAMS: Thanks, Rich. Erik Williams again. Yeah, I don't think, first off, this probably shouldn't be labeled L Infinity. This is really natural mortality is what this is. And that's the factor we need to think about. And in terms of that, I would say it seems unusual to me that you would get a max age that you'd get different max ages from different ecosystems, for the same species. I think in general, max age tends to remain fairly constant across ecosystems and is influenced more by exploitation rates within that ecosystem. But you know, that's, I'm pulling that out of, you know, just years of experience and may not actually be founded on any data necessarily. But I say that because I think- I guess what I'm saying is I'm leaning more towards including that North Carolina-South Carolina data and using the higher max age, which then, of course, affects the natural mortality

RICHARD APPELDOORN: Oh, I have a question on that. Just trying to think about this. I think we're talking, potentially, about two different things. One is that primarily with higher latitude there might be greater longevity off the Carolinas. But then there's- And I think we've seen that with other species of fish so, it's not just the one-off. There's, I think, a reasonable expectation that that might be the case. But the other thing is the effect of depth, and this is getting to the question that Michelle was asking about. Is there basically a depth refuge from fishing and hence

our samples? We are not estimating in the Caribbean what the maximum age might be. If there is a refuge, how does that get incorporated into an assessment of where the stock is? Because obviously, a younger age found in shallow waters might not be indicative of overfishing so much as just, you know, that's the available stock. You've got another deeper portion that's technically not exploitable stock using the current technology. So, can anybody address that?

ERIK H. WILLIAMS: Yeah. Rich, this is Erik, I'll jump in if that's okay. I agree with what you said. Yeah. I think maybe there's a slight bias in the max-age from a slightly northern latitude. Although I'd say the latitudinal difference there is not as great as you see for other species where you see that big change in longevity versus latitude. But I think you're right that we should be fixing a, or deciding on, a maximum age for this species based on all the available data and recognizing that the fishery data is potentially being selective, essentially, which actually gets to the next issue we're going to talk about. What you have to look at is, what is the probability of capturing the oldest fish?

Do we have enough samples that we think we have a good estimate of the maximum age? When you look at statistics trying to estimate the max of something is an interesting property that requires some special sampling sometimes. If we're relying on the fishery that is not fishing in the deepest waters to try and get at what an estimate of max-age is, well that's a biased estimate we're trying very clearly, and we may not ever, ever get to that maximum age depending on the sampling scheme and the distribution of older fish with depth. So that's my initial thoughts.

RICHARD APPELDOORN: So, my question is, how does that affect an analysis if you're underestimating the maximum age, but that maximum age is not exploitable? How does that affect the analysis?

JASON COPE: So, yeah.

ERIK H. WILLIAMS: Yeah, Erik. Oh, sorry, Jason.

JASON COPE: No, no, go ahead. Finish up then I'll follow you.

ERIK H. WILLIAMS: Yeah. It shouldn't affect the analysis. Ideally, the max-age is the max-age, right? You know, we're trying to estimate the population parameters and if there's a max-age for this population, it is what it is. And if the fishery is not exploiting those max ages, that's addressed through selectivity very clearly. So that's how we would adjust.

RICHARD APPELDOORN: Okay. Thank you. Jason?

JASON COPE: Yeah. Yeah. So, I'm trying to think practically through this one and agree with everything that's been said. Do we have recorded what the newly estimated natural mortality was based on that new additional data? And then maybe in comparison just what was being used before?

Because. I mean we keep calling this a data-limited assessment, but it's estimating, I think, steepness and natural mortality and selectivity and initial biomass, right? It's doing a lot. Sometimes when we add data, some of these parameters can go a little wacky and if we know that the maximum age scene in North Carolina-South Carolina area is 40, we have an estimate of, a ballpark, of what natural mortality should be. I think it should be around 0.13 or something like that. Is that what came out of the assessment? because if it is something really, really, really low compared to that, maybe something went a little haywire in the estimation. So, I just wanted to clean that up and clarify that so we can put that aside as being any issue in the assessment.

So that's a longwinded way to say what is the M estimation coming out of the assessment when the new data from those states were put in?

RICHARD APPELDOORN: Shannon, do you have a response to that?

SHANNON CASS-CALAY: Yeah. So, the natural mortality is not estimated in the stock assessment. It is a fixed vector of natural mortality at age that is derived using a Lorenzen function. So, we have the Lorenzen methodology that uses the von Bert parameters and the maximum age to scale a function of natural mortality at age. I can show it to you if you want to see what it looks like.

JASON COPE: No, that's actually good enough because what you're saying is you actually- the reason you're getting different natural mortality rates is you put in that longevity explicitly. You didn't put it in a model and have an estimation and stuff like that.

SHANNON CASS-CALAY: So That's correct. It is fixed. Fixed in the model. And by changing from a TMAX of 23 years to a TMAX of 40 years by including Carolina estimates it almost halves the natural mortality of age that you applied for each age.

JASON COPE: And essentially halves your depletion rate, your rate. Which we saw.

SHANNON CASS-CALAY: Exactly.

JASON COPE: Yeah, yeah, yeah. So, it all scales exactly how we would expect. And so, this does come down to our, as Erik said, unless there's some sort of predation release up in North Carolina-South Carolina, you really wouldn't expect a doubling of the longevity from one place to another. And again, unless predation is just massive in the Caribbean and not elsewhere.

So, understanding the sampling unit and was it able to- and the population that's being sampled for these longevities in the Caribbean, if they're long fish populations that have been truncated, right? You're only going to be sampling smaller individuals who'll never get to see the older ones because they're just not out there anymore.

But it doesn't mean they couldn't get there. And so under- I think this is going to be the key question here, do we believe that the sampling unit in the Caribbean would've fairly had a chance to get a good maximum age versus the 40-year-old? I mean, you also want to make sure that the 40-year-old isn't some sort of, just world champion in knowing how to live, right? But it's unlikely that that's the case. So, you want to make sure that the selectivity is proper in the Caribbean.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have two raised hands, Doug Gregory- Oh, just one.

RICHARD APPELDOORN: Okay, go ahead, Doug.

DOUGLAS GREGORY: All right. Thank you. The arguments that are being made are logical, but they're that, they're arguments, they're suppositions, and we have no information to refute or to accept them. I, for one, like to stick with the data. I am impressed, like Jason said, that given that this is a data-limited fishery or species or assessment is behaving as well as it is. As I said before, I'd be very, very nervous about including information from North Carolina and South Carolina for the Caribbean population. Longitudinal and latitudinal differences do exist. Age, size, I'm not so sure about age, but it definitely exists in size. Part of it is that once you get to the range of a species, there is less fishing pressure, but part of it could be other factors too because temperature and habitat affect all these variables with growth. I would argue for not including this North Carolina-South Carolina data, particularly given the magnitude of impact that it would have. Thank you.

RICHARD APPELDOORN: Anybody else?

LIAJAY RIVERA GARCÍA: You have Kevin McCarthy raised hand.

KEVIN MCCARTHY: Yeah. Thank you. So, sort of following up on Doug's. The North Carolina-South Carolina fish were not recommended to be included in the data set by the topical working group, the life history topical working group. So, you know, you all can make a recommendation that they be included, but we would require some pretty solid justification for why you would go against it.

RICHARD APPELDOORN: Yeah, I'm sort of leading deck side of this argument. And I'll point out that Virginia who is doing this work also said they should not be included. I think we generally tend to underestimate what the maximum age of our species are. So, I certainly would expect it to be more than what we have in the data now and that would be from, you know, large deep fish, which we don't really seem to have much in the sampling floor. However, doubling the maximum age seems to be a very big stretch and I don't think I would support including the North-South Carolina data because of the magnitude of that change.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have Marco Hanke and Virginia Shervette.

RICHARD APPELDOORN: Marcos?

MARCOS HANKE: Yes. Just on the context, aside from the results of the projections. For me, it's very interesting to think, from a fisherman's perspective, that the South Carolina fishing with hook and line, you catch bigger Triggerfish and Triggerfishes in there generally using bigger hooks than what we use here. Similar fishing is done here with Silk Snapper and some deeper water Groupers with smaller hooks that are a more suitable or better match to catch the queen Triggerfish. I don't think that we are talking about a major amount of Queen Triggers there. Also, I don't think there is an easy way out of getting bigger animals here. Otherwise, we should be seeing them on the landings for those fishermen. Either hook and line for Silk Snapper, Vermilion, and so on, or on the traps. Traps is a little complicated cause there's selectivity there but comparing the same things hook and line, we should be catching those huge Queen Trigger and on my 30-year experience, I have never seen one like that here. Thank you.

RICHARD APPELDOORN: Virginia?

VIRGINIA SHERVETTE: Hey, Virginia Shervette, for the record. Yesterday I spent a good part of the day participating in providing a data summary for age, size at age, results that we got from

otoliths for Gray Triggerfish from the South Atlantic. One thing that they did relating the Gray Triggerfish was, the maximum age that we have come up with for Gray Triggerfish using otoliths was 21, for example. But the group for life history said that because that maximum age was from a sample that was not validated using bomb radiocarbon yet, that they weren't comfortable using that maximum age. And so, they chose a younger fish. So, there's kind of a parallel to that, which is why I'm even bothering to tell you about it. Also, because Rich brought up South Atlantic assessments earlier today.

So, for the Queen Triggerfish samples, the bomb radiocarbon validation work that we did and the maximum age that we validated was a fish from the Caribbean. And it was 21 years. We have not validated that the Queen Triggerfish population or contingent from North Carolina-South Carolina yet. We're in the process of establishing a reference chronology for bomb radiocarbon, but we don't- this would potentially open up the assessment to criticism if you're going to use such an extreme maximum age, but it has yet to be validated for that region. Anyway, my recommendation, which Kevin mentioned, which came out of also the working group for Queen Triggerfish, was that we don't include the South Carolina-North Carolina data but there are some legitimate reasons why you would be opening yourself up to criticism if you do use it. Mainly, because we haven't validated that maximum age yet.

RICHARD APPELDOORN: Thank you, Virginia. So, it's really- Okay, thank you. Jason is just saying that, "if that age isn't validated, it's hard to justify using it." So, I was going to put it back to Jason and Erik were the ones who were arguing for using that data. Jason seems to be in agreement not to use it. Erik, are you holding your opinion fast, or do you want to change?

ERIK H. WILLIAMS: Yeah, yeah. No, no, Rich, no. All good discussion. So, yeah, no, I'm on board with not using that oldest age, but I'm not necessarily on board with using the 21 because of a lot of issues that have been discussed. Selectivity, detectability of the max-age, given the samples we're collecting, the history of the fishery, you know, all those things point to some reasons why we might have a tough time finding the oldest fish, or the true estimate of the maximum age for this species. So, I'm fine with 21, and, and if we have, if that's all we have in hand. I get Doug Gregory's point, you know, the data is the data. I would say, if we stick with that in the assessment, that we recognize that that could be the minimum max-age, so there is a probability that it's probably higher than that. We don't know what that probability is, we can't really quantify it, etcetera, etcetera. So, in that sense, I guess I'm kind of on board with

what everybody just said.

RICHARD APPELDOORN: Yeah. Thank you. And you know, that's why we have a large Sigma_min expansion, to take care of exactly these kinds of uncertainties.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have Jason Cope raised his hand.

RICHARD APPELDOORN: Yeah, go ahead Jason.

JASON COPE: Yeah. Thank you. I think this is another good example of not just trying to characterize uncertainty, but there are certain parameters that don't have normally distributed uncertainty. We know that this is uncertainty that goes one way, right? They don't live less than 20. We're not arguing that. We're trying to figure out, do they live- How much on a regular basis are they getting past 23 or so? So, to conceive of like an ensemble model or something, right? You would be kind of marching- You have a reference model that's at one end and you're marching away from it with any sort of sensitivity analysis, decision table, etcetera.

So, these one-sided uncertainty things, for me at least, they're kind of weird to think about because they're not the traditional, "oh, let's find the confidence interval around this median value." It's different than that. This is a bias issue. It's not about imprecision. And so just something for us to think about. But again, let's remind ourselves, we do have a control rule that is two times the min Sigma, just for these reasons, right? It's built in to be extra precautionary because you don't believe the base model is getting it all right. And in this case, the uncertainty is extremely small. So, we know adding a bit more is going to be the right thing to do. And this would be an extremely solid, this type of discussion, right? This is why we have it, to point out, next time around, this should be sorted out. We need focused sampling and attention on the natural mortality rate for these species. Thanks.

RICHARD APPELDOORN: So, all of this discussion has really been on the maximum age estimation, which was one of the factors going into the estimate of natural mortality. The other one which Shannon says was using von Bertalanffy parameters. So, we're still back to, are we considering L Infinity?

LIAJAY RIVERA GARCÍA: Mr. Chair, you have Shannon Calay with raised hand and also several comments that maybe she would like to speak up.

SHANNON CASS-CALAY: Yeah. Sorry Rich, I think you got ahead of me now, so I'm behind you. But I wanted to clarify that 21 is actually the maximum age from the Caribbean that was bomb carbon validated. 23 was the maximum age observed in the U.S. Caribbean and the stock assessment model used age 23, as the maximum age. All of the runs that we have done to date to look at different L infinities all produced essentially the same von Bert parameters. So, we'd have to- We haven't shown you the effect of L Infinity yet.

If you know what I mean, if, you know, all three sensitivity runs that were intended to examine L Infinity didn't produce any meaningful change except for the introduction of the new TMAX value, which changed M but not the growth parameters.

RICHARD APPELDOORN: Thank you for that clarification. That centralizes things a lot.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Erik Williams?

RICHARD APPELDOORN: Go ahead, Erik.

ERIK H. WILLIAMS: Yeah, yeah. Thanks, Rich. So, it sounds like we're just going to stick with what this assessment team did with natural mortality, to begin with, and move on from there. It sounds like there's no need for a change, but recognizing exactly what Jason said, that this is like a minimum estimate and that as we consider, you know, ensemble analysis, this would be one of those things that would probably go into the ensemble is alternate values of natural mortality. But we're not there yet because I think we've decided we're trying to just get to a central tendency for this model. I agree that we just stick with what the assessment team did at this point.

RICHARD APPELDOORN: Right, so, there's the part A research recommendation. Obviously, the question here is, what is the oldest age of the fish? Where do you have to go to find it? And do we want to go on record saying that this is a research priority coming out of this assessment? or assessment exercise?

You know, preface that by saying, “Yeah, we always want more and better data. Do we think we're going to get that?” Virginia made comment about the number of fish samples here which is in fact, fairly large. Unless we have something that's really targeting deep individuals. And so, if Kate Overly’s program is going to start getting some size estimates or if there's a way to capture some of those deep, large fish, it's just worth making the right research recommendation. Why take it? I don’t know.

LIAJAY RIVERA GARCÍA: You have a raised hand for Michelle Schärer.
RICHARD APPELDOORN: Yeah, go ahead Michelle.

MICHELLE SCHÄRER-UMPIERRE: Yeah, I would say that this is an important research recommendation, not only for Queen Trigger but for a lot of our species. I think the information we have for this species is limited to 60 meters and we've seen them a lot deeper. So, something targeted need to be designed to actually go after these and eventually have an answer to reassess this assessment.

RICHARD APPELDOORN: I'm not too sure who put things in the chat. It's like Jason was saying that "Natural mortality is such a key parameter; it should be a priority" and I have to agree with that.

Shall we go on to selectivity then, which is kind of what we were talking about with this question of age and sampling? although not exactly.

Our options here, retain the initial trap selectivity assumption, or use the dome-shaped. If I recall correctly and Shannon, you can remind me of this, but there was a slight difference, but it was not great. Is that correct?

SHANNON CASS-CALAY: Yes. You know, given the other parameters that are fixed in the model. There was a slight difference introduced by changing that trap selectivity assumption to dome-shaped.

The difference could be larger, you know, if we had deviated with a different concept about L infinity and M. But given the decisions you have made, which I think are quite rational, we expect it to be a relatively small difference.

RICHARD APPELDOORN: We don't necessarily know which one would be more, correct?

SHANNON CASS-CALAY: Well, the working group, the technical working group that examined this did support the logistic track selectivity. Perhaps Nancie can remind me why they did. But you know, typically we're talking pretty much about gear selectivity here. The idea is that if it's a logistics selectivity, which is what the model has assumed, that means that any fish that's present where you put the traps down, can enter the trap and be retained by the trap. If it's dome-shaped, that means that your largest animals cannot physically enter the trap.

So that's really, you know, that's where the model, we have length

composition data from several sources. We have traps, divers, and the RBC survey. All of those show that given the selectivity function estimated for the trap, that those animals all could be captured by traps. So, they support logistics selectivity.

The question really is, you know, if there are much larger animals, that are available where traps are deployed that simply can't enter the trap. So, it's really more of a gear selectivity issue we're talking about here. Nancie's typing so she can remind me of the discussions of the technical working group.

Jason's got some comments in the chat. Basically, I mean, he can tell it to you himself, but you know. One thing about stock assessments is they benefit from having at least one of the gear's selectivity be assumed to be logistic, if the data can support it, because it gives you a better idea, you know, about whether there could be a large amount of cryptic biomass.

If you have all of your gear selectivity, dome-shaped, you essentially get no information about whether there might be cryptic biomass.

RICHARD APPELDOORN: Yeah. So, I think what you were doing is explaining Jason's comment, which a dome-shaped is a less precautionary assumption.

JASON COPE: Yeah. I mean, you're invoking refugia, right? You're basically saying, we can't get to that part of the population. They're out there, we can't get to them. And so, which is, again, it's fine if that's what's happening, but if you do that, you should be prepared to understand that you're going to present a less depleted stock than it might be.

And so, the direction of error is going to be one that is less precautious than more. And so, we often don't start with the default that everything's dome-shaped, right? We start with gears that we think are getting the bulk of the population or whatever once they hit a certain size, right? They get everything after that. If that's not true, then you present reasons why not typically the other way around.

RICHARD APPELDOORN: So, I really question about selectivity and how it's affecting the analysis. And we've been talking about traps, but you know, divers also constitute a fair amount of the fishery, and I don't know whether they would be, at least in Puerto Rico, limiting their catch because of the way the fish are used in the market.

Whereas in the Virgin Islands, which we have not discussed yet, there is very much a market selection that goes on. The fishermen have told us about this substantially over the years. So, the, it's not so much the gear that's being selective as to what's being retained, that's being selective.

I'm not sure, as I said, I don't think that occurs in Puerto Rico, but it will be something that comes up in the Virgin Islands when we talk about that.

So, is the sense of the group at this point then to, given the comments that have been made, to go with the logistic model for selectivity?

LIAJAY RIVERA GARCÍA: Okay, Mr. Chair, you have a raised hand from Erik Williams.

RICHARD APPELDOORN: Okay, Erik?

ERIK H. WILLIAMS: Yeah. Thanks, Rich. So yeah, dome-shape selectivity is a tough one. I do think assessments should always make a sensitivity run with it to see how much doming occurs when you free up the selectivity. Sometimes that can point to misspecifications of M, natural mortality, which we just discussed.

For instance, if you'll allow a selectivity to be dome-shaped and it goes severely dome-shaped, usually that suggests that you've got some sort of misspecification with M. You know, in theory, if you have M specified correctly, whether you use a dome-shaped or flat top function, in theory, a dome-shaped function can still give you a flat top selectivity curve as its final estimate. But that usually doesn't happen very often.

There are all kinds of issues around selectivity, but I just want to make sure that, that we are being- I think Rich made a good point to make sure we all understand what selectivity and a stock assessment model is doing. It's a combination of the gear selectivity as well as the availability of the fish, which that would have to do with the depths that are being fished. And as you mentioned, you know, market forces that might drive the fishers to select a certain size fish because of the market conditions.

So, all those things need to be taken into account. I just want to make sure we have a logical consistency here that, you know, I heard, and I don't know this because I don't know the fisheries that well enough yet, that the deeper waters are not being fished. And that would sort of suggest that a dome-shape selectivity

function is more appropriate if that's actually happening. But at the same time, if that's also happening, that goes circles back to our M discussion, that that also then possibly does point to the fact that, you know, M should probably be a lower value or we should have a higher max-age, should be expected if there is this refuge of bigger, bigger individuals, bigger and older individuals in deeper water.

So, all of this sort of gets wrapped in with itself in thinking about it. But I just say all that. I think the decision to just stick with a flat top is probably fine for now. Just something to think about as we go down the road of starting to possibly incorporate more sources of uncertainty into this assessment.

So, I just wanted to put that out there.

RICHARD APPELDOORN: Okay. Thank you, Erik. All those pauses that you're hearing or not hearing anything is my writing, so excuse me for that. I can't speak and write at the same time.

So, I think what we're hearing, I think Erik summed it up, is that right now the way to go would be just to go with the logistic thing, but there are other questions out there. Other factors at play, such as the market and availability which would circle back down to around to this question of age and hence natural mortality.

So, I guess that points to, again, a research need on looking at some of these deeper water fish and trying to see if there's an age factor there as well. Size, age factor.

If no more other comments on that, we can talk about steepness. And the choice that we're looking at is to retain the value that is fixed or try to include in ensemble analysis. Let somebody who knows more about this than me volunteer to start the conversation.

LIAJAY RIVERA GARCÍA: You have Jason Cope with a raised hand also Shannon Calay.

RICHARD APPELDOORN: Okay. Jason and then Shannon.

JASON COPE: Yeah, I was going to say, I think option B is off the table, but there could be a new B- was it estimated? I thought it was estimated not fixed. So maybe clarify that and we can talk about it.

RICHARD APPELDOORN: Shannon?

SHANNON CASS-CALAY: Sure. Thanks. So, we did the likelihood

profile and we found that for Puerto Rico it does appear to be estimable at a value of about 0.75. But in the model, it was actually fixed at 0.7 and we could, basically, we could basically use the estimate. There was a likelihood profile that supported that estimate.

So, when I say retained fixed value, here as one of the options, we could actually use the maximum likelihood estimate.

JASON COPE: Doesn't seem like much. Seems like that's a good, good way to go. It sounds like the model actually has contrast enough to estimate it and it's right in the ballpark of what you were kind of using anyway. I know it's a little higher, more productive, etcetera, but not at all unreasonable. Sounds like you would then incorporate the uncertainty in that parameter in the model. So, sounds like a good way to go. I guess I would lean toward that given what you said.

ERIK H. WILLIAMS: You don't mind me chiming in. Couple of things to be cautious of when estimating steepness and that is, pay attention to the profile and the scale of the profile. I mean, I've seen a lot of what looks like reasonable steepness estimates that when you look at the scale of the likelihood change, it's less than two across the whole range of the profile.

Again, just sort of basic AIC principles. You know, you want to have a range. You want to have a change in your likelihood of at least two points or more in that profile. The other thing to look at is these models can get tricked by conflicting sources. You want to look at each data source, the profile of each data source's likelihood with respect to steepness, to see what data source is actually driving that value of steepness. If it's not coming from- You know, if it's coming from like the landings, that's kind of questionable, you know. You want to look at, do the data sources tend to agree on this MLE estimate of steepness, or are they at two ends of the spectrum? And that 0.75 just happens to be in the middle and is a sort of mediated point between two sets of conflicting data sources that are saying, one saying it's really high, the other saying it's really low.

So that would be my only caution. But in general, yes, if you can estimate it, great. Go for it. You know, that's, you're letting the data drive the estimate, which is why we do these models.

RICHARD APPELDOORN: Jason, would you like to expand on your comment or at least read it? So-

JASON COPE: Yeah, no. Erik gave a great suggestion on making sure

that the likelihood components aren't doing some weird things in the likelihood profile. And that there's this thing called a Pinner plot that's produced when you run these likelihood profiles. So, the team probably has this, that plot there. Just to take a look and everything that Erik said, making sure you don't have the illusion of estimation is very, very good. But if those things check out, estimating steepness seems like a good way to go in this model.

RICHARD APPELDOORN: Shannon, that's something that you can fairly easily check on, following up on Jason's comment.

SHANNON CASS-CALAY: Yeah, absolutely. It's already- For the previous SEDAR 80 base, it's already in the SEDAR 80 report, that Pinner plot. We did show it in July. It was conditioned on an initial catch estimate of roughly 50,050 metric tons, 50 metric tons.

And so, there is a possibility that as we make these changes, that you have suggested, that that steepness value that is estimated changes somewhat. And it is also possible that it will no longer be as well estimated. So, we will check into that.

I guess what I'm asking you to do is, we could start from the premise that it will be estimable, but we should probably have a plan B in the event that is not in the revised face case.

RICHARD APPELDOORN: So, would there be any option other than going with the 0.7, which you said was informed by the analysis in the first place, but I don't, I don't see how you would come up with another option other than going with what you had already used.

ERIK H. WILLIAMS: To that point. If you can estimate steepness, then you, what the model's telling you is you don't really have an estimable stock recruit function, in which case then you should probably default, since you already have an F30% proxy in place for these species is then go with an average recruitment model and use the F30%.

That would be my recommendation tends to be what we do in the South Atlantic. And that's probably the only reason I'm making that recommendation. Not to say that we couldn't deviate from that. I think if you go down the road of fixing steepness, which is fine too, but usually the reason- if you're going to fix steepness, you have something to go by, like a meta-analysis of other species or something like that, that you can draw upon a value of steepness. But if you don't have that, I would say then we're stuck with just a mean recruitment model.

RICHARD APPELDOORN: So, does that mean model come up with a specific value that could be used?

ERIK H. WILLIAMS: Yeah, you can derive all of your benchmarks and everything from a mean recruitment model with your proxy of F30%, because then what you'll be using is the F30% as your assumption about FMSY.

RICHARD APPELDOORN: Shannon, this is doable for you?

SHANNON CASS-CALAY: Yes. This is doable.

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

RICHARD APPELDOORN: Sorry?

DOUGLAS GREGORY: Thank you, Mr. Chair. Comment and a question on this. My comment is that I really appreciated Shannon's response this morning relative to using the stock recruit curve and MSY rather than the proxy. Personally, I want to see us moving to using MSY when we can. I mean, it's the estimate. It's not a proxy of an estimate. I know we've got a long history with proxies, the 30%, 40%, and we're comfortable with it, but we started using it years ago when we couldn't estimate MSY. So, I see no reason not to go back to it, but the answer that Shannon gave was external recruitment. I would find it hard to believe that Puerto Rico would not have external recruitment, and for that reason alone, I think probably we should stay with a proxy regardless of how steepness comes out.

Then my question is, in some of the assessments I hear the assessment scientists talk about, this is a question for Shannon, talk about setting priors on steepness. I don't know what effect that has because I'm not familiar with Bayesian analysis. That's when I got into trouble in college when I tried to take that class. But so, we've got a previous estimate of 0.75, and let's say with these other changes things don't seem right. Would it make sense to use 0.75 as a prior and then go forward and see if it's estimable? And that's my question. Thank you.

SHANNON CASS-CALAY: So, in this case, Doug, I don't think so. The answer is no, because unless we're very surprised by these relatively small changes that are being suggested. The model already suggests strong support for a steepness value between 0.6 and 0.8. So, using a prior would be unnecessary. The more important question in my mind is if there is not a unit stock in the sense

that your recruits are actually coming from outside of the population, right? Drifting in from other areas, for example, to settle in Puerto Rico, then your steepness is much more likely to be essentially one meaning there is no relationship between spawning stock and recruitment. In which case then we default to that mean recruitment model that Erik Williams talked about. Which is what we also often do in the Gulf of Mexico, by the way. So, if you'd like, I can show you the figure of the Pinner plot for steepness, which does show that it's quite well estimated with changes in likelihood of many, many units, like more than 50 for the total between a steepness of 0.3. It has a more than 50-point change from that to the minimum. I can show you that plot if it matters.

You can proceed with the recommendation to try to estimate steepness first. If estimable use it and use FMSY and then default to a steepness of one and mean recruitment if it is not estimable. Or you know, as Doug discussed, we can say there's no evidence that there is a relationship that we trust and default immediately to SPR 30 and mean recruitment.

DOUGLAS GREGORY: No, I don't need to see a plot. Thank you.

SHANNON CASS-CALAY: Okay.

DOUGLAS GREGORY: I'm just curious about that. Appreciate it.

RICHARD APPELDOORN: With that, are we ready to move on to the last item on that, which is the adjusted landings? Realizing that we haven't had a break, and we were scheduled for one some time ago. Half an hour ago. So, I'm suggesting we take a break and then we come back to this list and finish it up. Is that okay with everybody?

Okay. No opposition. So, let's take a- let’s see it's 3:40, 10-minute break. Is that okay for everybody, back at 3:50?

Thanks. Okay, we're on break.

(Whereupon, a brief recess was taken.)

RICHARD APPELDOORN: On the assumption, everybody's back. Maybe we could start picking up where we left off. As I understand it, we are looking at the question of adjusted landings, and Kevin actually had a second part of that as I recall. And then we are going to come back to the issue of the control rule or the ensemble analysis, although I think that we kind of said ensemble analysis was still not yet operational. I think it's how one person referred

to as maybe we've done that. But there was a point about, you know, ensemble analysis could not even be looked at until we had dealt with all these other factors.

So, getting to adjusted landings. Do we want to retain the DNR expanded landings or as the alternative that Kevin presented would be a fixed percentage of that based on the Puerto Rico port sampling analysis?

So, comments from anybody?

LIAJAY RIVERA GARCÍA: You have a raised hand from Walter.

RICHARD APPELDOORN: Walter? Good to hear from you.

WALTER KEITHLY: Yes, Mr. Chairman. I'm only going to make this come cause nobody else has raised their hands yet. I asked Kevin right after lunch about the different data sets. He mentioned that the DNER is considered, if I remember his word correctly, the accepted data set.

The DNER reports have not been reviewed yet, and given that to be the case, I think would be a mistake to not use the- I think it would be a mistake not to retain the DNER expanded landings data set for analysis. Thank you.

RICHARD APPELDOORN: Thank you, Walter. I don't know whether- Well, I guess I asked this question before. If the landings are actually lower, it doesn't change the assessment, but it does change what the recommended OFL ABCs are and then they would have to be monitored using the new factors? Is that correct? I think, Shannon, you addressed that.

SHANNON CASS-CALAY: Exactly. You know, we would basically then have the reported landings in order to monitor them against the ACL. We'd have to apply that same calibration factor to them. And so essentially, you're monitoring an ACL that is lower in a currency that is lower. And so, it really doesn't accomplish much at this time because we're applying a single calibration factor throughout the historical time series, and so it's not changing anything, right? It doesn't change our stock status and it reduces the landing's ACL, but it also requires us to monitor it in a currency that is a calibration factor. It's adjusted by a calibration factor. So, I know, I'm not saying it very correctly, but you know, it's basically like saying, "Okay, we can put Mexican pesos into the stock assessment instead of US dollars," and the outcome will be Mexican pesos now, but we'll have to monitor it in Mexican pesos.

RICHARD APPELDOORN: Thank you. And Kevin, you actually had like a second part two, part six, which of course I don't remember now.

KEVIN MCCARTHY: Yes, that's right, Rich. So, the other thing we need is a way to estimate 2021 and 2022 landings. So, we'll need those for example, for projections and what it- And so the issue for 2021 in Puerto Rico is, while we have all the landings, we don't have a correction factor yet. So, there's a decision that we need to make on whole filling that correction factor.

And then in 2022, we have neither the complete landing series because we're not yet to the end of '22. And we don't have a correction factor there either.

Now, what has been common practice? Particularly when we speak to DNER staff their recommendation is to whole fill the correction factor with the correction factor from the previous year. And again, it's a series of factors, coast-dependent. But we would, we would whole fill using the prior year. And the prior year where it's available is 2020. So, we whole fill for 21 and 22 using the 2020 values of correction factor. We'd have to come up with a mechanism to estimate the landings for the rest of the year for 2022 and then apply that proxy correction factor to those estimated landings.

So, it's a bigger- there are more assumptions for 22. There's only the correction factor assumption for 2021.

RICHARD APPELDOORN: Well, I'm looking at this and saying, the only question is how do we fill out 2022 and why do we need to do that? Can't the analysis just run through?

SHANNON CASS-CALAY: So basically, Rich, the stock assessment model ends in 2020, I believe. Is that correct? 2020. So we need an estimate for the catch that occurs in 2021 and 2022 for our projections. Because we can't, you know, we basically, we can't create a management measure that would affect the 2021 and 2022 catches because they have already occurred.

So, we need to, essentially, make some assumptions about what they would be. And what we must typically do is just use the recent landings, right? And assume that the landings will remain as they have been, say in the last year or the last three years of an assessment. I think in this case we have the landing data for 2021.

What we don't have is the correction factor. And so, I think the advice in the past has been to use the previous year's correction

factor.

I believe in 2022, we don't have the landings or the correction factor, so we have to make an assumption.

RICHARD APPELDOORN: Right? So, for 2021, the only thing you can do is use the 2020 correction factor. So, I don't see whether that's even a question because there is no other option. And then, the real question is how do we finish off 2022 landings? Again, there's no other correction factor available at this time. So, unless there's some indication where, you know, things have changed 2020 is all we have for correction factors. But then the question is how do you complete 2022 landings? Is that just extending the trend that we have? Given what we know about seasonal variability and run it through December? is that how you would normally approach that?

SHANNON CASS-CALAY: So, I can't speak for how we typically approach it. In the Caribbean, because we only have one assessment prior to this in the Caribbean. Maybe Kevin could walk us through each decision so that we can make each decision independently. Just for the projected landings.

Kevin, you are speaking. We cannot hear you.

KEVIN MCCARTHY: I'm not speaking yet. I was waiting to be recognized by the chair.

RICHARD APPELDOORN: I'm sorry, who were you? [laughter] Yeah, go ahead.

KEVIN MCCARTHY: Kevin, [laughter], So, that's fine. That's fine, Shannon. Yeah, so, the simpler one, as you said, Rich, is in 2021. And I think the recommendation has always been and continues to be borrowed from the previous year in terms of correction factors.

And let's take a step back and recall what the correction factors are trying to do. What they're attempting to do is to get at some estimate of what the actual landings were given under-reporting. So, when people look year to year to year, you know, oh, it was a covid year. It was a hurricane year. I understand that that will impact the overall landings, but as far as the correction factor goes, if there's a hurricane does that affect patterns of reporting? Are people more or less likely or about the same amount of likelihood? The same likelihood? of reporting their landings whether there's a hurricane, whether there's a pandemic, you know. So, it’s changes in reporting frequency that cause problems with borrowing previous years' correction factors.

So, if the pandemic did not affect reporting rates, then it's okay to borrow the correction factor. If a hurricane affects reporting rates because people can't be, you know, don't, they've got enough on their plate. They are worried about hurricane damage and getting out to fish and all of that so they're less likely to report, or they're unable to report because of the impacts of the hurricane. Then that's a legitimate concern that the correction factor from a- and I'm just making this stuff up. I have no idea. But if it changed the reporting pattern, then that's a problem for borrowing correction factors. If it didn't, if the pandemic did not in any way impact the likelihood of somebody actually reporting their catch, then it doesn't matter that there was a pandemic in terms of the reporting patterns. It may affect the overall catch but that should work out.

So, it's a reporting rate issue. So, with that bit of background, I would still recommend that the 2020 correction factors be applied to 2021.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Reni.

RICHARD APPELDOORN: Go ahead, Reni. Yeah.

JORGE R. GARCÍA-SAIS: Kevin, would it be possible for us to have a graph where we have the expansion factors floated versus time. To see what kind of- What's the range of the expansion factors we've been applying to our data for catch data? And what's the variability on those expansion factors and perhaps know if there's any pattern of explaining that kind of variability.

KEVIN MCCARTHY: We can certainly do that. I think that what we're seeing in 2020 is sort of right in the middle of all the variability. But we could certainly- that's my recollection anyway. I don't have that right at my fingertips, but we can produce that.

JORGE R. GARCÍA-SAIS: Can you tell me what it is? What's the expansion factor, the latest that we have?

KEVIN MCCARTHY: I'm going to have to look it up. Unless somebody else on the team has it. They are by coast so, it's a little more complicated because, you know if a coast that is accounting for much of the landings is relatively steady, and say the North Coast, were not a lot of the landings are coming from, the North Coast expansion factor may be all over the place, right? It may not be consistent at all. But that wouldn't affect the overall landings terribly much because they're, you know, it's a small percentage.

But I know that I've seen this plot relatively recently, but I'm going to have to look it up. I don't know if one of the other folks on the team has a plot of the expansion factors.

I'm seeing one now. Thank you, Nancie.

JORGE R. GARCÍA-SAIS: Have you ever explored the possibility of applying different expansion factors to different fishery yields? For example, deep-water snappers, lobster, conch, and compared to fish trapping and all the other- I mean, is there any reason to believe that there may be very significant variations in the type of, or the quality of, reporting on the different fisheries in Puerto Rico?

KEVIN MCCARTHY: So, we've heard a little bit about that. And it is true that there is- while there are expansion factors by coast, they're not species specific. So, if there is a portion of the fishery where the reporting is better than, or worse than, the average across the fishery, then that expansion factor's problematic.

But that hasn't been- that's a tough question to get at, and we haven't examined it in any detail. I mean, you hear anecdotal reports about it, that one sector of the fishery may be better or worse at reporting than another, but we haven't examined it in any detail.

RICHARD APPELDOORN: Yeah. The only study to look at that was the Puerto Rico Port Sampling Program that was conducted by what we've been calling the major study. That's just a one-shot thing. We need to be able to look at this across species. We would really need to alter our data collection programs to align with the recommendations on how that study was- what came out of that study.

You know, the Puerto Rico correction factor was designed only to estimate total catch correction, not high species. And that's what we have.

KEVIN MCCARTHY: Right? I think folks are looking for a plot of those numbers. We don't have them right in hand at the moment. But I will say that the recommendation from DNER staff, when whole filling, has always used the prior year correction factors.

JORGE R. GARCÍA-SAIS: Yeah. But how long back does that go? I mean, what's the latest expansion factor that we have? is that, you know, 2018, 2019, 2015?

KEVIN MCCARTHY: The latest one we have is 2020.

JORGE R. GARCÍA-SAIS: Oh, okay.

KEVIN MCCARTHY: So, we have the factor for 2020, and what we need to determine is, is it reasonable to use that for 2021, and then we'd also have to use it for 2022.

JORGE R. GARCÍA-SAIS: Okay. Okay. But you don't have any idea of- I mean, is that the last time that I heard of an expansion factor it was a hundred percent. And I don't know if you're going with that amount still, or we have refined that factor, that correction factor. Is it lower now? Is it higher? Or what is it, you know?

KEVIN MCCARTHY: Right. So, let's step back for a second and consider how they do this, right? Maybe you all are well aware of this, but they arrive at the correction factor by doing a port sampling survey. So, they'll go to a specific location on a particular day, and they'll sample everybody or attempt to sample everybody at the very least. Then they will compare that to the logbook reports that they get that match up to that same place on that same day and compare the differences in reporting. That's how they're doing it.

We don't have another way of getting at an expansion factor. And I don't know that we have a way of, you know, I can't think of a good way to go back, and you know, pick out a more appropriate expansion factor than the one from the year before. I just don't know what we would, how we would justify picking another year or coming up with a different number other than- I mean, the only thing that I could think of, and I hesitate to open up a can of worms for however many different ways we could do this, is taking an average by coast over some couple of years. I mean, that's the only other way I can see doing it. And my guess is it's not going to differ very much, but you could, it’s certainly worth an option.

I think we pick one of them and go with it and not use this as a way to complicate further this process by looking at multiple landing streams based upon multiple ways of getting at a correction factor. I mean, my recommendation is the recommendation of DNER staff, who know more about this than I do. Use the 2020 correction factors for the years where we don't have any. It's 21 and 22.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have Michelle Schärer and Shannon Calay in turn with a raised hand.

RICHARD APPELDOORN: Go ahead, Michelle.

MICHELLE SCHÄRER-UMPIERRE: Thank you, Mr. Chairman. The only thing

that I'm bringing this up is because of the pandemic unemployment assistance. In which the person that enrolled in it had about 18 months of a questionnaire asking if they were receiving any salary or not, which may have affected the reporting rates. So, I would caution to move forward with this without actually looking at the number of logbook reports from March 2020 until 18 months later.

KEVIN MCCARTHY: I don't know. I guess I don't know exactly what we're looking for there. And I, what we're recommending, could you elaborate a little bit?

MICHELLE SCHÄRER-UMPIERRE: A change in reporting rates. After that pandemic unemployment assistance began and many fishers enrolled in it. Presumably, if they were reporting that they weren't fishing because of the pandemic unemployment assistance, that would affect the reporting rates. I don't know if there's a way that you can actually measure this in order to be confident using the correction factors of 2020 for the following two years.

KEVIN MCCARTHY: So, when would that have begun?

MICHELLE SCHÄRER-UMPIERRE: April of 20.

KEVIN MCCARTHY: And so, it's continued until when?

MICHELLE SCHÄRER-UMPIERRE: 18 months. So that would be August of 2021.

KEVIN MCCARTHY: I guess I don't know how to get it. I don't know how we would get at reporting rates because we would know if more or fewer trips were being reported, but we don't know how many were actually occurring. Right? We don't know if it's just a decrease or an increase in actual fishing. Or if it's versus reporting, right?

We don't know how many people are truly fishing. So, if the number of reports went down, does that mean that there was less reporting? or does that mean that there's just less fishing? And the absolute value of, or the, of the ratio of people reporting versus non-reporting stays the same. You know, what I'm, you know what I mean?

So, I don't know that we can get at that, given the data that we have. And I understand what the issue is. I just don't know if we can make that determination. Because we don't have the survey data, which is- I mean, what you're getting at is exactly what DNER are doing with their survey relative to the reports that they're receiving. And we don't have the survey side of it during that period. Because if we did, we'd have a correction.

MICHELLE SCHÄRER-UMPIERRE: Just to follow up. You do have a correction factor for 2020. So, if there was a decrease in reporting rate, but the correction factor is seeing the same pounds at the dock, then you can figure it out for that year.

KEVIN MCCARTHY: Um, say that one more time, please.

MICHELLE SCHÄRER-UMPIERRE: If there is a correction factor for 2020, you might be able to actually detect a change in the reporting rate because the port centers were at the dock. At least during that year, we don't know what would happen for 2021. But part of that unemployment assistance began in 2020 after April.

KEVIN MCCARTHY: Right, and typically, I think their surveys for this correction factor works are, I think they're in the summer. Maybe they're more widespread than that. But I mean, the correction factor would be addressing that. The 2020 correction factor would be addressing that. What we don't know is, was it different in 2021?

RICHARD APPELDOORN: Kevin, did you say you have a graph that puts out the correction factors over time?

KEVIN MCCARTHY: Yeah, I think I have a version of it now.

RICHARD APPELDOORN: So, the questions would be, are there any trends, and did anything unusual happened in 2020? And someone was going to comment.

SHANNON CASS-CALAY: Yeah. So, these are important discussions and ultimately, we always have to make assumptions and projections. The assumptions we make, you know, we often find new information that invalidates those assumptions. And when we do, we update the assessment, and then we can update very simply the catch information, for example.

So, what we typically do is make relatively simple to execute assumptions about the landings data that is missing from our analysis. And so, for example, we can do something like rather than actually assuming a catch level, you can just say recent F continues until 2023, and in 2023 we actually start our projections, right? Our projected assumed F or catch.

You can just retain the terminal year of information and say the catches in 2021 and 2022 will be identical to what happened in 2020, or you can use a recent average. I mean, those are really the considerations that we typically consider. And we often find

that the actualized catches are higher or lower than that. And if it's a substantial amount, the council just asks us to do an update and then we provide that updated information. But it's impossible to guess and be correct about all of the assumptions we're about to make for projections.

And so, what I'm really saying is we could talk about this all day and do something very complicated, and it would be no more likely to be correct. And when we find out it's incorrect, the easiest thing to do is just update it with the correct information. It doesn't take very long.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from J.J.

RICHARD APPELDOORN: J.J.

JUAN J. CRUZ MOTTA: My suggestion would be to make the more parsimonious assumption and run with that. I mean, based on, I mean, using those expanded landings. And as I mentioned in the last meeting, I really like the idea to focus more on updating whatever estimates we did or following that rather than, as Shannon mentioned, try guessing. Thank you.

RICHARD APPELDOORN: So, as I was pointing out, if you look at the correction factors, unless you see something because of the covid year, the 2020 correction factor is an outlier from what we've seen in the recent past. Then 2020 would be a valid, or best estimate regardless of what level best is of what the expansion factors would be for 2021, 2022.

My concern is more, how do you fill out 2022? You just have something where you say, for a non-covid, major hurricane year, here's the pattern of landing seasonally, maybe average over a bunch of years. And then use that based on whether, you know, this is a big year or a small year you fill in the rest of the months.

Is that kind of how it goes? or how you were thinking about finishing off 2022?

SHANNON CASS-CALAY: I mean, yes, we typically, you know, we don't have any data yet for 2022. So, what we would typically do is just use a very simple assumption essentially that it persisted at the most recent year's landings or some recent average. But I see, this is Shannon. Sorry, I keep forgetting to tell you who I am. I see Kevin's hand is up also.

RICHARD APPELDOORN: All right. Thank you, Shannon. But again, we know that, if you read the comment by Nelson, you know there was

no fishing going on during any of the shutdowns. So, 2020 would not be the year you'd want to base 2022 catches on. Even though the reporting values might be okay.

Kevin?

KEVIN MCCARTHY: I think we could use the 2021 pattern of landings to whole fill for the landings part of 2022, and then we could use the 2020 correction factor for both 21 and 22. As Shannon said there, you know, there's a million ways we could go at this, all of them full of guesses, and the simpler way is to go with this parsimonious route. And then in, you know, next year we're going to know what the actual landings were and if they're way off then we rerun it and provide the council with an update.

So, I think we could use 2021 landings by month to fill out the rest of 22, and then we could use the 2020 correction factor for 2021 and 2022.

RICHARD APPELDOORN: So, do you fill out using a proportional approach or just whatever the landings were in 2021?

KEVIN MCCARTHY: I think we could look at the beginning of the year and if there's- You know, I mean, I would keep it simple. I would just whole fill using the landings from the prior year, from 2021, and just go with that.

Where we have data that we believe is complete say the first 4, 5, 6 months of the year for 2022 we'd go with what's reported. But after that you know and it is pretty obvious where reporting and/or data entry are still waiting to be completed. The landings typically fall off pretty quickly where, you know, when the staff office is still entering data. It's going to be obvious when that happens, and we would then whole fill from there using 2021 data.

So, let's say, and I'm just- I haven't looked at the data in this way yet. But let's assume everything's fine through June and then July just becomes, you know, they're really not caught up on the data entry, which is, I mean, that happens everywhere. We would start whole filling beginning in July or whatever month the landing start falling off due to data entry backlog.

RICHARD APPELDOORN: So, if you found through your first six months that catch was, 10% higher than it was the previous year, would you raise the predicted ones by 10% over the previous year? Or are you just going to add in what the values actually were?

KEVIN MCCARTHY: Right. I mean, we could do that. We could

certainly do that. And if that's the recommendation of the SSC, I'm happy to implement that. But I would, because that's not going too far out there with assumptions, I suppose. I would like to keep it as simple and straightforward as absolutely possible and go with a straightforward approach.

And I think that's reasonable if we see if they're higher or lower as reported then we could adjust for the remainder of the year. But if they're more or less in line with the previous year's reporting I think we'd just not worry about it and… the whole fill with 2021 data, but if there… we could make that adjustment for the rest of the year.

(Parts of Mr. McCarthy's comments were not audible in the recording)

RICHARD APPELDOORN: Well, that's okay with me. Anybody else has any comments so we can finish this topic? Okay. I'm not hearing anything more.

So, I think where we are is, we're circling back to item number two, which we, at least according to my notes, we did not look at, because we were saying that needed to be looked at after we addressed everything else.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have raised hand from Shannon.

RICHARD APPELDOORN: Yeah, Shannon.

SHANNON CASS-CALAY: Yes, Thanks, Rich. So, you know, given that the rest of our list is basically refinements to a base model, rather than large-scale changes, you know, it is possible to go ahead and execute the ensemble analysis as we described.

We could do one of two things. We can either, from that initial search of the ensemble, determine the initial catch that is most appropriate and fix that value in the stock assessment. Or we can go ahead with the full ensemble analysis. And given that you haven't asked for a lot of additional uncertainty to be included, you know, either one of those two options is possible. In fact, they're both possible.

So essentially you have the option at this point, you know, of executing your ABC control rule from a base run, or we can run the ensemble analysis and you can execute your advice from that result.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have raised hand from Erik

Williams.

RICHARD APPELDOORN: Yes, Erik.

ERIK H. WILLIAMS: Thanks, Rich. I don't think we need the ensemble analysis. Well, I think we need it longer term, but not for this particular application, because I think the ensemble analysis is too incomplete in terms of its total uncertainty characterization for it to be used at this point.

I think we would resort to A which is just using the ABC control rule on a base run. So, I would- I think the advice here is just to use the profiling or whatever was used to let the model guide on an initial catch value to fix for that base run in our number one A so that we can apply the ABC control rule.

I think to get to the point where we're going to use the ensemble analysis, not in place of the ABC control rule, but in terms of relying on it for the full characterization of uncertainty, we need to have a lot more pieces added to it to get to that point.

RICHARD APPELDOORN: So, I understand what you're saying about the whole ensemble analysis. What are you saying about the approach for initial catch?

ERIK H. WILLIAMS: Yeah, I think all that's needed is to rerun that profile, the likelihood profile, to find out which value the model's pointing towards. Correct me if I'm wrong, Shannon, if that's.

SHANNON CASS-CALAY: Yes. We believe that is correct. We do plan to look at whether there's a correlation between that initial equilibrium catch and steepness. And if so, you'd be looking at a, you know, a bi-variate profile of the most likely combination of initial F and steepness.

So, there is one important question about initial F and that is, basically, do that maximum likelihood estimate that we found was from a weighted median of that profile? So, do you want that weighted median from the profile? or something else? Because it can be quite different.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Jason Cope.

RICHARD APPELDOORN: Go ahead, Jason.

JASON COPE: Thank you, Rich. Shannon, I'm trying to be helpful

here and think through what you just said there. So, like you said earlier today, there are two ways to do this. There's putting in an actual initial catch, or there's estimating it. Estimating the F that you would get. What Erik said about the profiling is going through actual specification of that initial catch, but then you just brought up again the estimation of F.

Do you mind explaining if you have a preference or why you might do that instead of just doing the profile over the actual quantity?

SHANNON CASS-CALAY: So, I may have complicated it by saying F instead of catch. I'm talking about the initial catch estimate, but I see that Nathan Vaughan has raised his hand and is happy to explain this in more detail. So, I will defer.

NATHAN VAUGHAN: Thanks, Shannon. So, the thing that we're trying to get across is, basically, if we're not using the ensemble for the uncertainty, which we understand there are a lot of other sources and we're going to stick with the Sigma_min approach. The ensemble, if you take that uncertainty away, is kind of, because we have to take the initial catch outside of the model as a data point, we're basically now just estimating it the same as if we were going to do it in the model.

And because of the non-symmetrical nature of that profile. We can do the profile over initial catch and maybe steepness at the same time to figure out if they're estimable. If we do that, do we want to use- And then we put them back in the fixed values to do the rest of the analysis, do we use the maximum likelihood estimate of steepness and initial catch? or do we want to put back in the weighted median across the full profile range back in as the fixed value? Because they'll be, because of that skewed distribution, they'll be slightly different. So that would've been-

JASON COPE: For steepness. For the weighted value, you're talking about, for steepness?

NATHAN VAUGHAN: For steepness and initial catch. So, if we do, if we did that, basically, the ensemble approach, which is a grid, a bivariate grid, over lots of different values of initial catch and steepness, or compared, and figuring out the likelihood of all those different estimated models. Do we pick the combined joint maximum likelihood estimate and use those two values? Or do we do a weighted, the same weighted averaging that we did before and just pick the median and use them as fixed values to calculate the base model? The base model will have a fixed value for each of these things, probably.

JASON COPE: It, it, I see Erik's hand has popped up too, so I'll make this quick. So, part of the question is, how does choosing this initial catch play out through the steepness? Like, how can you change it?

NATHAN VAUGHAN: Yes.

JASON COPE: And so, if you just, if you estimated steepness and you did the profile, and then you found the minimum likelihood value for the initial catch from the profile and then checked in to the steepness value to make sure it wasn't something super wacky, couldn't you just go with?

NATHAN VAUGHAN: Okay. Yeah. So, you're saying do the profile in a- Profile the steepness in a model that is actually estimating- Oh, profile initial catch while estimating steepness not, instead of profiling over both of them as fixed values.

JASON COPE: Right. And we admit already that we don't know what steepness is, but we admit that this model seems to have some information, content about it.

And if that's the case, we're kind of going basing a little tiny bit here with a prior in our mind, like it shouldn't be like 0.3 and it probably- Right. We're playing around-

NATHAN VAUGHAN: Yeah. We've got some bumper bands on it.

JASON COPE: Yeah, exactly. Exactly. Yeah. Yeah. But then looked at it and said, "Okay, hey, it's, if it comes up at 0.72, you're like, Okay, that that's reasonable." And this initial catch is that minimum allowing steepness to be estimated.

NATHAN VAUGHAN: I gotcha.

JASON COPE: You feel good about that? Yeah. So that's my recommendation. I'll be quiet and let Erik talk.

RICHARD APPELDOORN: Could you just simplify your recommendation so that others could understand that?

JASON COPE: Yeah. I'll say it quickly. My one recommendation would be to have a base model that estimates steepness and does that likelihood profile across initial catch while estimating steepness at each likelihood profile interval. Then choosing the best fit model, the one that's most- that the data supports the initial catch that's supported by the model. So, the bottom part of the likelihood there. And then with that, checking in just to make

sure that the steepness value seems reasonable. And if so, you maintain that as the reference model with the initial catch, based on the likelihood that has estimated a reasonable steepness.

RICHARD APPELDOORN: So, were you using the weighting approach in this?

JASON COPE: No, weigh. No, there's no weighting.

RICHARD APPELDOORN: Okay. Thank you. Okay, Erik?

ERIK H. WILLIAMS: Yes, Thanks, Rich. I'll be quick. Jason said it perfectly, so I agree with everything you just said. So.

NATHAN VAUGHAN: Fantastic. That's easy. We can do that.

RICHARD APPELDOORN: Hang on everybody. Okay. Following all that discussion, Shannon, are you and your group fairly clear on our responses to those six points?

SHANNON CASS-CALAY: So yes, I believe we are. I have what I believe are the decisions written down. If you'd like to show, if you'd like me to show. I can email them to the SSC and to our staff, see if everyone agrees.

RICHARD APPELDOORN: Given that it's almost five, why don't you do that, and then we can pick that up tomorrow? That will give us, give you, more time to compose that and give us a chance to look at it before.

SHANNON CASS-CALAY: Sure.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Kevin?

RICHARD APPELDOORN: Yeah, go ahead, Kevin.

KEVIN MCCARTHY: Thanks, Rich. So, I know that it's five, but we have a similar list of questions for the Virgin Islands assessment models. Now, granted you haven't seen those yet, but where we can get some, where appropriate, and we can get some guidance it would be good to have that. We can pick up that discussion whenever you all want to do that. But it would be good to get what guidance we can, and again, as appropriate, given that you haven't seen anything yet. But if we can get a head start on some sort of general guidance, that would be great. But I recognize that it's nearly five.

RICHARD APPELDOORN: And I apologize, I actually missed a bunch of that cause stuff's coming at me over here from other directions. You're talking about the next agenda item, which are the standard products.

KEVIN MCCARTHY: Well, some similar, similar guidance for the Virgin Islands assessment. I see we've moved ahead to that next slide. This may be quick because these, you know, we've just gone through this in great detail obviously, for Puerto Rico, and the guidance may follow those directions.

Although again, you haven't, you haven't seen any results yet. So, some of this may be difficult to get at. But where appropriate, or where the SSC feels comfortable in providing some guidance, if we can get that. Doesn't have to be right this second, but if we can get that during this meeting sometime tomorrow that would be helpful.

RICHARD APPELDOORN: Yeah. So, some of these are also going to be based on what all is different. Okay. Initial catch will certainly be different. Are the growth parameters different? or are they using the same growth parameters? Is the selectivity different or are they using the same selectivity functions? etcetera. So, I could see whether it be a discussion on initial catch, perhaps because there may or may not be a problem depending on what that looks like.

So, I guess I'd want to see a visualization of that in the same way in Puerto Rico where the divers' initial catch is zero was actually a reasonable assumption, but not for the trap catch.

And if we're using the same growth parameters, then the same things would apply. If we're using the same selectivity, the same would apply for you- actually doing that from a separate analysis I would- You know, I don't know what to say because, as you said, we haven't seen anything yet, but we can at this point we will get to this tomorrow, I think.

And that is the next thing on the agenda. So, it will be first thing in the morning.

KEVIN MCCARTHY: Okay. Yeah, and I think the life history parameters, I think they're the same across for Puerto Rico as well as the Virgin Islands. So, we can- Yeah, I don't want to belabor this right now, at the end of the day when everybody's tired. We can discuss it tomorrow and get whatever, you all.
(Parts of Mr. McCarthy's comments were not audible in the recording)

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

RICHARD APPELDOORN: Yeah. I'll just throw a comment from Jesus that he does say that the growth parameters are used across all jurisdictions. So go ahead, Erik.

ERIK H. WILLIAMS: Thanks, Rich. Yeah, I'm probably jumping ahead and we can talk about this tomorrow, but I do think without having initial model results, I think, it's going to be very difficult to answer this one because a lot of our recommendations were conditional on certain properties that we were seeing from that last assessment, such as steepness looked like it was estimable, you had a good likelihood profile for initial catch. You know, those are the sort of things that if we don't have that in front of us, it's going to be a little more difficult to make recommendations for this.

RICHARD APPELDOORN: Okay, thank you, Erik. And maybe with that, we'll adjourn for the day.

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Shannon.

RICHARD APPELDOORN: Oh, Shannon, please go ahead.

SHANNON CASS-CALAY: Yeah, I'll just be very quick. Yeah, I'm not surprised. I agree with you that a number of these decisions might be conditional on some of the results that we will present in November.

I think the plan then will be for us to present to you the base run and some of the same analyses that accompany this, today's presentation in November for the U.S.V.I. models. And then it should be a much simpler process to finalize those. And so, the question will be, when could those be finalized? It would be best if we could do it before March. There's no reason it has to drag out that long, but we can talk about that tomorrow. Exactly how procedurally we would expect to review the base runs for U.S.V.I. in November, and when those revisions to create final results could be reviewed by the SSC.

RICHARD APPELDOORN: Okay. Sounds like a plan. So, we will adjourn for today, and tomorrow we start up again at 10 o'clock. We stand Adjourned.

(Whereupon, the meeting adjourned on October 4, 2022.)

- - -

October 5, 2022

WEDNESDAY MORNING SESSION

- - -

RICHARD APPELDOORN: Okay. Good morning, everybody. It is October 5th, 2022, and it is 10:03 AM. This is going to be day two of the SSC meeting of the Caribbean Council.

Graciela, do we need to do roll call for voice recognition, anymore?

GRACIELA GARCÍA-MOLINER: Yes, you should. And please everyone states your name when you're speaking up during the meeting. Yesterday we talked about the people who will be transcribing the minutes. So, yeah, I think it will be worthwhile to do that. Thank you.

RICHARD APPELDOORN: Okay. Before we even get started, let me comment on that. So, I went through some of the minutes to see how they were going. On the one hand, it seems to capture rather faithfully everything that's being said that's at least audible. On the other hand, if you don't identify who you are, for every little comment, it's not going to be necessarily obvious. That was evident in my reading through. Some of the times you can- you know, if someone's being called on, they'll start talking and because they were called on, they could be identified, but other times people just were injecting comments and it was not clear. It would not be clear from the reading who that was. If you were at the meeting and you knew the discussion, you could understand who was making the comment but it's not evident in the document. You know, it's not listed like so and so said this, it's just, comment whatever by, and, I think, the time period during that recording session. So, it's really important then that you identify yourselves before making your comments given this system for providing the transcripts.

So, with that said all the rules that I read out yesterday are still applicable, so please be aware of that. Let’s start with the SSC roll call. Michelle.

MICHELLE SCHÄRER-UMPIERRE: Buenos días, Michelle Schärer here.

RICHARD APPELDOORN: Walter.

WALTER KEITHLY: Walter Keithley is present.

RICHARD APPELDOORN: J.J.

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

RICHARD APPELDOORN: Erik.

ERIK H. WILLIAMS: Good morning, this is Erik Williams.

RICHARD APPELDOORN: Jason.

JASON COPE: Good morning, Jason Cope.

RICHARD APPELDOORN: Doug.

DOUGLAS GREGORY: Good morning, Doug Gregory.

RICHARD APPELDOORN: Todd.

TODD GEDAMKE: Good morning, Todd Gedamke

RICHARD APPELDOORN: Vance.

VANCE VICENTE: Vance Vicente SSC member.

RICHARD APPELDOORN: Thank you. Reni.

JORGE R. GARCÍA-SAIS: Good morning, Reni García.

RICHARD APPELDOORN: Okay. Thank you. I am SSC Chair Rich Appeldoorn. As was mentioned before Tarsila is going to be off and on, hopefully, during the meeting. Jason, you said that you'll have to leave at about 11 o'clock. So, we'll try to move as expeditiously as we can over the first part which is the continuation of the discussion of the SEDAR 80 Queen Trigger Fish assessment approach.

We were looking at the questions that the Science Center needed us to address before they could go forward and finish the assessment for Puerto Rico. Then, we were going to get onto the questions of the additional assessments for the Virgin Islands. Can we get the list of questions that- No, that's the Virgin Islands. We want the ones for Puerto Rico. Okay. Thank you.

Now we had discussed all these, and Shannon had- We'll get to that next. Shannon had sent a summary of what she understood our decisions to be, which I think was mostly correct. Does anybody

want to revisit this before we get to Shannon's list?

JORGE R. GARCÍA-SAIS: Richard?

RICHARD APPELDOORN: Yes, Reni.

JORGE R. GARCÍA-SAIS: I would like to (unintelligible) sorry.

RICHARD APPELDOORN: Nobody got that question.

JORGE R. GARCÍA-SAIS: I would like to know if we already have an answer to my question yesterday of what is the actual or the latest expansion factor for Puerto Rico catch? So, I'd like to have that just for the purpose of perspective. Do you hear me better now?

RICHARD APPELDOORN: Yes.

JORGE R. GARCÍA-SAIS: Okay. So, it's been a long time since I recall, what expansion factor are we using? So, just to have a, even if it's a ballpark number, I'd like to know, you know. I'd like to know if it's 15% or 10 or 40 or 60 or what, what is it?

RICHARD APPELDOORN: Right? And Michelle had asked for that information as well. Kevin, were you able to, if you're there, were you able to get that information?

KEVIN MCCARTHY: Good morning, everybody. Yes, we had it yesterday and we're looking to dredge it up again this morning. So, we'll have that to you as soon can relocate it.

But as my recollection is, from looking at it yesterday, that it sorts of falls in line right in the middle of the values that we've seen over the last couple of years, but that actual value I'm going to have to look at it again. It's about 1.5 to the best of my recollection, but we'll get the numbers here again and confirm that. We are looking for it right now.

RICHARD APPELDOORN: Right, can we get that in a graphical form that could be put up on the screen?

KEVIN MCCARTHY: Yes.

RICHARD APPELDOORN: All right, thank you, Kevin.

LIAJAY RIVERA GARCÍA: Pardon, Richard. Do you want me to present something else? I couldn't hear well.

RICHARD APPELDOORN: No. We're waiting for Kevin to get his data

recovered and then he will show it to us. I have a question, I guess it's for Shannon. In the material you presented yesterday, you know, we had a question on just the role of L Infinity and what some variability in that would have on the analysis. What you presented was, I think, just the effect of the Carolina data on L Infinity, which included also the maximum age. So, if I'm correct, we actually did not see just a pure sensitivity analysis on the L Infinity alone. Is that correct? Shannon?

KEVIN MCCARTHY: I'm not sure that Shannon's on the call. I think she had a conflict until about 11. Let me see if someone else from the team can tackle that question.

RICHARD APPELDOORN: I see Nancie is on. Adyan is also on.

ERIK H. WILLIAMS: Rich, if I might. I do recall a slide that showed the effects of that and basically, there was almost no detectable effect of that change in L Infinity. They changed the growth parameters, and they were right on top of each other.

RICHARD APPELDOORN: I understood that this was the- adding of the North and South Carolina data did not change the L Infinity much, and therefore that's why they were on top of each other. But what I'm asking was, was there a separate sensitivity analysis on the potential variability of L Infinity? You know, I think we have a very good growth model that came out of Virginia's team. But, you know, the estimates of the growth parameters still have variance on them and, you know, what impact was that variance on the analysis? So, I don't think that was looked at separately from the age, maximum age analysis. Is this something that either Nancie or Adyan can address?

KEVIN MCCARTHY: Yeah, I'm organizing that right now.

NANCIE CUMMINGS: So, Nancie Cummings here. Permission to speak?

RICHARD APPELDOORN: Yes, go ahead, Nancie, and good morning.

NANCIE CUMMINGS: Good morning, Chair, Nancie Cummings here.

RICHARD APPELDOORN: Yes. Can you hear me? Nancie? Can you hear us? All right. We have a technical problem.

GRACIELA GARCÍA-MOLINER: I think we lost Nancie. Here she is. Nancie, can you hear us?

KEVIN MCCARTHY: While we're trying to get Nancie back online, I've asked Shannon to jump on if she can.

RICHARD APPELDOORN: Okay.

LIAJAY RIVERA GARCÍA: Raise hand from Nathan Vaughan.

RICHARD APPELDOORN: Yes, go ahead, Nathan. Thanks.

NATHAN VAUGHAN: So, yeah, jumping in, while Nancie's having tech technical difficulties, she was going to say that we did have the multiple sensitivity runs. We had the base with all the Caribbean data. We had a Caribbean without the five oldest fish, which did not significantly change the growth parameters L Infinity or K and also, did not change the natural mortality rate because it didn't change the maximum age. Then, we had a third model that used the North Carolina-South Carolina data, which also did not significantly change L Infinity and K values but did increase M significantly. So, those were the three different runs that were performed.

These were just based on the different data that went into the model, not sort of sensitivity, just adjusting K or L Infinity.

RICHARD APPELDOORN: Which is what I was asking for. So, is that something that's done when the models run formally? That those sensitivities would be included.

NATHAN VAUGHAN: I'm not sure that anyone was intending to include those sensitivities. That's the estimate- Well Shannon's on now so she can jump in.

SHANNON CASS-CALAY: So, I can jump in. I, unfortunately, was not here for the question. So, is the question that we are considering additional sensitivity runs on L Infinity?

NATHAN VAUGHAN: Yes.

SHANNON CASS-CALAY: So, I think that the recommendation from the Science Center was to recommend additional research be conducted to further refine growth estimates.

If you want to see additional sensitivity runs on L Infinity, you know, they are obviously possible, but they would have to be informed by data in some fashion, right? We can't estimate the growth parameters in this model. There are insufficient data to do so. So, you would have to have some hypotheses, some alternate hypotheses, that you wanted to test. And in that sense, it becomes more of a sensitivity run and less a member of the ensemble. So, maybe I need to know what the actual proposal is so that I can comment more effectively.

RICHARD APPELDOORN: Well, I was thinking more of, we have a growth model that's giving us K and L infinity from the work on the aging that Virginia's group has done. And that model would give you estimates of those parameters, but it would also give you confidence limits for those. And have we looked at the effective variance within those confidence limits?

SHANNON CASS-CALAY: So, no, we have not. I see Erik's hand up. So, this gets to why it would be important to work towards something like an MCBE approach because this is when that sort of methodology would be very effective. The issue with stock synthesis is that we are using fixed growth, it cannot be estimated. And that same growth is actually being used to externally calculate the Lorenzen M vector that's being applied for the natural mortality at age, which is also fixed in the stock assessment. So, what you're asking for is very appropriate in an MCBE context or in a more sophisticated way to examine the scientific uncertainty. But it's extremely difficult to do in the current stock assessment model formulation.

RICHARD APPELDOORN: Well, I was thinking of just a simple sensitivity analysis, which I think would be fairly quick to do.

SHANNON CASS-CALAY: We can certainly run a sensitivity analysis.

RICHARD APPELDOORN: I'm willing to- I'd like to see that done, but willing to let you have the leeway to, you know, if nothing comes out of that, that suggests there's a high sensitivity there, then you can just go ahead with what we have and run the model with the primary estimate that we had. I don't know what you do if the sensitivity analysis says, "hey, you're really affecting natural mortality," and then we have to think about what we want to do there.

SHANNON CASS-CALAY: Yeah, and that is going to be exactly what will happen because- Well, L Infinity won't have much impact directly on natural mortality unless we also change the TMAX, which you are not proposing to do. So, I know Erik's hand is raised and I will defer now.

I think sensitivity runs are possible to look at the impact of L Infinity, but I don't think sensitivity runs- You know, these would be sensitivity runs to determine how variable the stock assessment results are. But unfortunately, we couldn't really include that in the official ensemble used to develop the management advice.

RICHARD APPELDOORN: Yes, I understand the problem with the

ensemble thing, so I'm not asking that. Thank you very much, Shannon. Erik?

ERIK H. WILLIAMS: So, we need to be clear on what we're going to do with said run or said sensitivity analysis. I've run across these many times over the years, that there's confusion on what a sensitivity run is and what an alternate base run is. They're not always the same and some people get those mixed up. A sensitivity run is meant to just look at a perturbation to the model and look at its behavior with respect to whatever parameter or input we're varying. What you do with that is what matters then in the end, because the sensitivity is just a, like I said, it's a model behavior test, so to speak.

Now, if you think of sensitivity run is an alternate base run, well then, then you're into that realm of ensemble modeling, and then what do you do with it? So, you run an alternate version of a growth curve, say for, in this case, what are we doing with the output from that? Is that going to change our base? If I step back and look at where we are now with respect to number one, that's on showing right now in the presentation, what we discussed is, where we're headed is using the ABC control rule with a single base run that we have set up in a way that we all agree is going to capture the central tendency but not the uncertainty. And that means we just need a single run, right? If we're going to go down the road of all the variability that is potentially within that model that's going down the road of that ensemble analysis and needs a lot more work, needs a lot more decision points, you know, of what sources of uncertainty are we going to put into this?

You know, we probably should go down that road eventually, but I don't think we're there now this gets back to one of my comments earlier yesterday where, what is the- You know, if there's management urgency to get this done, I think we stick with a single base model that we parameterize in a way that captures the central tendency of all the uncertainties that we think are going on and we apply the ABC control rule with the Sigma_min and that's what we can provide to management. That'll be the most expedient and efficient way to get them information and then possibly consider building the ensemble analysis approach further down the road.

If we're not doing that, then yeah, we're kind of derailing the system and we're not going to get management advice out of this immediately. So, that's sort of my take.

RICHARD APPELDOORN: So, just to clarify. I agree with what you said. So, when we talk about a base model, are we just- You know, that's going to be run a whole bunch of times. You have to get the

average or median or whatever we're using as the point of central tendency, and then most likely are going to be applying the Sigma_min. So, something's generating variability there. What is that?

ERIK H. WILLIAMS: No, I think that's incorrect. I, my understanding is we're looking at just a single base model. Now we can characterize uncertainty using, you know, sort of hash, inverted hash, and Matrix, but those estimates are not- they're usually minimal.

No, we're talking about just a single base run upon which we're in a basis, there's no variability being cast in this. Otherwise, we are talking about going to an ensemble approach of, you know, thousands of models runs with varying input and parameter settings.

RICHARD APPELDOORN: Is this what we did for lobsters?

SHANNON CASS-CALAY: So how you've done it recently is you've actually relied on your control rule to create the PDF. So, you're acknowledging that the scientific uncertainty that comes from the base model, even if we bootstrap it, you know, is much less than the true scientific uncertainty. Which is why your tier three control rule uses two times Sigma_min. So, you are actually discarding the PDF that comes from the stock assessment itself. You're using the central tendency of the single base run and you're creating the PDF using your control rule.

RICHARD APPELDOORN: Thank you for clarifying that.

SHANNON CASS-CALAY: Yeah. And even when we have bootstrapped or even Monte Carlo simulated our base models to create the PDF from all of the uncertainty, from all of the data inputs and the stock assessment, essentially, that- You know, all the parameter uncertainties that exist in the stock assessment because we use so many fixed parameters in many Southeast stock assessments, even when we bootstrap, you know, the PDFs tend to be quite narrow. So, you know, that's why yesterday when I proposed, you have two ways to go now, we try to incorporate a more realistic accommodation of the scientific uncertainty through an ensemble approach, or we rely on your base model to create the PDF that is even wider than what is going to currently come out of an ensemble approach. But, you know, the central tendency comes from a single base run.

RICHARD APPELDOORN: Okay. Thank you for that clarification. Jason.

JASON COPE: Shannon, did a great job of laying out the fact that there's a control rule in place just for this reason of dealing

with all these other sources of uncertainty that can't be included in the reference model but should be considered in the risk tolerance decision, which is what we're talking about.

Also, just a reminder, as we talked about yesterday, there is asymmetry in these uncertainties. When we do pick a reference model, the tricky part is the alternative models that could be devised typically are not- the reference model isn't necessarily centered around all of those. It's centered- I think when we say centered, we mean, we are finding a model that best fits the data and the model specification. Meaning the parameter values used, are the most justified for the moment. That doesn't mean it's centrally placed in all of the uncertainty and all the model runs we could do. And because of that potential bias, this is where you could also kind of think of P* coming in as well as the sigma being something that could be discussed as part of the risk tolerance.

But just wanted to remind us that all of these sources of uncertainty are not symmetrical. And that's an important feature consideration, but we find ourselves in this situation a lot. What people often do is put together maybe a decision table-type analysis where they do center the uncertainty in a way that says, "the reference model is here." There could be a natural mortality that kind of pushes it one way and then there's another source of uncertainty that would've actually pushed it a different way. Those bookends, you could actually look at how much more uncertainty is there based on those bookended models. And then look and see if that's more than your Sigma_min, right? But that also isn't the cleanest way of doing it. It's a way. So, I'm not sure if we want to go down that road. I think we have mostly what we need, but I don't know if maybe there's a P* consideration here that should also be discussed because of bias. Thanks.

RICHARD APPELDOORN: P*, however, is the review of the council.

JASON COPE: It is, that's absolutely true. And sometimes, I don't know for the SSC guidance part of this, for the statement, maybe we mentioned something and that's why maybe we discuss it. If not, I understand why.

RICHARD APPELDOORN: Okay. Thank you, Jason. Graciela or Liajay, do you have Shannon's list of her understanding of our responses yesterday?

LIAJAY RIVERA GARCÍA: Yes. Give me a second. There.

RICHARD APPELDOORN: While that's going on, Kevin, do you have the information on the expansion factors?

KEVIN MCCARTHY: I do. I can perhaps share my screen. My internet's sometimes a little wonky so it becomes problematic for people to see it clearly. So, we'll give it a try and if that doesn't work I, - well, let me do this. I'm going to email it to Liajay and have her present it. That way it comes through clearly.

LIAJAY RIVERA GARCÍA: Kevin. I just- Okay. Do you want to present something now?

KEVIN MCCARTHY: Okay. Yeah, I'll give it a try. Okay.

LIAJAY RIVERA GARCÍA: So, you're supposed to be able to share now. Okay, we see your research.

KEVIN MCCARTHY: And are you able to see a plot?

LIAJAY RIVERA GARCÍA: Yes.

KEVIN MCCARTHY: Is sharp enough that you can read it or is it fuzzy?

RICHARD APPELDOORN: No, it's good.

KEVIN MCCARTHY: Okay. Excellent. So, here's what you see. For correction factors beginning in 2014 through 2020, we've got 2021 in there as well, but it's the same value as 2020.

So, you can see they all fall in line more or less except the North Coast, which is this yellow line that shoots up to six times expansion. So, we're investigating right now how much of the landings came from the North Coast for Queen Triggerfish. Typically, the North has pretty small landings so generally speaking, about one and a half times expansion for East, South, and West. A little bit- And then there's this inland, which is the red line, which is a minor component, even less so than the North. It's just if we don't have a coast reported, it gets thrown into this inland category.

So, it's pretty much falling in line one and a half times expansion from the reported landings except for the North. I'll get you a number on the amount that came from the North relative to the other coasts. I've got Stephanie Martinez Rivera's looking that up right now.

So, there's not, it's not- other than this North that sort of went through the roof in 2020. The other expansion factors, correction factors are falling pretty much in line with where they have been

since 2024, oh sorry, 2014.

RICHARD APPELDOORN: So, for me, that North Coast estimate throws all kinds of red flags up in the air. I would be very hesitant of using it unless we fully understood what drove that deviation and we agreed that it was indeed real. So, the fact that perhaps not many fish come from the North Coast would be, would help us out. But frankly, I would take, for the North Coast, I would take the couple last, couple years, average and used that rather than 2020. To have that kind of change is, like I said, sends up all kinds of red flags for me.

KEVIN MCCARTHY: Rich, that's certainly easy enough to do.

RICHARD APPELDOORN: Anybody else, Reni, you were interested in this and Michelle?

JORGE R. GARCÍA-SAIS: Okay. You hear me now? I see that on the West Coast there is a decline in the line after 2019, I guess. Are there any reasons for that or are we- Knowing that the West Coast is a very high contributor to the total landings, perhaps the highest. So, are we going to use this 2020 even though it shows a decline after several years of consistently higher expansion?

KEVIN MCCARTHY: It's not the West Coast that drops. It is this orange line that falls in between, it’s inland, which is a minor component. There are a couple of municipalities inland that report landings. And there are also- if a coast isn't assigned to a particular report, then it gets dumped in with the inland category. So that's a very, very minor component. It's even much smaller than in the North. So, it typically amounts to a very, very small percentage.

JORGE R. GARCÍA-SAIS: Okay. Because the colors are so similar the

KEVIN MCCARTHY: Yeah. the West falls in with everything else.

JORGE R. GARCÍA-SAIS: Yeah, that's fine. And by the way, I agree with Rich in terms of the use of the North Coast expansion six times. You know, I believe that there's something wrong there. Maybe it's because of the small sample size. Anyway, I agree with not using that kind of information, you know, completely off the chart. Thank you.

RICHARD APPELDOORN: Kevin, Reni raised a good point in his final comment there about the small sample size. So, 2020 had a lot of lockdowns, restaurants were closed. So, that takes out a lot of the market for the fishermen. So, that would be another thing we

would be concerned about is whether, not necessarily was the reporting pattern the same, but was there enough reporting going on to capture what that level was?

Do you have a feel for that from looking at the data?

KEVIN MCCARTHY: Rich, this is Kevin. I don't, but we can- You know, that's another thing we could investigate. We're working with DNER to automate the calculation of these correction factors. But, you know, aside from that, I'm not too much into the data.

We can certainly investigate that, you know. Were there particularly small sample sizes that year? Because the rest of the time it pretty much falls in line, it bounces around a bit more, and that may also be a sample size. But the East bounces around too. That's that blue line. So, we can investigate that if it's not going to give me any consternation to use some average of the preceding years which seemed to behave a bit more for the North.

But yeah, it certainly warrants a little investigation. And again, it doesn't amount to a lot of the landings, but we may as well use the best approach that we can. And so, if that's the route we're going to go, using an average, which year do you want to use for the average? What we're looking at here 14 to 19 or some other group of years?

LIAJAY RIVERA GARCÍA: Mr. Chair, you have raised. Oh, sorry.

RICHARD APPELDOORN: Okay. I'll let the others with their hands raised comment first. Michelle.

MICHELLE SCHÄRER-UMPIERRE: Thank you, Mr. Chairman. I agree with looking at an average instead of this one data point from 2020, but I think it's important that we receive some feedback and the number of visits that the port agents did to calculate these expansion factors. Because of the shutdown that we had during that year, things were pretty atypical, not only for the fishers but also for DNER employees. Thank you.

RICHARD APPELDOORN: Thank you, Michelle. Jesus, do you have a comment relative to this?

JESUS RIVERA HERNANDEZ: Yes. I know that the port sampler also mentioned in one of the presentations last month that other people that were recreational fishermen also applied for the commercial license because that was the only way, during the pandemic, to get out of their houses.

So, most of the recreational guys also jump into the first, you know, the apprentice fisher license, Commercial Fisher license. Again, we don't have them to corroborate. I just checked with Wilson. I don't know how that data goes. Also, another change is that they also have a new port sampler that covered part of the North. So, in the past, they didn't have a specific person for the North, but I don't know when the new port sampler started or if there is an error in the data. But yeah, whatever you decide, it's just- they don't answer me very quickly when that question comes.

But yeah, again, it would've been nice if they were here and answered that question directly. That's it.

RICHARD APPELDOORN: Thank you, Jesus. That's actually some very interesting information. Again, saying we have a lot of stuff going on in 2020. Again, especially with the North so we should be careful with these values.

Fortunately, 2019, they all seem to kind of cluster similar to what 2020 is, except for the North. So, that would give us some reason to think the two 20, except for the North, is somewhat valid.

Kevin, you were asking about which years to average for the North going back and I would, for me, just looking at the graph, I would just go with 17, 18, and 19. I don't know if any of the rest of the committee has a feeling about that.

Jesus, is your hand up again or you just didn't put it down yet?

JESUS RIVERA HERNANDEZ: That was an error, sorry.

RICHARD APPELDOORN: So, anybody else?

VANCE VICENTE: I would include between 2014 and 2018 because these, like winter storms and weather events, you know. Density-dependent factors that could have been part of the future, in a more continuous way. So, I think that we should be, have a spectrum big enough to include such events.

JORGE R. GARCÍA-SAIS: Richard, I sort of agree with Vance in this observation. Actually, the years 2014 to 2016 show to be a little less, the correction factor appears to be smaller than what we have in 2019, 2020. That may be because, you know, there's an increase lack of reporting due to these factors, Vance, is talking about.

Maybe the 2014 to 2016 period reflects a more stable or more

characteristic type of reporting that probably even extends, at least for the West and the South Coast, extends down to 2017 right before Maria. So, just, you know, just an opinion for your consideration, you know?

RICHARD APPELDOORN: Thank you, Reni. I don't have a problem with using the 2014 to 19 averages for the North, but we're only talking about doing this for the North. That's my understanding.

JORGE R. GARCÍA-SAIS: on average, you know, particularly for the East and on the South Coast. That may just be reflecting the chaos of Hurricane Maria, you know. I don't know how that is characteristic of our fisheries. But you know, ever since hurricanes are now an almost everyday thing, you know, I mean, I don't know why not to include them as well, you know. Thank you.

RICHARD APPELDOORN: Okay. Thank you, Ernie. Does anybody else have comments on that?

VANCE VICENTE: Yeah, I have one more comment.

RICHARD APPELDOORN: Go ahead, Vance.

VANCE VICENTE: Yeah, I see that there are so many variables which affect directly these expansion factors, such as underreporting, pandemic, earthquakes, storms, winter storms, winter swells, and everything. How much weight are we going to give to each of these variables? I mean, is there any way that we can partition and- Like for example, how much of this expansion factor right now is affected by or influenced or impacted by underreporting?

We've been talking about storms, etcetera but how much weight does underreporting have in determining which expansion factor is going to be imposed on a year, on a specific year?

RICHARD APPELDOORN: Well, expansion factors are driven by underreporting. That's what you're trying to capture. Whether the patterns of reporting or not are variable, depending on whether you have a pandemic or earthquake or whatever, other than sample size, is something that has not been looked at, has not been designed to be captured in the data that are collected.

And while we can talk about trying to alter the process in the future. What we're really trying to do is to implement the kind of port sampling program that came out of- the port sampling program that was conducted by Amerigroup. So, that's the kind of direction we would really like to go rather than trying to just improve the system we have now. What we really want to do is replace the system

we have now with a much more rigorous statistical sampling program that would get us these correction factors. Not just on a coast-wide basis, but on a species basis.

So, there were hands by Marcos and then Shannon.

MARCOS HANKE: Thank you, Richard. By the way, I totally agree with your last comment. I want to say that in the Northeast and especially on the North Coast of Puerto Rico during the pandemic 2020, there is a big quantity of recreational fishermen that couldn't go out fishing. They applied for a commercial fishing license, which is very easy to do in Puerto Rico at this point, in order to go out and fish. I bet you that most of them didn't report anything they caught and most likely that yellow line is responding to that.

RICHARD APPELDOORN: Thank you, Marcus. Shannon?

SHANNON CASS-CALAY: Yes, thanks, Rich. So, I do agree that this is worthy, you know, of further consideration. However, you know, it really is a lengthy discussion and requires very deliberate evaluation. I think it would be more appropriate, you know, to propose, for example, a SEDAR procedural workshop to really get-look into the correction factors.

This is not a Science Center product. This is basically a cooperation between the Science Center and DNER. So, I think that for the purposes of this discussion for Queen Triggerfish and perhaps for Spiny Lobster, the more important thing is for us to establish what we're willing to assume in 2020 and 2021 for the purposes of the projections of these stock assessments. They can be updated easily if we get improved information from that program.

But, you know, I think solving the correction factor problem is going to require extensive deliberation and participation from DNER. So, I think what I'm requesting is that, at least for the time being, the most appropriate thing is to address the questions that are at hand about the Queen Triggerfish and Spiny Lobster assessment projections.

RICHARD APPELDOORN: So maybe I can summarize. Okay. Sorry. J.J.

JUAN J. CRUZ MOTTA: Thank you. I think I was going to say what you were thinking. Basically, I just wanted to propose, based on what my colleagues like you said too, to use the average from 2014 to 18 or 19 as an estimate for the years that we're missing and decide on that and move forward. Thank you.

RICHARD APPELDOORN: So, I need clarification on that. I was proposing only to adjust the estimate for the North Coast. Are you proposing that for all the coasts?

JUAN J. CRUZ MOTTA: I'm proposing that for all the- I mean for all the coasts to fill up the dates that we don't have which I believe are 2021 and also 2020 causes of the reliability of those estimates at that time. Thank you.

RICHARD APPELDOORN: Okay. Does anybody disagree with that? So, I'm not hearing any disagreement. That's going to be our recommendation. Instead of using the 2020 correction factors for 2021 and 2022, we are going to use the average between 2014 and- Was that 2019 J.J.?

JUAN J. CRUZ MOTTA: Well, I would say 2019, but then Vance suggested we do only until 2018 for some stuff that happened in 19. So, I'm happy to do it 19 or 18, whatever points of view. Whatever, whatever most of you guys want to do about it.

RICHARD APPELDOORN: I'm supporting 2019 (unintelligible). With that now can we go to Shannon's list that she prepared for-

KEVIN MCCARTHY: Rich, sorry to interrupt, this is Kevin. I don't, as a presenter, I don't have a way to raise my hand so, I'm going to stop sharing now. So, that is, if I'm correct on this, this is 2014 to 2019 across all coasts. So, for 2020 and 2021, we're going to use those averages. And that's for every coast, not just the North.

RICHARD APPELDOORN: That's correct.

KEVIN MCCARTHY: Okay. Thank you.

RICHARD APPELDOORN: So, Liajay, if you could go back to that list of decisions that Shannon made yesterday.

VANCE VICENTE: Richard this is Vance, may I comment?

RICHARD APPELDOORN: Yes. Go ahead.

VANCE VICENTE: One thing that I think we should remember is that the North Coast and the South Coast are totally different regimes. For example, storm more eastern storms affect the North Coast and not the south. Hurricanes go sometimes by the South Coast, along the South Coast shoreline and some come from the North. So, there are different systems I don't know if we should converge, get an average using all the coasts unilaterally. I don't know. That just

came up to my mind now.

RICHARD APPELDOORN: No, we're not averaging all of that using the one thing. We're averaging each coast by itself and that's what's going to be used to the-

VANCE VICENTE: Okay. Got it.

RICHARD APPELDOORN: Okay. So, the list is on the screen. There were six things, and of course, there are six things here. Maybe just jump to part six because that's what we've just been discussing. We were going to use the historic time series and the correction factor now is going to be generated from the averages of 2014 to 2019. And that yes, we would use 2021 landings to estimate 2022. So, we haven't discussed that last part, but I agree with that. That's what we recommended.

Subject two, and correct me if I am wrong, but you did say if you saw an obvious departure from 2021 into 2022, that you could adjust that accordingly using some kind of ratio rather than absolute values.

KEVIN MCCARTHY: Yes, that's correct. We're going to look for, you know, if there are consistently higher landings during the first part of 22, for example, we can make that adjustment to continue throughout the year where we don't yet have 22 landings relative to 21.

RICHARD APPELDOORN: All right. Thank you, Kevin,

LIAJAY RIVERA GARCÍA: Mr. Chair. Anything you would like us to add to the document as a recommendation?

RICHARD APPELDOORN: Okay. Well, the recommendation would be that correction factors by coast would be determined by the average from 2014 to 2019. And that these values would then be used to correct the 2021 and 2022 data.

LIAJAY RIVERA GARCÍA: Richard, we can't hear you.

RICHARD APPELDOORN: I'm not saying anything. I thought you were still writing. So, at the end of that 2021-2022 is data. Thank you

LIAJAY RIVERA GARCÍA: Mr. Chair, you have a raised hand from Kevin.

RICHARD APPELDOORN: Go ahead, Kevin.

KEVIN MCCARTHY: So, what are we doing for 2020? We've bracketed it here. Are we going to use that average to inform 2020 as well? So, that last bit would be 2020 through 2022. Are we just keeping 2020 as is but not using it for the average? What's the recommendation for 2020?

RICHARD APPELDOORN: Excellent point. Kevin, thank you for catching that. I would say from our discussion that we are going to use this same average for 2020. Unless the committee would like to comment otherwise, because that was the nature of the conversation, J.J.

JUAN J. CRUZ MOTTA: Yes, I agree.

RICHARD APPELDOORN: So, Liajay, in that sense, the very last part of that recommendation should be 2020 to 2022.

LIAJAY RIVERA GARCÍA: Okay. Thank you.

RICHARD APPELDOORN: Yes, thank you too. So now flipping up to the top of the list. We have the decisions; we don't have the questions here.

LIAJAY RIVERA GARCÍA: Mr. Chair, would you like to have a side-by-side screen with the slide of the decisions needed?

RICHARD APPELDOORN: Yes, if that's possible in a way that we can still read it.

LIAJAY RIVERA GARCÍA: Okay, I'll do that now.

RICHARD APPELDOORN: Well, I have a very small screen and I can actually read it, So, I'm thinking maybe that's okay.

LIAJAY RIVERA GARCÍA: Maybe it's not a good idea then

RICHARD APPELDOORN: No, no, I'm saying it's good.

LIAJAY RIVERA GARCÍA: Oh, you can read it. Okay.

Finalized SSC guidance recommendations

RICHARD APPELDOORN: Everybody should be able to do that. So, the first point, should we use the ABC control rule with the base or the ensemble? I think we said that we were going to use the control rule with the base. I'm actually going to ask Shannon to explain her statement because I don't- What's the MLE option?

SHANNON CASS-CALAY: So, the MLE option is that we can run the initial search on the initial equilibrium catch using a model that estimates steepness and then use the maximum likelihood estimate from that process. So, use the maximum length of those estimates of initial equilibrium catch.

RICHARD APPELDOORN: Thank you. I should have known that MLE was maximum likelihood. So, this was as you had presented yesterday, only now we're going to use that approach to estimate steepness as well. Is that correct?

SHANNON CASS-CALAY: That is our intention. So basically, you would end up with a model at the maximum likelihood estimate of the equilibrium catch. That model has estimated steepness. So, the only trick now is that in step five we have to make sure that the steepness that is estimated makes sense. And that's a step we still haven't attempted yet, but we assume it will. If not, there may be different decisions to make.

RICHARD APPELDOORN: No. So, yes, this agrees with what my understanding was. I just was not understanding how you had written it relative to my thinking. But yes. Thank you. Does anybody else want to comment on that? If not, we would move on to point two.

All right. Point two, I think this was actually more of a key point that we were looking at because the starting value did have an influence on what the model output was going to look like. So, the question was, should there be a fixed value for the initial catch or an ensemble analysis? And so, the answer that Shannon has written, fixed the initial catch at the maximum likelihood estimate, I think is saying, we're going to use the ensemble analysis to get that maximum likelihood estimate, and then that's what we're going to use. Is that correct, Shannon?

SHANNON CASS-CALAY: Yes.

RICHARD APPELDOORN: Right, thank you. And that's in line with what I thought the conversation said yesterday. Any disagreement from the committee?

Okay. Number three had to do with the impact of M on basically the Carolina data. And so, we had agreed, as Shannon has written there, not to use the Carolina data especially since that aging has not been validated and we would use the SEDAR growth parameters as an alternative.

Moving on to number four had to do with selectivity. Should we retain the trap, initial trap selectivity assumption, which was

logistic, or used the dome-shaped one? Our decision was, as Shannon has written, to retain the trap selectivity as a logistic model.

The fifth point with steepness should we retain the fixed value or attempt to include an ensemble analysis? And as we had just discussed in the first part that when we used the ensemble analysis to try and estimate steepness, making sure that that estimate makes some sense. If it does, then we would fix the steepness at the maximum likelihood estimate and if it doesn't, then we would then use some kind of mean recruitment value. And that is in alignment with what I thought we had decided yesterday.

Now, Erik, you have your hand up?

ERIK H. WILLIAMS: Yes. Thanks, Rich. Just to clarify, I agree with everything you just said, but when we say check that steepness makes sense, what we're talking about is some of the diagnostic tests that we actually talked about yesterday, which would be the likelihood profiling across steepness likelihood profiling for each input, you know, such as the landings, the length comps, and profile across steepness for those to make sure that the steepness estimate is being well estimated by the various data sources and it's not some mediation of two data sources that disagree on what steepness should be. But I think the assessment teams understand that.

RICHARD APPELDOORN: Thank you, Erik. Unless someone from the assessment team doesn't understand that we can go ahead and just- Since we've already done part six, we can say that Shannon has captured the decisions on those six issues with the recommendation that we've added today about the expansion factors.

And with that, we then move on to a similar set of questions for the analysis to be conducted for the Virgin Islands. Is that correct?

GRACIELA GARCÍA-MOLINER: Yes. Mr. Chair, that's what you wanted to see, right?

RICHARD APPELDOORN: Well, correct. And I'll start by making the comment and hoping somebody else will pick this up. But we had commented yesterday, just looking at this briefly before we closed that some of these would be difficult to address without having some kind of initial results to look at which was the case that we had for Puerto Rico. I think we could say that- For the same reasons, we would have to deal with the ABC control rule. It was the base model.

GRACIELA GARCÍA-MOLINER: Mr. Chair, you have Shannon, Erik, and Kevin.

RICHARD APPELDOORN: Okay. In that order, Shannon.

SHANNON CASS-CALAY: So, yes, thanks. We did have that discussion yesterday and certainly, that's understandable. I think most of the information from the discussion on Puerto Rico can at least help us move forward constructively with the U.S.V.I. There is one question that we have, because in our preliminary examination of Saint Croix, although we have used the same life history information across all three island platforms, in the case of the Saint Croix assessment, steepness does not appear to be estimable. It appears to bound near one, implying that there is no spawn-recruit relationship.

So, a question that we have is, would you prefer for us to go ahead, use an SPR30 proxy and move over in median or mean recruitment assumption for the projections? or should we borrow from one of the other island platforms that have an estimable steepness value? So, that’s really the only question that we have, is the question of steepness in Saint Croix.

RICHARD APPELDOORN: Okay. Sorry, I was writing. Erik.

ERIK H. WILLIAMS: Yeah. Thank you, Rich. I think you got cut off, but I was going to agree with what you said that I think what we've learned is we're not yet ready for the full ensemble analysis. So, I think we are going to be sticking with the ABC control rule, which means then we should be focusing on a base or reference run that's sort of centered on all of our understandings of uncertainty.

Just to answer, you know, one of the things that comes out of sort of the hierarchy of decisions we made for Puerto Rico is what Shannon was alluding to. And that is, if steepness is not estimated, I think what we said in that case, even for Puerto Rico would be consistent with the Virgin Islands, which would be to use a mean recruitment and the F30%. I don't- We really could discuss whether borrowing the steepness is the appropriate thing to do or not. But I think we even discussed whether estimating a stock recruit curve itself was appropriate, given that you potentially have sources of recruitment from outside the area of interest for the assessment. So, if it's not estimable, I'd say you go with a mean recruitment, but that's just my initial thoughts.

RICHARD APPELDOORN: Thank you, Erik. Kevin,

KEVIN MCCARTHY: Yeah, Shannon just got her hand up before I did. I was going to say the same thing that she mentioned about getting through this list and the steepness in Saint Croix. So, I'm going to lower my hand now.

RICHARD APPELDOORN: All right. And Doug.

DOUGLAS GREGORY: Thank you. Good morning. I don't have a strong preference, but I do want to point out, you know, for a point of discussion with the assessment people, that in the recent scamp assessment, we had a similar situation in which the South Atlantic stock had an estimable steepness, but the Gulf stock did not. And the reviewers decided to take an average of the South Atlantic steepness value and the steepness value taken from an international database. I don't know if it's life-based, or fish-based, and they average the two, and we went forward with that.

I just throw that out there for discussion purposes. I really don't have enough experience to know which the best way is to go. The more straightforward way seems to be the SPR approach and average recruitment, but other people have done other things. Thank you.

RICHARD APPELDOORN: Yeah. Thank you, Doug. Erik?

ERIK H. WILLIAMS: I just want to follow up on Doug's comments. Very good at comments, Doug. And yeah, I mean, it's a good point to sort of recognize what might be the differences between that situation and this situation. And that is when we're talking about a stock recruit curve, we're talking about a production function and we're talking about how well spawning stock biomass, as we're estimating it in the model, is contributing to recruitment subsequent recruit.

So, you have to think about the system and the stock that you're defining and estimating in the assessment model. And so, in the case of say, Gulf and South Atlantic, you're talking about a coast-wide, an ecosystem-wide assessment, in which case then you would think that there probably is more likely a chance to be that relationship between spawning stock biomass and subsequent recruitment. Whereas when you start to get down to what we're dealing with here, where, you know, it's island specific and we highly suspect sources of recruitment coming from outside of the stock assessment as it's defined, then you start to question whether such a stock recruit relationship should exist or should we be imposing a steepness on that or not. But yeah, very good point, Doug. Thanks.

RICHARD APPELDOORN: Doug your hand is up again?

DOUGLAS GREGORY: Yes. Thank you. I agree, Erik, and I guess this is the morning of agreement. My first reaction, cause my main experience has been with lobsters, which have a nine-month larval period and are widely dispersed, and local recruitment is highly questionable anywhere in the Caribbean. I would assume the same for most of the species on the Caribbean islands, but then you have these spawning aggregation sites. Life history suggests that where there are spawning aggregations, there's a system of local recruitment, which is contrary to what my initial assumption would be. So, it is possible to have local recruitment with some species there. I guess it depends on the larval cycle and how the larvae dispersed.

Now, one question I have, I'm not a Triggerfish biologist, but I believe the Gray Triggerfish in the Gulf of Mexico, the males actually brood the eggs on the bottom of the ocean. Like a freshwater nesting bird or something. So, in that case, there really could be local recruitment. If Queen Triggerfish do this similar thing of laying the eggs on the bottom and nurturing them while they're on the bottom. I don't know if, if Queen Triggerfish do that, but I, as I said, I have no strong feelings about either direction. Thank you.

RICHARD APPELDOORN: Thank you, Doug. I would certainly argue that- I agree with the approach of just looking at the average recruitment value and going with the F30% as the way to go. One can certainly look at what's happening in Puerto Rico and Saint Thomas and see if those steepness estimates are similar, and that might give you a suggestion that you could use the same value for Saint Croix.

In terms of biology. It, you know, Saint Croix would be the place where you would most expect to have a stronger relationship between the population and recruitment. I say that because there has been a study of bluehead wrasse, which has a 40-day larval period from broadcast spawner, showing that fish spawned in the eastern end of Saint Croix do settle in the, or can settle, in the western part of Saint Croix. However, that same study also did show that there were things coming in from off-island as well.

Triggerfish being a nest brooder is going to have a shorter larval period. So, do you think the possibility of retention in Saint Croix would actually be higher? But we don't have any specific information on that. Virginia, you can maybe enlighten us on some of that.

VIRGINIA SHERVETTE: Yes, I can tell you. So, we try to cover as

much of that information in our working paper as possible based on what we do know. And then, you know, what is speculated upon based on our understanding of Triggerfish spawning strategy in general. And also, from our work with Gray Triggerfish, which has been pretty extensive as well.

And so, essentially, we know that across all three management platforms that there are fish that spawn as part of specific aggregations, but there are also fish that spawn outside those aggregations. We also know, just from our age data, that the time that the larvae and then the juveniles spend in the water column is extended. So, it's not just a, you know, 30 days or 40 days or whatever, but from the data that we have, we don't see the juveniles, the smaller fish, recruiting to benthic habitat until they reach a size and age close to one year. Definitely between six to 12 months after peak spawning occurs. And so, I think that there would be, you know, we don't have any values, any way to actually provide any estimates at this point on what amount of in local recruitment is occurring versus outside the system.

But there is, at the last GCFI meeting, there was a great presentation about modeling for Red Hind larvae and recruitment and where they would end up, you know, from spawning that occurs in Lang Bank and so on. And so, we're actually trying to work with a guy that did that presentation to see if we can apply that to Queen Triggerfish since we also know that their peak spawning is around the same time as when Red Hind are doing it. Then also, since their aggregations, at least for Lang Bank and in Saint Thomas as well co-occur were some of the Red Hind aggregation spawning is occurring.

So, yeah, there's a lot still unknown, but in our working paper, we do try to cover as much of that as possible, just for insights. And then, we had a really good discussion at our working group, our life history working group, kind of related to that as well.

Definitely, you know, from our experience we're getting recruitment from outside the island management platforms themselves, though of individuals into each platform. So, I don't know if that helps in any way, but it's definitely worth looking into that, to the working paper as far as, you know, what we reported on and tried to summarize for that. Thank you.

RICHARD APPELDOORN: Thank you, Virginia. So, getting back to the question, some really interesting discussion there, especially on the biology, but from the point of view of the analysis, I think the sense I have from the discussion is that we would not use an estimate of steepness from another Island platform, but we would

just go with the mean recruitment and the F30%.

So, is there another issue that would need to be addressed specifically for the Virgin Islands that wouldn't more or less be the same result that you got from Puerto Rico? Shannon?

SHANNON CASS-CALAY: So, are you asking me? Could you repeat the question?

RICHARD APPELDOORN: Well, you had more or less said, that you needed some guidance on the steepness issue. I'm asking well, relative to everything else, I think it's kind of how we did it in Puerto Rico. You know, I don't know if the selectivity issues are different than in Puerto Rico, but certainly, the issues about including the Carolina data would be the same.

SHANNON CASS-CALAY: Those are all the same. So, the issue is that in our initial model runs, we're going to have to make these same modifications about initial catch, but in our initial model runs and SEDAR 80, Puerto Rico had a steepness of about 0.75. It was estimable. Saint Thomas is about 0.72 and estimable. Saint Croix is not estimable, according to the likelihood profile. So, we're very comfortable if you want to go ahead and use the main average recruitment for the projection and proxy FSPR30. If that's the decision of the SSC, we can move forward if you want to borrow from Puerto Rico or Saint Thomas instead, we just need to know, because it's unlikely that the Saint Croix steepness will be estimable.

The decision is fine if you want to go ahead with the decision made in Puerto Rico that if not estimable, we'll use the proxy. That's fine with us.

RICHARD APPELDOORN: Erik, did I see your hand go up and then down?

ERIK H. WILLIAMS: I didn't want to open a whole other can of worms, but, you know, the- and I don't know the history of how this region ended up with F30% as sort of the default proxy for FMSY, but that's in some regions considered rather aggressive.

One analysis that could be done is, for those stocks where you can estimate steepness is to then look at the corresponding SPR percent proxy that corresponds to that FMSY, and then maybe that'll point to, it may point to F30%, I don't know. But at least it'll give us some idea of what a proxy looks like when we're able to estimate steepness.

RICHARD APPELDOORN: What I think you're saying is that it's just

another thing you'd want to look at to see how confident you are in the results that you're getting. Is that correct?

ERIK H. WILLIAMS: No, not exactly. What I'm saying is, there should be, you know, if you do have a system-wide sort of tendency for stocks to fall in some range of steepness values, those steepness values all correspond to an SPR proxy. So, we choose a proxy because we want a proxy that's going to replicate FMSY in the absence of directly estimating FMSY. Well, when you get a steepness value, you directly estimate FMSY. When you do that, you can also then look at what the corresponding SPR proxy is that's associated with that value.

So, again, as I said, I don't know the source of where F30% came up with- was derived for this region. But one of the things that typically happens in other regions is they look at other species where you're able to estimate steepness and then look at the associated SPR proxy where you can estimate FMSY, just to confirm that say F30% is an appropriate proxy or maybe it's F35%, I don't know. That's something to just- that could be looked at.

Since we have stocks where it seems like we're able to estimate steepness. I mean that's kind of a bonus. To have that situation in many stock assessments and you can do these sorts of additional analyses when you have that case, which is to look at this, the associated SPR proxy with that steepness value.

RICHARD APPELDOORN: Okay. Thank you for that clarification. So, I think we have two things that that has brought up. One is, since Shannon now gave us the value for steepness in Saint Thomas, that it's very close to that of Puerto Rico, it may be reasonable to say, take an average of those two and apply it to the Saint Croix. Assuming that the dynamics of spawning and recruiter are similar. Given the comments that Virginia made about how long these things are potentially in the water column that probably is a very reasonable assumption. Then, from Erik's comments, if we are estimating steepness in two of the jurisdictions, and that's going to give us an FMSY should we not use that to inform what our proxy is for Saint Croix? Is that kind of where you were going with that, Erik?

ERIK H. WILLIAMS: Yes, that's correct. Thanks, Rich.

RICHARD APPELDOORN: I find that totally reasonable. And so, Erik, would you support using the average value of the steepness from the two jurisdictions and applying that to Saint Croix?

ERIK H. WILLIAMS: So, yeah, that's where this whole thing becomes

a circular argument in a sentence. Because yeah, on one hand, we can just apply an average steepness value directly to those stock assessments, or we can use the proxy with an average recruitment. It, yeah, those choices. I think the important reason to sort of associate, figure out what the SPR proxy is that associates with FMSY for the stocks that we can estimate steepness, is you can start to do that for other species beyond just Queen Triggerfish.

And again, this gets to, you know, how well you think stock recruit relationships line up with various species. But at least to get a sense of whether the proxy of F30% is in the ballpark of FMSY values. That's the check really is F30% very different from, you know, the SPR value that corresponds to the steepness values that are coming from these two Triggerfish stocks where we're able to estimate steepness.

RICHARD APPELDOORN: So, as I understand this, if we were to use the average value for steepness and apply that to Saint Croix, that automatically is going to generate the FMSY and therefore we don't need the proxy. So-

ERIK H. WILLIAMS: Yes, that's, yeah, that's correct.

RICHARD APPELDOORN: Okay. So, we need to make a decision about whether we want to do that or whether we want to just not apply the values from Puerto Rico and Saint Thomas but use those to inform what the proxy should be in Saint Croix. That's the question that we're- are those the options, Is that correct?

ERIK H. WILLIAMS: Yeah. That's how I understand it.

RICHARD APPELDOORN: Okay. While we were thinking about this, we have a hand raised from Hardnose, and you'll have to identify yourself.

JULIAN MAGRAS: Yes. Good morning. Can you guys hear me?

RICHARD APPELDOORN: Yes, we can.

JULIAN MAGRAS: All right. I just like to make a comment as it pertains to recruitment. I know from studies that have been conducted, that we show spawning that takes place in the Saint Thomas-Saint John shelf does send recruitment over to the Puerto Rico shelf. We are all connected. So, I'm wondering if because we have the B.V.I., which is also connected to our shelf, if anyone out of the group knows of any studies that have been done in the B.V.I. to see if their recruitment affects the Saint Thomas-Saint John shelf from all species or any species.

And then, a comment towards Saint Croix. Saint Croix, you know, has the Lang Bank, but also East of Saint Croix you have Saba Bank. Have they also been affected by recruitment from the Saba Bank since it's downstream? So, it's more like a comment question. If anyone has any information on that, Thank you.

RICHARD APPELDOORN: Thank you, Julian. I think I'll just respond by saying that I don't think there's been very much study but given the longer larval or project duration that Virginia mentioned relative to studies that have been done on other species, we would expect a fair amount of import into all the jurisdictions from other areas. I think, and someone can easily correct me here because I'm guessing, the steepness value, the higher that number, the less the recruitment seems to be related to the actual stock size that we're estimating. Is that correct?

SHANNON CASS-CALAY: Yes, that's correct.

RICHARD APPELDOORN: So, a value of 0.7 is tending toward not having a strong relationship then. Is that correct?

SHANNON CASS-CALAY: Yes, that's essentially correct, Rich.

RICHARD APPELDOORN: Yeah. Okay. So, that's in line kind with what we're thinking and the observations that Julian has, or questions that he had been raising, and the comments that Virginia has given us as well.

So, for the committee, going back, we have two options for dealing with steepness. Option one was to use the average of the values of Saint Thomas and Puerto Rico. And option two was to use a mean recruitment indicator and a proxy for FMSY. But that proxy could be informed by the steepness relationship from the other jurisdictions. So, Erik?

ERIK H. WILLIAMS: Yeah, thanks, Rich. I don't know how well your proxy is codified in the sense that F30% is it and you have to stick with it. So, that's the only hesitancy I would have with changing that proxy based on the other stocks. How entrenched is that number in any of your sort of FMPs or even ABC control rules or any of that stuff? I don't know.

RICHARD APPELDOORN: Might put that over to Shannon, but it's not entrenched, but it's been a value that we have been at least comfortable applying to a broader suite of species in the absence of actual information to the contrary.

SHANNON CASS-CALAY: Yes. You're right, it's not entrenched in the FMPs or the control rule. We considered it an SSC prerogative to select based on your understanding of the biology of the species.

RICHARD APPELDOORN: So, Erik, I hate to do this to you but you, I think, have the strongest background here to be able to give the committee guidance on which option might be the way to go. Maybe Doug wants to do that. Jason is unfortunately not available at the moment. So, you want to make a recommendation.

ERIK H. WILLIAMS: Yeah, yeah, sure. Rich. Thanks. And yeah, no worries. Putting me on the spot. I hope, you know, I would actually like to hear from Doug if he disagrees with me because I'm perfectly fine with disagreement. I would say, hopefully this is sticking with Doug's comment much earlier, which is, you know, let the data and the model drive our decisions. I would say that the decision should still, that should probably be, if you can't estimate a stock recruit curve, then you go with a mean recruitment, in which case then you have to select a proxy. I think we probably could use whatever the proxy is that corresponds to the other Triggerfish stocks as a good proxy to use in that case.

I think that there's a logical consistency across the board on that in my mind. But yeah, it'd be- I don't know if Doug has any follow-up on that.

DOUGLAS GREGORY: I feel compelled to answer. Now, I'm fine with it. What we don't know is what the SPR might be relative to the steepness of 0.75. I have no clue about that. That's the only thing that concerns me. I'd be more comfortable going with either or, 30% or the steepness that's estimated. But again, I don't have strong feelings about that. Thank you.

RICHARD APPELDOORN: Okay, thank you, Doug. So, let's go with that as a recommendation then. For Saint Croix to use mean recruitment value and use an FMSY proxy as informed by the results from Puerto Rico and Saint Thomas.

ERIK H. WILLIAMS: Thanks for keeping up with all that conversation. You did a good job of keeping track of that cause I know that gets confusing sometimes.

RICHARD APPELDOORN: Well, rest assured that I'll probably forget it all by tomorrow, but it's been great having people who can explain these things to us. Thank you.

So, I was just looking at the- So, are we done with this issue, Shannon, sufficiently for you guys to move forward?

SHANNON CASS-CALAY: Yes. Thanks, Rich. I would just like to, because I do love repeating what I hear, to make sure that I heard it correctly. The decision was that if Saint Croix is not estimable, we'll replace it with the average steepness of Puerto Rico in Saint Thomas. That was the final decision.

RICHARD APPELDOORN: No-

ERIK H. WILLIAMS: I'll jump in. No, no. To replace, if you cannot estimate steepness in Saint Croix, then estimate average recruitment and use the SPR proxy that matches the- Yep.

SHANNON CASS-CALAY: Got it. My apologies. I'm glad I asked for confirmation because obviously, I missed that final decision. So, thank you very much.

ERIK H. WILLIAMS: Yes.

RICHARD APPELDOORN: So again, Shannon, back to you. Have we addressed the issues you needed to move forward then on the Virgin Islands, to your satisfaction?

SHANNON CASS-CALAY: Yes, you absolutely have.

RICHARD APPELDOORN: So, I'm just scanning the agenda. The next items appear to be related to the Spiny Lobster assessment. Is that correct?

GRACIELA GARCÍA-MOLINER: Yes. That would be the first item on the agenda for today. SEDAR 57 Spiny Lobster update.

RICHARD APPELDOORN: All right. That agenda also suggested that we would be breaking for lunch at noon. It is 10 of.

GRACIELA GARCÍA-MOLINER: Correct.

RICHARD APPELDOORN: So, I'm suggesting that we break for lunch now and return at one to pick up with Spiny Lobster.

GRACIELA GARCÍA-MOLINER: Very well. We will do that.

RICHARD APPELDOORN: Not hearing any opposition then we are on break.

GRACIELA GARCÍA-MOLINER: Thank you. Back at one.

RICHARD APPELDOORN: Right, back at one.

(Whereupon the meeting recessed for lunch on October 5, 2022.)

- - -

OCTOBER 5, 2022

WEDNESDAY AFTERNOON SESSION

- - -

RICHARD APPELDOORN: Good afternoon, everybody. I hope you're all back from a nice lunch. I think we should get started again. As discussed, right before the break, the next topic would be SEDAR 57. Spiny Lobster update assessment progress report. So, who will be giving that?

SEDAR 57 Spiny Lobster Update Assessment Progress Report— SEFSC

KEVIN MCCARTHY: I think Adyan's going to get a quick update.

RICHARD APPELDOORN: Okay.

ADYAN RIOS: Hi everyone. Yes, we are working on that and the only thing that I was going to check in today to ask that I needed was guidance on the 2021 correction factor and the 2022 gap year. But I was thinking that to suggest just following the same procedure that you discussed this morning.

RICHARD APPELDOORN: This would be for 2022.

ADYAN RIOS: Yes, what was discussed this morning was using the 2014 to 2019 average correction factor to replace the correction factors in 2020. And then using that information, that correction factor as well in 2021 where we have the reported landings, but we don't have the correction factor yet. And then using 2021 to also provide preliminary numbers for 2022 just to kind of provide the projections starting in 2023 when you see the projections later in November.

RICHARD APPELDOORN: Yes, I think that, unless someone from the committee would like to say otherwise, that would be the recommended approach.

GRACIELA GARCÍA-MOLINER: Mr. Chair, may I ask a question?

RICHARD APPELDOORN: Graciela.

GRACIELA GARCÍA-MOLINER: So, one issue that we have with lobster specifically is the electronic reporting data from Puerto Rico.

RICHARD APPELDOORN: Graciela, do you have your hand up?

GRACIELA GARCÍA-MOLINER: I have my hand up. Can you hear me? Hello? Sorry. Can you hear me now?

RICHARD APPELDOORN: Yes.

GRACIELA GARCÍA-MOLINER: Sorry. Okay, we're switching, switching monitors here.

So, one question I had regarding the lobster specifically is, the data from Puerto Rico, from the electronic reporting, is that already part of what you're looking at, or is that still in the works? How is that? And the reason for my question is because, you know, it was a pretty large percentage of the landings. Thank you.

RICHARD APPELDOORN: Go ahead, Kevin.

KEVIN MCCARTHY: Thanks, Rich. So, we were able to get from DNER the raw electronic logbook data, which we've incorporated. We incorporated it for 2020 and 2021. It's not clear to me if we have any of the partial 2022 data, partial year. But we're going to check that. So, we are incorporating that, and we are applying the correction factors to those data as well.

RICHARD APPELDOORN: Any other comments? Adyan, do you have what you need then?

ADYAN RIOS: Yes. Thank you. Graciela's hand is up again.

GRACIELA GARCÍA-MOLINER: So, the timeline for this would be the November SSC meeting and then the December meeting for the council. Correct. Thank you.

RICHARD APPELDOORN: Okay. So, the next item on the agenda is the terms of reference for the next SEDAR

Review TORs SEDAR 84 yellowtail snapper (Puerto Rico and St. Thomas/St. John) and stoplight parrotfish (St. Croix)

KEVIN MCCARTHY: This is Kevin. That'll be me.

RICHARD APPELDOORN: Okay. Go ahead, Kevin.

KEVIN MCCARTHY: So, I'm not quite sure how you all want to handle this, but I'll just start, and you can tell me if we could speed up or slow down. I don't know, because I don't recall, whether or not you all have seen these terms to reference yet. But I've got them all in a series of slides here and we can just walk our way through them. Or if you're ready to pick up speed and move faster, we can do that as well.

So, next slide, please.

So, just a little bit of background, for those of you not familiar with the SEDAR process. Did someone have a comment here?

GRACIELA GARCÍA-MOLINER: So, sorry for the SSC members, the terms are in Google Drive so they all should have access to that. Thanks.

KEVIN MCCARTHY: Okay, thank you. So, just a little background on the SEDAR processes you are experiencing now.

The SEDAR 84 is going to be what we have in the past referred to as a benchmark assessment. That's not terminology that is currently being used in the Gulf and the South Atlantic. It is being used when we have an assessment that's headed up by the state of Florida. And I'll explain what that is in just a second. But what the process that we have for SEDAR 80, that Queen Triggerfish, is what's called an operational assessment. The update, the very brief questions you got from Aydan about the SEDAR 57 Spiny Lobster, that process, because we've already done an assessment, that will be an update assessment. Each of those is a very different process.

The idea is that an update goes pretty quickly, an operational takes a little longer and a benchmark is a much more involved process. So, for a benchmark, we're going to have a series of workshops. So, a lot of the discussion that's gone on in this meeting will, under a benchmark process, occur earlier in the process, which will prevent a lot of these late decisions. In a perfect world. There are always decisions that come up and changes throughout the process, but hopefully, those will be minimal under a benchmark and will make the kinds of data and modeling decisions that are being made in this meeting much earlier in the benchmark process.

So, we will have an in-person data workshop where there will be a review of all the available data. So, discussions about things like correction factors and landing series and all of that are going to occur then and in a couple of virtual meetings before then. So, those workshops involve scientists and stakeholders. So, the fishers are an integral part of that process and very

important. You all, I think at some point during this meeting will discuss who, from the SSC, will be an appointed participant. I'll also be working with council staff to come up with other appointed participants including, you know, identifying fishers. SEDAR 84 will be for Yellow Tail Snapper in Puerto Rico and Saint Thomas-Saint John and stuff like Parrot Fish in Saint Croix. So, we want to make sure that we've got people on the panel who are familiar with those fisheries and with those species.

There will be an assessment workshop where a lot of the questions we've been going through about the modeling will occur. That'll be there via webinar. It usually requires several meetings. In this case, because we've got three assessments every time we have our turn at the SEDAR table in the Caribbean, it's always three assessments. That's going to take a couple of months to get through that assessment workshop. The idea being we ideally see a base run early on. There'd be comments, much as you've had during this process. Then the assessment lead would go back and rerun models and change things up and come back a couple of weeks later at another webinar to review the progress and the changes made.

Then there is a review workshop. It's typically, it may be in person, I think this one is scheduled to be in person. That generally happens at the home base of the modeler, which in this case is likely to be Miami. But we'll see. This is the phase that involves CIE or Center for Independent Expert reviewers.

And after that whole process, the SEDAR is done, but it then moves on to you, the SSC, for your review. Then presentation to the council after that. So, it's a lengthy process. It tends to be very, very thorough. And that's what we're in for, for SEDAR 48.

So, in the next slide, we begin the terms of reference, and we'll do that for each of these steps.

I don't know, Rich, how you want to handle this. There are multiple slides for this. Is it better just to allow everybody to read through the slide and then get comments on the items that are on the slide? I don't imagine you need me to read through it for you.

RICHARD APPELDOORN: Yeah. But you have such a soothing voice.

KEVIN MCCARTHY: Yeah, and after lunch, you'll all be asleep.

RICHARD APPELDOORN: I would say just let's go ahead and present them.

KEVIN MCCARTHY: Okay. So, these are fairly standard terms of

reference. They're based on some previous SEDAR terms of reference.

One is just basically what we're going to do. A stock assessment for Puerto Rico and Saint Thomas Yellowtail Snapper and Saint Croix Stoplight Parrotfish. We'll use approaches, data-limited approaches, similar to what you've been seeing and then what you saw for SEDAR 57, which was a Spiny Lobster.

RICHARD APPELDOORN: All right. Erik has his hand up.

ERIK H. WILLIAMS: Yeah. Thanks, Rich. I'm just curious as to when you use the phrase, data-limited approach similar to those approved in a previous SEDAR, you were immediately limiting yourself. I know you probably are very familiar with what data you're going to have available, but I would- You know, usually you don't want to limit yourself with the terms of reference. You want to leave it as generic as you can to still get what you need out of it but allow flexibility. So, I don't know. I mean, I wouldn't- You know, data-limited, that's not well defined for starters. I would say an acceptable approach or, you know yeah, something along those lines, because people define data-limited in very different ways.

So, anyways, it may not need to be changed, but it just strikes me that when you start putting very specific things into ToR you start constraining rather than allowing flexibility, which I think is what you want from a benchmark assessment, is you want that flexibility to explore many options.

KEVIN MCCARTHY: Yeah, that makes sense. And we can easily- I'm happy to change things as we go through here. I'm taking notes. I think some others are taking notes and we'll make those changes. That's pretty quick and easy and then send it out to everybody.

The second bit is just talking about data inputs and how we're going to present those sort of standard data inputs, especially for the kinds of information we've got in the Caribbean.

VANCE VICENTE: Richard, may I add something?

RICHARD APPELDOORN: All right, go ahead, Vance.

VANCE VICENTE: Yeah, look, regarding item number two, review available data inputs and provide data, etcetera. I don't see anything regarding like review available data on the ecology, I don't know, feeding habits, diseases that these species may go through. I don't see anything in there regarding the habitat or anything like it. That's it.

KEVIN MCCARTHY: Well, if there is information- I mean, we could certainly add a line, you know, ecological information or something of that order that can be considered. But, you know, we've to have a way to include it into an assessment model. You know, we want to keep this productive so if we have some actual information that can inform a stock assessment, that's terrific. But we don't want to have the discussion go down the rabbit hole of a lot of discussion of things that we can't actually quantify.

So, I'm happy to add something here, however, we want to phrase it, to consider other relevant information. But we want to make sure that we're focused on data that will inform an assessment model. That would be the caveat I would include there. But certainly, we don't want to limit things. If they're going to be helpful to the analysis.

RICHARD APPELDOORN: Thank you, Kevin. I want it certainly to say at the end of the first line, "including, but not limited to." Shannon.

SHANNON CASS-CALAY: Yes, thanks. So, Kevin is kind enough to present these terms of reference, which is very helpful. And I think that the SSC is encouraged, frankly, to add their considerations to the terms of reference.

It does require a negotiation back with the Science Center to ensure that we can meet that capacity. You know, we reserve the right to negotiate, essentially, to make sure that our staffing can meet the challenges that the SCC desires. And so, what I'm getting at is, I think you should feel free to add your own input to the terms of reference but recognize that Kevin is not speaking for the Science Center at this moment. It does require a negotiation with the Science Center to make sure that we can meet the work plan.

KEVIN MCCARTHY: Thanks, Shannon, for that clarification. So, I guess the in practical terms, what that means is we can add whatever edits you care to but that then becomes a negotiation with the Science Center. So, if we want to word smith number two here to include some additional options, we can certainly do that. But it will go back to the Science Center for review.

So, is there something we care to add here?

RICHARD APPELDOORN: Well, as I said, just a generic, "including but not limited to." So, if something does come up, you know, we have the option of looking at it. So, Erik and then Graciela.

ERIK H. WILLIAMS: I was just going to suggest, I mean, I think your suggestion was good, Rich, just to add that phrase. But maybe, because I think the issues brought up like ecology and habitat and things like that, I always think of them as falling under life history information. Maybe some people don't read that into that. So, maybe we just put "life history and ecology information" and maybe that encompasses it all.

RICHARD APPELDOORN: Thank you. Graciela.

GRACIELA GARCÍA-MOLINER: From the discussion earlier in number one, you also want to have something to that effect "using a data-limited approach, but not limited to those approved SEDAR 57."

RICHARD APPELDOORN: The suggestion for number one was to, I think, take out "data-limited," or "a data-limited" and replace it with "using an appropriate approach."

GRACIELA GARCÍA-MOLINER: Okay.

JULIE NEER: I can't seem to raise my hand. I don't know why.

RICHARD APPELDOORN: Lack of muscle tone, I guess. Anyway, Julie, go ahead.

JULIE NEER: I just have a quick comment with regard to general timing for this. This assessment is slated to begin with data scoping next month and a data workshop in April. So, all the comments that you're making are valid and if you think they're needed, then please do them. Just acknowledging that it might shift the schedule back a bit.

The more negotiations we have to go back and forth with the Science Center, which is absolutely the way it should work. Things might get switched, slid back a bit. We were going to talk about the schedule when we talk about the potential of participants and we apologize these came late to you guys and so, we recognize that that might just be the case.

We took a bit of work to finalize the species for this and then finalize the terms of reference to get them in a form that could come to you for review. So, apologize for the lateness in getting it. I just want the big picture. This was supposed to start shortly and finish in early 2024. Just keep that in the back of your head, how pressing your requests are versus how pressing it is to get the assessment done in a timely fashion.

But everything you want to consider should definitely be laid out

at this point So, it can be discussed. I'm just putting it out there that the schedule you're going to see in a bit may not match what we actually end up doing based on your requests at this point. Maybe we should have done the schedule first anyways. Sorry. Thank you.

RICHARD APPELDOORN: Thank you, Julie. I personally like Erik's comment to just include, say, "life history/ecology information" on C.

KEVIN MCCARTHY: Okay.

RICHARD APPELDOORN: And we move to the next slide?

KEVIN MCCARTHY: Yes, please. And thanks, Julie. You're right. I've got the current schedule sort of summarized toward the end or at the end.

So, here we talk about some of the things to consider in the model. Life history, gear selectivity, a lot of the topics we've been discussing already in this meeting. Abundance. And the NCRMP or RVC survey which is D. That is currently our only, well, to the best of my knowledge, it's one of the few, and so far, the only one that we have attempted to use as an index of abundance. Our only fishery-independent data source. There are perhaps some others out there that we'd like to explore but certainly, we want to have a look at the RVC data point D.

I see Erik's hand up.

RICHARD APPELDOORN: Yeah, he can read faster than me. Go ahead, Erik.

ERIK H. WILLIAMS: So, you know, this is awfully detailed and again, falling back to my earlier premise, and I'm not necessarily recommending a change here. I recognize the timeline and all of that, but these kinds of ToR are just too specific. It should just- This whole ToR should be summed up with "build a model that's applicable for the data available" or something like that.

"Build a stock assessment model appropriate for the available data." Maybe that's the phraseology to use, period. This is too detailed and can and often, not often, but has on occasion become constraining because of the wording.

KEVIN MCCARTHY: I'm just taking notes, Erik. Yeah, I agree with you. That we want to be as general as possible in the terms of reference. This is based on some other ToR and maybe that's a

reflection of the difference between the Gulf and South Atlantic. Perhaps. Maybe the Gulf was a little more detailed than the South Atlantic. But I like the idea of keeping it a little more open. But that would be a pretty big change. These other edits are less problematic. Well, not that that's problematic but less extreme. So, I'll have to chat with Shannon and others. I don't have a problem with simplifying the terms of reference and as long as they don't, maybe we can do that here.

RICHARD APPELDOORN: Erik, what was your wording again, on a more generalized statement?

ERIK H. WILLIAMS: "To construct a stock assessment model that is most appropriate for the available data."

KEVIN MCCARTHY: I see Doug's hand up.

RICHARD APPELDOORN: Go ahead, Doug.

DOUGLAS GREGORY: Thank you. If this is a benchmark assessment under the old guidelines, definitions of benchmark, then everything is on the table. The constraints that Erik is talking about come into play, at least in my experience, with operational updates, whatever the other intermediate type of assessments is because you're not supposed to deviate from what was in the benchmark. But the benchmark was open to any and all appropriate analyses. So, I agree with what Erik is saying but it may not be critical in this instance.

It should not constrain the assessment scientist in doing what needs to be done. Now, Julie can comment on this more because she's the gatekeeper of what assessment definitions are as far as I can tell. Thank you very much.

JULIE NEER: Yeah, Doug, is correct that benchmarks are supposed to allow more flexibility to examine everything that, within reason, we still have a schedule to keep so let's just set that expectation from the beginning, but yes. They're not as constrained to define terms of reference as say, an operational or an update would be, which is really looking at just what is specifically outlined in the terms of reference.

So, in this case, you could do a more flexible term of reference, but it's not even really needed because you can always do more. Terms of reference should be sort of thought of as minimum requirements. It does not mean you can't do above and beyond those terms of reference. Again, within the time constraints and availability of getting stuff done in a timely fashion for the

managers who are waiting for this information down the line.

But yeah, this is a benchmark because some of these species have not been done either at all or for the platforms that they're working on or have not had successful assessments in the past. And so, given that, you really can have more flexibility, but you don't necessarily have to take things out of the terms of reference. These are the things that you're sort of highlighting as you want considered, but they can look at other things and that's what the panelists are also supposed to be part of in developing the assessment.

Again, always within the realm of getting stuff done in a timely fashion. So, I'm going to keep putting that out there because we're struggling with that piece. But thanks.

DOUGLAS GREGORY: This is Doug again. Thank you, Julie. And I'm not speaking against what Erik has suggested. I like his suggestions. I just wanted to point out that we don't need to feel like we're constrained, but I think his suggestions are very good and I'd like to keep them. Thank you.

KEVIN MCCARTHY: Okay. So, this is Kevin again. I would add a couple of comments. I'm perfectly happy with keeping the language as general as possible. I agreed with you absolutely, Doug, that the benchmarks are wide open to a degree. Let's keep in mind this is not a to-do list for the Science Center alone.

The SEDAR process is a collaborative process where we're relying on the work of others as well as Science Center staff. So, you know, to put in a bunch of additional ideas about let's turn over every rock, that does not mean that the Science Center staff are going to be the ones turning over all the rocks. So, when we ask for particular things where we want to leave the process open to considering all the available data, that is not definitionally in order for the Science Center to do all that work. So, let's just keep that in mind.

If we know of people who have expertise in one of the species and they've done work, then the appropriate move is not to task the Science Center staff to understand the work of others necessarily if they are available to participate in the process. So, that's a critical element that is often not pursued to the fullest extent, which is to get the experts involved in the process to the fullest extent possible. So that's something we need to keep in mind when we're looking at getting other participants requested by the council, for example. So, just something to keep in mind.

Any more thoughts on this one or should we move on? This is a lengthy list because we're just in the data workshop and there are a couple of other workshops that we have terms of reference for.

Doug, your hand is still up. Did you have a follow-up or just a hand in the air?

DOUGLAS GREGORY: No. Thank you.

KEVIN MCCARTHY: Are we ready? Well, we're ready to move on.

RICHARD APPELDOORN: I have a question for Doug because I wasn't sure he was agreeing with everything Erik said, and then he said, "but" in the end, I didn't catch what his bottom line was.

DOUGLAS GREGORY: Bottom line is I don't think we need to worry about being limited but the things that we have changed that Erik suggested to change were appropriate in increasing the flexibility and recognizing that. Because, you know, he didn't say it, but there's always the potential that somebody will take the terms of reference literally and constrain their efforts in one way or the other. And so, being cognizant of that, I think, just as a precaution is appropriate.

RICHARD APPELDOORN: Okay. So, we take that from Julie's comments, that this would be, the terms of reference are really kind of a minimum. And that should, the parties involved decide more or site different direction that's within their purview. If that's the case, we can move on.

KEVIN MCCARTHY: So, this is Kevin. So, the other thing that I would add is, we've got a relatively well almost brand-new branch. Not yet two years old. We're going through a lot of this for the first time both with new SSC members, with a new branch, with a new approach to how we're going to work in the Caribbean.

I am perfectly fine with getting everybody happy with the terms of reference, provided the Science Center signs off on it. So, I think it's useful to have this kind of conversation so that, in the future, we will have a better understanding of what we want for the Caribbean benchmark assessments. What do we want our terms of reference to look like? Not that they wouldn't ever be revisited, but you know, let's get a baseline set of the terms of reference and it will benefit us in the future.

So, I think this is a helpful exercise although I don't want it to take the rest of the day, and I'm sure neither do you. Are we ready to move on? I'm going to take that as a yes. So, next slide.

So, we always have research recommendations that are pretty broad. They can include new ways of doing port sampling, for example, or other kinds of sampling in addition to, life history work, it's across the board. And then we've to prepare a data workshop report, and that, again, is a collaborative exercise from the people who are involved. We tend to run Caribbean workshops differently than we do in other regions. In that everybody participates in the process. So, in the Gulf or the South Atlantic, for example, we'd have separate working groups. You know, there'd be a group that talked about commercial data and a group that talked about recreational data and a third group that talked about indices of abundance, and a fourth group that talks about the life history. We don't do that in the Caribbean. We tend to work through each of those together collectively as a single group. So, everybody talks about commercial data and then we move on to life history or indices or that sort of thing. But we do have to put together a workshop report and research recommendations, and those go into the report. And that is a collaborative process.

So, this is pretty standard.

RICHARD APPELDOORN: Yeah, this is pretty standard, and we've been through this before. I don't think there are going to be any arguments. If somebody wants to raise a hand, otherwise, we will go on.

KEVIN MCCARTHY: So, then we've got an assessment workshop. And these are typically virtual. We've just sort of got a general statement at the beginning, about documenting what was done, developing the assessment tools, and then the list of management benchmarks and status determination criteria that are produced.

RICHARD APPELDOORN: All right.

ERIK H. WILLIAMS: Just one phrase to add and this is just to tighten things up. At the end of the first sentence append the phrase "consistent with standard practices" and that links it directly to the review ToRs. The review ToRs are very restrictive, and we need to be careful with those more so than these others.

So, yeah, I recommend we add the phrase "consistent with standard practices" to the end of the first sentence in bullet one.

KEVIN MCCARTHY: Thanks, Erik.

RICHARD APPELDOORN: So, any other comments on one or two? So, let's go on to the next slide.

KEVIN MCCARTHY: And then 2D gives us wiggle room.

RICHARD APPELDOORN: Sorry, I missed that, Kevin.

KEVIN MCCARTHY: I just said 2D provides us with some wiggle room as needed.

So here we're talking about projections. To get MSY, OFL. I think I'm missing an open parenthesis there. Thank you, for the edits on the fly.

LIAJAY RIVERA GARCÍA: Whatever is needed.

RICHARD APPELDOORN: Part A, the "use the geometric mean" of following the discussion we had for Spiny Lobster. Is that correct?

KEVIN MCCARTHY: I think that's pretty standard practice. Not necessarily what came out of Spiny Lobster, necessarily. I think it's just standard practice.

RICHARD APPELDOORN: Okay. Hearing no one making any objections, suggestions, or otherwise, Let's move on to the next slide.

KEVIN MCCARTHY: So again, a report comes out of this with research recommendations.

RICHARD APPELDOORN: Again, I think this is very straightforward.

KEVIN MCCARTHY: Yep. Very straightforward. I would just add, one of the things we're working on, and I hope to work on further with this SEDAR 84, is to really tailor these reports to fit the needs of the Caribbean. These reports can be very lengthy, and I think we can design a better format for reports. But that's a conversation with Julie and the SEDAR folks as well as the Science Center folks.

Next slide. If we're ready to move.

So, then there's a review workshop with its own terms of reference. These typically involve the CIE review and a number of questions to ask when evaluating the data used in the assessment including the decisions made at the data workshop phase in the assessment workshop phase. So, not just strict data questions, but were the decisions by those two groups sound and robust, and reasonable? We talked a lot about data uncertainties at this meeting, and that's certainly a topic for the review workshop.

It's just sort of standard things that the review workshop, the CIE team, would be asking of the process.

RICHARD APPELDOORN: Well, it looks okay to me again, and I'm not seeing any other hands up. So, we can go to the next.

KEVIN MCCARTHY: Okay. Next.

And again, just a series of questions for the reviewers in the workshop.

RICHARD APPELDOORN: Right. Again, I think I'm seeing that we can move on. There's a great-

KEVIN MCCARTHY: Okay, next. Yeah, these are borrowed from other terms of reference from previous SEDARs. Then some questions about how robust the results of the assessment might be.

RICHARD APPELDOORN: It's included in these that there's an assessment of the caveats to answering those questions? Is that assumed in the-

KEVIN MCCARTHY: I think that's assumed. So, particularly, in a, you know, given that- I mean, I could read that as, you know, develop- you know, given the caveats are the results useful to inform management? So, I think that's a fairly wide-open interpretation there.

RICHARD APPELDOORN: Okay. Again, not seeing any other people commenting. So, let’s move on.

KEVIN MCCARTHY: So again, questions about uncertainty and research recommendations.

RICHARD APPELDOORN: Okay, I think we have a silent agreement there. Let’s move on.

KEVIN MCCARTHY: So, opportunities to provide some guidance for improvement in both the SEDAR process and the assessment modeling. Then a summary of conclusions and recommendations. That's something that the CIE reviewers do, that 8- well, all of this. But they are also responsible for preparing any documentation.

RICHARD APPELDOORN: I have an issue with the English in number six. It sounds to me like “which” should really be “that.” Other than that, it looks fine.

KEVIN MCCARTHY: Okay. There's always a (unintelligible) but that's helpful. So, any questions about what we've seen so far? Because from here on out I'm just going to walk you through sort of a condensed or a highly edited timeline. I didn't go through absolutely everything that needs to be done in a benchmark but some of the highlights. If not, we can move on to the next slide.

So, terms of reference approved, which is we're getting your side of it. It would then go back to the Science Center and then it would be sent off to SEDAR. That's what we're trying to do here in October.

We talked about workshop appointments. So, I'll be working- I think you all have the opportunity to appoint some SSC members to be involved in the process, which will be really helpful. I'll work with the Council staff and SEDAR staff to get some additional appointments. Hope to get all that done this month.

We need to be concerned about management history. We've got a mechanism for getting that together. That'll be Council staff and Science Center staff.

Then no rest for the weary. We're right now scheduled in mid-November to begin data scoping calls. And then in a data scoping call, we're identifying data sources and providers of those data. And we review the timeline for data delivery.

Next slide, unless there are questions.

Then we've got some data deadlines. Unprocessed data is in mid-February. Those are things like QA/QCd length comp data, NCRMP data, and other data sources where we want to start to get that together. Landings data. We don't have a lot of recreational data, but there are some in Puerto Rico. Unfortunately, that's not ongoing, but work is being started to get that up and running again.

Then there are a couple of life history webinars that are in the second half of February. One for Yellowtail and one for Stoplight Parrotfish.

Next slide.

Length comp data will be finalized in mid-March. We need not only the tip data and other sources of length data, but we also need the commercial and recreational landings to do that work. Working papers submitted to SEDAR in early April. And then right now the data workshop is an in-person workshop that's scheduled.

I think we need more days than that, but I'll- we probably, we might- I can't remember what we discussed, Julie, so I'm sure this is what we did discuss. So right now, it's scheduled for three days. Those are three full days. I guess the day before and the day after will be travel days for folks. And so that's scheduled, you know, mid-April right now.

Next slide.

Then we get final analytical products to the assessment lead in the beginning of May. We get a final data workshop report at the beginning of June, that goes to SEDAR, and then is distributed. There are a lot of steps to get to all of these, but I spared you that level of detail.

The assessment workshops will, again, be a series of webinars from June through October. Again, it's an extended period because we've really got three assessments we're walking through. Then, we get an assessment report in January. We'll have a review workshop. It's scheduled in my Miami in February or for Miami in February. And then the report to the Council in March or April of '24.

So, this is a long process. You know, I certainly hope that as we do more of these, we will reduce this timeline. That's certainly something that Clay would like to see. I think that all of us would like to get through the process as rapidly as possible while doing the best work that we can.

I think that's the last slide.

LIAJAY RIVERA GARCÍA: Yes.

KEVIN MCCARTHY: Okay, so once that- so this is the end of the SEDAR process, and then there would be SSC review after that assessment report goes to the Council. So that's- an SSC review is really outside the SEDAR process as I understand it. Julie can correct me if I'm wrong about that, but it's not the end of the review of the assessment. It's just the end of the SEDAR part. And then it goes to you all for your review much like we've been doing the last couple of meetings. But, hopefully, it's a single meeting because we've gone through this lengthy process. Some of you will have been involved throughout the process, I hope. And you know, it'll be much more of a presentation for you all to do your review in a single meeting.

So, any further questions or concerns, or comments? I see Graciela's hands up.

GRACIELA GARCÍA-MOLINER: Sí, Mr. Chair if I may. So, Kevin, one of the things for people to- once they sign up or are assigned to the different groups, the data, the assessment, the review, etcetera, to follow through during all of the meetings so that we don't lose the continuity of the work that it's being done. So, you know, data and assessment people go through all of the meetings, right?

JUAN J. CRUZ MOTTA: Graciela, sorry to interrupt. Rich is having issues communicating I don't know if there are technical problems on that side that you could help us with.

KEVIN MCCARTHY: Yeah, I agree completely. It would be really helpful to have SSC involvement throughout the process so that a couple of SSC members have seen the data discussions and have seen the modeling discussion and be aware of the questions that came up during the CIE review. So, that would be really helpful to provide some background to the SSC in general.

So, you're absolutely right about participation and Marcos has a comment along the same lines in the chat. So, it's very helpful to have folks who are assigned to really be involved and follow through.

RICHARD APPELDOORN: So, I'm back. Are we talking about appointments to the process from the SSC?

KEVIN MCCARTHY: We're certainly talking about the importance of SSC appointments and their involvement in the process.

RICHARD APPELDOORN: Graciela, that's the next item agenda. Appointments from the SSC. So, is that something you're actually doing now?

GRACIELA GARCÍA-MOLINER: Yes, please. I mean, because it's better if people volunteer for this. So, Yellowtail Snapper for Puerto Rico, Saint Thomas-Saint John, and Stoplight Parrotfish for Saint Croix. So, we need three SSC members for the data and assessment workshops.

Ideally, they would go from the data all the way to the assessment, but that's not a complete requirement. And then the appointment for the review panel. I mean, you would recommend who the people would be to the Council, and they will make all the appointments.

RICHARD APPELDOORN: But we have a year before we get to the review panel and the make-up of the committee might change by then. So,

I would suggest we're not going to make those recommendations yet. We're looking towards the deadlines for the- What was it, the deadlines for the assessment workshops? Kevin?

KEVIN MCCARTHY: The assessment or the data workshop?

RICHARD APPELDOORN: The data.

KEVIN MCCARTHY: The data workshop comes first. Yeah. So that's in April. But I would also say that whoever volunteers or is otherwise appointed at least for this first phase, ideally, will be involved in the various calls and webinars that occur prior to the data workshop.

So, there's a data scoping call that'll come up in mid-November. There are some life history webinars that are in the second half of February. So, ideally, they would be involved in all of those. There's no, you know, those are all calls or webinars, so there's no travel involved. I realize people's time is limited but it is really helpful to have people involved in each of those phases.

I would say that in the Gulf or the South Atlantic, and Eric could correct me if I'm wrong, for the South Atlantic, it's typically one or two SSC members that are involved in the process. I think there are oftentimes, and I may again be wrong on this, but I often see Council members who attend the workshop as well. So, if I'm wrong on that, Eric or Shannon or Nancie, or Adyan, please let me know. But that's my recollection of being involved in this process.

JULIE NEER: Hi, this is Julie. Can I chime in for a second?

RICHARD APPELDOORN: Yes, go ahead, Julie.

JULIE NEER: Yeah. You know, we try and get all the appointments at once. If we can't that's totally understandable. I want to just refresh everyone's memory that if you serve on a panel for data and or assessment, you cannot serve as the reviewer at the review stage. You could serve as the chair of the review workshop, but you could not be one of the SSC-appointed reviewers.

So that's part of- does everyone think about that? What stage of the process they might wish to be a part of? You can't be a reviewer if you also help make all the decisions leading up to the product for review. Just a quick FYI and a reminder with regard to that. Thanks.

RICHARD APPELDOORN: Thank you, Julie. Shannon?

SHANNON CASS-CALAY: Yes, thanks, Rich. So, I think Julie is basically still my funder. Thanks, Julie. I think it is very important though, that we have some SSC representation in the data stages of this process as well. Especially if you are aware of data sets or scientific findings that might be relevant to these assessment processes. You know, the earlier we can receive that information, the better, in terms of trying to integrate that information into the stock assessment.

Appointments of SSC members

RICHARD APPELDOORN: So, considering that things are going to start in mid-November, according to Kevin. That means we need to get some volunteers out now prior to our next meeting. So, I'll start with, are there any volunteers for the data process, the data workshop, and the things that lead up to that? And if not, I will probably have to harass some people. I guess I would do that over the next couple of days and then get that information to you guys on the Council as to who our recommendations would be. So, I'm not overwhelmed by volunteers at the moment. I'd just rather do the harassing offline than online.

GRACIELA GARCÍA-MOLINER: So, Mr. Chair if I may. So, you know, the Council will be looking into industry members who will be part of, especially the data process. Most of them will go through the whole data assessment and review. So that's something that the Council will be doing. So yeah, in the next few days, please volunteer or make the appointment so that we can recommend it to the Council and see who's involved.

RICHARD APPELDOORN: Okay. So, I guess that- Julian.

JULIAN MAGRAS: Yeah, good afternoon. I would just like to make a recommendation that all the DAP chairs be included in the process. Because especially since we go into island-based fishery management plans and each one of us has our own knowledge of each one of those fisheries I think it would be of great interest to have us involved in the process.

I've been involved in almost all the processes already, but it's just to ensure that recommendations can be made to the Council. That would be greatly appreciated. Thank you.

RICHARD APPELDOORN: Thank you, Julian. Kevin?

KEVIN MCCARTHY: Yep. Thank you. So, Julian, yeah, I agree with you that we definitely need to get people whose expertise is in these particular fisheries, Yellowtail, and Stoplight. So, whoever

those fishers might be, if they're the DAP chairs, that's great. If they're other fishers, you know, those are the folks that we need. You know, whoever are the experts in those particular fisheries are the folks we'd like to have involved.

JULIE NEER: Hey, Rich, this is Julie. I still can't-

RICHARD APPELDOORN: Go ahead, Julie.

JULIE NEER: Sorry, thanks. I just wanted to let people mull over as you're thinking about, you know, how you'd like to be involved as SSC members. The way this is set up with your involvement in the process and during the entire process, what you guys have been doing for this review now is not what you're intended to do when you review a benchmark product.

That product has gone through a review. You're not to re-review it. You're supposed to review, you know, look at the results and the information, the reviewer has provided to you. So, your ability and your opportunity, I should say, to participate, we want it front-loaded. We want it as part of the process, not expecting that you're going to get free SSC meetings to redo the assessment at the end.

So, you know, I know you have some new SSC members who may not have been through SEDAR processes, but it's a different process in terms of the type of assessment and where we want your feedback. And so, we're hoping to get your feedback front-loaded more than at this point, at the end, and have the Science Center go back and redo things to address your concerns. We want your concerns brought to us earlier.

So, I just want to make sure everyone understood that when you're looking at your schedules and potentially volunteering for one or all of the steps. And you can just do data if you can't do data and assessment, or you can just do assessment. We understand that time is important for everyone. So, thanks.

RICHARD APPELDOORN: Thank you, Julie. As I said, seeing no volunteers I will start harassing people and find some volunteers to the best of my ability. So, I suggest we then move on to the next agenda item.

LIAJAY RIVERA GARCÍA: Yeah, allow me a second.

RICHARD APPELDOORN: And that's the island-based fishery management plan update. María, are you giving that?

MARÍA LÓPEZ-MERCER: Yeah, I was just waiting for your cue. Cause I see there were other things too.

LIAJAY RIVERA GARCÍA: Okay. Allow me a second. I'm just uploading that document on the screen.

Island-Based Fishery Management Plan and Amendments Update

MARÍA LÓPEZ-MERCER: Alright. Good afternoon, everybody. This is María López with SERO Sustainable Fisheries Division in the Caribbean branch. I was asked to give an update on the island-based FMPs. Where we are right now in the process and also the status of some of the amendments that are currently ongoing for the island-based FMPs.

I have one slide that I want to show to you, which is the next one. Please, Liajay.

This is just a list of all of the amendments and the plans and the statuses. So, I'm going to discuss each one of them pretty quickly because I know that we are a little bit behind on time.

So, the Puerto Rico FMP, San Croix FMP, and Saint Thomas/Saint John FMP, or the island-based FMP, have been- the final rule was published on September 13. It will be effective on October 13th, 2022, so next week. After that, the old plans which are the reef fish, Spiny Lobster, corals, and the Queen Conch are not going to be used anymore and we are going to be moving on to island-based management and everything that it needs.

With that said, that means, that every single one of the amendments that we are working on right now are going to be amending all of these plans, or each one of the plans, depending on the actions. So, the list that we have here is all of the actions that we're currently developing. They're in different stages of progress, depending on the Caribbean Council's priorities.

The first one is the generic framework amendment to the island-based FMPs. This is the Spiny Lobster reference points. This is the one that updates the reference points based on SEDAR 57. The status of this one is that it has been submitted by the Council on September 26th, 2022. When we say submitted, it means that this is the final version, like no more changes, etcetera. Everything is good to go. The Council basically submits it to NMFS. Then officially the National Mayor Fisher Service starts working on the proposed rule stage. And that proposed rule is currently being drafted right now.

Another one of the amendments that we have currently ongoing is the Buoy Gear Definition and Use. This one is the one that will allow the use of buoy gear only for the commercial sector. So, it prohibits the use of buoy gear for recreational. Then it will allow up to 25 hooks on buoy gear for the commercial fishers. So, this one we're still working on a couple of minor details, but it will be submitted by the Council soon. And then the next stage will be drafting the proposed rule.

So, these are, these two amendments we're hoping could be out at least the proposed rule and final rules before the end of the year. That depends on, of course, how long the proposed rule phase takes, which is the one that usually takes a little bit longer. But they're all being worked on right now.

Another amendment that is in the works, although at a different stage, is another amendment to the island-based FMPs. This one is dealing with the trawl gear, net gear, and descending devices. This one, as you may recall from other Council meetings, may prohibit the use of all trawl gear in the U.S. Caribbean EEZ, or alternatively in the marine-managed areas. That's a decision that the Council will need to make. It may also prohibit the use of gillnets, trammel nets, and purse sines in the EEZ. As you recall, the gillnets and the trammel nets are already prohibited for reef fish and Spiny Lobster. However, they are not prohibited for use for the pelagic species that are new to management now. So, this action aims to do that and perhaps, put a more general prohibition on its use for other species as well. This is not related obviously to HMS, which are not things that we manage.

Purse seines is another one that the Council was interested in doing a prohibition in the EEZ. I mean, this is a gear that it's not necessarily, is not used in the EEZ, at least for our species. But the Council is interested in being proactive for any potential future use.

Now, another thing that came at the August Council meeting was the use of assembly devices. So, the Council wanted to include in this amendment that was on the work, a requirement for having the descending devices rigged and ready when fishing or possessing reef fish in the EEZ.

So, these are three actions that are going to be included in this amendment. The status of this one, the IPT was formed. They have met a couple of times. Right now, there's a draft that is being developed for the Council, and the Council will be able to select preferred alternatives soon.

Another amendment that's on the work is another generic amendment. It is the pelagic management measures. This one may establish recreational bag limits, commercial trip limits, and/or recreational and/or commercial size limits for pelagic stocks. There are several decisions that need to be made. For this one, there's an IPT that has been formed and there is a draft that is being developed for the Council review as well.

Now the next actions that I'm going to mention are actions that do not have an active development of an amendment per se, because they're still too early, or the direction that the Council has taken right now is not conducive to doing an amendment. Mostly because it depends on the, of course, the priorities and workload, etcetera, and interest from the Council doing it.

So, number one will be the development of a federal permit system. This basically will revive the action that was tabled in 2016. If you might recall, back then there was a discussion about creating federal permits. This was back in 2013, and this was a discussion that was done from 2013 through 2016. That was tabled because the Council wanted to have the island-based fishery management plans in place before moving forward and get a little bit more information to be able to do this. This is something that is a Council priority, and we all know that it's needed.

So basically, this one would evaluate either the use of general permits or limited permits or any other combination of permits that the Council deems necessary. So right now, the IPT is under the selection process, and then there's going to be a scoping paper presented at the Council meeting. This scoping paper is going to have information from before from everything that was discussed, and it will be updated. The Council has not expressed anything other than wanting to do maybe some pilot project, etcetera. So, it's important for them to see what we did in the past and see where they want to move forward with this because many years have passed.

Next is the trap reduction plan for the U.S. Virgin Islands. This is another action that was brought to the Council's attention. This one is about evaluating compatibility with the trap reduction program that is in place in the U.S. Virgin Islands. The Council requested a presentation with the issues for the December meeting. This is something that has been discussed in the past as well. However, there were some discrepancies between the U.S. Virgin Islands regulations and the federal, that need to be addressed before something like these could move forward.

The last two actions have to do with Red Hind. One of them is the timing of seasonal area closures for the Red Hind Grouper in the Puerto Rico EEZ. This was a discussion paper. The last time that it was discussed at the Council was in December 2021. The Council's direction was to have some informational workshops with fishers to obtain more information and also do some more data requests and some of the things are pending.

The last one is the modification of Red Hind seasonal closures in the EEZ of Saint Croix. The task will be to develop a scoping paper to evaluate modifying the Red Hind closure that is in the area of Lang Bank to allow fishing for pelagic species during that closure. And this is another action that is pending further discussion. The status is, well, at the April Council meeting it was discussed this request camp, and then SERO staff has been conferring with HMS staff, as recently as in the summer of '22. So, this is pending.

Again, there may be other actions that have been discussed in other Council meetings, but these actions may be a little bit more important at this time. And of course, the development will depend on the Council's priorities.

So that's it. If there are any questions.

RICHARD APPELDOORN: Any questions from the committee or comments? Okay. I'm not seeing anything. So, thank you very much, María.

MARÍA LÓPEZ-MERCER: Okay. Yep.

RICHARD APPELDOORN: It's really good news to hear that next week we'll have island-based plans.

MARÍA LÓPEZ-MERCER: I agree, finally. It's been a really long process and I want to thank everybody that has been involved through all these years. So, looking forward to new things.

National SSC (August 15–17, 2022) Update

RICHARD APPELDOORN: So, the next item on the agenda is what we're calling the National SSC meeting, which took place in Alaska in August. There's been a slight change, well, several slight changes for that. So, I remember the case study that we presented, or actually, J.J. presented, is not going to be presented to the committee now. That'll be done later on when we meet in person because it's really important to have that kind of give and take that we really can't do as well online.

Also, unfortunately, I grabbed the wrong folder this morning when

I left for someplace with internet. And so, I don't have my notes on the meetings, so I'm just going to have to wing this a little bit and maybe J.J. can step in to help me with that.

So, the focus of the meeting was on EBFM approaches, focusing really on stock assessment. Typically, in SSC meetings we have really high-end people coming in and talking about really high-end models that don't really apply to our situations here in the Caribbean. However, in some cases this was different. Nevertheless, there were a number of people who were presenting models that were incorporating the effects of the environment and different competing, or prey or predator, species and looking at those impacts on a particular stock. So, all the assessments that we saw, or I should say attempted assessments that we saw, were all still single species directed. But they were bringing in a lot of other factors that might affect that particular species.

None of them, to my recollection, actually were operational. That's to say that they ended up being accepted for management advice. But they were looking at quite a number of different ways to try and approach looking at various aspects of the environment.

One of the things that came up as kind of a focus area in terms of the environment was climate change. This is going to play back a little later when we, either in this meeting or the next one, talk about climate change and assessments. But most of what we were looking at were the effects of large-scale changes in distributions. By large scale, I'm talking hundreds, if not a thousand kilometers, scale change in the distribution of where fish were and where they are now. Or occasionally where they get restricted to during essentially marine heat waves. And the changes that they look at, at those scales are indeed large. Here in the Caribbean if we look at the Puerto Rico/Virgin Islands platform our North-South range is something on the order of, I don't know what, 60 miles.

So, it's a whole different scale that they were discussing at these meetings relative to the kinds of ways that climate change is going to affect our species and perhaps how we do our assessments as things become more obvious in terms of how these changes are affecting us.

Now, one thing- I have to find it, excuse me. Here we go. One thing that impressed me, and I talked to J.J. who is also of the same opinion, was a presentation that was given by Sarah Gaichas who works for the Northeast Center. While everybody else was talking about how to do these models and eventually, someday we might be able to get something that's actually giving management advice.

She took a very different approach and was trying to develop on behalf of the Mid-Atlantic Council a system of ecosystem information and catch recommendations that would give more general advice to the Council. So, you know, this advice would fit into a number of places in the management process. We were really impressed by that.

My major takeaway from the meeting was it would be extremely valuable to have Sarah present, basically, her presentation to the Council, FSC, and EBFM Tap. Because it was a way of trying to get that information into the modeling system that was not necessarily derived from complicated models that would not be possible.

J.J., you want to add to that a little bit.

JUAN J. CRUZ MOTTA: Yeah. Thank you. I have feedback. Anyhow it doesn't matter. Expand on what Rich was saying for- sorry, can you mute your mic, please? Thank you. Now I'm fine.

Yeah. I just wanted to expand on what Rich was saying. We took from that meeting a couple of main messages. One of those that was highlighted during Sarah's presentation is that we need to come up with complementary information to the stock assessment we have been doing to help inform the management process. The reason why Rich is proposing to invite Sarah is that she provided specific examples that would be those alternative tools or exercises that could help the management process.

The other lesson was that what we believe is peculiar to the Caribbean, which is a multi-specific fishery with multi stressors affecting those fisheries with multiple objectives being overlapped on the areas where these fisheries happen, is not unique to the Caribbean. Many other regions, including the western Pacific, shared that. Even though a lot of them, or most of the talks during the joint SSC had to do with multi-specific models, what we learned is even the most sophisticated, and I was really impressed by the nice models brought up by a colleague in Australia, even those sophisticated model will not even get close to predict the reality in the Caribbean. In this case, what I mentioned before in the West Pacific. So based on that, it's not only the Caribbean that would need to come up with new or complementary information to manage the fisheries. Other regions would benefit from that.

What will make the Caribbean unique is, I mean, based on the conversation with colleagues from all the regions, this is a nice experimental setup to propose these complementary approaches. The fact that we are small, the fisheries are artisanal, 100%

artisanal, it happens mostly in the coastal zone, and is strongly related to the habitat. I mean, most of these managed species are related to the reef or habitats related to the reef. Provides the Caribbean a uniqueness in which we can develop these complementary approaches that could help the management of fisheries that are multi-specific.

So basically, to summarize the lessons that we learned during that meeting. One is the need to come up with complementary approaches. Second that the Caribbean, even though has been traditionally criticized as that type of region where not much advance has been done, in this particular case, could provide a unique setting to come up with these complementary approaches. That's the two messages that I would like to convey from that meeting. Thank you.

RICHARD APPELDOORN: And just as a commentary. You're going to hear this presentation at a later meeting. The case study that J.J. presented, which is the work coming out of the Lenfest-sponsored work in conjunction with the Tap, and everything was very well received. It was very different than what most people were doing but it was very well received as an approach that, I guess, others had not really considered. So, I think we really have something to offer the rest of the Councils in that regard.

So I'd like to have the committee support a recommendation that Sarah Gaichas be invited to present jointly to the Council, the SSC, and the EBFM Tap. Basically, the presentation that she gave at the SCS7 meeting in Alaska. So, I'll ask if anybody has an objection to that. J.J., do you have your hand up, or not?

JUAN J. CRUZ MOTTA: No, no, I don't.

RICHARD APPELDOORN: So, I'm going to take the silence here to say that there's an agreement that we're recommending-

LIAJAY RIVERA GARCÍA: Mr. Chair?

RICHARD APPELDOORN: Yeah.

LIAJAY RIVERA GARCÍA: If it is okay with you, I can drop here the link for Sara Gaichas' presentation at the meeting.

RICHARD APPELDOORN: Okay.

LIAJAY RIVERA GARCÍA: Okay. And will the invitation to Sara Gaichas will be for the next SSC meeting or at her convenience for a future meeting?

RICHARD APPELDOORN: Well, the recommendation would be a

presentation to the Council, the SSC, and the EBFM Tap. So, yes, I'm sure she would be giving that a zoom.

LIAJAY RIVERA GARCÍA: Okay, thank you.

RICHARD APPELDOORN: It would, I guess, take a while to get everybody on the same page for when that would be. Much of her presentation is, in fact, oriented to things that the SSC would normally have to work on within the process. But I think it takes to Council to kind of say, yes, we want our committee to kind of start implementing something like that. Cause there were some things that needed to be done. And again, J.J. might elaborate on this, but there was, they were doing some- J.J. what were they called? Ecosystem status reports or something like that?

JUAN J. CRUZ MOTTA: No, no, it's called the Fisheries Status Report, which is one of the tools they presented as complementary to stock assessment to inform management. By the same token, another tool, they were not using but she talked about it, is the ecosystem status report. Two different types of reports are complementary to stock assessment to inform management. Thank you, Rich.

RICHARD APPELDOORN: Okay. Thank you J.J.,

JUAN J. CRUZ MOTTA: To mention. A lot of the tools she talked about, which is interesting, take into consideration what we call non-traditional knowledge, or local knowledge, from different types of stakeholders. It's a shame Tarsila is not here today because she could expand on that a little bit. Thank you, Richard.

RICHARD APPELDOORN: So, either Graciela or Liajay, you captured the essence of the recommendation.

LIAJAY RIVERA GARCÍA: Yes. I have here the SSC request to Sarah Gaichas to be present for the EBFM Tap, SSC, and Council meetings. If there's anything else you want me to add, just let me know.

RICHARD APPELDOORN: Oh, her presentation or that was given at the SCS7 meaning or modification? They out of, Okay,

GRACIELA GARCÍA-MOLINER: Mr. Chair let's take together after the meeting if the SSC is recommending this because it might be a good opportunity to have also J.J.'s presentation at the same meeting and perhaps the ESR if Mandy is ready by then. So, let's talk about it afterward if it's okay with you. Have like a mini workshop type of thing, the one day of these updates.

RICHARD APPELDOORN: Yeah. Our recommendation is to have this kind of presentation. I think the format in which it might best be done, I would kind of leave to the Council, or Council staff actually, which comes down to you, I guess. J.J.?

JUAN J. CRUZ MOTTA: Thank you. Yeah. This is not up to us, to recommend. I mean, because this has to do with another advisory panel, which is an EBFM Tap. But it will be a personal recommendation to the Council to set up a meeting of that group.

Because based on what we learned during this joint meeting Tarsila, Stacey, and I would like to propose a roadmap, which includes some of the tools that we learned about during that meeting. But of course, it's not up to SSC to recommend that. It's just a personal recommendation for the accounts. Thank you.

RICHARD APPELDOORN: Thank you, J.J. Any other thoughts on this? If not, I'm going to interject something here. We're actually close to being on schedule, believe it or not. And we're scheduled for a break at three, which is 12 minutes from now. And so, I'd like to take the time between then and now to go back to an issue I raised yesterday concerning a written response to the issue of the conflict-of-interest charge that came up from the last meeting.

And so, what I'll do, just for Kate's sake, if you have a copy of the transcripts. you can find the pertinent discussion in the committee on the second day. So, the file is SSC second day Augusto Segunda parte, or second part, I'm not quite sure of that. In mine is parenthesis two. And the initial chat comment that was read into the record is found on the line that is labeled S403:26:09. So, I think that's three hours and 26 minutes into that afternoon's discussion. Todd's specific request for a written resolution is found online, S703:38:54.

This was brought up in the Council meeting that this had occurred and that we were requesting a written resolution or statement as Todd had, and as you've noticed, has said that he would- well, he's still listening to the meetings and that he would refrain from commenting from SSC procedures and discussions until such time that this was cleared up.

So, I think it's important for this committee to have Todd's input, especially for the kinds of stuff we just spent the last day and a half working on. So that's what we're looking for. There is a follow-up to Todd's comment where Jocelyn says, yes, this is possible. So, I don't know whether that was ever communicated to Kate or not. But it's in the record. So, Kate?

KATHERINE M. ZAMBONI: Yes, sir. Thank you. I tried to convey yesterday that it's not really the role of NOAA's Office of the General Council to weigh in on specific individuals' conflicts of interest. As I understand, the way this came up, it's not as though Mr. Gedamke claimed to- He did not think he had a conflict. Normally, that's how a conflict is addressed, somebody's concern that there's an interest that they have and that it should be disclosed. If they want to get written confirmation or ruling, if you will, on whether or not a conflict exists, the appropriate way to do that is through the Department of Commerce's, Legal Ethics Division or Department.

Those lawyers are very skilled at weighing through those types of issues. They're the only ones that really, in my mind, could do a written response to a specific set of facts. In this case, it was somebody else that asked a question, and I don't think that question- I have read- I don't have the transcript in front of me, but I do have a copy of the chat, I think, that raised that question. I think the question came from a place where maybe the term, conflict of interest, wasn't completely understood, hence the need for some additional guidance on what those conflicts mean. But, to the extent there's a need for anything in writing, I stand by the letter that the executive director wrote in response to the Chair's request with a number of issues.

Based on the guidance that we are working on and the facts as presented we don't believe that it rises to a conflict of interest. There's no requirement that he refrain from participating in discussions. I understand that that's his personal choice at this point, but I agree with you that his input's important and invite him to further engage. I don't really think there's anything more to be said on the matter at this point.

RICHARD APPELDOORN: Okay. Thank you, Kate. I think actually Todd is not online at the moment because he had some kind of medical appointment that took him away and I'm not sure that he's back yet.

GRACIELA GARCÍA-MOLINER: Mr. Chair, Todd Gedamke is online. He has his hand raised.

RICHARD APPELDOORN: Oh, okay. Sorry, I didn't see you, Todd. Go ahead.

TODD GEDAMKE: Richard. I'm here. Kate, that is a really fantastic explanation of what happened at our last meeting, but you're ignoring everything else that has happened in the previous years over this, which is stated on the record. We also have GC Council

stating that they will work with me on a written response. And I have emails to you specifically requesting the statements.

My statements are not a legal conclusion. My request is very simply that on these three occasions, not just this last little one, this has been going on for many years and the Council and GC have not provided any buffering of an individual to provide their own opinion. To provide their take on science without having lash backs in the public forum.

The record is being used, and this swarm is being used to make personal attacks repeatedly upon individuals and members that are part of the SSC. This has already been discussed. So, my request is very simple, and I wrote it to you, specifically, and Jocelyn and I laid it out exactly. I have not received a response from Kate, you nor Jocelyn nor Miguel on this.

So, you can say whatever you want publicly here, and verbally, but this needs to be resolved. You have people, you have a situation, and multiple conflicts of interest have been accused in this case. And Kate, if you search your email, you will see the issue here. Not that this letter is the issue. This is a much, much bigger issue. And Jocelyn on the record, as Richard just pointed out, during the last meeting, told me that this would work.

So, all I want is on this date, these people, I have not been informed. These are all things on the record. These are things that have been stated previously by the Council because this is insane that we are allowing people to just make- I mean, I can say something right now, four or five things right now that will be interpreted in a different- excuse me, I'm just going to stop right there.

This forum is being allowed for people to make false allegations repeatedly on the record with no accountability. There you have the impotence of the Council if we end up in that situation. We need to be able to make our own decisions regardless of people standing up there and attacking us given this forum.

I really hope that I can get not this grand legal opinion that you're talking about, Kate. Not this grand thing that has to go to other people. Just protect the institution of the SSC by not allowing members to make false allegations on the record. And when they do, there needs to be repercussions and accountability. Thank you.

KATHERINE M. ZAMBONI: Mr. Chair. May I respond to that?

RICHARD APPELDOORN: Yes, Go ahead, Kate.

KATHERINE M. ZAMBONI: I certainly understand where you're coming from. Regarding a number of the points that you made, we're very much aware of the personal attacks that have been made on the record, and there is an effort to quell that. I appreciate you showing some restraint. I'm sure there was more that you wanted to say. The Chair read a kind of rules, if you will, of conduct that is going to be expected moving forward, and that's part of the effort to stop the discussion from becoming one that engages in personal attacks.

I agree with you, that when one alleges a conflict of interest of a participant, that constitutes a personal attack. That really does interfere with the important work that this committee needs to do and we're going to really try to dissuade people from doing that.

I know that it was read what Jocelyn said on the record, that she thought something could be done. And I, having talked to her, know what she had in mind. It is the letter that was provided to the Chair. She believed that that resolved the matter, and she did not think that it would be appropriate, and I agree with her, for our office to provide anything more specific on that. The main reason is I don't know that we have all the correct facts to make a determination. So, everything I have to say has to be caveated, you know, based on the information I have available to me.

I don't believe there was a conflict of interest. I don't even think there was the appearance of a conflict of interest. My hope is that once people understand what it means to have a conflict of interest, it will no longer be used as a way to make those types of personal attacks that have become so distracting. And that's all I have.

GRACIELA GARCÍA-MOLINER: Mr. Chair you have Todd Gedamke’s hand raised.

RICHARD APPELDOORN: Alright. Okay, Todd.

TODD GEDAMKE: I just want to be clear, Kate, you will not be responding to any of my emails or any of the requests, that previously- I would at least expect a response that says, we’re not doing this, instead of ghosting me on everything because I need something documented at this point.

All the SSC members need to understand that what you're saying is that you're not going to get protected, but we're going to write

a document that gives guidelines. Because that's where you're at right now, just moving- You're saying there's nothing, quell, is that I think the word you used. We will quell this for the future.

What about where we're at right now? And you're saying- I just want everyone on this SSC to be totally clear that the General Council is not going to jump in or not going to do anything to guide this. If you make a recommendation or say something on the record that may be problematic because this is this situation-

Anyway, is there a way- Forget is there a way. Kate, are you saying that you will not be responding to any of my correspondences on this?

KATHERINE M. ZAMBONI: Mr. Chair, may I respond?

RICHARD APPELDOORN: Yes, go ahead. Kate.

KATHERINE M. ZAMBONI: I believe I have responded to you here. If you want me to write you an email that provides the same information on how to contact the Department of Commerce's Legal Ethics Division for a formal opinion, I'm happy to do that, but I'm not ghosting you. This is the response. The message, you know, perhaps I was not clear, is I do intend to intervene if I see people making personal attacks, including alleging conflicts of interest in the record.

I don't know that it's my role to protect anybody here, but I do think it is my role to guide this body and help it stay focused on its mission and what it's the important work that it has to do. To the extent personal attacks are made if the chair does not step in, I will remind the Chair when it's appropriate to do that.

So, I think that's very different from what you repeated, but if there's a continuing misunderstanding, I'm sure you will let me know. That's all I have.

RICHARD APPELDOORN: Okay, thank you, Kate. And with that, it's three o'clock. We're on break for 15 minutes or at 3:15.

GRACIELA GARCÍA-MOLINER: Back at 3:15. Richard, back at 3:15 correct? Alo, I think Richard left.

(Whereupon, a brief recess was taken.)

RICHARD APPELDOORN: Okay, everybody, I'd like to start the meeting again, back from break. Graciela.

GRACIELA GARCÍA-MOLINER: Yes.

RICHARD APPELDOORN: One of the things I forgot to ask when we started today, or Liajay, was to read out the people who were online. So, I wonder if that could be done now?

LIAJAY RIVERA GARCÍA: Certainly, yes. I can do it now.

RICHARD APPELDOORN: Because we only did the committee before.

LIAJAY RIVERA GARCÍA: Okay. So, starting with myself, Liajay Rivera Council Staff, Alida Ortiz Sotomayor, Graciela García-Moliner, Adyan Rios, Carlos, missing the last name, but I guess it is Farchette, please confirm. Cindy Grace-McCaskey, Ed Glazier, Julian Magras, Jesus Rivera Hernandez, Kate Zamboni, Kevin McCarthy, Marcos Hanke, María López-Marcer, Nancie Cummings, Nathan Vaughan, and Nelson Crespo. That is all on my list.

GRACIELA GARCÍA-MOLINER: So, from earlier this morning you also have Jesus Rivera, Virginia Shervette, Julie Neer, Martha Prada, Sarah Stephenson, she's still online. Jay Grove, Nicole Greaux. Let's see Rafik Orhun, Jerry Ault was also online. Jeremiah Tania Capote, Rachel Eckley, and that's what I had for today.

LIAJAY RIVERA GARCÍA: I was still missing people on my side here.

GRACIELA GARCÍA-MOLINER: But there is a complete list of participants that we have at the end of the meeting from the Zoom list of participants. So that will be part of the record.

RICHARD APPELDOORN: Okay. Thank you very much then. Alright getting back to the agenda then, I think we are scheduled for an update by Alida Ortiz on the outreach and education advisory panel. Alida, are you there?

ALIDA ORTIZ SOTOMAYOR: Yes, I'm here.

RICHARD APPELDOORN: Please take it away.

ALIDA ORTIZ SOTOMAYOR: Yes. Okay. Liajay, can you put the presentation in?

LIAJAY RIVERA GARCÍA: Hi, Alida. I did not receive your presentation, but you are already a co-host, so you are able to present.

ALIDA ORTIZ SOTOMAYOR: Okay. I'll do that. That's the one that I gave to you for the previous meeting.

LIAJAY RIVERA GARCÍA: Oh, okay.

ALIDA ORTIZ SOTOMAYOR: But I can try my best to do, you know to share my screen.

LIAJAY RIVERA GARCÍA: Okay. We'll let you try first and if you can't then I'll just open it.

ALIDA ORTIZ SOTOMAYOR: Okay. Where do I press here so that I can share the screen? In more?

LIAJAY RIVERA GARCÍA: There is a green icon that says share screen.

ALIDA ORTIZ SOTOMAYOR: Share screen. Okay, great. So, I'll put my stuff-

LIAJAY RIVERA GARCÍA: You should see the window that you want to present.

ALIDA ORTIZ SOTOMAYOR: Okay.

LIAJAY RIVERA GARCÍA: You will hit it twice and it should be available.

ALIDA ORTIZ SOTOMAYOR: When it says, share. Okay, I did it.

LIAJAY RIVERA GARCÍA: Yes. Now we need it in full screen.

ALIDA ORTIZ SOTOMAYOR: Okay. And where do I get that full screen? Right here. I think.

LIAJAY RIVERA GARCÍA: There, Perfect.

Outreach and Education Advisory Panel Update

ALIDA ORTIZ SOTOMAYOR: There. Alright. Okay. Thank you for the opportunity and I will be very short. I will just let you know what we have been doing with outreach and education. I will also be requesting that the SSC suggest new topics to work with, especially now that we will be working with specific island-based plans in each of the islands. And also on issues very important in terms of what we want to get to the public, like in areas of a stock assessment and the species that are being managed.

So, in our outreach education, as you all know, we are following the Caribbean Fishery Management program for five years. A five-

year strategic plan. You have seen this. In terms of communication, it says that it's sound science and data on fish and fisheries, productivity, and ecosystem. Improvement of public understanding, and work with existing legislative, regulatory, and institutional frameworks. Because we have- the species don't know where they are, whether they're in the economic exclusive zone or whether they're in the territorial zone, but it is the same species. So, we have to learn and put together all the regulations.

Then the design and production of educational materials that translate scientific research to the public. There are many, many issues that are employed in management that need to be explained to the public and need to be explained in a vocabulary and in a format that is easier for them to understand. We are making partnerships with all the local agencies See Grant, the Department of Natural Resources, and the Nature Conservancy. We have worked with them in terms of seafood sustainability. And then to increase that political awareness and understanding of the ecological and socioeconomic impacts of fisheries to promote better stewardship and informed decisions. These are the five-year strategic plans that you all have and have seen.

The material that we have produced already for the ecosystem fisher management plans, and MPAs, they're already in the hands of the fishers and the consumers. We put them in the Council and also the liaisons take them to the fisher themselves. And we have worked one on ecosystem-based fishery management and another one on the MPAs. There's an old one, a fact sheet on essential fisher habitats. And also, what are the forage fish that are working here.

All the products that I brought to you at the last meeting. They are posters on the life cycles of the species that are being managed. This is something very important because it is not just how many fish they catch, but the size, the time of the year, and knowing if they have been reproducing or if they are in the reproduction stage. That's something very, very important for people to know.

Other products have been the posters that were requested by Saint Croix for seafood and also for Saint Thomas. These are materials that were brought to the fish markets, the restaurants, and the hotels. Wherever they wanted to have them so that the consumers also know what they are eating and what regulations exist. We are now working on fact sheets of other invertebrates, and other organisms associated with the fisheries. These are part of what they have in each one of the island-based fishery management plants as reef organisms or organisms that live on the seagrass beds. They are as important as the ones that we are catching. If we don't

regulate or aren’t aware of these species, we are impacting the life cycle of the species that we are eating.

For new products, we will be working on climate change and marine fisheries. We have a very special interest in understanding a stock assessment, not only for fishers but all the stakeholders. For this, we are working with Adyan Rios, and Graciela so that we have the information that you discuss in your meetings, in the presentations, the SEDARs, and all the very scientific meetings. This is so that they can have the information and they can see how it applies to what they are doing and why is that information so important as a management tool. Also, the fishers recognize that they can contribute enormously to the material that is going into these products. Especially, when they tell you about where they are eating, where are these species ovulating, the aggregations, and where they go from there. That's something that we cannot get just from a scientific space.

Also, the IBFM will be working just now, and we are starting very soon. The IBFM essential topics and especially chapter five for each one of the management plans for Puerto Rico, Saint Thomas-Saint John, and Saint Croix. With this, we will get the material that is in there, which is like a summary of all the content of the document. María Del Mar will be very good support for that information. Also, the district advisory panels are giving recommendations from materials on deep-water snapper and grouper fishing regulations that they want in a vocabulary and in a format that they can use. And we have to find ways that all the stakeholders, the consumers, the household people, everyone, the teachers.

We need to get this information to all these areas where something as La Parguera in Puerto Rico, where you have a school there where the students are from La Parguera and many of their parents are working in the fishing industry, but they don't have information anywhere. So, to understand this terminology that is so important, like optimal yield, allow catch limit, acceptable biological catch, and all these other terms that appear in the island-based documents and also in all the regulations that they have.

So, with that, what we would like to request from the SSC is to suggest to us formats that you would like to see that information. Vocabulary, because I know that as scientists, we do have, you know, a vocabulary for our meetings. But then if you are in a bar in La Parguera with fishers, do you use the same vocabulary? If we are in the fish market, are we going to use the same vocabulary? Do we have ways of getting more information and getting more collaboration from the fishers and the consumers so that our

documents are easier to understand and easier to follow if there are any recommendations?

So that's what I was planning to present to you, and I am very grateful that you allowed me this moment. So, I will take any recommendations, any questions, or any ideas that you can give me. Graciela, I think that's my presentation.

VANCE VICENTE: Alida, thanks a lot for all your effort and your great work, which has been- Thanks a lot for your great effort on this endeavor of transmitting, you know, scientific terms, etcetera to the public, the fishers and other person, people of interest on it. My recommendation would be, and it's for my own sake too, to put more effort into trying to translate, digest, and simplify the models. Mathematical models are being used to impose new recommendations and new regulations. I know that's going to be very challenging, but if there will be a way in which we can transmit to the public, to the fishers, and other stakeholders, how these models work in a very simplified fashion, which I know is going to be rather impossible, but I trust that you can do a good job on this. That's my recommendation. Thank you, Alida.

ALIDA ORTIZ SOTOMAYOR: Thank you, Vance. And if you have any references that you can give me, I will be very grateful. And the same thing for María Del Mar, for Adyan, for all the people that work with the other Science Centers that have probably the same reto, the same challenges that we have.

Remember that the Caribbean Fishery Management Council is more complex than any of the other Councils. Because we have, even though we have Puerto Rico, what we do in the West might be different from what we do in the East. The North of the South. And then what happens in Saint Thomas is another thing. And what happens in Saint Croix is another thing. And probably, to me, after so long that I have been with the Council and with a marine education, not just fisheries, to me, the thing that now we have plans for each one of these islands is a very, very important challenge that we will have to follow. Thank you, Vance. Any other ideas? Recommendation?

RICHARD APPELDOORN: Well, Jason, you have your hand up and then Shannon does as well.

JASON COPE: Yeah, I do. Sure. Thank you. That’s a great presentation. Science communication is at the crux of what we do, and if we can't communicate what we do, really doesn't matter how well we do it. It's not going to get uptaken right. And so, I really appreciate this specific emphasis on the science

communication education part. I am grateful that I have an opportunity to do a fair bit of this, working with the folks at the Marine Resource Education Program.

I think at some point in one of our SSC meetings, we brought up that group and they happen to be on the west coast this week right now, and we're meeting with the fishers, right? And one of the best things you can do is have the scientists in the room with the fishers and the managers and create a space where any question can be asked. Right? There are absolutely no remedial or dumb questions. Let people explore what they have questions about.

Let the scientists learn how to communicate back to them in simple ways, what it means. Because our models, they may be complex, but they have very simple elements that are things that we can communicate. So, I guess that's one suggestion is to maybe, if that partnership hasn't been created, have a partnership with that group.

And then, again, I have materials. I do this not infrequently and very much enjoy making this accessible. So, I'd be happy to talk more with you specifically about opportunities.

ALIDA ORTIZ SOTOMAYOR: Great. I'll contact you. Actually, when we participate in the MREP in Puerto Rico, to me it's a classroom and it's a very, very effective classroom. And now we have the liaisons. The liaison is the person that connects the Council with the fishers for everything. Sociology, economics, cultural things, everything. And the experience and the resources that we are getting for them are extremely valuable. So, thank you.

JASON COPE: Absolutely. The last subject matter that I was going to throw out was the concept of uncertainty and having grown an appreciation for that term and what it means because we're never going to be able to deliver a number. It’s always going to be surrounded by uncertainty. And we talk about precaution, we talk about buffers, and it leads to all its other jargon, but really being able to communicate the idea of uncertainty and why it's not bad, it just is. And knowing that it exists is an advantage for us to be able to make better decisions. And so that would be a specific topic that I would have as a discussion point or an education point, taking away the fear about the concept of uncertainty and learning to work with it.

ALIDA ORTIZ SOTOMAYOR: Great. I took note of that and when I do something, I'll send it to you so that you can help me with that.

RICHARD APPELDOORN: Okay. Thank you very much for those comments.

Jason. Shannon?

SHANNON CASS-CALAY: Yes, thanks, Rich. Yeah, the Science Center is also very interested and very involved in outreach and education and of course, Adyan serves this Council in that capacity. So, I just wanted to make sure you understand too, that if there are specific topics that the fishing community, DAPs, or the SSCs have identified that they would like additional information, you know, we are more than happy to look into it and create outreach tools as well. So, you have our support as well in any capacity.

ALIDA ORTIZ SOTOMAYOR: Thank you so much, Shannon. Any other comments? Graciela, do we have any other?

GRACIELA GARCÍA-MOLINER: So I don't see any other hands.

RICHARD APPELDOORN: Yeah, I'm working on J.J. I think he'll make a comment.

JUAN J. CRUZ MOTTA: Yeah, there was something that was mentioned in the joint SSC and it's not exactly outreach. It's not like the scientists are trying to convey what we were doing, but it was a very interesting exercise in which, and this was related to the fisheries status report. So, the engagement with the fishers in this particular meeting was the other way around. It was basically the scientists asking the fishers about their perception of changes in their environment or changes in the stocks. You know, information that came out of the fishers to the scientists. And then, the (unintelligible)there was too and the tools that Sarah was developing were basically tools to quantify that information, which by the way are in line with some of the tools that we have been using in this Lenfest project, and that we will be presenting in the next SSC and hopefully the Council.

So basically, the way the Northeast Region was engaging, in this particular case, the fisher, but this can be extended to any other stakeholders, was by getting the information out of them, quantifying and getting it in this management advice tool, which is the official status report.

So please note it's not exactly outreach material. There is a way in which you can incorporate the stakeholders, and in this case, the fishers into the management process or informing the management process. But thank you.

ALIDA ORTIZ SOTOMAYOR: Thank you so much J.J. I think that's probably, for our region, again the Caribbean region, that's

probably one of the most valuable actions that we can have. Because, my experience, in a long time, is that fishers were way out, they were on the coast, they didn't have anything to do with the rest of the community, they got fish, they sold it, and that's it. And that's a very incorrect look at the product, at what they gave, what they produced for the economy of our sociology.

And I lived in La Parguera for quite a long time. I studied marine sciences and as far as I remember, we had very little contact with the fishing community. Except for when we took the boat to go to the marine sciences. And that's something that we have to, if we have the opportunities, if we have the facilities, we have to incorporate them.

Are there any other comments?

RICHARD APPELDOORN: Okay. I'm not seeing any other comments, but I think you had some things you can work on. Vance was really pushing the issue about having to try to develop ways of communicating how the models worked in fairly simple terms. And, Jason had some experience that I think you could apply.

ALIDA ORTIZ SOTOMAYOR: Yes. Yes. That's what I'll do. What I'll do is that the materials that we are working already on the island-base, on each one of the island-based, I will send you our draft. Actually, we're going to have a meeting next in two weeks with the DAPs and the liaisons for the question that the community has on the island-based fishery management plans. And I will, when we have a draft of what's there, I'll send it to you so that we can get all your recommendations.

RICHARD APPELDOORN: Alright. Thank you, Alida.

ALIDA ORTIZ SOTOMAYOR: Thank you for the opportunity.

RICHARD APPELDOORN: Yeah, I'm sorry we couldn't fit it in the last meeting, but sometimes these things take time. Thank you.

ALIDA ORTIZ SOTOMAYOR: Oh, yes. And it lasts forever, so whenever it can be done, it gets done. Thank you.

Other Business

RICHARD APPELDOORN: Okay. I think we've come to the point where we're going to be looking at some of the new business issues that were added to the agenda yesterday morning.

I guess we're going to start with the Queen Conch list thing. And I understand Orian Tzadik is online and maybe he would like to

explain to the SSC what's going on here. And how we can affect that. You there Orian?

ORIAN TZADIK: Yeah. Hi, can you hear me?

RICHARD APPELDOORN: Yeah, you're good.

ORIAN TZADIK: Okay. I have to apologize. I've been having some Fiona-related internet issues, still. So, if I cut out, maybe Graciela can text me or something. Yeah, as Rich said for those of you that tuned into the last Council meeting, you'll see that the Queen Conch has been listed with a proposed ruling for threatened status under the Endangered Species Act.

A lot of people are asking us what exactly that means. And the truth is that it doesn't mean anything yet. No immediate actions are going to be taken. However, once it is listed under the Endangered Species Act as threatened, there are measures that can be taken by NOAA Fisheries based on the kind of input that we get back from everybody else.

So, what I want to encourage for this group here, for the SSC being regional researchers and people who know about the fishery here and about the state of the fishery and all that. I would really just like to encourage anybody who feels the need to, to please write in with comments. Comments are open until November 7th. The easiest way to do that is to go onto the Federal Register and look up the proposed rule for Queen Conch and file your comments there.

I will note on the side that I have spoken to Rich and Marcos separately about trying to get ahead of this. I don't think that anybody, you know, is trying to impose anything that's unjustified. But if we could all work together on this, I think that that would go very far. Yeah. So, looks like Liajay has the exact point that I'm talking about, and if you see that green button there, it says, "submit a formal comment." You guys have until November 7th to do that.

One thing I just want to emphasize particularly for this group is that the Endangered Species Act specifically says that NOAA Fisheries can take ecological and biological factors into account, but not social or economic, with regard to the listing of a species. So please try and keep your comments geared in that direction. And ideally to the people in this room, if there are additional data sets that maybe were unavailable to the review team, those would be of particular interest.

I think that's about it. Just wanted to kind of give the

notification to everybody and make sure that you guys were all aware that, as it says there, you got, 33 more days. The comment period ends in 33 days. Yes. So please get your comments in if you have any.

RICHARD APPELDOORN: Yeah. Thank you, Orian. I have a question. If this goes through as proposed, is there a set of automatic things that happen, not necessarily regulations, but steps, whatever that this would initiate?

ORIAN TZADIK: Yes, yes. So as many of you know, I'm relatively new to this process, so you know, forgive me for all the details. But yes, the Endangered Species Act outlines a process of what needs to happen. So, as you pointed out if it's listed as threatened, the regulations get put in. If it's listed as endangered, that's a different story. But once it's listed as threatened, under the proposed rule, there is a time limit of one year to get to the final rule. And then once the final rule is published, there will be a proposed critical habitat rule. And then after that will be a final critical habitat rule. And then after that, there are several other products that get produced as we go along, including obviously like a five-year review. But those are down the line.

So, the immediate actions that are going to happen are that we're going to have, the proposed rule listed. Then we'll have the final rule within a year. And then immediately after that'll be the critical habitat rule, the proposed rule. And that'll be kind of what we're all working on, you know, immediately following the final rule.

RICHARD APPELDOORN: Okay. Thank you, Orian. Any questions from the committee?

VANCE VICENTE: I have a couple of comments. One thing- Thank you, by the way, for your presentation. The fact that the specie is being proposed. I mean, there is a proposed rule that automatically, believe me, makes a big conservation wave. Second, I have my own opinion. I'll be making my reading comments.

I work with Fishers, you know, I use their boats. I use them as captain to do my work. And I ask them, you know, what is their opinion about making more stronger conservation, imposing more conservation measures on the Queen Conch. And surprisingly, you know, I'm talking to very heavyweight fishers, and they agree. They think that they believe that it should be protected at a higher level as a threaten or even as an endangered species, which has really surprised me. I was expecting a different answer. And

this is specifically fishers from the North Coast. Anyhow, those are my two comments. Thank you.

ORIAN TZADIK: Thanks, Vance. That's good information. And yes, please do include that in written comments. I'll just kind of repeat, you know, when I spoke to Marcos, I think it's essential that if, you know, our Council kind of gets ahead of this issue, I think it'll be easiest for everybody in that, you know, we're looking at the recovery of a species. And it's a species with a wide range beyond the U.S. Caribbean. And so, if we can, you know, enact sense here, it'll be very easy to then approach other countries throughout the range and kind of, you know, put our best foot forward while we're doing so. So anyway, I appreciate the comments.

RICHARD APPELDOORN: Orian, you sort of touched on the subject. Can you comment a little bit about what impact the listing might have on other jurisdictions across the region?

ORIAN TZADIK: Yeah, I mean, you know, again, I have to caveat this with, you know, I just started in this position a couple of months ago, but my understanding is that I, personally, will be working with other liaisons from other countries to try and fill data gaps and ideally influence legislation both domestic and abroad.

We're focused on the recovery of a species, you know, not the recovery of species within Puerto Rico and the Virgin Islands. And so, I mean, obviously, the recovery within those waters comes into play and once we kind of are able to do what we do here, we'll also be able to kind of discuss opportunities with other countries.

RICHARD APPELDOORN: We have a number of hands up now Marcos, Kate, and Doug, and we'll take him in that order. So, Marcos.

MARCOS HANKE: Thank you. Orian. I know that we spoke before, but I want to share those thoughts with SSC as well. Once we treat this issue across the range, I'm not hearing something super important around WECAFC, Nicaragua and all the countries that fish heavily for these fish, for the Conch, they have motherships, they import, they export, and so on. But treating the U.S. Caribbean leaders on science-based proactive regulations for Conch should be used as an example and treated in accordance. Otherwise, we'll mine regionally, the interest in science, compliance, and the sustainability of the Conch across the range. Other countries will not have any stimulus to look for science to manage the Conch. It will be much harder if we give this example and just address heavily the local fishermen. It can be super detrimental to the

Conch across the range if the leaders of the best science-based regulation treat it the same as the countries that export, that doesn't comply with international treaties or regulation.

Fish Conch sustainability is something that everybody wants to do in U.S. Caribbean, and we have regulations that are topnotch on that matter. Things that we should address are to fix what is not working, which is compliance, education, limitation on the future for exploitation, and creating, probably, enforcement. A specialized enforcement group to address the problem with enforcement. Around the region leading by example is the way to go. And we should use our position to show how science works. Enforcement and education, we should improve those first before we do anything else. That's all I want to say. Thank you.

RICHARD APPELDOORN: Thank you, Marcus. Kate, your hand is still up. I only see, I don't see another one, so go ahead.

KATHERINE M. ZAMBONI: Thank you, Mr. Chair. I just wanted to elaborate a little bit on what Orian said. He did a great job explaining the effect of the proposed rule under section seven of the Endangered Species Act. There now is a requirement for conferencing on federal actions that could jeopardize the future existence of Queen Conch. I know there is a plan in place to conduct such a conference on the island-based fishery management plans. So, they'll satisfy that section seven requirement. Once the final rule comes out, if presuming it is listed as a threatened species and we have a final rule, that conference requirement becomes a consultation requirement.

The service could also contemplate implementing what is known as Section four D rules. So, unlike an endangered species, where there are some automatic prohibitions that go into place when a species is listed as endangered, such as banning importations and takes. That doesn't necessarily apply to species that are listed as threatened, but the National Marine Fishery Service could implement additional rule-making that would determine whether or not imports would be allowed and those types of things. That would probably be the type of action that would be taken to address what goes on in foreign countries because our listing status doesn't necessarily affect other countries. But to the extent those Conch are imported from those other countries, that could help. I just wanted to add that. Thank you.

RICHARD APPELDOORN: Thank you, Kate. And I would point out that the U.S. is one of the two major importers of Conch, the other one being the E.U. So, we potentially have a lot of opportunity here to sway how other countries are looking at their stocks as it might

affect their ability to import into the U.S. more so than under the CITES process that is already in effect. So, any more discussion on this issue? Sorry. Michelle?

MICHELLE SCHÄRER-UMPIERRE: Thank you, Mr. Chairman. I just had a quick question regarding- In our EEZ, we have a prohibition and I believe we have a rebuilding plan, if you could update us on that and what actions that includes?

ORIAN TZADIK: Yeah. We don't actually have a rebuilding plan that is part of the process through the Endangered Species Act. We will need to develop a formal one. I'm not sure what has been discussed at the territorial level. I don't know if they have rebuilding plans within DNER or DPNR. But at the federal level, the recovery plan, one of the products that I was mentioning is after the critical habitat proposal rule, and then the critical habitat final rule we will need to develop a recovery outline, and then that will be followed by a recovery plan. So that's the status of that. Anything prior to now has been just Council legislation or Council actions.

MICHELLE SCHÄRER-UMPIERRE: Mr. Chair, a follow-up. I was actually asking about a fishery rebuilding plan after it was determined overfished. Not a recovery plan.

ORIAN TZADIK: It looks like María has her hand up. I'll defer to her because again, that would be a sustainable fisheries question.

MARÍA LÓPEZ-MERCER: Yeah. Thank you. Thank you, Orian. Yes, Michelle. So, yeah, that's correct. In the EEZ, obviously, we have management measures to protect the species such as, you know, the prohibition on the harvest of the Queen Conch in pretty much the whole EEZ except for that smaller area in Saint Croix. And then there was that rebuilding plan that the Queen Conch had that ended I believe in 2020.

And so, one of the things that our office is doing is we are in the process of evaluating, finding a way of evaluating if the species is rebuilt or it hasn't been rebuilt. Then what management measures need to be taken to ensure that the population of the Queen Conch is at the level that it's not overfished.

So, we are having those conversations right now. This also kind of goes hand in hand with this proposed rule. So hopefully we will request the assistance of the SSC once we have a better plan put in place. But this is something that we definitely have at the top of our list, and we have been working on it. That's all I can say for that right now. I'm sorry, I don't have any additional

information, but this is something that you will probably, as you know, as a member of the SSC you will be hearing from us. Thanks

RICHARD APPELDOORN: Graciela.

GRACIELA GARCÍA-MOLINER: Okay. So, thank you María for that. But I still have one more question regarding the- Orian, there is a statement that you can request a public hearing before October 24th. I know that you're new to the job, but do you have any idea- I mean, how does that work in terms of having a public hearing for the listing of an ESA species? I've never been to one.

ORIAN TZADIK: Yeah, that's a good question. I would, I mean, I can certainly, you know, look into that, or I would recommend contacting the contact on the listing. While I will be heavily involved in this moving forward, I was not involved with this being produced because of the timing of it. So, there is somebody listed there that would be the person to contact for that and she would be able to guide you to do something like that if you wanted to.

GRACIELA GARCÍA-MOLINER: So, follow- Let's see, our microphones are dying on us. Can you hear me? Yes?

ORIAN TZADIK: Yeah, we can hear you.

GRACIELA GARCÍA-MOLINER: Okay. So, you know, the request for a comment, it's open until November 7th. I see from, you know, the federal register, that there are already 22 public comments. We're trying to get to them to see. We've known of a couple of fishers that are sending information on the numerous regulations that are in place already. Who would be- we don't have an evaluation of the changes in the habitat that's specific to the Queen Conch. That kind of information would be something that we need to look into because, Richard, correct me if I'm wrong, but there is some specificity to the habitat of the Conch and the type of sandy shelf-bottom that it can handle. And there have been quite dramatic changes near shore, you know, making it really muddy type of silty areas. So that's one. And secondly, very few monitoring efforts have been conducted in the mesophotic reefs. Apparently, the densities of Conch are higher but it's not part of the ongoing monitoring efforts.

So, those are the kinds of things that the Council will be addressing. We had submitted a 12-page or something like that letter way back when in 2012. Those would be the kinds of considerations that the Council would be looking at. So just to put that on the table. Thanks.

RICHARD APPELDOORN: Thank you, Garciela. María, is your hand still up, or do you have an additional comment?

MARÍA LÓPEZ-MERCER: No, but I just want to add something else. So, as the next step for the rebuilding and just to clarify that, and then, as I say, hopefully, we can bring that to your attention at some point, is to determine if the Queen Conch is rebuilt in each island area. And if it's determined, of course, you know, there are data limitations. But, if not, one thing that could be done is to develop a new rebuilding plan. And I just wanted you to know that the ESA listing process and any regulations that come out of that ESA process are separate, and they are apart from this process, from rebuilding, from the fishery part. Thank you.

RICHARD APPELDOORN: Okay. Thank you, María, for clarifying that. Any other questions or comments on the listing?

JORGE R. GARCÍA-SAIS: Richard, Reni here.

RICHARD APPELDOORN: Yes, go ahead. We can't hear you very well.

JORGE R. GARCÍA-SAIS: Well, it's green. Let me see with Graciela's. Can you hear me better right now?

RICHARD APPELDOORN: Yeah, much better.

JORGE R. GARCÍA-SAIS: Oh, good. Okay. You know, I see this lifting of Queen Conch under the threatened list, actually, as an inability for scientists, for us scientists to develop a management policy that will allow sustainable fisheries of this organism. And I was wondering, you know, where are we regarding the status of that population within the EEZ and even within state waters? I mean, it's been a long time since we heard about the status of the populations of Queen Conch in our waters. I wonder if, you know, just listing this organism under a threatened list with plans to ban its fisheries altogether is just an admission from us that we cannot manage this population from a fisheries standpoint. And I was wondering, you know, I mean, isn't there any other route? Isn't there any other alternative to look at Queen Conch fisheries anymore? Just like well, you know, we're not going to do anything more with it, you know, just put it on the list and ban it forever.

You know, I mean, Queen Conch still is a very important fishery product in Puerto Rico and the U.S.V.I. I don't see anybody saying, "wait." I mean, there might be ways in which we can apply catch quotas or seasonal closures or any other alternative for the fishermen to keep bringing this product to the table.

So that's just my comment. You know, I don't know where this is coming from. What kind of data is backing this up? I don't even know what's the opinion of the SSC regarding this. But we certainly should have a voice and our voice might be significant in pushing this forward or giving it a twist. So that's my opinion. And this microphone is going red, so thank you for the chance.

RICHARD APPELDOORN: Alright, if I could fill in something before, we go to Jason. So, the listing, of course, isn't banning anything. It's just, it's listed as threatened, so there's a concern there. What might or might not be done remains to be seen. It is also something that is focused on the species as a whole, even though its specific impact is going to be relative to U.S. populations. You know, the U.S. Caribbean, and Florida.

However, as I mentioned before, the real impact it can have is regulating imports. And that's what's going to potentially force other countries in the region to actually take a really good look at their fisheries and start making sure that they have something that's sustainable. Now, this is something that's supposed to be going on through CITES, but thus, a nicely envisioned and flawed implemented system because of the way in which CITES committees are formed in a lot of countries. Where you have a good committee that's independent of the fishery, it works nicely. Jamaica's a good example of that. Where you don't have that, it's basically an arm of the industry and it's not really doing its job. So, there are ways that the U.S. can impact what's happening in the regions through controlling the status of populations from which imports are coming.

So, what's happening in Puerto Rico on the Virgin Islands is not really, you know, the focus of this action. However, yes, the potential for it to impact the fisheries here is there. There has not been a formal assessment. This is a survey of the concrete sources in the US Caribbean since 2012. There was some additional work that was done by Ron Hill and his colleague Jennifer, oh, I forget the last name, on the Virgin Island. And there was a pilot survey testing a towed photographic sled array off the west coast of Puerto Rico. So, they sort of filled in some stuff, but since then we've had Hurricane María and lots of other things going on.

So, we really don't know what the status is of the Conch. I would point out that both of those interim surveys, were not necessarily designed to show the full status of the stocks, in fact, the one for the sled was not designed to do that. But they did find very high concentrations of Conch in the areas that they looked at. Much higher than what we saw in the previous CMAP surveys, which

is the main mechanism we're using to assess the populations.

So, it is obvious that the population is fluctuating. We don't know what the status is now. Right now, CMAP is undergoing surveys to test a new methodology. So, the pilot study for that is currently underway. And then, based on the results of that, it will be implemented next year. So at the end of the next year, we should have a fairly good indication of what the status of the resource is, both in Puerto Rico and the Virgin Island.

So those are my comments. And you know, if things look good that's something that could be presented to the team that's looking at the proposed rule. And I don't know if at that point they would be changing their mind on anything. Again, it would just be the U.S. Caribbean and not relative to the whole region.

Now, I will say that regionwide, for maybe a number of reasons, there have been things that don't look good. And I think this is what's driving the committee to make the recommendation for the listing. In the Bahamas in particular, there's been a number of papers published showing that there are severe problems with the fishery. I believe there is a number of papers that also point to that. Although the fishery departments would argue that there's no problem and that in fact, the thought is that it’s getting better. They have closed the fishery in Pedro Bank in Jamaica, which is one of the biggest because densities in their last surveys were low, but they haven't repeated the survey in quite a number of years. So, we don't know what's going on with that population.

So, these kinds of things are happening and there's not a lot to refute what's going on. There's also a modeling study, and you can agree with this or not but there was a modeling study of dispersal and try. They made a number of assumptions about what the impact of density is on that and the ability to produce larvae and have them disperse. Then, there's the question of the model they used to do dispersals on. But that paper was saying that overfishing, or let's just say the level of fishing, whether it's overfishing or not, is having a significant impact on the connectivity of Conch populations across the Caribbean. That study was not designed to look at one specific location to the level that it could offer management advice to that location. But as a regional-wide study, it painted a not very positive picture.

As I said, it's a modeling study. It has lots of caveats, but I think this is, you know, this is what's coming out in the literature and that's what the committee is responding to. So, I'm not sure I agree with the action, but I think from what I've seen of the literature coming out, I understand what they're reacting

to.

And both Ron Hill and Jennifer Leo were on that committee or are on that committee. They both have a very extensive background working with Conch Copulations, particularly in the Virgin Islands. So, there was a lot of Conch expertise on that committee when those recommendations were coming out. So those are my comments. Jason, you have your hand up.

JASON COPE: Yeah. Thank you. Something that María said I think is important, and this is just something to flag in general is that there is no official connection between ESA and Magnuson-Stevens Act. So MSA management. And that is a very awkward thing.

We're dealing with that in Puget Sound with some rockfish that got listed and trying to do a recovery plan. But the question is, when do you hand it back over to fisheries management? And there are large inconsistencies in how recovery plans are built around reference points that exist for fisheries management. They can be very inconsistent and hard to communicate why they're inconsistent.

So, we'll be having a paper submitted soon on the topic if it's something the SSC wants to talk about later. It's a really interesting thing that should be solved by getting the MSA and the ESA to talk a little bit more. Because there's no reason they can't be connected more effectively. They just haven't been because I think the two arenas haven't really been operating in the same sort of space. But with a few more marine animals getting listed like this, it becomes, I think something that can't be put off anymore. Thanks.

RICHARD APPELDOORN: Thank you, Jason. Any more questions or comments? If not, we would move to the next item, which I'm guessing is climate and control rules. Is that correct Graciela? Graciela, are you there? Oh, you are in the room with the-

GRACIELA GARCÍA-MOLINER: Oh, sorry.

RICHARD APPELDOORN: I was going to say, you're in the room with the dead microphones.

GRACIELA GARCÍA-MOLINER: Okay. Wait, we are on the last of the batteries here, so H.R.4690, that's the one that you want to talk about?

RICHARD APPELDOORN: Yes.

GRACIELA GARCÍA-MOLINER: Hello?

RICHARD APPELDOORN: Yes, that's the one we want to talk about.

LIAJAY RIVERA GARCÍA: Did you hear us?

RICHARD APPELDOORN: Yes, we can hear you.

GRACIELA GARCÍA-MOLINER: Richard, do you have the, um- it should be in the Google Drive. Amendment in the Nature of a Substitute (ANS) that will be offered to H.R.4690.

LIAJAY RIVERA GARCÍA: Mr. Chair let me know if this is the document.

RICHARD APPELDOORN: Yeah, if you go down to the, where the paper actually starts.

LIAJAY RIVERA GARCÍA: This is the top of the page.

RICHARD APPELDOORN: Yeah, go down a page.

LIAJAY RIVERA GARCÍA: Okay. Oh, okay. Here,

DOUGLAS GREGORY: Mr. Chair. Can I interject something while we're in the middle of this before getting started?

RICHARD APPELDOORN: Yeah, go ahead.

DOUGLAS GREGORY: We were talking earlier about steepness and SPR and I mentioned that I didn't know the relationship between the two. So, during lunch I went online and just did a quick search, and found two papers, nothing extensive, that talked about that. And it looks like a steepness of about 0.73 or 0.75 is probably between 35 to 37% SPR. I mean, it's above 30% SPR, but not by much. I sent those papers to, Graciela, but I failed to ask her to forward them to the committee. So, I just think we need to know what it was we were asking for. And it seems like there is an almost one-to-one relationship between steepness and SPR, so it's fairly easy to judge where things will fall, it looks like. But again, I just did a cursory look at what I could find on the internet really quick. Thank you very much.

RICHARD APPELDOORN: Thank you for those comments, Doug. And I am sure Graciela will forward those papers to the rest of the committee.

LIAJAY RIVERA GARCÍA: Mr. Chair, the documents are already

uploaded in the- for the SSC members. They're already uploaded in the shared folder.

RICHARD APPELDOORN: Yeah. So, I have to admit I'm not prepared for this because I wasn't able to download them until yesterday. Cause I haven't had internet since Fiona went by. But the issue here obviously is trying- and this is, if I understand this correctly, these are revisions to the initial document that came out that I think we had, and the Council was asked to comment on, at least a year ago, I would guess.

Probably in line with comments that I made before the climate change issue in a lot of the other jurisdictions is a much bigger, obvious impact at the moment. Because of the issue of changing distributions. Basically, moving northward as temperatures warm. And we just don't have a large north-south territory to be able to really look at what this issue would look like for at least our reef-based species. And more likely we are looking at the potential for depth changes. As the waters warm, things might look to get into cooler waters below the thermocline. It's not really sure how this is going to play out.

I think that the greater concern that we would have is the impact on, say, growth and reproduction. And I'll give you an example. This is not definitive, it's just where the thinking is at the moment. Those who have been following Queen Conch in Florida, they've had reproductive failure inshore waters for quite a long time now. And initially, the thinking was that this was due to some form of pollution going on inshore waters that was not affecting the offshore waters. And if you move the Conch from the inshore waters into the offshore waters they recover and reproduce. If you take Conch from the offshore waters and put them in inshore waters, they stop reproducing. So, there was something going on there.

More recently they're thinking it's a temperature issue, a high-temperature issue. And again, that's something that hasn't been established, but that's where their thinking is at the moment. And I think that kind of problem may start occurring with a lot of species. That’s just going to be too warm for them to be able to adapt to and be able to, say, reproduce if they're doing that during the peak temperature months. Or the other side of that is something like Nassau Grouper and Red Hind which seem to require a minimum temperature to be able to spawn somewhere in the ballpark of 26 degrees. And so, as temperatures warm, they're not going to get that temperature unless they move deeper. And so that might be driving some dynamics on spawning aggregations in the future.

And then there's just a general issue on growth where warmer waters hold less oxygen. And oxygen is very much a limiting factor in the growth of marine organisms because it's in low concentration in water. So, while at the same time higher temperatures will increase biological activity and hence oxygen demand. So, what oxygen they can get is going to go into maintenance metabolism as opposed to growth and reproduction. So, I think we're looking at potentially a large impact from climate change, but it's not the kind of thing that has been most obvious to the other Councils who have been dealing with these problems. And there's been really directed toward changes in distributions, which as I mentioned before, have been substantial.

I also don't know of any particular ongoing research in the Caribbean that's really directed toward looking at the issue of climate change and how it would affect particular species.

JORGE R. GARCÍA-SAIS: Richard, Reni García here.

RICHARD APPELDOORN: Yeah, Reni, go ahead.

JORGE R. GARCÍA-SAIS: Yeah, Richard, I want to make a comment. You know, some very recent observations we've made with the ROV. I don't know if there is any background data or information or anecdotal accounts of Queen Conch in the 200-foot range, but we have seen, particularly in Culebra and V.I. this last survey that we were there last month we observed several, if not like a dozen of Queen Conch, you know in the 200 plus range. So, I'm not sure if that is a recent movement of Queen Conch towards cooler, deeper waters below the thermocline or close to the thermocline. Or if this is just, you know, something that has been reported before.

So just for your info, you know, we were not expecting to see- At first, we saw one, then we saw two, then we saw several, you know in a particularly horizontal area. Cause, you know below 160 feet what we usually encounter is a slope. But whenever we see a horizontal bottom we were surprised to see quite a few Queen Conch in our way, with the ROV. Thank you.

RICHARD APPELDOORN: Yes, Reni. That would match the observations you've made off of Abrir la Sierra with your rebreather diving and also ROV observations we had of the Tourmaline as well. And yes, I don't know whether that's a movement or just that it has always been there.

Graciela, was the Council looking for us to make additional comments to the alterations that had been made to the original 4690 documents?

GRACIELA GARCÍA-MOLINER: I think this one works. So, the question that Miguel has provided for us was, what and how can considerations on climate change be included in the FMPs?

So, you know, one thing that we need to get back on track is the research priorities. You know, that might be one way of us dealing with that. But, you know, in terms of specifics to the document that you were provided. Is there anything in particular that you see that needs to be addressed?

RICHARD APPELDOORN: Well, as I said, I- since I was only able to download this the other day, I haven't had a chance to go through it. But I'll point out that my previous comment about the recommendation to have Sarah Gaichas give her presentation to the various committees and the Council proper, is that this is sort of exactly what she's trying to do, is set up a way where this kind of information can actually be entered into the control rules stock assessment process in a formal way. And does not rely necessarily on developing complicated models to look at. Either the interactions between stocks or stocks in their environment, particularly the changes being caused by climate. So, I think from her presentation, we can kind of look at this issue in that way and start thinking about how this is going to affect things.

But clearly, it's an area of needed research because things are going to change and to a degree that we can anticipate where the priority stocks are going to be that potentially will be impacted, the more we can try to address, you know, those things in our assessments.

And at this point, I would again talk about the workshop that was held in Miami a decade ago, at this point, or more, where we tried to develop a consensus view on what species would be priority cases to be impacted by climate change. And the report for that was never released. And I think that was, you know, it was a week's worth of work that everybody put in. I'm not sure why it was never released other than, we got things about, or that it was being reworked, or they were modifying the process from what had been done when they were applying it to other regions. But the point was that there was an effort made to try and identify what species would be most vulnerable to climate change and why. It would be nice to have that as a starting point.

Graciela, I think you were at that meeting. So, you know what I'm talking about.

GRACIELA GARCÍA-MOLINER: I can't hear you. So, what?

RICHARD APPELDOORN: I said, I think you were at that meeting as was I. Do you know what I'm talking about?

GRACIELA GARCÍA-MOLINER: The report of the vulnerability?

RICHARD APPELDOORN: Yes.

GRACIELA GARCÍA-MOLINER: Yeah. I just asked Liajay to see if we had it in the-

RICHARD APPELDOORN: No, it never came out.

GRACIELA GARCÍA-MOLINER: But I thought that there was a draft of some sort. So let me, let us check on that.

RICHARD APPELDOORN: Yes, there may have been a draft,

VANCE VICENTE: But there was never a final report.

GRACIELA GARCÍA-MOLINER: Okay. So, then we would have to, you know, scoop it out and, and bring it up to date. I mean, there is quite a bit of work being done by the Puerto Rico Climate Change Council. And they do have the resilience reports, for Puerto Rico and the Virgin Islands. So that would be, you know, that's- A lot of is addressing anthropogenic impacts out of the sea level ride, the changes in weather, etcetera.

VANCE VICENTE: But nothing much in the biology.

GRACIELA GARCÍA-MOLINER: Yeah, Vance was just saying nothing really on the biology. So, that's an issue and a gap.

VANCE VICENTE: Except for mitigation. The only thing about biology that I have read that they've been doing is establishing artificial dunes to mitigate the costly erosion rate, but nothing on the ecology or fisheries or endangered species or anything of the like.

RICHARD APPELDOORN: Yeah. And of course, another area of concern is not just the impact on the species themselves, but on the habitat. Obviously, corals are the poster child for this because of bleaching and disease under high-temperature conditions, but there are other issues as well.

GRACIELA GARCÍA-MOLINER: So, I was just looking at the dates, and September 19th was Fiona, right? So, we were just- Part of the problem that we're having, you know, and it had to do a lot with the excessive amount of water that we received. There are going to

be very large issues, especially on the North Coast of Puerto Rico, with all the water being dumped out of the urban area into the Atlantic, for example. So yeah. So, these are big concerns because of the changes to the habitat, the decline of coral cover in an area that it's already, you know, exposed to high energy, high wave energy, and just open Atlantic rather than protected areas. So that's also a concern.

So, one of the things is that the EFH review thing, it's coming up for us. So, we'll be looking into doing that review. And that would be one place that's, you know, climate needs to be and has to be addressed. And what I had mentioned earlier about the changes in the habitat, specifically for the Queen Conch, for example, would be quite pertinent to the EFH review, five-year review, or seven-year review that's coming up.

RICHARD APPELDOORN: So, where do we go from here at the moment? I mentioned that I think Sarah Gaichas's approach would be helpful in looking at how we can take this kind of information and get it into the assessment process. But obviously, I think it's an area that a lot of research would help.

GRACIELA GARCÍA-MOLINER: So, I don't know if María's online, but we will do our best to find the draft of that vulnerability workshop and bring it up to date and see what we have not used from that report. Then again, you know, you saw the many amendments are coming up in terms of the island-based FMPs and this would be, you know, also different for each one of the islands. So, that's going to be a lot of work I foresee.

I've been trying to figure out a way of making this easier to deal with, but I don't think that there is a way to do that. So, we have to figure out a way of basically, accounting, for making sure that we have information on the parameters that we need to look at. And I think that that's where the conceptual models and the Lenfest effort might come into play. So, it might be through the fishery ecosystem plan, the way that, that should be addressed. But I'm not a hundred percent sure. I'm just saying that that's what I think should happen.

RICHARD APPELDOORN: Okay. Thank you. We have about 15 minutes left. There was an issue about risk policies that had come up recently, and I'm not sure I fully understand where the SSC comes into these. So, if you could enlighten us on that.

GRACIELA GARCÍA-MOLINER: So, this just came out to us, what, yesterday or the day before yesterday? So, apparently, the CCC is working on assessing the risk policies at the Council level. So,

Miguel had actually answered to Chris Moore from the Mid-Atlantic about, you know, looking at page 25. But I think that what you're seeing is the presentation, was there a document with that?

So, we would have to look at that presentation and see what needs to be changed now that the island-based FMPs are in place and add our changes. Add whatever needs to be changed at that presentation.

RICHARD APPELDOORN: Is this an effort to more standardize risk policies? In the sense that each Council has been dealing with this independently and maybe there should be some comparison and look at what- Sorry, go ahead.

GRACIELA GARCÍA-MOLINER: Well, that's what the presentation- So, that's what the presentation does. It goes through the risk policy of the other Councils and what's similar and what's not. I think that this might need a little bit of updating and looking at it and- You know, the ABC control rule, the P*, let's see, Managing risk.

So, you know, now we have the ABC control rule for the island-based FMPs. We have what we discussed, you know, this morning or yesterday. So, this needs to be updated. So yeah, there are changes that we need to make, but I don't think that we need to do anything in terms of the SSC per se. I think that we just need to update the information that's in here.

So, I'm looking to see if we have any other documents. I think that it was just a summary presentation.

RICHARD APPELDOORN: There's a paper.

GRACIELA GARCÍA-MOLINER: Yeah, but the paper refers to a- Yeah. So now I think I'm starting to understand it. So yes, we definitely need to update what's in the presentation. So that's where the CCC and they're referring to this paper for the implications on climate resilience to see how our risk policy got generated by what we've done. But, you know, I think that I just need to sit down look at the presentation, and definitely include the CFMC updated version from the island-based FMP.

RICHARD APPELDOORN: Well.

GRACIELA GARCÍA-MOLINER: okay. And I think that that's what needs to be done with that.

Yeah. This is outdated. Definitely, this needs to be revised for us.

RICHARD APPELDOORN: Right? So, the paper shows harvest control rules used in U.S. Federal Fisheries Management and Implications for Climate Resilience are in the preprint stage. That's what was provided to us.

GRACIELA GARCÍA-MOLINER: Okay. I mean, if anyone had more information than I do please say so. If not, Richard, it would be us sitting down and going through the paper and the presentation.

RICHARD APPELDOORN: Right. Can you hear me? I've again lost the zoom. I mean, I can hear you, and maybe you can hear me, but I can't see anything, and I can't control muting or anything, so I'm going to have to-

GRACIELA GARCÍA-MOLINER: So, all we have in there on the screen is the paper that they sent, the pre et al. paper. And the presentation goes through whatever was in place at the time of 2012, you know, that's a long time ago. In 2016 that's way before all the island-based FMPs, etcetera. So, the summary that you have, it's outdated for the Caribbean Council.

RICHARD APPELDOORN: So, this would be an issue that the Council and the SSC should revisit at the upcoming meeting.

GRACIELA GARCÍA-MOLINER: Right. So, I need to update the presentation because that needs to change. I mean, they're talking about the scenarios that we used to have way back when. So now things are not like that. And there is the P* and everything else, that is now in place that wasn't then. So, the presentation, it's quite outdated.

RICHARD APPELDOORN: Okay. I was able to recover my controls here.

GRACIELA GARCÍA-MOLINER: Can you see the screen already or not?

RICHARD APPELDOORN: Yes, I can.

GRACIELA GARCÍA-MOLINER: Okay. So, in this overview, if you go down "the CFMC sets ACLSs using a multi-step process. The OFL can be set to the average, or median of catch (unintelligible). So, the ABC control rule now is a little bit different. So, it has- keep going down. There! So, Caribbean uncertainty is associated with the landings data due to underreporting or non-reporting. High scientific uncertainty due to the lack of scientific information. So that kind of thing, you know, needs to be- Do we still believe that that's the case? So those are the things that need to be corrected.

RICHARD APPELDOORN: Yeah. In a generic sense, I'm not sure much is going to change, except for now we have the island-based plans actually coming into effect, and therefore the control rules developed within that will also come into effect.

GRACIELA GARCÍA-MOLINER: Right. So now, in this case, the approach to say, these are four tiers, right? Not eight scenarios. I don't know if you guys even remember what the scenarios were. So, that's the kind of thing that we need to, you know, go through the presentation and make sure, that we change it. Okay?

Yeah. Change the CA to only C. Yeah, this is from the previous FMP. Yeah.

RICHARD APPELDOORN: So, without really specific information we're sort of left saying, "Okay, the climate's going to be a much more significant player in the dynamics here. And maybe the multipliers on our Sigma_min have to be actually expanded to account for even more uncertainty." But I would wait to hear more about some approaches, again, looking at Sarah's presentation that might help us look at how we might incorporate things more specifically.

And with that, I'd ask the committee whether they have any other comments or questions on anything before we close. It's almost five o'clock. Go ahead.

GRACIELA GARCÍA-MOLINER: I think I sent everyone the National Standard 1. I think María just sent it to me, or I sent it to her. So that is just part of the press.

RICHARD APPELDOORN: Yes. So, Jason, if you're there, does this means this is going to be in effect?

JASON COPE: Yeah. Yeah, they're going to have an official rollout and all that stuff, but it's an official tech memo now. So it can be used.

RICHARD APPELDOORN: Well, that's great news. It's obviously going to be something that we're going to have to learn how to use this new flexibility to our advantage. But I think that opens up a lot of possibilities for a lot of our stocks such our, you know, our poor, on the data-poor scale. So that's really good news.

And for those of you who don't remember these flexibilities are ones that would allow us to use something other than a weight to set OFLs and ABCs. So, they could be something like catch per unit effort level or mean size, length, or combinations thereof to be

able to manage the fisheries.

GRACIELA GARCÍA-MOLINER: This concludes all the other businesses that we had on our list. Anything else that you need?

RICHARD APPELDOORN: In the next three minutes? No, not that I can think of.

GRACIELA GARCÍA-MOLINER: We are negotiating the contract with the hotel for the next SSC meeting. The date that we have is the week of November 28th. So as soon as we have that information, we'll be sending out the travel memo. It looks like we might need a three-day meeting. So, Richard, I will be speaking to you probably next week about, you know, all the topics, etcetera. But that's all I have for now. So, if anyone has any specific topics that they would like to include in the agenda for the November meeting, do send us an email.

RICHARD APPELDOORN: Okay, Graciela, We'll be working on the agenda for that. Julian?

JULIAN MAGRAS: Yes. Good afternoon once again. Question for Graciela. Diana sent out a memo from a week ago for us to make reservations for this meeting. So, does that still stand, or do we need to cancel those hotel reservations?

GRACIELA GARCÍA-MOLINER: And they were for the SSC meeting?

JULIAN MAGRAS: Yes.

GRACIELA GARCÍA-MOLINER: Let me-

JULIAN MAGRAS: She sent it out, I can tell you right now, let me get into my phone here.

GRACIELA GARCÍA-MOLINER: Then let me talk to Diana about it because- No they sent- Yeah, there was a-

JULIAN MAGRAS: The reservation link for the SFMC SSC meeting from November 28 to December 1st and that was sent on August 23rd. And it has a link down below of who to call, and reservations must be made by October 15.

GRACIELA GARCÍA-MOLINER: Julian, can you send that to me because I don’t have it?

JULIAN MAGRAS: It was sent to a lot of people. So, I’ll forward it to you because I actually forward it to Nelson today.

GRACIELA GARCÍA-MOLINER: Please do because I don't have it in my email at all and that's what I was-

JULIAN MAGRAS: Alright you have it. I just sent it to you. Yeah, but that was sent on August 23rd.

GRACIELA GARCÍA-MOLINER: Si, si but that- Yeah. That's an email, if that's the one that I'm looking at, that has to do with the setup of the October meeting, and then it should be stating that it will be the week of the 28 but it doesn't have a link. So, send me what you have because I really don't have-

JULIAN MAGRAS: I just did.

GRACIELA GARCÍA-MOLINER: Okay.

JULIAN MAGRAS: So, can you please confirm so we can know if we have to do our reservations or not?

GRACIELA GARCÍA-MOLINER: Okay, pues thank you.

JULIAN MAGRAS: Not a problem.

GRACIELA GARCÍA-MOLINER: Okay. Did you adjourn the meeting? Richard?

RICHARD APPELDOORN: I haven't. So, first, Julian, thank you for the critical information.

GRACIELA GARCÍA-MOLINER: Definitely because it's-

RICHARD APPELDOORN: And then I would like to thank the committee Sarah, Kevin and there are others there at the Science Center who did some excellent presentations. And of course, the Council staff, especially, Graciela for helping lead this and Liajay for all of the zoom stuff. So, it is now a little after five so thank you very much and we'll adjourn the meeting.