SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SCIENTIFIC AND STATISTICAL COMMITTEE

Webinar

March 4, 2016

SUMMARY MINUTES

SSC Committee

Dr. Marcel Reichert, Vice-Chair
Dr. John Boreman
Dr. Steve Cadrin
Dr. Eric Johnson
Dr. Sherry Larkin
Dr. Amy Schueller
Dr. Fred Serchuk
Dr. Carolyn Belcher
Dr. Jeff Buckel
Dr. Brian Irwin
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Dr. George Sedberry
Dr. Alexei Sharov

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Dr. Michelle Duval

Council Staff:

John Carmichael
Dr. Mike Errigo
Myra Brouwer
Amber Von Harten
Dr. Brian Cheuvront
Chip Collier
Mike Collins
Julia Byrd

Observers/Participants:

Dr. Nick Farmer

Other Attendees Attached

The Scientific and Statistical Committee of the South Atlantic Fishery Management Council convened via webinar on March 4, 2016, and was called to order at 9:05 o'clock a.m. by Vice Chairman Marcel Reichert.

DR. REICHERT: I want to welcome everyone to the webinar. Luiz is traveling and he asked me to lead the discussions today. Also, and, John, correct me if I'm wrong, but the webinar is also broadcasted, correct?

MR. CARMICHAEL: Yes, it's available. It's going out over the internet for those who are registered and there's various staff and members of the public that are onboard, it looks like.

DR. REICHERT: Thank you. Do you want to do introductions or was the sound check sufficient for introductions? I forgot how we do that during the webinars.

MR. CARMICHAEL: We usually try to do it with the sound check, and plus there is a list that everybody can see, and I will make sure that is available to everybody. If not, I will turn it on so everyone can see the attendance list. Then, just for purposes of the minutes made, normally I expect you or I will be calling on people, and so if you and I try to remember that, so then we know who is going to speak.

DR. REICHERT: Excellent, and as a reminder to everyone, I think it would help if you mention your name before you speak. That will help later on in making the minutes. With that, are there any changes or additions to the agenda from anyone? Hearing none, the agenda stands approved. John, have you heard of anyone who would like to make a public comment? I would like to open the floor for public comments right now.

MR. CARMICHAEL: I think that sounds good. If you would like to make a comment, please raise your hand and we will call on you.

DR. REICHERT: No hands, John?

MR. CARMICHAEL: No, and so I think we can move on.

DR. REICHERT: Okay. There is another opportunity for public comment at the end of the meeting. Before we give the floor to Mike Errigo and Nick Farmer, who will give the presentation to remind us of the issues at hand, I would like to go to page 8, to remind everyone of the action items today, under 3.3, and I will briefly read them and, John, if you can bring them up on the screen.

Identify uncertainties in each of the methods and discuss their impact on fishing level recommendations and management. Compare and contrast the approaches with regard to risk of overfishing and progress toward rebuilding goals. Number 3 is discuss whether the implementation of a minimum size limit violates the projection selectivity assumptions for recreationally-caught hogfish in the Florida Keys and East Florida stock and the potential effects on fishing level recommendations. Number 4 is discuss whether each method represents best scientific information available, and provide guidance on their use in setting fishing level recommendations for this stock in Amendment 37.

That's, at the end, what the council has asked us to provide for next week's meeting. That also reminds me of the fact that we need to make sure we have a pretty decent draft of the report by the end of this meeting, because myself and Luiz will update the council on this webinar on Tuesday of next week, and so we don't have a lot of time for turnaround of the report. If anyone has any questions or comments, I will like to give the floor to Mike and Nick.

MR. CARMICHAEL: Yes, Marcel, and we'll do this like we have at past webinars and put consensus statements up on the screen as we go through the discussion, to help with what you and Luiz need to report next week.

DR. REICHERT: Excellent. Thanks, John.

MR. CARMICHAEL: Let me go over to Mike now and make him the presenter. All right, Mike.

DR. ERRIGO: I showed my screen. Hopefully that worked.

MR. CARMICHAEL: Yes, we can see your screen.

DR. ERRIGO: Okay. Good.

MR. CARMICHAEL: Now we see the presentation. It looks good.

DR. ERRIGO: All right. Great. I am going to be giving most of the presentation. I will do a brief history, an intro, of how we got here and what's going on and describe the issue and give a brief intro of the two methods for specifying the recreational ACL for hogfish in the Florida Keys/East Florida stock.

Then, when it comes to describing the details of each method -- The details for Method 1, when we get there, Nick will describe that, since that's the method he worked on and did all the work for, and then I will go over some reasons why we were looking for an alternative method. Then I will go over that one for you guys. That will conclude the presentation and then you guys can start your discussion. If there are questions, there are several places that we could stop for questions, if you do have any, at the end of each of any of these sections. We can stop and if anyone has questions, I will stop and ask.

Really quick, SEDAR 37 was completed in 2014 by Florida FWC, and the Florida Keys and the East Florida Stock were determined to be overfished and undergoing overfishing. The SSC reviewed that assessment in October of that year and then they reviewed updated projections in October of 2015, the following year, and then the SSC also discussed setting ABCs and ACLs in numbers versus pounds at that same meeting.

The recommendation was to use numbers for ABCs and ACLs; however, the allocations would need to be recalculated using numbers rather than pounds, which is how they're currently allocated. At the December 2015 meeting, the council gave direction that they would like the rec ACL set in numbers; however, they did not want to look at recalculating allocations at this time, because what they wanted to do was to go back and address all of the species that have their rec ACL set in numbers with some kind of omnibus amendment and make that change across the board. They didn't want to treat hogfish differently from other species at this time.

At the end of the December meeting, we were going to set the ABC in pounds and then convert the rec ACL into numbers, using average weight. The problem is when you convert the rec ACL from pounds to numbers, you need some average weight, but Amendment 37 is also proposing increases to the minimum size for hogfish in the Florida Keys and East Florida stock.

If you assume then that everything else remains constant as the minimum size increases, you would also expect the average weight of the landings to increase, because everyone will be landing larger hogfish, and, in the Florida Keys/East Florida stock, the rec landings comprise over 90 percent of the total landings, and so there will be a significant difference in the total average weight.

As the minimum size increases for the same number of fish used for the ACL -- So let's say you catch your ACL and you're catching the same number of fish. As the minimum size increases, you could eventually exceed your ABC, your total ABC, which is in pounds, because the rec sector comprises a large portion of the landings, over 90 percent. There is a possibility that overfishing will occur simply by landing the same number of fish, if you assume that everything remains constant after all this management goes into place.

This is just a graph from the assessment of the length/weight relationship. You see as the length increases, and so therefore as the minimum size increases, weight goes up. It goes up exponentially. This is an example of what can happen. These are projections, in pounds, for the total ABC, in pounds, in the first column, right here. This is the total ABC. Then this is the recreational portion of the ABC. This is the rec ACL, in pounds. This is the rec ACL, in numbers, at the current twelve-inch minimum size.

If they landed these numbers, and then you use the length/weight relationship here, these are what the landings, in pounds, would be if you landed this number of fish. The fifteen-inches is the panel's preferred minimum size. You will see that you can get up to almost 67,000 pounds, whereas the ABC is 30,000 pounds, and you can significantly exceed the ABC in pounds, by landing the same number of fish, by going up to a fifteen-inch minimum size limit. That's the issue that we ran into.

What can we do about it? There were two proposed, two overall proposed, methods. One was developed by SERO staff when this first happened and one was developed by council staff later on. The first method, Method 1, was developed by SERO staff and has everything -- OFL, ABC, and ACL are all set in pounds, as it was before, and they use the assessment length/weight regression to help predict the average weight at different minimum sizes.

Then they use the predicted average weight at each minimum size to convert the rec ACL into numbers. As the minimum size increases, the rec ACL in numbers decreases to try to keep the rec ACL in pounds, if you were to convert back, below the rec ACL, the original rec ACL, in pounds, from the assessment projections. As the minimum size goes up, the number of fish the rec sector can land goes down, so that the pounds equivalent stay the same. That's what Method 1 does, and there are various forms of predicting the average weight that Nick will go over.

Method 2 sets OFL, ABC, and ACL in numbers. Now, in this scenario, the commercial ACL would need to be converted back into pounds, using the commercial average weight, and the current commercial average weight equates to a hogfish that's just above the preferred minimum size of fifteen inches. Once those ACLs are calculated, they don't change with the minimum size limit.

That's the basis of Method 2, and we'll go over both in more detail, to see how we work out all the issues and details and nuances with each method in just a minute. Does anyone have any questions now, remembering that we're going to, starting in the next slide, go over each method in detail? I am not seeing anything and so we'll just continue on with the description of the methods.

DR. SHAROV: I had a question. I raised a hand. Could you go back for a second to the table that shows ACLs, and you estimated ACLs and then different minimum sizes? I assume the calculations were done correctly, but, nonetheless, is that correct that, based on this table, just an increased minimum size by three-inches leads to a double of the ACL in weight? It goes up, for 2017, the first line, it goes up from 34,000, currently, to 66,000.

DR. ERRIGO: Yes, and so this -- Although this is based on the length/weight relationship, it doesn't use the length/weight relationship directly. It uses a method from Method 1 that was originally proposed there, which takes the length/weight relationship and then looks at the actual average weight of the catch and the difference between the two, the percent difference between the two, and then sets that as the average weight at twelve-inches, and then keeps that percent difference constant as you go up in size.

DR. SHAROV: Can you show the length/weight curve, just to see where --

DR. ERRIGO: The fishery was landing fish, on average, that were -- At the twelve-inch minimum size, they were landing fish, on average, that were equated to a fish just larger than thirteen-inches. When you go up to a thirteen-inch minimum size, you would have been landing a fish equivalent to just above fourteen-inches. When you go up to a fifteen-inch minimum size, they would be landing a fish equivalent to a fish just above sixteen-inches. That's how the average weight was calculated.

DR. SHAROV: All right. Thank you. Just looking at the curve, it doesn't feel like there is a double increase in weight by going from twelve to fifteen, but probably it is. I just wanted to make sure that that's the case. Then the second question was on the -- You start your description of your Method 2 by saying that we'll set the ABC and then the ACL in numbers of fish. How is it going to be set in numbers of fish? Could you remind us how those numbers of fish for ABC will be calculated initially?

DR. ERRIGO: Yes, the model projects in numbers, and it can also project separately in weight.

DR. SHAROV: So the output of the assessment model will be used for that purpose, correct?

DR. ERRIGO: Yes.

DR. SHAROV: Okay. Thank you.

DR. SERCHUK: I have a question. In this presentation and other presentations, I haven't seen any discussion of the impact of the proposed increase in the minimum size on the demographics, that is the sex ratio of the population. From what I understand, most fish below fifteen-inches are predominantly, if not almost exclusively, females, and that the change from females to males really -- The 50 percent maturity, as I understand it, is not reached until sixteen-inches.

I am a little bit concerned that an increase in the size limit will move mortality away from younger, smaller females to larger, and perhaps more fecund, older females. It's very difficult when dealing with these species that change sex, but in none of the discussions that have been presented, or none of the analyses, have I seen any discussion of how the size limit will change relative to the impact on the sex ratio in the population, and also on the potential removal of larger females and what that might mean in terms of potential recruitment activities. Thank you.

DR. ERRIGO: Actually, I am not hogfish biologist, and so it's difficult for me to speak to that particular point. However, I do know that, although there is an overall size at 50 percent transition, hogfish, in particular, tend to change sex at any size, depending on the male/female ratio in localized areas, from what understand. They are kind of difficult to predict how this will impact the population. It might be that as minimum size increases that what you will get is larger males and larger females in the population, but I'm not sure how it will affect it.

DR. SERCHUK: My point is simply I think it merits some mention in whatever we move forward with, in terms of likely consequences, or the lack of understanding of the lack of consequences, simply because hogfish, again, change sexes and, from the studies that have been done, the size at 50 percent maturity for the males is over sixteen-inches, and so going from twelve to fourteen to fifteen suggests, to me, that we're going to displace fishing mortality away from smaller females, which presumably contribute most of the landings, to larger-sized females. We may not know what that means, but I think it's worth noting if that is a possible scenario.

DR. REICHERT: Fred, if I may, I think you're making an excellent point, and what I would like to do is table that discussion until the end, because I am not sure how that affects the discussion of whether or not we recommend using Method 1 or Method 2.

DR. SERCHUK: That's fine with me. Thank you.

DR. REICHERT: Yes, but I do get your point and I think it's an important point to mention when we formulate our recommendations, but so please remind me if I forget to bring it up at the end, that we should make sure that we allow some time to discuss that, but, for the sake of this discussion between numbers and pounds, let's see if we can focus on that at this moment.

MR. CARMICHAEL: Marcel, I've noted that, to be sure we bring it back up when we get through.

DR. REICHERT: Okay, and thanks. Great, but thanks for bringing it up, Fred.

DR. ERRIGO: It looks like there are no other raised hands.

DR. BOREMAN: Just one more question here. I assume that the assessment, under the conditions of raising minimum size limit, takes into account regulatory discards and discard-related mortality and is that true?

DR. ERRIGO: The assessment does look at, yes, dead discards, both in the assessment and in the projections. In the projections, it's at a set selectivity, whatever the terminal selectivity is in the model.

DR. BOREMAN: Okay. Thank you.

DR. ERRIGO: I am going to turn it over to Nick now, and, Nick, I will just advance the slides for you, if that's all right. You just let me know when you need me to.

DR. FARMER: That sounds great. Mike gave a great introduction, and I really appreciate that, and thank you guys for attending the webinar and Mike for setting it up. I want to thank David Records, in particular, for a lot of the work he did on this process for how to work out what to do about a changing size limit.

This is something that we haven't really faced before, in terms of having had the ACL specified in numbers for a stock where we were contemplating changing the size limit. Typically, those ACLs are in pounds, and so it kind of implicitly handles the fact that the mean size might change with a changing size limit, whereas in this case we really needed to explicitly handle that. I think Mike's table made that pretty clear, that, for example, if you specified a twenty-inch size limit that you could be three-and-a-half times, almost, over the recreational allocation of the ABC in pounds, just based on the mean weight at twenty-inches.

Having recognized that, we wanted to explore a bunch of different options for what the mean weight could be in the future under different minimum size limits, and we went through and the simplest idea was just take it and divide the ABC or the ACL in pounds, which would be the recreational allocation of the ABC, by the mean weight at a given minimum size, but that doesn't really account for the fact that there is some selectivity and also some availability issues going on.

We toyed around with a bunch of different approaches to handle the fact that selectivity and availability of fish isn't exactly proportional to the Von Bert growth curve. I don't really want to belabor all of them, because they get pretty technical. The one that I think we're leaning towards right now is one that addressed a comment from the Science Center, who gave us a very detailed review of this approach and also the decision tool that we developed in association with it that we'll be presenting to you guys in May at your meeting.

Basically, the idea is we look at the weighted mean of weights. What I mean by that is we have observations from both headboat and from MRIP and so we weight those observations based on the total pounds coming from each of those data sources. We look at the weighted mean of weights of those intercepted fish in the remaining size bins at or above the specified minimum size, but we also assume some undersized retention, because we've observed that at the twelve-inch size limit, and we assume it as a percentage, based on observed data. This is Approach Number 7 in red at the bottom here.

Basically, we didn't observe any undersized retention in the headboat fishery between 2011 and 2013. We observed about 3.2 percent of the total landings were two-inches under the minimum size limit, through MRIP intercepts, and 25 percent of the landings were one-inch under the minimum size limit, from the MRIP intercepts.

On the next slide, you guys can see the actual data. The MRIP is in blue and the headboat intercepts are in red, and you're looking at the number of fish intercepted at different sizes, and so you can see, from the MRIP data, the fork lengths in inches and the undersized retention. Then, if you go to the next slide, under Scenario 1, and I want to point that one out first just because this addresses Alexi's comment about the conversions and what the growth rate is between these size bins.

Column 1 here shows the fork length in inches and the "1" there denotes Scenario 1, which is just the Von Bert mean weight at size. You can see a twelve-inch fish weighs, on average, 1.38 pounds, whereas a fifteen-inch fish, which is the preferred, is at 2.55 pounds. Scenario 7, which is the far-right-hand side, a twelve-inch fish weighs 1.85 pounds, which is what we observed over the last three years. That's the mean weight, and that's the weight that was used to convert from the recreational allocation in ABC to the recreational ACL in numbers.

Then, assuming that same percentage of undersized retention one-inch and two-inches below the minimum size limit, a fifteen-inch minimum size limit would result in a mean weight of landed fish of about 2.99 pounds per fish. If you didn't adjust the ACL in numbers at that fifteen-inch minimum size, our concern was that you could then exceed the ABC, and potentially even the OFL, and, without any additional information as to how selectivity changes would result in a change in ABC at different size limits, this would keep you from, at least statutorily, overfishing the stock.

Certainly the ideal scenario here would be to incorporate selectivity into the projection model at different size limits coming out of the assessment and get different ABCs for different management alternatives, and that's something that we've been working on with the Science Center for a few years now. It looks like some progress is being made there, but it does not look like it will be completed in time for hogfish, and so this was an approach we came up with to try to handle that issue.

If you go to the next slide, under Scenario 7, basically what you're looking at is the fork length, in inches, in Column 1. The mean weight from the Von Bert curve at that fork length is in the second column, and then the assumed mean weight for the Florida Keys/East Florida stock is in the third column, and so you can see, again, at fifteen-inches minimum size limit, we're looking at 2.99 pounds per fish.

The East Florida/Florida Keys rec ABC allocation, in pounds, is 34,670 pounds, which computes out to 11,007 fish at the preferred ACL at 95 percent of the ABC, in numbers. You can see, comparing Row 1, the 17,778 fish, to the row for the fifteen-inch minimum size limit, that you lose about 6,000 or 7,000 fish when you make that adjustment for the increase in the minimum size, because the mean weight of fish is increasing.

That's basically what we came up with to try to constrain the fishing rate, to keep it below an overfishing level, as defined by the ABCs that we have been presented. Mike, that's all I've got, and so if anybody has any questions, please let me know. Otherwise, we can move on to the description of the method that the South Atlantic Council staff has come up with to try to address this.

DR. SERCHUK: My question is what was the fate of the discards that you took into account and how would that affect the total allowable landings from the fishery?

DR. FARMER: With this approach, we've developed a decision tool that accounts for the conversion of what was previously catch into discards. We're assuming that there's about a 10 percent release mortality rate, and we're also assuming that about 73 percent or so of the fish that were previously caught would not even be discarded anymore, because that's the percentage that's caught by spearfishing, and so the idea is that the spearfishing would not select for fish that were undersized.

This approach of dealing with the change in the ABC under different mean weights is not explicitly accounting for any change in stock productivity due to survival into larger sizes. It's not accounting for any changes in discards due to a shift in retention patterns. It's just basically accounting for the fact that the fish that are landed are going to be larger in size, and so, in order to retain the catch levels below that rec ABC allocation, in pounds, of 34,670, which was generated out of a twelve-inch minimum size limit assumption from the projection model, you would have to constrain the catch, in numbers, to 11,007 fish.

DR. SERCHUK: I appreciate that.

DR. FARMER: It's not a dynamic population modeling type of approach. It's really just keeping the numbers in line in a more a straightforward type of accounting approach.

DR. SERCHUK: I appreciate the bookkeeping aspects of it, but I wish -- I really think we need to be explicit about some of the assumptions that you made. I am not saying they're wrong, but they're assumptions, and, quite frankly, from what I read, the sampling of the recreational fishery, in terms of the numbers of fish that are actually observed each year, is very small, and an even smaller portion of that are actually weighed. There is uncertainty there and I just want to make sure that we characterize that uncertainty. Thank you.

DR. FARMER: Yes, and to add to that, the predominant mode of catching these fish with spear is even more poorly intercepted. I agree with you that the recreational sampling, although we're doing our best to leverage what little data that there is to make these assumptions about the mean weight, it's based on some pretty low sample sizes.

DR. REICHERT: A quick question. You may have mentioned that, but, to follow up on Fred's question, was it, in all of these calculations, taken into account that the discards also will increase in size with an increase in minimum size limit?

DR. FARMER: From a decision tool perspective, which is one of the things that we'll present to you in May, we do keep track of what the changes are in total removals, but this is not a dynamic population model in terms of how we're computing the ABC in numbers. It's not giving any credit to the hogfish population for this change in minimum size.

If there is a biological benefit that would result in an increased ABC under this approach, it's not accounting for that. This is more consistent with basically, when we manage in pounds, this is kind of how we do it, and all we're doing is trying to keep that approach consistent.

For example, you guys have reviewed any number of assessments where you've recommended an ABC in pounds and the council has made a change in the size limit and we haven't done anything to explicitly account for any biological benefit to the stock for that change in the size limit when setting an ACL. We just manage to an ACL that's some percentage of that ABC. If you reran the projections and changed the selectivity, you might get a different output on the ABC, and that's what the South Atlantic Council staff are going to be presenting to you.

DR. REICHERT: Thanks. Mike, I assume you will take over now and explain the method that you've been using?

DR. ERRIGO: Yes, and, quickly, I will go over why we considered a second method. Then I'll go over the details of that method. There is an inherent assumption in Method 1, which you guys were just going over, and that's that the selectivity remains constant after the regulations are implemented.

We all know that's not the case, but that's just an assumption so that we can use a fairly simplified method of calculating the ACL and keeping the ABC in pounds. However, pop dy theory says that if you harvest at higher sizes that it should result in larger yields and overfishing may not occur for the same number of fish harvested.

That, of course, is always dependent on the amount of discards, dead discards, and things like that, but there are scenarios where overfishing would not occur, but the yield will go up, because the selectivity changes, which changes the projected yield. It changes the yield per recruit, basically. Method 1 reduces the number of fish able to be harvested to keep yield constant, and this actually could result in underfishing the stock rather than overfishing.

Council staff developed a modified yield per recruit model to look at the effects on the fishing mortality and yield when the size of harvested fish increases. We have this simulated population, but it uses all the parameters from the Florida Keys/East Florida hogfish assessment model. It has both numbers and biomass at age, and they're fairly simple inputs for this purpose, and so we started with, at age one, 100,000 fish and simulated the population out to age twenty, or twenty-five, and then used all the growth and length/weight parameters from the model.

Then we created this simulated yield per recruit, or the modified yield per recruit, and we looked at the changes in yield. We also looked at fishing mortality on the exploited part of the population, and so we assumed at any given size limit that you didn't harvest anything below the minimum size, but you could harvest anything above the minimum size.

F exploited means what's the F rate for that portion of the population from the minimum size and above. Population F is the fishing mortality rate for all those fish that are twelve-inches and above, but it does not include dead discards. That's basically the entire exploitable population under the current management. Then total F is the entire population from twelve-inches up, which includes the dead discards at an increasing size limit, and so the dead discards change depending on how big the size limit gets.

For the results, and I will show you the table and graph, but basically as the size limit increases, yield and exploited F increase. The F on the exploited part of the population increases because the abundance of fish at higher age classes gets smaller and smaller, and so to harvest the same number of fish, your F has to go up. However, the population F and the total F remain fairly constant. You only see a difference in the two at the twenty-inch minimum size.

Here is a table, and I have it in graphic format, but it goes up by two-inches here in the table by size limit, but you get the idea. You're harvesting 10,000 fish in this scenario at each size limit, but the pounds, the yield, goes up. The exploited F, so the fishing mortality rate on those age classes that you are able to harvest from, goes up, necessarily, because the abundance at age, as you get into higher age classes, goes down, and so F has to go up. The population F and the total F remain constant, and the total F only increases relative to the population F at twenty-inches, and only by 0.01.

Here it is in graphic format. Purple is yield and the X-axis is the size limit. The left Y-axis is F and the right Y-axis is yield. Purple is yield. As size limit goes up, yield goes up, as you would expect. As the size limit goes up, so does the exploited F, which is blue, but population F and total F remain almost perfectly constant and they deviate only at twenty-inches.

Seeing this, it was clear that we could, for hogfish, harvest at higher size limits, especially at the fifteen-inch preferred minimum size. We can still harvest the same number of fish but not be overfishing, because the F didn't change.

DR. SHAROV: Mike, could you please explain what here in total F and population F, considering that you must have a selectivity curve and you have a full F, and, therefore, F at age is different? Please, if you could possibly explain what you mean under these terms.

DR. ERRIGO: Fs are calculated with the Baranov Catch Equation. Fs are soft and so exploited F, the blue, is solved for using the actual landings, or the population size, of only those age classes that are harvestable, and so only the age classes above minimum size. Population F uses the population size of all age classes from twelve-inches and higher, no matter what the size limit is.

What we're looking at is the F rate relative to the selectivity that the assessment was looking at. What the F would be -- You're increasing the size limit, and we wanted to take into account the fact that we're not harvesting this section of the population that's below the minimum size, and so we put that population size into the Baranov Equation to calculate the F. Total F includes dead discards in the catch proportion of the Baranov Catch Equation.

DR. SHAROV: Okay, and you express this actually as F, as an instantaneous rate, rather that just -- It sounds like what you're describing is essentially you're looking at an exploitation ratio, whereas you're looking at the ratio of the number of fish removed over either the total population or the exploitable stock, in numbers.

DR. ERRIGO: That's not exactly what it is, but yes, kind of. That's what it is in the catch equation, and then the model solves for the F.

DR. SHAROV: All right and so you are solving for the instantaneous rate in fishing mortality. All right. Thank you.

DR. ERRIGO: Yes.

DR. REICHERT: Any other questions at this point?

DR. SERCHUK: I have two questions. Can you tell me what the natural mortality rate you assumed in the yield per recruit analysis?

DR. ERRIGO: It followed the Lorenzen curve from the assessment and so it varied by age class.

DR. SERCHUK: It varied by age you said?

DR. ERRIGO: Yes.

DR. SERCHUK: Could we see these Fs by age then?

DR. ERRIGO: The F was assumed -- In order to simplify the model, the Fs were assumed the same in each age class. The F was assumed the same in each age class.

DR. SERCHUK: I am not following how this was done then.

DR. ERRIGO: This is really just for illustration, to show how F would change with size limits, but not with age.

DR. SERCHUK: I mean these results about the population total F remaining relatively constant, essentially what you're saying is you're taking a group -- We normally see this in undersized fish that are not selected by the gear, and they have very little weight, because they're not exploited, either because the gear is selective only for larger sized -- I am not surprised at that, but I am -- I am trying to put the F rate on the exploited stock in relationship to what the underlying natural mortality rate would be for that stock. I'm assuming that it's -- I don't know and I will ask it. What is the natural mortality rate for fish that would typically be fifteen-inches and above, or those age groups that would be fifteen-inches and above?

DR. ERRIGO: One second. I need to look it up.

DR. SHAROV: While Mike is looking, I think, Fred, in terms of F, it looks like what he used is the knife-edge selectivity, so to speak, and that is zero F for the undersized fish and the full F at the legal size and larger.

DR. ERRIGO: We started from fifteen-inches and going up.

DR. REICHERT: Any additional questions at this point? John, are there hands up?

MR. CARMICHAEL: Chip, did you have something to add?

MR. COLLIER: One of the big things in looking at this YPR model is we are trying to figure out if changing, going to numbers, would induce overfishing, and, based on this model here, what we're seeing is it's not inducing overfishing by changing to accounting for the population in numbers of fish, as opposed to weights of fish. That's one of the big goals, is trying to determine if overfishing would be induced by just managing based on numbers of fish and ignoring the overall ABC in weight.

DR. SCHUELLER: I have a question. It sounds like the blue line is the full F value. Can you remind me what does the stock assessment report out for its benchmark F? Is it full F or is it some F weighted by something or what is it? I guess I say all of this because we should make sure we're comparing apples and apples.

DR. ERRIGO: I am not 100 percent sure how it is calculated in SS3.

MR. COLLIER: It was Option 4 of the SS3 model, and I'm going to look that up to exactly determine what that is.

MR. CARMICHAEL: That would be helpful, Chip, and thanks. In the SS3 realm, it could be complicated.

DR. BUCKEL: Mike, the total F that includes discards, it included dead discards, it's not a big jump-up, like I was thinking, if I understand correctly. Is that because you're not expecting that much more of an increase in discarding, because a large proportion of the fishery is spearfishing? I just want to make sure I understand that.

DR. ERRIGO: Yes, that is the reason. If you look at it, there is two parts of the fishery. There is the spear portion and the hook and line portion. The spear portion has a 100 percent discard mortality, but like less than 2 percent of the total catch is discarded, and so it's very, very tiny. Then the hook and line has like a 10 percent discard mortality, but they make up a very small portion of the landings. When you increase the minimum size, your dead discards go up by a very minimal amount, because most of the big are taken by divers, and their discards are very, very low.

MR. COLLIER: Looking at the F report units from the starter file for the SS3, it was Option 1, which is exploitation biomass, and then F report basis is Zero, which is the raw numbers.

DR. SCHUELLER: Can you say that again, Chip?

MR. COLLIER: The F report units is Option 1, which is the exploitation biomass, and then for the F report basis, it's Option Zero, which are the raw numbers, the raw F numbers.

DR. ERRIGO: What does SS3 define as exploitation biomass?

MR. COLLIER: I will have to go to the user manual. Hold on. I mean we're getting into the details of looking at SS3, and that's not the goal of this. It's more or less -- We're not trying to compare the F rates that are coming out of this yield per recruit. What we're just trying to determine is can we look at numbers of fish as opposed to biomass of fish, and, if we do just numbers, does that induce overfishing, based on other factors?

DR. SCHUELLER: But you can't compare whether or not it would induce overfishing without actually knowing what the definition of the overfishing metric is. That's why I asked.

DR. ERRIGO: Chip, do you think now is a good time maybe to go to your exploratory analysis?

MR. CARMICHAEL: Let's maybe see what the SSC feels about some of this, because while there is some question about what did SS3 actually do and how does that -- I think the real question, in that regard, is how does changing the selectivity affect that, because the yield per recruit was, in my understanding, intended to be more of a proof-of-concept kind of example, showing that you could take a higher poundage if you hold the numbers of fish constant and not lead to overfishing.

I guess one question is does the SSC agree with that, in concept, or are there things overlooked here that could affect it that you would be concerned that maintaining the numbers, while leading to a higher overall poundage with the selectivity change, could lead to overfishing?

DR. SHAROV: I think Amy is right. In order to answer these questions, we need to remember exactly how we defined overfishing. As I understand it, in this case, in this yield per recruit analysis, these selectivity curves essentially are not used or a new one is designed, which is the knife-edge selectivity, unless I misunderstood this.

DR. ERRIGO: The same selectivity curve is used from the model. We added on a secondary knife-edge selectivity in order to change the minimum size. The population F and total F are created using the original model selectivity curve, or the curve that --

DR. SHAROV: Okay and so you were just dropping it -- Okay.

DR. ERRIGO: What the fishery would select for in absence of the size limit.

DR. SERCHUK: I have an observation. I think we're all -- If we reflect on this figure, really what we're most interested in, in the short term anyway, is the difference between twelve-inches and maybe going up to fifteen-inches, which is what I understand is the council preferred. If you look at the exploited F, it really goes up very slightly from presumably 0.7 to around 0.1. That's not a big increase in exploited F, as I see it.

DR. ERRIGO: It goes up to 0.1.

MR. COLLIER: Following up on Amy's question, Options 1 and 2 both look at exploitation rate in biomass, or in numbers. That uses total catch for the year and summary abundance at the beginning of the year, and so it combines season and areas. This is coming directly from the SS3 manual, but if most catch occurs in one area and there is little movement between areas, this ratio is not informative about F in the area where the catch is.

DR. ERRIGO: We use the total abundance where F is, and so it's calculating these Fs down here, which these use total abundance. This F, this blue one, uses only the abundance of size classes above the minimum size.

DR. REICHERT: Amy, does that answer or address your concerns?

DR. SCHUELLER: I mean I have the SS3 user manual out and I'm looking at it and so just give me a minute to think about it.

MR. COLLIER: Amy, that's page 11 of the user manual.

DR. SCHUELLER: I've got it. Thanks.

DR. ERRIGO: Shall I continue on?

DR. REICHERT: This was what I was going to suggest while we are mulling this over. Why don't you move on and complete your presentation and then we can pick up this discussion later?

DR. ERRIGO: Sure. We can readdress it after it's over. I don't have much left.

DR. REICHERT: Okay. Thanks. Go ahead.

DR. ERRIGO: In light of this information, the council staff looked at some other ways of calculating the ACL so that we can compensate for the change in selectivity that we have when the minimum size is increased. Method 2 proposes setting the OFL, ABC, and ACL into numbers of fish rather than in weight, since the YPR model shows the -- It's very difficult to predict what the average weight is going to be in the future.

Setting catch limits in numbers avoids the issue of predicting average rates and compensating for selectivity or model differences in selectivity. Limits can remain constant while yield varies, and so we avoid underfishing and also we avoid overfishing, as long as we keep the numbers of fish under the limit.

The complication is that the council does not want to recalculate allocations using the harvest in numbers. They plan to address that in the future, and so we need to try to figure out a way to use the current allocation formula, which uses the harvest in pounds. That's where this starts to get a little more complicated.

We get the projected ABC and then whether ABC equals ACL or ACL equals 95 percent of the ABC. We get it in numbers and it's converted to pounds using the model-estimated average weight per projection year. Because the model projects in both pounds and numbers, it has an estimated average weight that you can use to convert from numbers to pounds.

Then you take the commercial allocation, which is already established, and calculate the commercial ACL in pounds. Then you take that commercial ACL in pounds and convert it back into numbers, using the commercial average weight. The commercial average weight has better overall sampling, and also their average weight is above the fifteen-inch minimum size, which is the council's preferred, and so it really doesn't require adjustment into the future. Now you've got the commercial ACL in numbers.

DR. REICHERT: Mike, I am hearing you going in and out and so I couldn't hear the last minute or so, and so could you repeat that? I'm not sure if other people had the same problem. I also hear a lot of interference and it sounds like some yard blowers going off. I am having a hard time hearing what you're saying.

DR. ERRIGO: Okay. I will try to speak up. I also was hearing that same interference and I'm not sure what that was, but I will try to speak up. I will start over, because I just want to make sure that everyone understands this.

First, we take the -- We get the ACL in numbers, and so it's either ACL equals ABC, or ACL equals 95 percent of ABC, or whatever the council picks. We convert that into pounds, using the model-estimated average weight. Because the model projects in both pounds and numbers, we could get an average weight for the projections, and we use that to get the ACL, the total ACL, in numbers and we convert it to pounds.

Then we calculate the commercial allocation in pounds using the current allocation formula. We already have that allocation. Once we have the commercial ACL in pounds, we need to convert it back to numbers, and we do that using the commercial average weight. The commercial average weight has better sampling and it also equates to a fish larger than the fifteen-inch preferred minimum size that the council chose, and so we don't really need an adjustment for that size into the future.

That converts the commercial ACL back from pounds to numbers. Once you have the commercial ACL in numbers, you can subtract it from the total ACL in numbers to get the rec ACL in numbers. That is what we came up with to still use the allocations that the council already has set up.

This graphic here is a comparison of the commercial average weight estimates and the recreational average weight estimates from 2001 to 2014. The arrow bars are standard error, one standard error. From year to year, occasionally the rec does have less error, but it's much more highly variable than the commercial is.

MR. CARMICHAEL: Mike, hold up a second. We have a hand up.

DR. SERCHUK: Can we go back to the previous slide for a second? I hope that when we're all done, regardless of what decisions we make, that we have a fishery that takes 90 percent of the total allowable catch, or landings, and it's very poorly sampled. I am concerned that we don't really have a way, and maybe this is premature, to validate whether our assumptions about what the recreational average weight is or whether our approach is working.

As I understand it from Document A.6, it said, on average, from 2012 to 2014, for a fishery that takes 90 percent of the catch, only roughly 250 fish a year are observed, and only eighty of these are measured. I recognize that we have to deal with a data-limited problem here, but we're going to a large extreme in using what we know about 10 percent of the fishery, which is better sampled and it may not be adequately sampled, but it's better sampled, to get at a problem which is really a poor sampling problem in the recreational fishery.

It seems to me, at the end of the day, and I would hope we could come back to this, because the validation of all these methods really depends on what the average size that is caught and not landed, but caught, in the recreational fishery is. Thank you.

DR. REICHERT: Thanks, Fred. I think that's an excellent point, and we definitely should come back to that and formulate a recommendation to see if this can be addressed.

DR. SHAROV: While we're here on this slide, can I ask a question? This says convert projected ACL, in numbers, to pounds using the model-estimated average weight per projection year. When you do this, are you projecting under the current management regime, that is given current selectivity curves and current minimum size, or are you changing -- Are you doing projections under the proposed new minimum size and adjusting the selectivity curve appropriately here?

DR. ERRIGO: Unfortunately, no. We don't have new -- We cannot create new projections, and so we have only the one set of projections to work from. We know that this is not an ideal situation to work with, and so this conversion, the conversion of the ACL, from numbers to pounds, is not going to be perfectly correct. It probably will introduce a bias as time goes on. Actually, the bias will get worse as time goes on.

DR. SHAROV: So actually then we're projecting forward and we're getting the ACLs, in numbers, that we think are excessive numbers, because these numbers correspond to the lower minimum size and with a higher minimum size, the number of harvested fish should have been lower, et cetera, et cetera. I am thinking of the effect of the final effect of the removals on the spawning stock biomass.

DR. ERRIGO: We don't know what the projected removals in numbers would have been under different size limits. I don't know if they would have been lower or higher. If the fishery for its entire history had harvested at fifteen-inches instead of twelve-inch minimum sizes, I assume that the whole stock would be in better shape and the harvest would be higher. If you start the projection years at a higher minimum size, I don't know what that would do to the numbers that can be taken. Unfortunately, that's all we have.

DR. REICHERT: Mike, I think there's one more slide, and so why don't you finish your presentation and then we'll continue the discussion. That may help clarify some questions people may have.

DR. ERRIGO: Okay. This is just the table of how the calculations were done. Here is the projected ABC, in numbers, in the first column. Then we have the model-projected average weights per year. That is used to calculate the yield. Here, I was just assuming -- I just used the ACL equals ABC scenario, just for simplicity. If we were going to use 95 percent of ABC, we would just take 95 percent of it and then continue with the calculations.

Here is the yield, in pounds. Then you have -- We used the allocation formula and so just under 10 percent is commercial, and so here is the yield of the commercial ACL in pounds. Then you use the commercial average weight to convert these pounds to numbers. Here is the commercial ACL in numbers. Then you take these numbers and you subtract from the ACL, which in this case the ACL equals ABC.

You subtract from the ACL to get the recreational ACL, in numbers. Then it would just stay like that and we wouldn't have to track it in pounds. We would just track it in numbers. We would track ABC in numbers, and the commercial can be tracked in weight, since that's the native unit that the landings come in. Then the average weight each year would have to be used to convert the landings back into numbers, in order to compare the total landings to the ABC. That was it, and now I'm going to ask for any questions.

DR. REICHERT: Mike, can you bring up the previous slide real quick? Thank you. I am trying to figure out how this differs from Method 1 in terms of the eventual results.

DR. ERRIGO: In Method 1, what is happening is as the size limit increases -- This is by year. In a given year, in 2017, the ACLs are constant. The rec ACL is 16,514 fish and it doesn't change, no matter what you set the size limit at. In Method 1, as the size limit increases, this number goes down. At fifteen-inches, this is like 11,000 fish. At twelve-inches, it was actually 17,000-and-some-odd fish. This method actually, I think, calculates a rec ACL that's lower than what the previous method calculates at twelve-inches, but it does not change with changes in minimum size.

DR. REICHERT: It just changes because the ABC changes, basically.

DR. ERRIGO: Yes, and this is in years. The table that Nick had put up -- I will go back to that one for a second.

DR. REICHERT: I have it up on a different screen. Yes, that one.

DR. ERRIGO: These are all the possible ACLs for 2017, at different minimum sizes. Here it is at twelve-inches and it's 17,788 fish. Under the Method 2, it's 16,514 fish, but it remains constant. It doesn't drop down to 11,000 fish at fifteen-inches.

DR. SERCHUK: I have a question. Just so I understand the mathematics, in going from yield of the commercial ACL in pounds to the commercial ACL in numbers, is my understanding correct that you simply have divided by 2.61 for all of these years, because that's the average weight of a commercially-caught hogfish?

DR. ERRIGO: Yes.

DR. SERCHUK: But presumably, if there are larger numbers of animals being recruited into the exploitable biomass, because of the increase in the size, one would also presume that the commercial average weight also might go up. That's a possibility.

DR. ERRIGO: There is a possibility that the commercial average weight could increase. However, the changes to the commercial average weight are going to be much less than any changes to the recreational average weight, because they're starting at a much higher average weight than the recreational sector is.

DR. SERCHUK: I understand that, but I'm just trying to get what the assumption was here. Again, I think using a constant from the commercial, because you don't really have very good information from the recreational, is another reason why I think we need to get back to perhaps thinking about a recommendation trying to validate the approach. Thank you.

DR. REICHERT: Are there any other hands up? I also want to give Amy an opportunity to address her earlier comment or question.

MR. CARMICHAEL: There are no other hands up at the moment. Do any other SSC members have further questions on the presentation to this point?

DR. SHAROV: Again, I think the key question here, and I apologize that I should have looked at the assessment document ahead of time, but could somebody please remind us what are the F reference points for the hogfish and what are the SSB reference points for the hogfish, if any, because that is the key question, how the overfishing is defined.

For example, if the overfishing is equivalent to the F 30 percent SPR, then everything should be measured with the final outcome of this regulation, whether the percent SPR is going to go below or above the threshold, the defined threshold. Remembering what the reference points are is critical here in defining which method to go with, but both of them obviously are based on number of assumptions and both are really not perfect, but nonetheless, reference points. Could somebody remind me of F and SSB reference points on this stock here?

MR. CARMICHAEL: Alexi, I'm sure someone can look that up, and I think, to some extent, it's a little beyond what the intent of the yield per recruit analysis was intending to do, I believe. It was intended more of as a theoretical and not as a quantitative evaluation of this applied to this stock.

DR. SHAROV: Yes, I understand this, but, besides the effect on the yield, there is also the effect in the change in distribution of the fishing mortality among ages, on the spawning stock biomass, the per recruit, and I believe that in most cases, in all assessments, that's what people are looking for. That part was completely not looked at in this exercise, and that's why I think it's important to keep that in mind.

MR. CARMICHAEL: That's a good point, and I have a note on that when we get to discussion, because I think that's very much what Fred was bringing up about shifting, particularly given a sex-changing species and shifting between the sexes.

DR. SHAROV: He was talking about the sexes, and I didn't even go to that step. I was just thinking of the step of what would be the relative change in SSB per recruit, assuming there is no change in the sex ratio. Changing the sex ratio, that's a second -- That's the icing on the cake and that's the second step. We have not figured out even the first step here.

MR. CARMICHAEL: Mike, did you have, in the yield per recruit -- I don't know that you extended that to include SSB or not, but did you look at SSB per recruit and whether or not that is increased, or at least preserved, under these scenarios?

DR. ERRIGO: I have total abundance and we calculated biomass at age, but we didn't specifically look at that. I can put it together, but it will take a second. I did find the parameters. I believe we used FMSY and it was 0.138, and the SSB --

DR. REICHERT: Mike, for other members, I believe that's in the October SSC Report. There is an overview and it's on page 12 of the October 2014 SSC Report.

DR. SERCHUK: Alexi, can I get back to your intervention for a second?

DR. SHAROV: Sure. Thank you.

DR. SERCHUK: The reason I didn't focus on SSB per recruit is because SSB becomes very difficult to define in this species, because the females change to males. I am concerned about displacing fishing mortality onto larger-sized females. It's a concern. I understand its impact needs to be evaluated from going from a lower size limit to a higher size limit within the size range that the change from females to males generally hasn't occurred for most of the fish in the population.

I understand that it can change in relation, but from the average sizes that I've looked at, that were provided in some of the literature, the fishing mortality -- When you change a size limit from twelve to fourteen or to fifteen, it still changes the fishing mortality, mostly on the females.

By inference, it means that you're changing the exploitation from females that have, I presume, a lower fecundity to females that have a higher fecundity and would contribute more to spawning stock biomass, if you only considered the female portion of the resource. In a sense, I was trying to get at exactly what you were trying to get at, because I don't know the proper metric for spawning stock biomass for species that changes sex.

DR. SHAROV: That's true, and I agree, but also, at the same time, by delaying the fishing mortality, through the increase in minimum size, we're allowing more of them to survive and so, therefore, in principle, there should be more survivors at the larger size, more surviving females at the larger size, and even though the harvest will increase, there will be more survivors and so what's the net effect?

The net effect should be evaluated in the yield per recruit in terms of the yield, but then in the spawning stock biomass of females through the SPR, and hopefully, if we could have included some function that would describe the change in the sex, if we have any idea how that function of the sex is the function of the size, then we would have some sort of approximation to the solution to this.

DR. SERCHUK: Right, but we can see from the table that SSB is defined by both sexes combined.

DR. ERRIGO: I believe those units are in metric tons. It says the units were not defined in the report, but later I found out that those were in metric tons.

MR. CARMICHAEL: Nick Farmer, I see you have your hand up. Is it relative to this issue or do you want to see if we wrap this up first?

DR. FARMER: No, mine is more pertaining to the yield per recruit model initialization, and so if we get back to that, I can ask it.

MR. CARMICHAEL: I will keep you there. I think we see on the picture there what the MSY levels are. If I recall, we noted the shift of fifteen-inches moved the F to 0.1. I guess, compared to that MFMT, that's certainly not exceeding it.

DR. ERRIGO: That's true. I would be very cautious about directly comparing the F values, however, because we did not use actual abundance at age in the YPR for the Florida Keys/East Florida stock. Like I said, it was a simulated population. We did use parameters for growth and for length/weight and for selectivity and things like that, but we did not use the actual abundance, and so I would not -- It was really only supposed to be in order to look at the differences when you harvested the same number of fish and what happens to your yield and what happens to your F values relative to your starting point of the twelve-inch minimum size.

MR. CARMICHAEL: Right, Mike, and so it wasn't intended to be a direct comparison in terms of scale.

DR. ERRIGO: No.

MR. CARMICHAEL: Mortality rates from the model and certainly not to these benchmark reference points.

DR. ERRIGO: Right, and so I have no idea how the YPR model compares to these F values. It certainly doesn't compare to the SSB parameter.

DR. FARMER: John and Mike, that was going to be my question, because I think SS3 provides you with outputs of numbers at age, and it looks like the YPR model was initialized assuming an equilibrium with an Lorenzen M, and so I was just wondering as to the impact of that on the projected F rates.

DR. REICHERT: Anyone else that currently has a hand up?

DR. ERRIGO: I just wanted to say there probably will be differences in what the estimated actual F rates are, and so the if abundance at the higher age classes was much lower and things like that, then, compared to the younger age classes, then we would probably see higher Fs and things like that, depending on the minimum size. However, I think the relative comparison is still valid. For the same exact population dynamics, the same population, under different minimum size limits, you can still look at the relative change in F.

DR. CADRIN: I have a question more about process. Are we going to make a decision on, based on what options we have before us, Methods 1 or 2, or is there still time to propose revisions to the analyses?

DR. REICHERT: I am afraid, and, John, correct me if I'm wrong, but I'm afraid that we are pretty much out of time, because there is a statutory deadline coming up. The council will need to make a decision next week, and actually, to that point, I was going to suggest -- Because I think some of the issues that we discussed are equally relevant for both methods.

What I was going to propose is to see if we can discuss whether or not we can look at the uncertainty specific to each method and then compare and contrast the approaches and then discuss some general issues that were brought up relative to, for instance, the potential of changing sex ratios, and also briefly discuss, and, again, John, correct me if I'm wrong, that this is an interim solution, until full projections can be provided.

DR. CADRIN: Okay, and I will save my comments for report recommendations then.

MR. CARMICHAEL: We have a number of options that are before you, and so clearly there is -- You could pick any one of them, and so if you were to pick something that was an alternative that is simple and straightforward and maybe falls within what's been done here, so it can be calculated relatively quickly, then I think that that's possible, because obviously the answers for every one of these alternatives haven't been fully fleshed out and it's one reason for having this webinar now, before the council meeting and doing it at the last minute like this, relative to the council meeting coming up.

I don't think I would rule out a priori some better solution that the committee may come up with if it could be put into place relatively quickly, and I think, Myra, you're on here and you probably know more about the timing, and Brian Cheuvront as well. If you want to add to that or you want to clarify the timing or if you think I'm pushing the envelope a little bit too much, raise your hand and I will be glad to let you jump in.

DR. CADRIN: Then I guess I will just throw it out there, John, based on what you said. I think that the YPR spreadsheet could be revised to have the SS3 abundance at age, rather than equilibrium age structure. I think it's a fair approach, in lieu of revised projections with different selectivities, but we really could use all the mechanics in that YPR spreadsheet and replace the equilibrium abundance at age with the current or the most recent estimates of abundance at age, to make the same evaluations.

I think that would essentially be a short-term projection, which would be more relevant. I mean I am leaning towards Method 2, because it accounts for minimum size changes, but, as you just said, it's really in lieu of projections from SS3 that account for the selectivity changes, and so I think revising that abundance at age would be a step toward that, but, again, I don't want to delay this any more. That either should be a recommendation, or if it can be done before the council meeting, but I'm just throwing it out there. Thanks.

MR. CARMICHAEL: Mike, I guess we'll ask if you could do that and maybe, given some of the outputs relative to SSB, whether it's for males or females or combined, which is the question we always have with the hermaphrodites. If you could possibly do that, would that help some of the concerns and give us a way to give some more confidence that these results fit in within the scaling of the assessment?

DR. ERRIGO: I can do that, and it's actually relatively easy to do, but I need to get the actual abundance at age estimates from Florida FWC, because they are not in the assessment document. They're in graphical format. They're in there in a bubble plot, and it's impossible to predict what the actual abundance at age is from a bubble plot, but I could ask them to send me the data, the actual numbers.

DR. REICHERT: John, as a matter of process, would the SSC then need to review this before -- I am just trying to think about timing and, if this can be done, whether or not we will have an opportunity to take a look at that and if we would want to include it in our recommendations to the council, because, as I just mentioned, that recommendation needs to be formulated by Tuesday afternoon of next week.

MR. CARMICHAEL: Yes, I think we would want to look at it in some way. I think having a resolution on how we would want to proceed with this and letting the -- I think, at this point, that analysis, to me, is verification of the approach and you would be accepting the concept that is put forth and supported by the yield per recruit analysis that preserving the numbers of fish as the metric by which we evaluate the population's overfishing status between stock assessments is acceptable and the council could move ahead with the options that do that, as opposed to falling back to the options that preserve the total poundage, irregardless of changes in selectivity and yield per recruit that come from changing the size limit.

I think if you accepted the conceptual idea and are saying that you think this may verify that and you reserve the right to look at it and, if it does not verify it, obviously pull the plug and we would try to get this done early next week and get the folks, if at all possible, during the council meeting.

We could have final resolution of this, and perhaps it's not ideal, but perhaps during full council later in the week, if it came to that, or if we saw the method failed and we decided it wasn't appropriate, then I think we could deal with that as well. Our Chairman is on the call as well, and so I will say, Michelle, if you want to shout out on this regard and the timing and the nightmare it creates for you as Council Chairman and Snapper Grouper Chair, just raise your hand and I will be glad to call on you as well.

DR. DUVAL: The concern is having the SSC be able to feel comfortable with approving one method or another and being able to see any modifications to that method, if I'm understanding it correctly, just based on Steve's suggestion of replacing those equilibrium abundance at age numbers in the spreadsheet, correct?

DR. REICHERT: Yes, that's my understanding, Michelle. That's why I mentioned earlier that my concern is that of timing.

DR. DUVAL: I mean we are scheduled to take final action on this in June, but we are scheduled at this meeting to -- This is the meeting where we actually approve all of our final preferred alternatives, so that staff can have the intervening time between the March meeting and the June council meeting to complete all remaining portions of the DEIS, so that all the I's are dotted and the T's are crossed when we go ahead and send that to the Regional Office.

I don't know what the protocol is for any kind of email review of something by the SSC. I don't know if that is a situation that you all have run into before, if you all feel that you would have greater comfort in blessing one of these two methods by first seeing the changes that Steve has suggested.

MR. CARMICHAEL: I think we've done it before over email in this kind of situation, where there's a method and the SSC recommends some refinements to it and then they ask to look at it. I think we could do that under email and it would be follow-up and, as noted, it would be sort of the process of finalizing the report and making sure people agree and making sure that the outcome is as anticipated and it certainly doesn't undermine any of the recommendations that might come from it.

DR. DUVAL: So perhaps conditional approval, if this is the way folks are feeling. I don't know, but that might be my suggestion.

MR. CARMICHAEL: Yes, I think so. It could be written that the SSC approves this approach, pending verification that it won't lead to overfishing based on refining the yield per recruit analysis.

DR. REICHERT: That also means if the bottom would fall out of this method by doing that, then our fallback is Method -- Well, this is all making a number of assumptions here, but fall back to the other method, correct?

MR. CARMICHAEL: I would expect your fallback is yes, some approach for converting the poundage to a set of numbers, as per the various alternatives that Nick put forth.

DR. SERCHUK: Can I make a comment? I think there are two exercises here. One exercise is can you set a catch level in terms of numbers? There is no question that I think you can. It has a number of assumptions to it. It's good if we can validate those assumptions, but clearly, given some assumptions, that could be done. That was one issue.

The other issue I think is equally as important, because they're contained in the bullet points for our action items, is what effect, in doing a length-based, in doing a numbers, have on fishing mortality? The fact is the council suggested to go to a higher minimum size. That has some beneficial aspects, we believe.

Contingent upon that, the real question, I think, that will sooner or later have to be answered, is what does that mean to reducing fishing mortality so that the resource is no longer -- So overfishing is no longer occurring and what does that mean in terms of rebuilding the stock to the MSY level? I think the analysis that Steve talked about, and I think he prefaced it by saying in the short term, and I think we need to think about when the next assessment will be done, because, quite frankly, any assumptions here that are carried forward for ten years are likely to be unrealistic with respect to changes in the status of the stock.

One issue that I would like to see explored is if we go to a fourteen-inch size limit, how many years would it take to get to a point where overfishing is no longer occurring? Is that possible within three or four years? I say three to four years because I am presuming we will have a new assessment by that time. I actually don't like these tables that go out to ten years, because, as was previously pointed out, the robustness of the assumptions becomes less robust, because the uncertainty increases in the out years.

Looking at something that says, okay, in the table that we have before us, well, gee whiz, we're above -- We're taking more than the MSY catch by 2026, because the MSY catch is 156,000 pounds, and so I would like to see the analysis that Steve talked about, having a short-term projection, maybe three to four years, contingent on the fact that we probably expect a new assessment by that time, and, within that short three-to-five-year period, do we expect that the change in the size limit will have a significant impact on reducing fishing mortality to near or below the overfishing level? Thank you.

MR. CARMICHAEL: Thanks, Fred. Those are good points, and I guess I will remind you that the analysis and all that we are having now, it is intended just to be interim. We hope that within the next year that the council might be reevaluating any of these regulations and looking at how they work out. We'll have the updated projections, which will account for the size limit changes and the resulting selectivity that the council puts forth as their preferreds and passes on in June.

That would certainly say that yes, a year from now we should have an analysis which is much more robust and consistent and properly scaled with the assessment that was done and which will evaluate the size limit change. Then I think it's very good to make the point of looking at a full assessment update in three to five years.

You know obviously, given the size limit change and the impact that has on yield and the complexity of our hermaphroditic stock and the concerns with the weight sampling and difficulty sampling this population, I think it all adds up to a lot of uncertainty and there should not be too much time between the next assessment. That's a good recommendation that I've got down here for three to five years for the next update.

DR. REICHERT: John, that was exactly the point I was going to make, and, as a matter of a fact, in our October 2014 meeting, our recommendation was that a stock assessment should be conducted in no more that five years, and so the SSC is already on record stating that this should not be used for long-term management, and, in particular, addressing some of the other concerns that we had and the CIE reviewers had, and so that is consistent with what we decided earlier.

DR. ERRIGO: I just wanted to add to that. The reason why this stock has a ten-year projection time period is because it's under a rebuilding plan and it has to rebuild in ten years, and so we needed to project out to ten years to see if it meets the rebuilding plan, or if it rebuilds in ten years or not. Typically, if a stock doesn't fall under a rebuilding plan, I think the standard is a five-year projection time period, because we know that beyond that it really gets uncertain.

DR. REICHERT: Thanks for that reminder, Mike. That was a good point. I want to go back to the original discussion, because perhaps we were getting a little ahead of ourselves. From what I'm hearing from several of the SSC members is a current leaning towards a preferred method of Method 2.

Luiz emailed me earlier, and I am reading from his email, just as an FYI, that he felt that the development and that the Method 2 was a preferred method to provide ACLs, because it was able to keep F in check and while adjusting for some of these selectivities associated with that different minimum size. I would like to pose that to the SSC and see if that's a correct characterization of the discussions right now, and, in particular, if people disagree with that characterization.

MR. CARMICHAEL: When you say Method 2, you're referring to the results which are on the screen here?

DR. REICHERT: Yes, and that was the council method, right?

MR. CARMICHAEL: Yes.

DR. REICHERT: All right, and any comments from the floor relative to the selection of the current preference of the SSC?

DR. CADRIN: Marcel, I will take a shot on it. I guess I will back up first. One thing the council may be thinking is, is it worth all of this, considering the difficulty projecting catch in numbers? I think for our report that it would be appropriate to reiterate some of the merits of that. I mean I remember the discussion at the SSC for specifying ACL and MSY in numbers, and I think all these efforts are worthwhile, to provide the consistency between the ACL and the MRIP currency, as well as more appropriate recreational utilities.

Going towards answering your question, I think both methods have assumptions and uncertainties. I think Method 2 has the advantage of accounting for changes in size limit, which is a very relevant aspect of the current management decisions. I think, among those two, that is the best scientific information that the council has to base these decisions on.

Then, maybe later in the discussion, I have a list of recommendations, but it sounds like the direction we're going towards are entirely consistent projections, and this is just a stopgap. I will stop there in answering your question, but if I could put a placeholder for some recommendations later.

DR. REICHERT: Absolutely, and I have a couple and I have heard, during the conversations today, some other recommendations that we should definitely include, but thanks for that, Steve. Any other SSC members that would like to add to that discussion? John, any hands up?

MR. CARMICHAEL: Marcel, if you would like, if you think you're at the point of going over to the overview and perhaps reading down the notes and points of comment that I have recorded so far.

DR. REICHERT: Yes, and if there is no one else. I just wanted to -- Earlier, Amy was going to look some information up. I just want to make sure I give Amy an opportunity to address some of her earlier comments, if necessary and relevant. Amy, are you good right now?

DR. SCHUELLER: I think I'm okay, after I looked at what's been done. I agree with Steve's assessment of the situation and some of the changes that were recommended, and so I'm onboard with this.

DR. REICHERT: Thank you. I just wanted to make sure that we didn't leave anything hanging there. Okay, John, I think that's probably a good idea, and so if you could bring that up, what you have, and then we can also go to the action items, to be sure that we address all the action items appropriately.

MR. CARMICHAEL: All right.

DR. SHAROV: I guess I am kind of getting swayed a little bit by Steve's comments and Amy's, and I know that Steve would provide further comments and recommendations, and recognizing that neither of the methods is perfect, it's hard to make recommendations here, feeling that each of them has a number of things that are not addressed, that would be described as different levels of uncertainty, and yet we're forced into the position of making a choice.

Obviously an ideal situation would have been a projection using the assessment model with the modified selectivity curves that would reflect changes in the minimum size and modified FMSY value that would address change in selectivity as well, but obviously this cannot be done quickly. I imagine that this certainly could be done for the next year's specification.

I just wanted to make a point that still -- You know the information, the data available on this species, are scarce. Therefore, the overall level of certainty existing is not very good, but we do have to make some decisions, and so I am sort of reluctantly agreeing to choose one method of the two and would go with the group, but I think it would be important to point out that the level of uncertainty in this case is quite significant and yes, this is the decision being made based on the fact that we have to make that decision out of as much information as we have, but the caveat should be clearly presented that the level of confidence here really depends on the quality of the data. Thank you.

DR. SERCHUK: I have one more comment, Marcel, if I could. I think it was correctly pointed out the projections that have been made were ten-year projections, because it requires to see whether a stock can be rebuilt within a ten-year period, given normal life history characteristics.

I am just wondering -- That only looks at one of the status determination criteria. The other is that overfishing needs to cease within a -- I don't know what a reasonable time period is any longer, whether it's one year, two years, or three years. I think that's an issue that we need to evaluate, if we can, either in this go-round or in the future, because you're not given ten years to -- As I understand it now, you're not given ten years to eliminate overfishing.

That has to be done, typically, within a one or two-year period, and I think the change to the size limit is a first step at trying to do that, but I think we need to show that, or it would be useful if that could be shown in the analyses, so that the council could have some confidence that there is going to be significant progress in the near term to end overfishing. Thank you.

DR. ERRIGO: Marcel, I was just going to maybe help clarify for Fred about the ending overfishing portion of this. I believe overfishing has to be ended immediately now, and the criteria that's used is as long as landings are below the OFL, overfishing does not occur in that year. As long as we're below OFL, actually we don't even need size limits or bag limits or anything. We implement those to help extend the seasons or protect parts of the population, but, in terms of regulations, the --

DR. SERCHUK: Yes, but the OFL has some relationship to FMSY, doesn't it?

DR. ERRIGO: Yes, it does.

DR. SERCHUK: According to the Table 3 that we have, F to FMSY is about 1.6 times FMSY, and so the question I'm having is, is it possible to illustrate how the change in the size limit will make significant progress towards making that ratio, F to FMSY, one or below one.

MR. COLLIER: When you're looking at the management of the stock, the OFL, or the ABC that's coming out right now through the rebuilding plan, it's an 83 percent reduction from what they were currently harvesting, and so it is a dramatic reduction, and I'm not exactly certain on where it would stand with the F/FMSY value, but I will try to look that up for you real quick.

MR. CARMICHAEL: Any other questions or do you want to start going through some of these comments as they are right now?

DR. REICHERT: Unless anyone has a hand up right now, let's go through the comments and the action items that I listed earlier. I see that you have them up, John.

MR. CARMICHAEL: We have the action items and the uncertainties comparing the methods and discussing whether or not changing the size limit affects the projection selectivity assumptions, and then we have the best scientific information and recommendations. I kept discussion points as we went along. I just made them numbered, but they're just a running list, as you can see here, and each of these bullets is just which comment I think would be put up there to address each of our terms of reference.

DR. REICHERT: Okay, and so your comment numbers refer to some of the comments below?

MR. CARMICHAEL: They refer to these items in the discussion. I thought that was a good way to help us organize it without totally trying to reorder things here on the fly, but I wanted to make sure that we don't miss any of those terms of reference, of course.

DR. REICHERT: Okay, and thanks.

MR. CARMICHAEL: We talked about the change in size limit of shifting selectivity of the population. There is the concern as a hermaphroditic and sex-changing, and potentially shifting exploitation from younger females toward older females, and then there was also the concern about SSB per recruit, and I think those are uncertainties within the method and those are -- Obviously there are things the council should be aware of it when it considers size limit changes. There is the yield concern, but then there are also other concerns as well.

Do you want to move on the next one? The SERO approach is consistent with past practices and it prevents exceeding the recommended ABC, typically in pounds, regardless of the size limit and those selectivity changes. I thought that was an important point that Nick made that explains how their method came to be and what theirs is based on, versus as we've seen the South Atlantic approach is based on essentially preserving numbers of fish, which is consistent with the original ABC recommendation, and allowing the yield in pounds to change consistent with the change in yield per recruit, which will come from the size limit change.

It's been noted that the uncertainty is very high in the assessment, the yield projections and everything. Fred pointed out the issues with the taking a large proportion of the available yield, yet there are very few fish sampled for weight, and I think that's something that definitely needs to be highlighted as an uncertainty that affects all these methods, and, in fact, if it weren't for some of that uncertainty, we might not be needing to have this call in the first place.

Then there was quite a bit of discussion on the yield per recruit method, which was good, because that is kind of the theoretical foundation that the South Atlantic Council's approach, as put forth, was based on. This was talking about the yield per recruit Fs and how the Fs are defined, you know the scales of those relative to fishing mortality of the assessment, and then I think, as we're coming full circle to that with the recommendation from Steve, which is caught up here in e, to actually resolve some of those issues by making the yield per recruit, rather than equilibrium-based, make it reflect the abundance that was going in the population.

Our intent is to try to do that ASAP and get it out to the SSC to make sure it turns out as anticipated and there's no changes and it doesn't raise concerns that this approach would result in overfishing occurring, and our goal being to have that, if not by Tuesday, certainly by the end of the council meeting, to give the SSC a chance to give a thumbs-up on it.

Fred raised some of the basis questions that are underlying this. Can you set catch in numbers, and the answer there was yes. It does require assumptions and they can be evaluated and considered, which is what we're doing here.

That led to the question of the effect that setting catch in numbers will have on fishing mortality, and these are things which, to me, are sort of under the first bullet in dealing with the method, and somewhat in dealing with the term of reference addressing what a size limit does to assessment projections about selectivity and the projections and outcomes that come from it.

We raised the timing question, and I think we've got to make sure that's in there, that this is recognized as being an interim approach. It's being done because we've not been able to secure the desired projections using the same approach used for the existing projections, not being able to secure those using the selectivity change of the council, and it's our intention that once the council has a preferred size limit that we would request that those be done, and I think, if we requested those in June, it would seem reasonable to me that we could have those projection results for the SSC to review at its fall meeting in October.

I think right now that would be my staff position, that we would certainly like to bring those to you at your meeting in October. Probably not in May, because I think it's better to wait until we see which size limit the council actually changes. Then that will let us know which selectivity parameter they need to use.

DR. REICHERT: John, that last point, does that not interfere with the council timing?

MR. CARMICHAEL: Well, no. The council will be moving forward based on you guys supporting the method here, and I don't think we've anticipated necessarily having those updated projections even by June. If we did, that would be great. If we could get them, then that would be great, but I think, considering how many size limit alternatives there are, it would be behoove us to see which size limit is chosen.

DR. REICHERT: Okay. I just wanted to make sure that we're not throwing a wrench in the council's timing, which doesn't seem to be the case. Thanks.

MR. CARMICHAEL: That's why we're talking about it here. We talked about the timing, and then we considered approval of the Method 2, which was shown up on the screen, as illustrated in the South Atlantic presentation. It was pointed out that it may seem like the things are small, but it is a very important issue and it's necessary to address these details, and addressing the size limit impacts on yield is appropriate, and this method is appropriate, given the lack of standard assessment-based projections at this time. I expect Steve will have a much better write-up of his comments that he will provide you to put in the report.

DR. REICHERT: Thanks, John. One small -- I would perhaps, under 6b, "recommend" a new assessment in the timeframe, rather than "consider", because that is consistent with what we recommended in our 2014 October meeting, to have our recommendation stand for no more than five years, given the uncertainty and the issues that were raised by both the SSC and the CIE review.

MR. CARMICHAEL: So do we want to mention a year, because you say three to five years now and that could be interpreted as three to five years from March 2016, as opposed to three to five years from fall of 2014.

DR. REICHERT: I would recommend, or I would suggest to the SSC, that five years, starting at the completion of the current assessment, and so that would be now maybe three or four years. I am not sure. That was 2014 or 2015, and we are two years further, and so I would say three years.

MR. CARMICHAEL: That data were probably 2013 or maybe 2012. Is that correct, Mike?

DR. REICHERT: I think 2012 was the terminal year, correct.

DR. ERRIGO: Yes, 2012 was the terminal year of the assessment.

MR. CARMICHAEL: Okay, and so these regulations will go into place in 2017. I would assume we would -- Would we want a year of this change selectivity and size limit in the books before doing the projections and the assessment?

DR. REICHERT: Yes, I think that would probably be good. I mean, generally, don't we want to have at least two years of a new regulation before we start looking at a --

MR. CARMICHAEL: If you went two years, then it would be done in 2019 with 2018 data, or would it be done in 2018 with 2017 data and have one year?

DR. REICHERT: I would say 2019 with 2018 data, because that means that we have two years of data under the new regulations, and so that would get us in the three-year timeframe from now, unless my math is off.

MR. CARMICHAEL: Do folks agree with that suggestion?

DR. REICHERT: Anyone disagree?

DR. ERRIGO: We could use the model to estimate the new selectivity. A single year might be a bit difficult.

MR. CARMICHAEL: Yes, exactly.

DR. FARMER: Two questions. One was just looking for a more explicit statement from the SSC for General Counsel purposes regarding the ABC and rec ACL recommendations coming out of Method 2, a statement of a level of certainty from the SSC that those will not allow overfishing, especially in the near term of 2017 and 2018, and also -- You know in the past, when there's been some uncertainty about projections, I've seen the SSC approve a time series of ABCs that doesn't go all the way through the rebuilding plan, and so I was wondering if this would be something where -- Let's say something happens and the new assessment isn't completed in time. Does the SSC want to approve that ten-year time series of ABCs, or would they want to approve a shorter time period and then hold the ABC at a constant level beyond that point? That's something that I've seen done in the past with that sort of uncertainty.

DR. REICHERT: Thanks, Nick. Those are good points.

MR. CARMICHAEL: Marcel, to that point, I added the bullet here, under best scientific information and fishing level advice. It simply says the SSC recommends the ABC values shown for Method 2 are sufficient to prevent overfishing, and then pending review of the YPR modification requested, to get in that that method supports this --

DR. REICHERT: I am thinking out loud, but should we add also pending the full recruitment or the full projections that are being worked on right now?

MR. CARMICHAEL: I think that would be a major timing issue, because we don't know that those -- As I said, I believe the intent is to have the council decide what size limit it's going with so those can be prepared.

DR. REICHERT: Okay, and then I think the other question is the ten-year rebuilding and what to do if that recommendation of an update assessment somehow isn't materializing, whether we are comfortable with holding on to that ten-year rebuilding plan or some other form. Then Nick mentioned potentially keeping the ABC at a fixed level.

MR. CARMICHAEL: That's fairly typical, and what you've done in the past is give recommendations out a couple of years and then the assessment can be updated to verify. I wonder if you want to state that -- If we have the full projections in October, that gives you a chance to reconsider how long your recommendations are in place and would that suffice? We could add a note here to evaluate the timeframe, the time span, into the future of your recommendations once you see the full proper projections in October.

DR. REICHERT: Yes, I think that's a good idea. That also allows us to further discuss the issue. On a philosophical note, in particular in cases where we are looking at a rebuilding, I would argue that an update in the middle of that rebuilding, at least in the middle of that rebuilding, is something that would be highly recommended, so you at least once, and preferably more times during that rebuilding, see where you actually are in your rebuilding plan, or are you accomplishing your goals, but that was a more general remark. Any other thoughts or comments relative to this point?

DR. IRWIN: I have kind of a general comment as well, but you were sort of just touching on it, Marcel, about kind of reassessing the goals, but I am kind of thinking just of the very step one of a process like this and thinking about the objective of the regulation, or a regulation change. At least in my mind, one of the objectives of a size limit regulation would be to ensure that some proportion of the population is reaching maturity and has an opportunity to reproduce before being harvested.

It seems, at least the way I was interpreting some of the information today, is that there's questions about whether or not the benefit of increasing that or having a size limit is being offset by the increasing mortality that would be experienced by the individuals that remain vulnerable to the fishery. I think that it does warrant some note that, and this goes back to some of the monitoring comments, but that we need to think about if the objective of the management action is being met, and it's going to take some monitoring or some simulation studies to really get at that. That's all.

DR. REICHERT: Thanks, and I actually agree.

DR. SERCHUK: I agree with the point that was just raised. I didn't stress looking at the minimum size with respect to the size at 50 percent maturity because the literature shows that females in this stock have a size at 50 percent maturity between six and seven-inches. Clearly a twelve or fourteen allows a considerable amount of the females to be mature.

My concern is that younger females tend to contribute less to spawning stock biomass, and their viability of their eggs, in many cases, has been shown not to be as good as larger, older females. That's why I made the comment earlier about changing a size limit will change the focus of exploitation for a fishery which is almost entirely, in the recreational sector, females from younger females to older females, and I didn't get concerned with changing the exploitation from non-mature fish to mature fish.

DR. REICHERT: Thank you for that clarification, Fred. I appreciate that.

MR. CARMICHAEL: But when we look at the projections with the modified selectivity from the size limit, we may want to focus in on SSB, perhaps even SSB male and female, across ages.

DR. REICHERT: I think that would be good. Anyone else?

DR. SERCHUK: A comment that one of the researchers said, and this to document A.8, on page 23, but a comment that he made, and he has looked at maturity, says the size at 50 percent male maturation is approximately sixteen to seventeen-inches fork length and it's well above the current minimum size limit.

Evidently, to reduce disruption to spawning harems and avoid recruitment overfishing, the minimum size limit should be increased, and so it is being increased. Maybe not to sixteen-inches, but it's going a way towards trying to ensure that there are -- To avoid recruitment overfishing and to ensure that there are sufficient males for harem spawning.

MR. CARMICHAEL: I've got some notes down about the projections. Are there any other uncertainties or anything that we don't feel like we've raised during this discussion?

DR. REICHERT: I think you've captured the majority of them in your notes here. Anyone? Does anyone disagree? Does anyone have any additional comments? Just I want to make sure at the end, John, that we have an opportunity to list our recommendations, research recommendations, in terms of, for instance, one of the things that Fred brought up was a better monitoring and better sampling of the fishery, since they are so poorly sampled. I want to make sure that we capture that, and that's the only other note that I made here.

MR. CARMICHAEL: Marcel, how about this? Do you feel like you know what you would say with regard to this term of reference? It's compare and contrast the approaches with regard to risk of overfishing and progress toward rebuilding goals.

DR. REICHERT: Sorry, but what was your question?

MR. CARMICHAEL: Do you feel like you have enough on this term of reference?

DR. REICHERT: I believe so.

MR. CARMICHAEL: Research and monitoring. Sampling is --

DR. REICHERT: I think increased sampling of the recreational sector, that is the majority of the hogfish landings, because that sector is very poorly sampled.

MR. CARMICHAEL: Yes, with regard to weights.

DR. REICHERT: I think there's a couple of recommendations that address this in the original stock assessment report also, and so that's consistent with those recommendations also, I believe.

MR. CARMICHAEL: We're also looking at the dive fishery.

DR. REICHERT: Steve, you mentioned earlier that you had some other recommendations that you may want to come back to later.

DR. CADRIN: Yes, and I think that they're fairly general. I emailed them to the group when you were discussing needing text. I have those. I can read them out loud, if you would like. I propose a general recommendation for developing internal consistency between SS3 and projections that address the proposed changes in selectivity to reduce scientific uncertainty, as well as consistency between the projections, allocations, and ACL monitoring to reduce management uncertainty. That was really the general one.

Then I have a future recommendation of after the minimum legal size changes are implemented that a retrospective evaluation of the expected fishing mortality and realized fishing mortality for the observed catch would be informative to evaluate performance of the method.

DR. REICHERT: Yes, I completely agree with you.

MR. CARMICHAEL: I put those in here.

DR. REICHERT: It was copied, and so I assume that this captures it, Steve?

DR. CADRIN: Yes, please.

DR. SERCHUK: Can I ask another question? This will probably show my ignorance, but I know that someone had indicated that, based on the assessment report, the fishing mortality applied to the exploited portion of the population, but is that weighted by abundance or is that just an average across the exploited groups, assuming a flat top? I just want to make sure that the metrics that we use in the future conform to the existing assessment recommendation for expressing fishing mortality.

DR. REICHERT: John or Mike or anyone else?

MR. CARMICHAEL: The SS3 experts, maybe Chip or Amy, but I guess what I heard, I thought it sounded like it was weighted by abundance.

DR. SERCHUK: Okay, and we don't need to resolve it now, but I just want to make sure we understand what the metric is. Even under exploited fishing mortality, one can average the Fs among the fully exploited age groups, or one could take the Fs on each of the age groups and weight it by their abundance. I am unclear, and I will try to go back to the assessment report, but whatever we do in the future in terms of evaluating fishing mortality, we need to evaluate it against the metrics that's been used in terms of the status determination criterion.

DR. SCHUELLER: I agree with this comment, and I guess I'm -- I think I've said I'm okay right now, because I think we should move forward with this particular recommendation; however, I still think that there is a caveat, because based on -- I went through the stock assessment document a little bit while we were on the call, although it's hard to listen and do that, but I am still unclear what exactly the F metric is that they used, and I think that would require probably asking them a little bit more specifically.

DR. SERCHUK: Okay, and I think we need to get clarification, because if we're using it in terms of the status determination criterion for overfishing, clearly we need to base any subsequent analyses that look at F with respect to that type of metric that came out of the assessment.

DR. SCHUELLER: Agreed.

DR. REICHERT: I actually agree with that, too. Let's make sure that we get that information, if nothing else for our report.

MR. CARMICHAEL: If nothing else, make sure it's explicitly stated in all future assessments just what it is referenced against.

DR. REICHERT: Exactly, and that will help us a lot in future recommendations, formulating future recommendations.

MR. CARMICHAEL: That's a good point.

DR. SHAROV: Generally, even this minor change, or maybe not minor, considering the doubled weight of the harvested fish by going to fifteen-inches minimum, that certainly would have an effect on your FMSY estimate. The FMSY, if we are to keep this as a relatively -- Well, as a regulation measure for a number of years to come, the FMSY value would certainly have to be recalculated and re-estimated, and that's important to keep in mind when doing projections, if those would be used to compare against the FMSY itself. The reference points are going to change.

DR. REICHERT: Thanks. Any other comments or recommendations?

DR. BUCKEL: Just on the research monitoring, it's not exactly germane to the topic we're talking about, but I hate to miss a chance and so I want to get it on the record. When the size limit change does go into effect, it would be nice to have, as a research and monitoring, to monitor if there is any change in the age at maturity and also the age or size at the sex change. Those two might change, given the change in the size limit for a wrasse.

DR. REICHERT: Thanks, Jeff. Yes, I agree. We have seen that occur in other species, and I would say, generally, that monitoring changes in life history parameters. Anyone else? John, could you scroll up a little bit so we can go back to our action items and make sure we have addressed them all, and we can then flesh the report out a little more later.

MR. CARMICHAEL: There is the actions. I believe we've addressed them all.

DR. REICHERT: I was just going to look at that. We discussed the uncertainties and we compared and contrasted the approaches. We discussed the implementation and we discussed the best scientific information and we discussed the caveats there and we provided guidance on their use.

Any other comments or closing remarks? All right. Then, hearing none, I would like to close this agenda item. I want to thank everyone for their contributions to this. This is not an easy topic and I really appreciate everyone's input here, and, if we have some questions relative to specific points in the report, we may contact you directly via email to see if we need some clarification there, but, I think John did a good job of capturing the discussion here. John, moving to Other Business.

MR. CARMICHAEL: I have no other business, Mr. Vice Chairman.

DR. REICHERT: Does anyone else have any other business? Hearing none, Agenda Item Number 5 is another opportunity for public comment. John, have you heard anyone wanting to say something or do you see hands raised?

MR. CARMICHAEL: I will say if members of the public who are on, if you would like to make a comment, please raise your hand and I will call on you as I see you. The first hand I see is our Chair, Michelle Duval. Michelle, you have the floor.

DR. DUVAL: Thank you very much, John. I just wanted to say thank you to the SSC for the really robust discussion that you all had on this topic, especially given sort of the last-minute nature of this ask of all of you, and I appreciated all the points that have been brought up, and I think it will certainly give us food for thought as we move forward with perhaps some more management measures in the future.

I was just thinking to myself that the last time we actually changed a size limit was actually in Amendment 18A, where we raised the black sea bass size limit from twelve to thirteen-inches on the recreational side, and I think maybe before that that it might have been in Amendment 13C back in 2006, where we did a sequential size limit increase on black sea bass.

Obviously hogfish is a little bit different. It's been a little bit of a perfect storm of a significant increase in the size limit, from twelve-inches to fifteen-inches, as well as having such a low annual catch limit and the council being interested in tracking that in numbers, and so you have this perfect storm of ACL currency combined with what happens when you make such a change in the size limit and how does that affect your selectivities, but I have a feeling we'll probably have more discussion about this in the future if we consider similar measures. I really appreciate all of the thought that you all have brought to this discussion and thank you very much.

DR. REICHERT: Thank you, Michelle. John, were there any other hands raised?

MR. CARMICHAEL: I see no other hands raised and so this is last call if anyone has a question or a comment or any information to add. Now is your chance.

DR. SCHUELLER: To beat a dead horse, I guess. In the hogfish assessment, I think I've found where they've said what they're doing with fishing mortality rate, and so this is from the October 2014 A.7 SSC document, on page 235. It says that the fishing mortality rates were summarized using annual exploitation rates of biomass, and so the summary biomass refers to the total biomass of ages one to twenty, with twenty being a plus group. Exploitation rates were chosen to represent F, due to difficulties in interpreting the sum of instantaneous F from each fleet.

It looks like they're using exploitation rate that's not really F. I guess my shorthand for that would be a U, based on ages one to twenty biomass, and so I guess I'm not -- Looking at the spreadsheet for this call, I guess I'm not totally understanding, or maybe I just missed this, but is the exploitation F -- I guess it's not exactly the same thing as what they're describing in the documentation, I don't think.

DR. ERRIGO: Exploitation F in the YPR model is just age classes that are at and above the minimum size. The population F and total F is the total abundance of all age classes that can be selected by the fishery.

DR. SCHUELLER: So there is a mismatch between what they're using and what's being used in these spreadsheets.

DR. ERRIGO: I calculated three different F values in the YPR model.

DR. SCHUELLER: Right, but you're using an instantaneous value and they're not, and so there is a difference, and I think that needs to be at least discussed.

DR. SHAROV: The selectivity curve is not used either in the YPR model.

DR. SCHUELLER: Can you say that again, Alexi?

DR. SHAROV: As I understood, there was no selectivity curve used in the YPR exercise. It was just a knife-edge selectivity, zero selectivity under minimum size and 100 percent selectivity. A full F was applied to all fish or ages that are at or above the minimum size, as I understood it.

DR. SCHUELLER: Right, and that's still a type of selectivity. It's just knife-edge selectivity, but I guess why I bring it up is that exploitation rate and F are related, but they're not exactly the same thing, and so we have to be careful when we're comparing here.

DR. SHAROV: The thing is that the net outcome of the effect on the yield and on SSB really depends on interaction or the values of the fishing mortality and the natural mortality at each age. Here, the effect of the selectivity parameter is very important, because, depending on what they are, you are going to have either a decline in your yield or an increase in your yield or no change, and that really cannot be predicted, because it depends on, as I said, your natural mortality values, which, in this case, are changing at age and the fishing mortality values, which should be changing at age, because the selectivity is obviously not a knife-edge.

We cannot obviously complete the full analysis of this sort within the short timeframe. These are the deficiencies or uncertainty elements that we talked about. We just have to accept that, given the timeframe, this is the best that we could have, or at least that was my understanding.

DR. SCHUELLER: I see your point, Alexi, and I agree with you. I think they're two separate points that both warrant some attention.

DR. REICHERT: Amy, do you think those are sufficiently captured in the report right now, or would you like to see some additional language, and would you be willing to provide that?

DR. SCHUELLER: Sure, I can provide some language. I will reference the stock assessment report.

DR. REICHERT: Okay, and I appreciate that. If you can send it to John and then John and I will hash out some of the details of the report and get that to you and to the rest of the committee. I appreciate it and thanks.

MR. CARMICHAEL: There is the instantaneous versus what the assessment says is annual exploitation, and then did you also say it was across biomass?

DR. SCHUELLER: I mean they're using biomass to get an exploitation rate, which -- I mean I think -- I would have to double-check this, but in pop dy results, it's usually like exploitation rate is -- It can be calculated multiple different ways, and the one that always comes to my head is one minus E to the negative F, but it doesn't equate to what they're doing here, because they're using a biomass.

MR. CARMICHAEL: Exactly, yes.

DR. SCHUELLER: I think this just gets to the apples versus oranges thing again, where we're not looking at the same things exactly, and while the method itself may be useful with a bunch of caveats, the values still aren't -- I mean they don't match what the council is using for determining stock status.

MR. CARMICHAEL: Right. It sounds like they're just using sort of the change in biomass across all the ages from year to year and that's being used to calculate that.

DR. SCHUELLER: I mean they're using an exploitation rate, yes. I will provide some language for this.

MR. CARMICHAEL: It's a zero to one scale instead of a one to infinity, or zero to infinity.

DR. SCHUELLER: Absolutely, yes.

MR. CARMICHAEL: Except for over that little narrow range, where they do.

DR. REICHERT: Thank you. If there are no --

MR. CARMICHAEL: We have the Report and Recommendations Review, Marcel.

DR. REICHERT: I think we basically did that a little earlier when we went through that, unless anyone has any additional comments or recommendations relative to what we looked at earlier. As I said, I will try to send out a report as soon as possible, and I want to remind everyone that Luiz and I, or I, will provide the Snapper Grouper Committee with our recommendations on Tuesday afternoon, and so we don't have a lot of time to get this completed, but hopefully later today we will get something to everyone and then I hope that you can provide us with any comments or edits you have as soon as possible, and I apologize for the short turnaround.

On Monday, I am mostly driving up to the council meeting and so I don't have a lot of opportunities to work on this on Monday, but John and I will get together with Luiz on Tuesday morning to take a look at that and make sure we've got all our ducks in a row. Does that make sense?

MR. CARMICHAEL: Yes.

DR. REICHERT: Then unless anyone has any last comments, and, again, I want to thank everyone and, John, as far as I am concerned, we can adjourn.

MR. CARMICHAEL: Okay, and thank you very much. Thanks to everyone for preparing and discussing and taking part today.

(Whereupon, the meeting was adjourned at 11:50 a.m. on March 4, 2016.)

Certified By: ____________________________________ Date: ________________

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