We have some new numbers on red snapper. I think we have certainly an issue that raised my attention with that change in recruitment addressed. Through talking with these guys and seeing this all the way through, there is no simple answer. High steepness just reflects a lot of uncertainty in what is going on with that population and what this stock's dynamics are doing.

These fish are just proving to be very resilient despite their long life span and the expectation that they should have a long time of reproductive behavior, and, shoot, the suckers are spawning at age one, and persisting despite this greatly truncated age structure is probably torqueing around that steepness, and the 0.95 kind of tells you, I guess basically by definition, you don't know much about that stock-recruitment relationship. But you guys have done a great job here and I really appreciate that. I hope the SSC has enough information to make some recommendations and move us ahead on red snapper.

Dr. Barbieri: Kyle, it is not really a question, but if we explore your last question there, other alternatives that we could look at, right, I think one that we should consider is the validity of the suggestion by the review panel that we use the 40 percent SPR as a proxy for F in this light. I think that brings two points that I could help us.

One is the council has pre-established FMSY proxies that have already been defined by the Comprehensive SMA Amendment; so for the Snapper Grouper Complex for non-hermaphroditic species they adopted F 30 percent SPR as a proxy for FMSY. I think the other benefit of us considering that possibility is that if we find a corresponding steepness that would go with an F 30 percent SPR, I think we find steepness ranges that will be more within the range that we would expect for red snapper than either 0.95 and 0.68.

I looked at some of the steepness values that we have used for yellowtail snapper, for mutton snapper, for red snapper in the Gulf, and they fluctuate between 0.75, 0.8, 0.85. So I will be curious to see what value we would get when you look at that relationship between steepness and F at SPR levels. You know, at 30 percent, yes, that would put us close to 0.9, which we can all discuss here about how realistic that is relative to the biology of red snapper.

I think it is sensible. I don't think it is unrealistic when you think about potential compensatory mechanisms I think within red snapper and considering the low level of spawning stock biomass and how this stock has been persisting at a sustainably overfished status since the late seventies and still has episodic recruitment pulses that to me fall very much within the periodic strategists.

I went back and looked at that paper by Kenny Rose and Cowan, et al, that considers all the steepness values in relation to the biology and compensatory potential for species. You see that those periodic strategists would be in the upper range of steepness values, and to me that is consistent with the biology of red snapper. The benefits to me were perhaps threefold. One, we have benchmarks that are consistent with the council's already adopted estimates of MSY proxies.

Two, we get a steepness value that is more consistent with the expected biology of red snapper; and, three, we have, getting the higher steepness, a higher productivity value in your recruitment. You know, when you do your projected recruitment, it is not going to be as low as we are now at

0.68. That changes our rebuilding schedule and that changes really the bar of where we need to rebuild the stock in terms of MSY.

Dr. Williams: To that point, I have given this speech many times at many assessment workshops, and I'll give it again. There is no strong empirical evidence that links steepness to the biology of the critter. I have yet to see it. I understand the Kenny Rose you're quoting, but, I'm sorry, that relationship does not exist.

And if you think it does, really, red snapper does not fit into – I mean, it is a long-lived species. If there is such a relationship it seems like red snapper would actually be at the opposite end. It lives to 53 years. Until I see the evidence that there is some relationship between steepness and biology, it is not appropriate. Steepness is a function of the recruitment dynamics.

Recruitment dynamics, as all of us should realize, are not driven by biology as much as they are the environment and fishing. The environmental conditions and the ecosystem conditions, the biology is a tertiary factor, in my mind, when it comes to determining recruitment levels, for potential recruitment levels for fishes at various stock sizes.

I think that is a bogus argument, to some degree. As far as the choice of proxy, that is always up for debate in every SEDAR, is my understanding, is when a benchmark assessment is conducted there is a re-evaluation of what is an appropriate benchmark. Just because there is an F 30 percent on the record books as a default value for all snapper groupers, it does not mean that we have to stick with that.

If a review panel suggested that F 40 percent is more appropriate, then I think we need to seriously consider that. That is one of the reasons we go through the SEDAR process is to re-evaluate that benchmark. It is one of the terms of references in the SEDAR process is re-evaluate the benchmarks.

Dr. Barbieri: Erik, first of all, I disagree completely with you, and I will explain why. Number one, the biology of the species is very much related to the stock-recruitment pattern that you are supposed to get. Otherwise, perhaps we should do away with incorporating a steepness value and having to have a stock-recruitment relationship for our assessments.

Based on what you're saying, that is a non-parameter that has no value into this process, and I disagree. That is number one. Number two, the fact that the council has a pre-adopted FMSY proxy – I'm not saying that we should not consider a F 40 percent SPR as an alternative proxy, but I think to adopt it at the assessment level without giving the council the possibility of evaluating that, that is not an assessment decision, in my opinion.

I mean, the management benchmark is a management decision, and I would rather give two scenarios to the council to consider – here is the expected scenario using your F 30 percent SPR proxy. Now here is an alternative scenario using 40 percent as suggested by the review panel. I think that we as an SCC need to bring the review panel's recommendations within the context of the management policy that is established and utilized by the council that we actually serve.

So, our job here is to actually incorporate that management perspective into our decision-making. To me, not presenting to council these two alternatives is having the SSC or the assessment process take up a management decision role that I feel very uncomfortable with. If the council decides to make that change from an F 30 percent or at 40 percent as a benchmark for evaluating the status of red snapper in the South Atlantic, I'm okay with that, that is their decision and prerogative.

In my case I'm going to look at what makes sense biologically and scientifically, and I don't agree at this case – look at the episodic recruitment. We still have strong year classes coming by. To me that is a clear pattern of a periodic strategist, and a higher steepness value to me is justified. When you guys actually ran the model, this is before the review panel, you came up with the upper bound.

So, to me it is very – and I hate to use that word – arbitrary for the review panel to make a suggestion – if you can explain to me what is the scientific basis for that 40 percent from a scientific perspective, not from a management perspective because that is the council's job, I will live with that, but at this point I think that F 30 percent especially – there is this issue also about SEDAR inconsistency in our parameter choices.

I mean, this SSC has just endorsed an assessment for mutton snapper fairly recently that considered a steepness value of 0.75 and an F 30 percent as a proxy for MSY. How can we reconciliate the two? We're talking about red snapper matures very early. Yes, they live very long. They have like this complicated life history pattern, but the maximum age estimated for mutton snapper now is 41 years old. So to me it begs the question of why should we stick with an F 40 percent SPR as a proxy for MSY when it is giving us what I believe is an unrealistic steepness value by association?

Dr. Williams: First off, the choice of a proxy is not the council decision because it is a proxy for FMSY. FMSY is a science-based decision. Unless you're suggesting that the council be estimating FMSY, let's dispense with that notion right now. We are looking at a proxy for FMSY, and we're suggesting that F 40 percent is a better proxy – actually not we but the review panel is.

Now let's look at the scientific literature. What does the scientific literature support? The scientific literature supports in several articles – there is a laundry list of proxy papers that have come out most recently that are all pointing to the fact that F 30 percent is not a good proxy. F 35 percent is still not even sufficient. All the other regions are suggesting that F 40 is a better proxy if not even F 45 or even F 50 percent.

So the literature is pointing us in that direction. Now let's look at the literature that is point us to an appropriate steepness value for red snapper. There is none, none of it. They have done many meta-analyses, including Ram Myers and many others, that have attempted to come up with these relationships between steepness and some biological parameter such as age at maturity, such as longevity, such as many of these other factors, and the relationship doesn't bear out. It just doesn't exist.

So when we want to fall back on sort of what is the scientific justification for what we're doing, we have very little scientific justification for suggesting that steepness is 0.95 for red snapper without any other information, but we have a body of literature that does suggest that a better proxy for FMSY is F 40 percent.

Dr. Barbieri: I will read here from the assessment document: "Some studies have found that F 40 percent is too high across many life history strategies (Williams and Shertzer 2003) and can lead to undesirably low levels of biomass and recruitment."

Dr. Williams: That is exactly the argument I am making, it is too high so it should be even at 45 percent or F 50 percent.

Dr. Barbieri: But you're saying that F 40 percent is too high.

Dr. Williams: Right, a higher percentage means a lower F, so if we're saying F 40 percent –

Dr. Barbieri: And F 30 percent –

Dr. Williams: Is an even higher F than F 40 percent. F 30 percent is a higher F rate than F 40 percent, and our paper actually suggested that F 40 percent may even be too high, which means that what we were suggesting is something even higher in the percent range, F 45 or F 50 percent meaning a lower F is probably more appropriate.

Dr. Barbieri: Erik, I'm sorry but I'm not convinced. I haven't seen – and I think this is an interesting discussion because it is going to pretty much frame the way this SSC is going to look at a lot of these assessments and those benchmarks. We know that we're going to have poor stock-recruitment relationships out there and their steepness values are going to be unrealistically high in many cases, and then we're going to end up having to use proxies. I think unless there is stronger evidence suggesting that F 40 percent – I mean, what you're doing here, using the F 40 percent, is actually –

Dr. Williams: Look at the scientific literature.

Dr. Barbieri: With some of the scientific literature, Eric, are you telling me that F 30 percent, keeping that F 30 percent SPR value for these species is not sustainable?

Dr. Williams: What I am suggesting is that's not the maximum sustainable yield. Of course, any one of those levels is sustainable, but is it at the maximum level that we would like it to be at? No.

Dr. Barbieri: I have not seen an explicit relationship here that will show me that F maximum sustainable yield corresponds to F 40 percent SPR.

Dr. Williams: Reduce it to F 30.

Dr. Barbieri: To me, when you use the two – I mean, here are two indicators to me. One is that F 40 percent is a new standard, really, that is being introduced. I don't disagree that having the discussion is actually desirable and healthy for us to have. But, when you look at the values of steepness – and if you're going to reference the literature, I'm going to reference the work that Kenny Rose and others did, which to me is the only explicit relationship between the biology and the compensatory mechanisms in different species by fishery patterns and use a life history theory in making some decisions when you have to make these judgment calls and expert advice on picking steepness values.

I'm not disagreeing with the assessment. I'm not disagreeing with us considering this F 40 percent SPR, but I just think that it is inconsistent with the way that we have looked at other snapper species that have similar life history patterns. To me it is not convincing that we need to have 40 percent SPR to reach maximum sustainable yield.

Dr. Harris: At the Red Snapper Assessment Workshop there obviously was a great deal of concern about the level of steepness because that is one of the reasons why a sensitivity run was run at a steepness of 0.6, and yet the decision was made by the assessment workshop to go with the F constraint of 0.95.

If the review panel didn't like that for – it is unclear as to exactly why they didn't like it. I don't necessarily think we should be thinking about overriding what the assessment workshop decided to do when they recognized the initial problem in response to what the review panel had issues with. They recognized it as an issue. The decision was made at the assessment workshop that this was what everybody was not necessarily comfortable with but was willing to accept. For me, I think we should just leave it at that.

Dr. Cooper: Unless my brain has completely misfired, I believe not two hours ago or three hours ago we just approved the stock assessment based on a VPA model that couldn't see the stock-recruit curve very well and basically used a very steep stock-recruit curve to project forward and estimate all the benchmarks.

It's the same problem as we're facing right now. We just approved it. As Pat just said, it was the best they could do at the time there; so while I definitely commend the efforts of trying to figure out a better solution, I don't really see a problem with sticking with things as they were.

Dr. Belcher: We also approved this same document in June with that steepness factor as well. The main concern I guess is just the fact there are two values that have been assigned through the addendum and how best to – we didn't keep a consistent steepness I guess is the question in front of us, as John pointed out through his paper. That is more the issue, I think. Pat.

Dr. Harris: Perhaps the best approach is for a steepness procedural workshop.

Mr. Carmichael: You approved the assessment but you didn't have the addendum; and then when you approved the – at the time you approved the F 40 percent SPR recommended. You endorsed that recommended by the review panel, which then triggered this need to redo the

benchmarks and brought up this question with the change in steepness between the two periods, so you do have some actions to do there.

It just seems like it is a question where Luiz seems to be saying – we don't know where MSY occurs. Luiz is saying F 30 percent seems reasonable. F 40 percent is more conservative. The justification of the review panel was F 40 percent is a more conservative choice. Erik is saying the literature more supports F 40 percent and F 30 percent is acceptably risky and that the SSC should stick with saying F 40 percent and say both are plausible and let the council make a decision. That is sort of where we are standing?

Dr. Williams: With one correction that the review panel never used the word "conservative". They just said that this was a more appropriate proxy.

Dr. Barbieri: And I understand that, but they provided very little justification, Eric. If you look at John's paper, he is trying to interpret, really, what the review panel was trying to convey in that language. There is no justification whatsoever, no scientific basis for suggesting that F 40 percent not explicitly at all in that document. I would say, then, why not 45 percent, why not 38 percent?

To me it is a matter of if we have – for addressing the status of the stock, if the council has adopted as a management – because this is actually giving you the status of the stock and a rebuilding target they're aiming for. So, the value of steepness here is going to change the productivity levels, which is going to change your timeframe for rebuilding, and it is going to change the ceiling you're trying to reach as you rebuild the stock.

To me, if we want to go forward with F 40 percent – and I don't disagree that we should present the council with that option as well – we should give them two options. We should give them F 40 percent SPR and an F 30 percent SPR scenario and then ask them to choose how conservative they want to be in managing the red snapper stock. But I don't have a scientific basis as this point to tell them – I cannot stand on my two legs and tell them that I have a good reason to say that F 40 percent is better than 30, and that is where my problem lies.

Dr. Shertzer: While this discussion of F 40 versus F 30 is both fascinating and entertaining, it really doesn't matter here whether you use F 40 or F 30 in terms of having this consistency between benchmarks and projections. All the issues with F 30 would be exactly the same as they are with F 40.

Other than that, your steepness might be a little higher so when you see this drop in recruitment, it might not be quite as extensive. I think you're talking about two separate issues here; what is a proxy that should be used; and then more specifically to red snapper, how should we go forward with computing benchmarks and projections. I have heard a couple of ideas floated that maybe the estimated value of steepness of 0.95 was maybe that is okay, and so that was Alternative 2, I think, so that is up here as well.

Dr. Barbieri: Right, and I brought it up just because of this correspondence between steepness and the SPR value that we're shooting for, you know, and the fact that now we are looking at

those different scenarios of what are considered for the assessment steepness value versus the projection steepness value, so that choice is really – because the way you guys explained it very well in the text; I mean, you went from the F 40 percent backwards and worked the steepness value from that. In that case it is having a major impact on what steepness we end up with so that is why I brought it up.

My suggestion is that we add maybe Alternative 5 or Alternative 6, because you did actually consider Alternative 5 after that, that we would use a steepness value for the assessment and the projections, the same value corresponding to an F 30 percent SPR.

Dr. Jiao: I want to ask Kyle what is the difference for F 30 percent and F 40 percent – I mean, values, their difference, F 30 percent and F 40 percent?

Dr. Shertzer: I don't know.

Dr. Jiao: Basically those proxies, they are proxies; they don't actually tell us what is the maximum sustainable yield, they don't, so I usually suggest in these situations, when the proxies of the biological reference points are largely different and when the population steepness is bad, it is heavily overfished, we go to a proxy that is conservative. That is sort of my suggestion. Again, here in this example, I am not sure what is the difference between F 30 percent and F 40 percent. For example, if it were 50 percent different, I would suggest to move from 30 percent to 40 percent because, you know, because that is a big difference there.

Dr. Shertzer: I didn't recompute those, but in the original benchmark F 30 percent was 0.1 and F 40 percent was 0.07.

Dr. Jiao: The differences are huge in this situation, and I think those are very good reasons to move from 30 percent to 40 percent. I also have a suggestion about the benchmark of SSB at FMSY, the proxy; because there is no relationship between stock-recruitment and we have no idea about the steepness.

In this situation and not for just this species, we may consider a proxy based on historical estimated population abundance. For example, a medium size of the estimated abundance in the last 50 years, treat that as, you know, a proxy for the next 10 or 15 years and over time we may be able to estimate a better stock-recruitment relationship because of further data added to that situation. Just a suggestion; I don't really want to move too far.

Dr. Belcher: I'm going to pose a question just because I'm probably going to show my ignorance to the process, but any other time that we have offered a proxy have we ever adjusted projections because of that adjustment with a changeover in a proxy? It seems like the assessment went forward, we had projections, and the suggestion was made we needed to use a value other than what we were looking for because the data didn't support that, so we threw a proxy in there to fill in that space.

Nothing really changed in the projection at that point, so now we're coming into this recognizing there is a proxy and we have adjusted for the proxy. Have we ever done that before with a

projection; have projections ever been changed to accommodate for proxy? Do you understand what I'm saying?

The question to me is we get projections and we talk about what we're using to fill in for our values for management purposes, and we use proxies to fill in because we don't know that number. Have we ever adjusted projections because we have not used the real number; we have used a proxy?

Mr. Carmichael: I'm not sure. I guess the question is more have we ever adjusted steepness, which we have tended to adjusted steepness to keep consistent. It is something about this one with it being so high and then going so low that has really made this huge difference in just where the stock just happens to be falling must be having some role in this.

I don't think it is out of the ordinary that the panel said, well, use F 30 percent and F 40 percent and you have constructed it to be consistent over the long term, which was what was initially done. It is just the way the pieces fall out in this one that has just created this disconnect that is requiring more attention to settle. I don't think we're completely out of bounds in what we have done given what we have traditionally done.

Dr. Cooper: Well, a technical question, under Addendum 1 I assume you incorporated the autocorrelation in the recruitment in going from the final year to the first year of projection so that huge jump is still accounting for the autocorrelation; is that correct? Okay, so the jump would be even worse if we didn't have autocorrelation in the there?

Dr. Shertzer: The projections have autocorrelation, but it is not in between the assessment and the projection.

Dr. Cooper: Then if you incorporated the autocorrelation essentially from your last recruitment in the assessment to your first projection, then we wouldn't see as big a jump, right, assuming they're positively correlated?

Dr. Shertzer: Yes, but those are in the residuals as well so you would still see a big jump because you're changing stock-recruit curves.

Dr. Cooper: Okay, so it wouldn't dampen that jump at all? I would think it would try and shrink that jump when you switched stock-recruit curves because your recruitment will be correlated with the previous recruitment regardless of what curve it is based on, right?

Dr. Shertzer: Yes, but the end of the assessment period it is really tightly constrained to the spawner-recruit curve, so it is not going to be much of a jump, if there is some.

Dr. Cooper: You mean nothing much of a change in the jump?

Dr. Shertzer: Not much of an effect.

Dr. Cooper: Well, I'll just go back to my question before. The reason why the steepness is coming up is because we're estimating the spawner-recruit curve internally as opposed to estimating recruitment and then trying to fit the spawner-recruit curve. Basically what this is saying is we don't have a good stock-recruit relationship.

The solution to that in the past is not to try and change the steepness and project forward with the stock-recruit curve but rather to essentially bootstrap previous recruitments into the future just like we did with the stock assessment we just passed, which I believe again is the same as essentially putting a very high steepness to it that mathematically they're basically equivalent, I think, which is essentially then Option Number 2, if I'm not mistaken.

So, it seems like we have a process for dealing with this situation in the past. We have it already done. We have it already approved, in fact, including the F 40 percent, so I guess I raise the issue given that is how we used to operate – again, I think it is wonderful to try and solve this. You guys have done a huge amount of work, but personally I kind of like Option Number 2 because it is kind of how we have done it in the past, it seems to make sense in the past.

I mean, I like the idea of us to figure out something better. I'm not sure as a universal approach we can determine from this trying to find a different steepness and project forward and then try and figure out ways to marry the two concepts together. I think it is a great thing we should work on, but from the point of moving forward Option 2 is kind of how we have done it. It is consistent. We agreed with it before. I just kind of throw that out there for people to mull over and throw stones at.

Dr. Barbieri: And I agree with that as well. I agree that is a good option there that we can follow, and it goes with what Pat just mentioned. After the assessment workshop that is what the panels had decided was acceptable. Maybe they're not completely comfortable with that steepness hitting that upper bound, but they're willing to live with that, just like the previous assessment on king mackerel we just saw.

I'm not sure for this species if there isn't really a very high independence between spawning stock biomass and subsequent recruitment, so a high steepness, in my opinion, would not be unrealistic. My only point is that looking across a number of species of snappers and if we have sometimes to make these choices not based on model estimates, but make choices, I would rather look at the biology of the species, stay consistent with some of the choices that we have made in the past or very recently for other snappers than to accept a suggestion or recommendation from the review panel that I don't think reflects well for a species that we deal with here in the Southeast United States.

I mean, it goes back to the discussion that we had yesterday about us here at the SSC bringing those review workshop results and recommendations into the context of managing the species that we work with here in Southeast United States.

Mr. Gregory: I must have missed the red snapper discussion in June, but the Gulf people have been working on red snapper for almost 20 years now. What steepness are they using and why

would the South Atlantic population necessarily have a different steepness? I'm sure they have looked at this ad nauseam and we're just starting.

Dr. Barbieri: Well, first of all, they use an FMSY proxy for red snapper in the Gulf of F 30 percent SPR, and they have steepness fixed at three values, 0.81, 0.9 and 0.95. I think that their base run – and I have to confirm this, but I think their base run was at 0.9, and they used 0.81 and 0.95 as sort of sensitivity runs.

Again, all we're suggesting here is what are we going to consider the run? It doesn't mean that we cannot present the council potential alternatives that would consider an F 40 percent SPR as a proxy for FMSY and the equivalent steepness value as possibilities and alternatives, but what we consider the base run that we use for the assessment results and for the projections I think will be consistent biologically.

Mr. Gregory: Yes, you woke me up when you said "consistency", Luiz, and that is something we should strive for, consistency within a region or a species group and consistency even between the two councils where we have the same species, groupers or snappers. I would think whichever stock assessment is done first and the work that has gone into that sets a precedent and any subsequent assessment, either in the same region or in a different region on the same species, would seem to me to have onus to document and justify why you would go off on a different trajectory of any assumed parameters or anything than what has previously been decided.

I daresay the species biology and life history is not going to differ between the east coat of Florida or Southeast United States versus the Gulf of Mexico. They're going to be very similar. Was there documentation as to why a steepness of 0.68 or 0.95 was rejected when that is within the realm of previous stock assessments on red snapper? To me that is where the onus should have been, but in one sense I'm a dollar short and a day late on this discussion. We should have had this in June.

Dr. Barbieri: Well, I think this is a question for Kyle and Erik. Why did we reject the 0.95 steepness value when it was discussed at the review workshop?

Dr. Shertzer: The wording was that it was unrealistically high, so you can interpret that. I think part if it, too, was that the estimate was hitting the upper bound of what was allowed. So it wasn't just estimated at 0.95, it was actually hitting its upper bound, which sometimes can mean that you have trouble in estimation.

I think there really just wasn't a lot of good information to estimate what steepness it was. I would also just add that if you're willing to accept a steepness of 0.95, that's fine, but then I don't think you can accept the proxy of F 40; because once you define steepness, there is this relationship with the proxy. If you have steepness, you can estimate MSY benchmarks, so that would make those proxies irrelevant.

Dr. Barbieri: To that point, Kyle, very good points. This is why I started this discussion really based on the F 30 percent proxy; because if you look at that relationship they have put there, if

we choose a 0.95 steepness, you know, Pat, you end up actually with a corresponding – because you end up then with a FMSY proxy that is even lower than 30 percent SPR.

As a compromise, perhaps, between an F 40 percent SPR proxy and what I believe is a low value of steepness corresponding, I suggest we use a 30 percent SPR proxy; and then the equivalent steepness is going to put us almost exactly in the range that was already used for red snapper in the Gulf, was used for mutton snapper and other assessment that was SSC approved back in June; for yellowtail snapper and some other species that are with that same biology pattern.

Dr. Cooper: Kyle, I would actually disagree with you to some extent in that if you accept the steepness of 0.95 as representing an accurate stock-recruit curve, then you can do an MSY base. If you interpret the steepness as we can't fit the stock-recruit curve, then you can still do an F 40 percent and then do what we have done in the past in bootstrap recruitments over some time period and project forward and still be internally consistent on saying we don't believe the stock-recruit dynamics as truly this.

And so rather than fix that, we are going to do what we have in the past and bootstrap and not call it FMSY but call it a proxy. I think that is still internally consistent. I think the difference is the steepness is – mathematically you end up at the same place, but the difference is interpreting the steepness as an accurate stock-recruit curve as opposed to the statistical models getting flat because it can't fit anything and so just accepting that as no known stock-recruit curve and so just using the observed recruitment.

I am very willing to be corrected on this by anyone who cares to weigh in, but I don't think holding the steepness at 0.95 and using an F 40 percent proxy is necessarily inconsistent. I could be wrong.

Dr. Shertzer: If you defined your spawner-recruit curve with a steepness of 0.95 and if you compute FMSY, by inconsistent I mean that FMSY won't necessarily equal F 40 or whatever proxy you want to use. Now, if you're saying you just can't define a spawner-recruit curve and then use estimated average recruitment with some variation around that, then that is fine, but that is more like a steepness of 1. Your point is the same, I think.

Mr. Carmichael: Some clarification, thanks to Andi, from the regional office on where the Gulf stood. What happened with the situation in the Gulf was the SEDAR Review Panel put forward sort of the options to them to, well, you could use stock-recruitment relationships or you could use an SPR-based approach; and, if you're going to scale either one up to true MSY, you're going to have to have stock-recruitment, anyway.

Where it all ultimately settled out was the Gulf using an FMSY approach with translating to a steepness of 26 percent – I mean, to an SPR of 26 percent in their case and a steepness of 0.97. So going to 0.97 I guess that model had a little bit higher bound, but I think we probably all can look at 0.97 versus 0.95 versus 1 and understand that there is not necessarily a lot of information about the stock-recruitment relationship there.

I just kind of wonder if you kind of buy that there is no stock-recruitment relationship, you're kind of putting yourself into in a sense Kyle's Option 5 that we really don't know. And is that where we're more heading that we don't know what the ultimate biomass of this population will be MSST, what its rebuilding point is.

We do have the relative references about clearly the stock is overfishing and the biomass is not where you want it to be, but we have all these uncertainties and is it more realistic to admit that we don't know where it is ultimately going to end up because we have this great uncertainty about stock-recruitment – just to ponder as we go through this.

Dr. Cooper: I have a question. If we didn't have that big jump in recruitment, would we even be having this discussion or was it that drop in recruitment that is causing all these machinations; that as you've done the F 40 percent and recruitment was nice and smooth, would we be having these discussions or would we just have an addendum and be moving on?

Mr. Carmichael: Certainly, it is the drop in recruitment which is related to the change in the steepness and thus a different stock-recruitment relationship between the model estimated period and the model projection period, so, yes, certainly, if it weren't for whether it is the change in recruitment or the change in the stock-recruitment relationship, they are both completely tied together, we probably wouldn't be having these options.

And a lot of time maybe the norm has been more to just fix the steepness throughout, like we said either 0.95, 0.68 or something somewhat in between, and that is where we're kind of in a different territory, and that wasn't explicitly what the review panel did.

Dr. Belcher: Wasn't the whole goal of the addendum just to fix data points and rerun the model with the fix of the data points?

Mr. Carmichael: That and to account for the recommendation of the review panel, which was endorsed by this committee to use F 40 percent as a proxy for FMSY. So because of either way, both of them required an update and a re-evaluation of the model runs to get you projections.

Dr. Barbieri: Right, John, and, yes, we did look at this back in June, and, yes, we accepted the assessment then. However, I think it was looking at these new projections, looking at the addendum, that we really could have a full evaluation of the impact of that recommendation. In reading the issue paper that you put together, to me it is clear that we're trying to interpret what the review panel was trying to convey there with the F 40 percent.

And, yes, it is very explicit in recommending F 40 percent, but there is no direction on what to use for the projections, and there is no clear justification on why that benchmark will be more appropriate for this stock than any other from a scientific basis.

To me, instead of sticking with the 0.95, just because that will be a little more risky, it will put us in an SPR range lower than 30 percent, I think that a good compromise would be to adopt the F 30 percent proxy as approved and adopted by the council. You just work the same way they worked for this addendum. If you generate a steepness value from that, it is going to come

around 0.85 to 0.9 or thereabouts, and that we use both for the assessment estimates as well as the projections.

Mr. Gregory: In the review workshop I see the statement where it says that – basically it says this leads to a low estimate of age-specific natural mortality, yet the assessment seems to suggest the stock is highly productive and contributes to a very high estimate of the steepness of the stock-recruitment function. The panel felt the steepness estimate was unreliable. That is the discussion.

There is no discussion of the Rose and Cowan paper. There is no discussion of any of the stock assessments done in the Gulf. I think for future stock assessments – and most of them are conducted by the Southeast Fishery Center scientists – that there should be some continuity of information that is available on the species even if it is in a different region.

I think if they had known about the number of stock assessments done in the Gulf, the steepness estimates on the Gulf, they may not have concluded that it was an unreliably high estimate. I think that was done out of context. I would ask that the SEDAR people, in particular, and the National Marine Fisheries Service to try to bring more information together here from adjacent regions and other stock assessments.

Dr. Williams: Just to clarify, I think that it is an unreliable estimate because it is hitting a bound. If it was hitting the lower bound, we would have this same discussion. Whether it is hitting an upper or lower bound, the fact is in any statistical model if your parameter is hitting a bound, it is telling you it is reliable, and it doesn't matter which bound it happens to be hitting.

Dr. Belcher: Any further comment or discussion points?

Mr. Carmichael: Anyone care to make a motion or put something out there?

Dr. Belcher: Seeing none, we have to decide what we want to do relative to this addendum for red snapper. John.

Mr. Carmichael: I think at this point my understanding is that you have recommended F 40 percent. You have that in the addendum. The remaining question then is how do we deal with recruitment for the projections and do you go with the 0.95 or one of the other approaches? Clearly, there is a problem with the change in stock-recruitment relationships between the estimates and the recruitment, so we're back to that question unless someone has some other idea.

I think Luiz has kind of proposed, well, Option 6, which is you use 30 percent SPR and the steepness that comes from that, and you fix it in the model and you go from there, which then necessitates going down another path and do some more runs, but that is just where it stands. We would have to wait and see how that panned out.

Dr. Barbieri: And I think that the advantage of that is that we then present the council with an FMSY proxy that they have already approved and accepted. Maybe I don't understand, Erik,

really how that works, but in my opinion if the council has accepted what they consider to be a proxy for FMSY from a management benchmark perspective that will be used there in the denominator, well, then, in that case we should give them at least that as one of the options for them to consider.

And if they wanted to be more conservative than that, that is their prerogative. If they want to be less conservative, they ask for additional runs. But, I just feel uncomfortable, really, from a scientific basis just presenting them with the F 40 percent SPR as a proxy for FMSY.

Dr. Williams: All right, come on, Luiz, I mean you're telling us from a scientific perspective that in June you endorsed the F 40 percent. When you saw the outcomes of the F 40 percent, suddenly you're reconsidering that now F 30 percent may seem more appropriate. Come on!

Dr. Barbieri: I'm sorry, Erik, come on what?

Dr. Williams: We endorsed that 40 percent in June. It is in the SEDAR document. It was approved by the review panel. Why are we reconsidering it? What we're talking about here is projection.

Dr. Barbieri: And that is fine. My fault by not looking at this issue as carefully back in June as I should have undoubtedly – there is no doubt about that. I should have looked at this more carefully especially when we had a mutton snapper assessment that was presented concurrently and used an F 30 percent SPR as a proxy for FMSY because it is part of the SEDAR process to have a table of the existing management benchmarks as adopted by the council.

So because we approved this back in June, I don't want to give the council bad advice if I had a chance to reconsider and admit my fault for not looking at this more carefully in June, but I really feel uncomfortable putting forth the F 40 percent SPR as a proxy for FMSY without having a strong scientific basis for it.

Dr. Cooper: Okay, here is a strong scientific basis for it; a citation you read into the record, Williams and Shertzer, peer-reviewed, published literature saying F 40 percent is probably the smallest you want to get. You yourself quoted that. Okay, you want scientific evidence. There is a peer-reviewed publication that you yourself quoted.

Dr. Barbieri: And that's fine, Andy. I'm just making a point here about us having to be careful about consistency among species and about making recommendations to the council that are based on a scientific basis and that are non-arbitrary and that will give them the opportunity to choose how conservative they want to be.

Dr. Cooper: As Erik as said, the choice of proxy that best approximates FMSY is not a management decision. That is not a precautionary versus what is a precautionary decision. Where you set ACL or ACT, ya da ya da, ya da, that is management, but the choice of proxy that best represents FMSY is science and not management. The choice of do you manage at FMSY, that is management.

Dr. Barbieri: However, when you determine the status of the stock and you do the plots of Fcurrent over FMSY, where you are, the status of the stock and your rebuilding target is going to be based on that, Andy.

Dr. Cooper: Yes, exactly, and it is up to the council to say whether or not they want FMSY or its proxy as a definition of overfishing or BMSY or 50 percent BMSY as its definition of overfished. The choice of which proxy to use that best represents the targets and thresholds chosen by management is science. The manager sets the targets and thresholds; we figure out how to best estimate them.

Okay, if they want to do something different than FMSY or its proxy, that is their prerogative, but given FMSY or its proxy is what needs to be plotted on there. We need to base the proxy based on best scientific knowledge and consistency over time, as we have talked about in stock assessments, is a minor consideration.

We don't do it just because that is how we have always done it, which is different from saying, okay, let's take a meta-analytic perspective on snapper grouper and try and encompass all this other knowledge from other areas, and let's not also do it in an ad hoc fashion and just say, well, because the Gulf used F 30 we should use F 30.

Excuse me, you know, you want it based on science, give me the science that says F 30 is the appropriate one. Right now we have got a publication on the table that says F 40 is the best. Give me a citation that says F 30 is the best.

Dr. Barbieri: That's fine, I'll just make my recommendation for the committee to consider. I don't mean to argue with you guys. I'm just saying looking at consistency across time and across species, looking at a lot of solid scientific evidence out there in terms of the range of steepness values and the biology of the species, I think the steepness of 0.68 is too high – I mean is too low. I really think so, so I'm just presenting my opinion, and in that case I'll vote for Option Number 2, and we might as well stick with the recommendation that came out of the assessment workshop.

Dr. Belcher: Do I have that as a motion?

Dr. Barbieri: Yes, I will move that the SSC accepts Option Number 2 of a steepness of 0.95 to be used in assessment estimates and projection estimates for red snapper in the South Atlantic.

Dr. Cooper: I know I'm the one who advocated that at first, but clarification. Going back to John's point, in the past when we haven't been able to estimate a stock-recruit curve, have we actually done what John called Option 5 with saying, well, we can't estimate the BMSY proxy or have we – I'm saying I thought we did, but as everyone knows here my retention is rather limited, so I think we then do geometric mean and estimate BMSY based on that. Is that in fact what we have done; am I stating things correctly?

Mr. Carmichael: I think you have kind of done both. You have done ones where you picked a steepness and fixed the steepness and went through with it, and you have also done ones where you say we have no idea what it is so we can't give you biomass values. Both have been done depending on the feeling of the group and which way they felt they could run.

If they could go with the steepness, then at times they have. If they just felt like – you know, the best example probably is vermilion snapper where the original assessment said there is just no information about that so we reject that outright. It seems in this case maybe there is a little more feeling.

I think gag between the Gulf and Atlantic kind of went both ways. One they said there is none and the other said, well, there is some and we can go with it. So, two and five are both certainly within the realm of what you have done historically.

Dr. Cooper: Well, I'd certainly support number two because it seems to make sense given the stock-recruit relationship at very low abundance, seems to be relatively flat. We're not seeing huge increases over the time period.

Dr. Barbieri: Do you second it?

Dr. Cooper: Yes, I'll second it. I didn't mean to debate before it was seconded, so, sure, I'll second the motion.

Dr. Belcher: Any further discussion or comment? Kyle.

Dr. Shertzer: Well, if we're going to use the steepness of 0.95, can we just go with the MSY benchmarks that fall out of that, then, rather than any proxy which might not be consistent with the MSY benchmarks?

Dr. Williams: My understanding was we would still stick with the F 40 percent proxy basically and kind of ignore the biomass benchmark for now since we're talking about five- and ten-year projections, anyway, and we're going to be reassessing this thing in the near future, I'm sure.

Mr. Carmichael: I was going to go something along those same lines as well and say I think by doing this you're kind of saying that biomass is fairly uncertain when I get to that high stock, because I think it is important, as Andy said, at this low stock size and what we're seeing about its stock-recruitment relationship just kind of infers that 20 years, when this population is at a better status, you may have more information to get a stock-recruitment relationship that sheds light on steepness, and we're out of this problem.

So it's kind of incumbent upon this that you're really talking about for short term and are you willing to make sure that the caveat is added that there is a lot of uncertainty in overall rebuilding times and in the rebuilding point.

Dr. Williams: And I will add that is more consistent with the review panel's findings, too, because if you read what they say, they say that long-term projections cannot be used or can't be

trustworthy. I forget the terminology but they say only short-term projections should be relied on, so this is more consistent. With the F 40 percent short-term projections, it is very consistent with what the review panel sort of suggested.

Dr. Cooper: Does not setting a biomass target; what does that do to the declaration of overfished status?

Mr. Carmichael: It means that you probably can't quantify it, but you could probably give some general qualitative advice that says clearly it is overfished. We just don't know where this population would exactly reach the rebuilt and what the optimal desirable level is and what optimal desirable yield will be at that point, but we know we have to solve these problems first and make some progress. I think language along those lines would solve that problem.

Dr. Belcher: We had done that with vermilion. Yan.

Dr. Jiao: I want to make sure that I understand Alternative 2. If we use Alternative 2, that means that we still use F 40 percent as the proxy for FMSY, but we use 0.95 for projection? Okay.

Dr. Shertzer: I think I had a very different understanding of what you guys are saying, which is sort of a double hybrid approach here between Alternative 4 and Alternative 5 where Alternative 5 means we can't really estimate any biomass benchmarks or rebuilding timeframe. We're just going to rely on the short-term projections, is that correct? Then that is not really Alternative 2. So then the short-term projections would be the ones from this hybrid approach which don't really assume steepness of 0.95 but use the mean recruitment from the end of the time periods.

Mr. Carmichael: Or is it Alternative 2 with significant caveats on those long-term benchmarks; saying, yes, when you do this, you get them, but given what the review panel said, you don't have confidence in them at this point, but you think it is informative for the short term, to try and keep it a little simpler.

Dr. Belcher: Any further comments or discussion? Okay, with that, we have a motion on the table with a second.

Mr. Carmichael: Which you will read.

Dr. Belcher: Which I will read, yes. The motion is that SSC accept the 95 percent steepness value to be used in both assessment and projection estimates for red snapper in the South Atlantic. Comments or discussion? Andy.

Dr. Cooper: Given the way in which we're moving our operations, do we need to have language in the motion regarding our lack of confidence in the specific values of the long-term projections or when we summarize this in the report that will come out?

Dr. Barbieri: Right.

Mr. Carmichael: As long as you summarize it in the report and that will come out, that will be fine, yes, as long as it is there. Who is in charge for this part of the meeting?

Dr. Belcher: I am one of them.

Dr. Barbieri: Yes, I'm one of them, too; Jeff Buckel.

Dr. Shertzer: I just wanted to point out for this Alternative 2 the projections have not been run yet. They were run in SEDAR 15 but they haven't been run based on the corrected recreational landings time stream. The assessment was rerun, that is the addendum, but the projections with fixing steepness at 0.95 haven't been done yet.

Dr. Belcher: Okay, comments to that point? Okay, continuing on with the motion, I'll put it to the vote. All those in favor of the motion as it stands, raise your hand; all those opposed. Okay, how many people abstain? The motion passes. With that, we will take a 15-minute break.

Dr. Belcher: We're going to get started on the next agenda item, which is the SEDAR 17 review and recommendations.

Dr. Shertzer: Okay, vermilion snapper, and this is the first time the SSC has seen this assessment. This was through SEDAR 17, which just went through the review workshop a little over a month ago. What I will be presenting is the assessment data, stock definition and life history, the landings composition data and the indices of abundance and then the various assessment models that were run, catch-curve analysis, surplus production, catch reduction analysis and then the base model, which was a statistical catch-age model which is really the one that I will focus on for the presentation, and a little bit on projections.

Okay, to start the data, in this case the stock definition here is defined from east of the Florida Keys to the North Carolina/Virginia line, just as most of the snapper groupers are defined in the South Atlantic. The natural mortality rate, as before, was based on the Lorenzen Age-Specific Curve and was scaled to the Hoenig estimate. In this case the Hoenig estimate was 0.22.

The sensitivity runs of the model, we used a lower value of 0.16 and a higher value 0.28. This is a plot of size at age, length at age; and along with it – well, the central values were treated as input to the assessment through a von Bertalanffy curve. What is shown here are estimates of the variation in grown from the model with an estimated CV of 0.21 constant across ages.

You can see from this that there is a lot of variation in size at age in vermilion snapper. And if you were just to take a slice, say, at the current size limit of 12 inches, that size could easily be any age, and this was used in the assessment from 1 through 12. In terms of reproduction it is a gonacharistic species. The spawning is from April through November with peak spawning in July. The assessment assumed that spawning occurred at the midpoint of the year.

Almost all females were treated as mature; 80 percent of the age one females were mature and all of the rest of the females were considered mature. Fecundity was estimated based on fork