GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

STANDING & SPECIAL REEF FISH, & SOCIOECONOMIC SCIENTIFIC AND STATISTICAL COMMITTEES

WEBINAR

June 1, 2020

STANDING SSC VOTING MEMBERS

Joseph Powers.....
Lee Anderson.....
Luiz Barbieri.....
Harry Blanchet.....
David Chagaris.....
Benny Gallaway.....
Bob Gill.....
Douglas Gregory.....
Jeff Isely.....
Walter Keithly.....
Kai Lorenzen.....
Camp Matens.....
James Nance.....
Will Patterson.....
Sean Powers.....
Kenneth Roberts.....
Steven Scyphers.....
Jim Tolan.....

SPECIAL REEF FISH SSC VOTING MEMBERS

Jason Adriance.....
Judson Curtis.....
John Mareska.....

SPECIAL SOCIOECONOMIC SSC VOTING MEMBERS

Jack Isaacs.....
Andrew Ropicki.....

STAFF

Jessica Matos.....Document Editor & Administrative Assistant
Ryan Rindone.....Fishery Biologist - SEDAR Liaison
Carrie Simmons.....Executive Director

OTHER PARTICIPANTS

Kevin Anson.....GMFMC
Matthew Smith.....NOAA

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TABLE OF CONTENTS

- - -

TABLE OF MOTIONS

PAGE 59: Motion that the SEDAR 67 Gulf of Mexico Vermilion Snapper assessment is considered the best scientific information available and is suitable for management advice. The stock is not overfished nor undergoing overfishing. The motion carried on page 59.

PAGE 60: Motion that the OFL is the yield at F SPR 30 percent and the ABC equals OY is the yield at 75 FSPR 30 percent and for constant catch for the years 2021 to 2025, OFL and ABC in millions of pounds, whole weight, are: OFL is 8.60 million pounds and the ABC is 7.27 million pounds. The motion carried on page 65.

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The Standing and Special Reef Fish and Socioeconomic Scientific and Statistical Committees of the Gulf of Mexico Fishery Management Council convened via webinar on Monday, June 1, 2020, and was called to order by Chairman Joe Powers.

INTRODUCTIONS AND ADOPTION OF AGENDA

CHAIRMAN JOE POWERS: Good afternoon. My name is Joe Powers, and I welcome all of you as the Chair of the Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council. We appreciate your attendance on this webinar and input in this meeting.

Representing the council is Kevin Anson. Council Staff in attendance are Ryan Rindone and Jessica Matos. Notice of this meeting was provided to the Federal Register, sent via email to subscribers of the council's press release email list, and was posted on the council's website.

Today's meeting will include the following topics: Adoption of Agenda; Approval of Minutes from the March 11, 2020 Webinar; the discussion of the Scope of Work; selection of the SSC representative for the June 15 to 19, 2020 Gulf Council meeting, which is a virtual council meeting; a review of SEDAR 67; and Other Business.

This webinar is open to the public and is being streamed live and recorded. A summary of the meeting and verbatim minutes will be produced and made available to the public via the council's website.

For the purpose of voice identification and to ensure you are able to mute and unmute your line, please identify yourself by stating your full name when your name is called for attendance. Once you have identified yourself, please re-mute your line. To signal you wish to speak during the meeting, please use the raise-your-hand function, and staff will display your name. Please remember to identify yourself before speaking and to also re-mute your line each time you finish speaking. Thank you. Do we go through you and ask people to identify themselves, Jessica?

MS. JESSICA MATOS: We're going to go ahead and call attendance.

CHAIRMAN POWERS: Okay. Thank you.

MS. MATOS: Lee Anderson.

DR. LEE ANDERSON: Here. Lee Anderson is here.

MS. MATOS: Thank you, Lee. Luiz Barbieri.

DR. LUIZ BARBIERI: Luiz is here.

MS. MATOS: Thank you, sir. Harry Blanchet.

MR. HARRY BLANCHET: Harry Blanchet, Standing SSC.

MS. MATOS: Thank you. Dave Chagaris.

DR. DAVID CHAGARIS: Dave Chagaris is here.

MS. MATOS: Thank you. Benny Gallaway.

DR. BENNY GALLAWAY: Benny Gallaway is here.

MS. MATOS: Thank you. Bob Gill.

MR. BOB GILL: Bob Gill is here.

MS. MATOS: Thank you. Doug Gregory.

MR. DOUG GREGORY: Doug Gregory is here.

MS. MATOS: Thanks, Doug. Jeff Isely.

DR. JEFF ISELY: Jeff Isely is here.

MS. MATOS: Thank you. Walter Keithly.

DR. WALTER KEITHLY: Walter Keithly is here.

MS. MATOS: Thank you. Robert Leaf. I don't believe he has joined. Kai Lorenzen.

DR. KAI LORENZEN: Kai Lorenzen is here.

MS. MATOS: Thank you. Camp Matens.

MR. CAMPO MATENS: Camp Matens is here.

MS. MATOS: Thank you. Jim Nance.

DR. JIM NANCE: Jim Nance is here.

MS. MATOS: Thank you. Will Patterson.

DR. WILL PATTERSON: Will Patterson is here.

MS. MATOS: Thank you. Joe Powers, we know you're there.

CHAIRMAN POWERS: Joe Powers is here.

MS. MATOS: Thank you. Sean Powers.

DR. SEAN POWERS: Sean Powers is here.

MS. MATOS: Thank you. Ken Roberts.

DR. KEN ROBERTS: Ken Roberts is here.

MS. MATOS: Thank you. Steven Scyphers.

DR. STEVEN SCYPHERS: Steven Scyphers is here.

MS. MATOS: Thank you. Jim Tolan.

DR. JIM TOLAN: Jim Tolan is here.

MS. MATOS: Thank you. Now from the Reef Fish SSC. Jason Adriance.

DR. JASON ADRIANCE: Jason Adriance is here.

MS. MATOS: Thank you. Jud Curtis.

DR. JUDSON CURTIS: Jud Curtis is here.

MS. MATOS: Thank you. John Mareska.

MR. JOHN MARESKA: John Mareska is here.

MS. MATOS: Thank you. Socioeconomic SSC, I have Kari MacLauchlin Buck, and we were told she is absent. Jack Isaacs.

DR. JACK ISAACS: Jack is here.

MS. MATOS: Thank you. Andrew Ropicki.

DR. ANDREW ROPICKI: Andrew Ropicki is here.

MS. MATOS: Okay. Our council liaison, Kevin Anson.

MR. KEVIN ANSON: Kevin Anson is here.

MS. MATOS: Okay. That concludes the attendance.

CHAIRMAN POWERS: All right. Thank you. Now we have the Adoption of the Agenda, and there is one additional item under Other Business, and Michael Drexler wanted to spend a few minutes as a public comment under Other Business, and I agreed to do that, and so, with that change, do I hear a motion to adopt the agenda as amended?

MR. RYAN RINDONE: Joe, I have one more thing.

CHAIRMAN POWERS: Okay.

MR. RINDONE: We sent you guys a doodle poll for a webinar on June 29, to talk about a NOAA procedural guidance document for changing assessed stock status from known to unknown, and just to talk a little bit about that and let you guys know when that webinar is going to take place.

CHAIRMAN POWERS: Okay. Thank you. All right. Bob Gill, do a have a motion to adopt the agenda as amended?

MR. GILL: So moved, Mr. Chairman. Thank you.

DR. NANCE: I will second.

CHAIRMAN POWERS: Okay. Thank you. **If there is no objection, then the agenda is adopted.** The next agenda item is Approval of the Verbatim Minutes and the Meeting Summary from March 11.

APPROVAL OF VERBATIM MINUTES AND MEETING SUMMARY: MARCH 11, 2020 WEBINAR MEETING

MR. GILL: So moved.

CHAIRMAN POWERS: To approve the minutes. Is there a second?

DR. NANCE: Jim Nance seconds.

CHAIRMAN POWERS: All right. Any objection to approval? **If not, the minutes are approved.** We're moving quickly here. Now the Scope of Work.

We basically have one major agenda item, and, Ryan, do you want to just mention -- It's pretty much outlined in the scope of work document that you gave anyway, but, Ryan, can you just briefly talk about it?

SCOPE OF WORK

MR. RINDONE: Sure. Thank you, Mr. Chair. The main purpose of this webinar is to review the SEDAR 67 standard assessment of vermilion snapper. We decided to do this via webinar to try to spread the workload out a little bit, both for council, SERO, and Science Center staff, as opposed to just having everything stack up at that July webinar.

You guys will review the presentations of the model and the results of the projections, and Matt is going to walk you through all of that information and how he arrived at his conclusions, and you guys will recommend any modifications that you think might be appropriate.

You will then determine whether the assessment represents the best scientific information available and inform the council of stock status, based on status determination criteria, and Carly Somerset has provided the background document that was sent around to you guys to help frame that a little bit. You also determined whether the assessment is suitable for providing management advice to the council, and, if so, you will make recommendations to the council about the overfishing limit and acceptable biological catch.

You guys can consider annual and constant catch yields, and Matt has provided you the information to make either of those decisions, and then, lastly, you guys will take a look at the stock assessment executive summary and provide any feedback, and, again, the point of the stock assessment executive summary is to serve as a much shorter and easier digestion of the larger stock assessment report, and its primary users are a very wide group of people, which include NMFS and council staff and interested stakeholders. Mr. Chair.

CHAIRMAN POWERS: Thank you very much. That is our marching orders. Moving on then to Agenda Item IV, Selection of SSC Representative for the June Council Meeting, and this is a virtual council meeting, and, Ryan, the SSC representative is only going to be required to be online for one day, and is that correct?

SELECTION OF SSC REPRESENTATIVE FOR THE JUNE 15-18, 2020 VIRTUAL GULF COUNCIL MEETING

MR. RINDONE: Yes, Mr. Chair, that's correct. It's just on June 16.

CHAIRMAN POWERS: Does anybody have a great desire to do it? I am watching closely to the raised hand thing. If not, then I will go ahead and do it, if that's acceptable. All right. Then Agenda Item V, which is the crux of this, is SEDAR 67, and so we'll have a presentation, and why don't you get set up with that, and, also, recalling what Ryan just said, what we're really trying to do is to review and then make the standard set of recommendations that are typically done. This is the presentation of the SEDAR 67.

REVIEW OF SEDAR 67 - GULF OF MEXICO VERMILION SNAPPER STOCK ASSESSMENT
ASSESSMENT PRESENTATION AND STOCK STATUS DETERMINATION

DR. MATTHEW SMITH: Everyone is looking at the cover slide for the stock assessment, just to make sure we're on the same page. My name is Matthew Smith of the Southeast Fisheries Science Center, Gulf and Caribbean Branch, and I did this stock assessment with the help of Dan Goethel, who has now moved on from Miami to the colder, more mountainous climates of Juneau, Alaska, and so he is no longer with us, but I believe he's still in Florida, because he hasn't been able to drive through Canada yet to get to Alaska, but he's in the process of relocating, but the bulk of this work was done by the two of us, and he moved on late in the process, but he was the vast majority of this, and so we worked together, in tandem, with the entire Sustainable Fisheries Division, to produce this stock assessment.

A few things for me to cover before I get into this, if I can, and number one is, like many people, I have two kids at home, a two-year-old and a five-year-old, and the Smith family team is going to do their best to keep them out of my hair for the next two hours or so, but, if somebody busts in screaming or crying, and I have to mute myself and duck out real quick, I will try to do so as quickly as possible, and I will let you guys know what's happening.

The other thing is that, and this may not be my place to say it, but I've got the microphone, and so I'm going to say it, but we have a new Gulf and Caribbean Branch Chief, which is Katie Siegfried, and I got the official notice from Shannon today, and so I guess we can tell everybody, and so you'll be hearing a lot from her in the coming years and decades, depending on how long she wants to keep the reins, and she'll be primarily responsible for telling you guys no when you request too many sensitivity analyses and things of that nature, but she did really well during her stint as an interim branch chief, and we're all

really excited to have her onboard, and so congratulations to Katie. I look forward to working with you in the future.

I think that's it, and I'm not sure how Joe wants to work questions during this, and my recommendation would be that, as we go along, there's going to be a series of slides that kind of break this presentation up into sections, and each one of those breaks is going to have this picture of fish heads on it, and so, if there are hands going up during a section, maybe, just to keep things flowing and keep me on my spot, if we could hold those questions until we get to one of these blue slides with the fish on it, and that seems like a good spot, a natural breaking point, to maybe go back and address questions that came up in this section.

CHAIRMAN POWERS: Yes, that's a good idea.

DR. SMITH: Okay. Great. Then that's what we'll try to do, and, obviously, if we move on and somebody thinks of something later, by all means, we can go back and review things at the end, and so, without further ado, the SEDAR 67, Gulf of Mexico vermilion snapper, stock assessment.

The first thing, just to sort of set the stage, like Ryan mentioned, this is a standard assessment, which is that ambiguous assessment that falls between an update and the former benchmark, and the main goals here are to update all the data from the previous SEDAR 45 terminal year of 2014 to 2017 for this assessment, to produce a continuity run, where we do our best to replicate what was done in SEDAR 45, with just updated data, and then, in the terms of reference, we were tasked with considering a number of additional datasets and possible changes to the data, which were to reevaluate the effect of the IFQ on commercial indices of abundance, look at including discards, handle the FES adjustment for the MRIP data, take another look at using the combined video survey over one of the individual lab surveys, and then see whether or not we could estimate selectivity for the shrimp bycatch. Once we considered all of those, the task was then to develop a base model and project stock status.

The outline of this presentation is going to move sort of sequentially in the way that we developed the stock assessment model. The first thing we're going to look at is the continuity model, and we will look at the data for that, the model fits and results, and then we'll move on to the base model, and we'll address any changes to the continuity data, and we'll do a more in-depth look at model fits and results for the base model than

we will for the continuity model.

If, for some reason, at the end of this presentation, we want to go back and seriously consider the continuity model, we can look at the fits for that in more detail at that point, if it's the request of the committee. Then we'll do the results, model diagnostics for the base model, and then we'll get into the projections.

The continuity model development and the data, life history, and, again, because this is a standard and not a benchmark, we didn't have to go back and re-address everything, and so, for the life history, we did not. We maintained continuity, which, in this case, means everything from SEDAR 45 was used in SEDAR 67, for all of the life history parameters in the assessment.

Then, just kind of as a review, we will look at those quickly, but, like I said, none of these changed, and that's just to refresh everyone's mind, because SEDAR 45 was quite a while ago.

Length and weight, the assessment was done in fork length and using whole weight, and the conversions are shown here. There's fairly tight fits for both. Age and growth, age and growth was estimated externally to the stock assessment model, and we are starting to dabble with the concept of doing this internally in SS, but, for SEDAR 67, as in SEDAR 45, the growth curve was estimated externally, using a censored method to account for the minimum size regulations, and then these parameters were fixed in the stock assessment. The coefficients of variation for this were also fixed, and I don't have those parameters listed here, but they were inputs and fixed in the assessment.

Fecundity and maturity, this is a highly productive species, the vermilion snapper, and, again, we used everything from SEDAR 45, and the top-left graph here is showing you the proportion mature at-length, and over to the right of that is batch fecundity at-length, and then there was an estimated spawning frequency of eighty-two spawning events per year, and so the lower-left-hand panel is showing you the number of eggs in millions by weight per year, and then the bottom-right is the fecundity at-age, and this lower comparison is just showing 45 and 67, and they're the same now, but a highly-fecund species, and, again, these are all carryovers.

Natural mortality, we used a Lorenzen function for natural mortality, with the mean of the target natural mortality rate of 0.25 for this species, and we see this in a lot of the Gulf and Caribbean assessments, where we sort of prorate the age-zero

mortality to account for, in this case, an assumed middle-of-the-year birthdate, and the new SS 3.30 has some additional flexibility built into it, where we no longer have to assume a January 1 birthdate, and so this may be something we get away from in the future, but, again, in the spirit of the standard assessment, we mimicked what was done in SEDAR 45 for both the continuity and the base model. We kept that January 1 birthdate assumption and then prorated the age-zero natural mortality, and so we basically just cut in half from what would be estimated from the Lorenzen function.

Commercial fisheries data, for the continuity model, we have recent landings, historic landings, and composition. As noted at the bottom, discards were evaluated in SEDAR 45, but they were not included at that time, and so, for the continuity model of SEDAR 67, discards are again not included.

For all of these things, we just updated the time series from the terminal year of 2014 to 2017, and the historical landings for the commercial fishery were left unchanged, because there wasn't any readjustment to these landings, like we'll see for the recreational, where we had to make some adjustments to the historic.

Taking a look at the commercial landings now, we only ended up using handline landings in SEDAR 45, again for continuity, as well as in the base model, and that decision was carried forward, and so the longline and other sources of commercial landings are not included in the assessments, and they are extremely small, both in absolute terms and in relative terms, and they do not represent a significant portion of the removals, and so they weren't included here.

The only major difference, which you can see on the screen, is, in 2014 -- In 2014, there was an issue during SEDAR 45, where our data analysts determined that Florida had not completed a quarter yet in the ALS database, at the time that those data were pulled, and so, right over here, especially in the eastern Gulf of Mexico, you can see this difference in 2014. You can see that difference between 2014, the SEDAR 45 value in blue, and the SEDAR 67 value in red, and that was due to the fact that some of those Florida landings had not been recorded in 2014, during SEDAR 45.

West handline landings are on the right plot, and the Y-axis for this is the same, and so what you're looking at is comparing apples-to-apples, in terms of the magnitude of the landings.

Commercial east composition, the top-left shows the bubble plot of the age composition for the vermilion snapper caught by the commercial east handline fishery, and over on the right are the sample sizes by year that make up those distributions, and then, down in the bottom-left, we're showing mean age by year.

Two things jump out from this. Number one is, in the bubble plot, I highlighted a couple of cohorts. It's always promising to see, in age composition data, that there are signs of cohort strength coming through, and that helps a lot, in terms of estimating recruitment events further down, as we get to the modeling portion, and the other thing to take note of here is, sort of in the bottom-right quadrant of this plot, there's a lot of sort of large bubbles coming in, and there is quite a bit of evidence, throughout the stock assessment model, that the recent couple of years, and, by recent, I mean 2017, 2016, and 2015, and so not necessarily recent from where we sit right now, but recent in terms of data years for the assessment model, but there was a pretty strong pulse of recruitment going on, and that will show up in these other bubble plots for the other fisheries that we look at shortly.

We see a sort of decline in the tail-end of the mean age of the fish being caught, and the way that I have interpreted that, from looking at the information available to me, is not that we are fishing down the population, or overfishing to the point where the older fish are being removed and now only the younger fish are remaining, but rather what we're seeing is an influx of young fish coming into the fishery, and, because these animals grow so quickly, relatively young fish can become selected by any number of these fleets at a relatively young age, and so we'll see similar plots to these for the other two fisheries, and just to highlight those two points.

Without further ado, commercial west is the same layout. Here, the commercial west seems to have a strong year class in 2012, and it didn't necessarily stand out in the east, but, by and large, it's the same story. There's fairly robust sampling for both those commercial fisheries, in terms of being able to estimate age composition, and, again, a reduction in mean age in the last couple of years.

Moving on to recreational, again, we're still in the continuity model development, and so I've highlighted these two things in red here, just to make sure that I remembered to let you know that these differ from a true continuity model. The SEDAR 45 was done using APAIS-adjusted MRIP data, prior to the FES calibration taking place, and it was still using the Coastal

Household Telephone Survey, rather than the Fisheries Effort Survey.

We were not, and didn't ask, for our data providers to provide us the recreational data in both formats, and they have a lot to do without doing that for us, and so they provided the data to us with the FES-adjusted data, which is the best available data that we have, and it's what is being recommended for use in all of these assessments going forward.

For the recreational fishery, in the continuity model as well as in the base model, we had to use the FES data, rather than the MRIP data that was available at SEDAR 45. Because we used the FES landings, we had to also update the historic landings to account for the changes in the FES data, because they were no longer starting from the same point, and, therefore, the historic landings had to start from a different point as well.

Here we see the recreational landings. The large plot on the left shows landings in thousands of fish on the Y-axis, and year on the X-axis. The SEDAR 45 values are shown by the blue line, and the SEDAR 67 values are shown in the red line. Now, the biggest takeaway here, and this is common with the FES adjustments that are taking place, is that the FES-adjusted data suggests that more fish were landed that were historically thought to be removed.

Beginning in 2015, when the new data kicks in, we also see another thing taking place in the vermilion snapper fishery, which is this rapid expansion in recreational landings over the last three or so years, or I guess really the last two years, two data years, for recreational fishing.

If we move over to the right-hand side, the east and west breakdown is shown in the top-right panel. Again, landings in thousands of fish are on the Y-axis, and, here, the eastern Gulf of Mexico is the purple line, and the west is the yellow line, and so you can pretty clearly see, from this, that this is largely an eastern Gulf of Mexico fishery, and pretty much all of the removals are coming out of that section of that Gulf, and, just as a reminder, the eastern Gulf of Mexico, at least for the purposes of the modeling, is divided at the Mississippi River, using the old shrimp statistical grids.

Below that plot, we see recreational landings by mode. Here, the charter boat is shown in blue, and the private fishing is shown in red, and the headboat fishery is shown in green. Again, it's thousands of fish on the Y-axis, and you see a

pretty steady uptick in landings in all of these fleets occurring over the last roughly five years or so, ten years, of the data, with the private fishery becoming the predominant source of recreational removals.

Looking at the age composition for the recreational landings, again, just like commercial east and commercial west, this 1999 to 2006 year class seems to stand out, and the recreational is more like the commercial east than the commercial west. Again, it shows this kind of muddying of the waters over here in the last couple of years, and, just like we saw with the other ones, there is a declining sort of mean age composition in those last few years. It's relatively robust sampling, especially in the later part of the time series for the recreational age comp, and that's it for that.

Shrimp bycatch is another one of the sources of removals for vermilion snapper, and there are two components to that, the shrimp effort and the actual bycatch itself.

Again, for any new members of the SSC, this is an annual approach to the shrimp bycatch, and the same thing will be done for the base model, as well as the continuity, but, rather than try to fit the individual annual estimates of shrimp bycatch removals, we calculate the median value of that time series, and then we use the shrimp effort, which is better estimated, to guide the magnitude of the removals, and so an annual value will be estimated for shrimp bycatch removal in the stock assessment model, but it will be a product of this median estimate from the actual bycatch data and the annual effort that produces that removal.

Here, we are looking at that effort time series, and the SEDAR 45 value is shown in blue, and the SEDAR 67 value is shown in red, and they match up fairly well throughout the entire time series, and these values, both in 45 and 67, have been reweighted, and that was done to try to scale the effort of this to the observed distribution of vermilion snapper from the SEAMAP groundfish survey, and so, basically, if the bulk of the vermilion snapper are occurring in the eastern Gulf of Mexico, we're going to use the information of where the vermilion snapper are and match that to the effort data, or reweight it to the effort data, from the shrimp fleet, to try and paint a better picture of where the actual effort is taking place for vermilion snapper. The same methodology was used in both SEDAR 45 and 67.

Shrimp bycatch, the estimates differ quite a bit, and I do not -

- I thought I understood what was going on, but I went back and read through some working papers, and I am not 100 percent convinced that I know the exact reason why these two ended up differently.

I had thought that it was the changes in methodology, and that may not have been the case, and it may have come down to a data issue, but I wanted to put that out there, in full disclosure, but, with differences between 45 and 67 -- They may not have been due to methodology. We had two general approaches to doing this, one that Jeff Isely had been doing for us using WINBUGS, and then one that Xinsheng Zhang had been doing for us with sort of a generalized linear modeling approach.

Jeff had done the bycatch for SEDAR 45, and we had Xinsheng do the bycatch for 67, and so I originally thought that these differences came down to the methodology, but that did not appear to be the case in the working paper.

Either way, the most important part from this bycatch time series, like I spoke to earlier, comes down to the median value that came out of them, and, in this case, the SEDAR 45 median that was used for the super-year was this 3,367,500 fish, and this is in thousands of fish, or the SEDAR 67 super-year is shown here, and these two medians don't differ by very much.

Basically, it's making the fact that these individual annual estimates being different -- They don't have much influence at all over how shrimp is fit and the influence it has in the model, and it comes down to this median estimate to come out of it, and so, while there may be some differences here, the difference is the median is slight, and it doesn't represent a major departure from what was done in 45.

Indices of abundance, the SEDAR 45, as well as the continuity model here, included commercial vertical line indices, and this is split east to west, and, for the continuity model, we have a pre and a post-IFQ period, and so it runs the whole time series, with those being split at 2007, and that is to account for the red snapper IFQ.

There is not an IFQ in place for vermilion snapper, but, at the time, during SEDAR 45, there was concern that changes in red snapper fisher behavior might also influence vermilion snapper, as they might shift effort off of red snapper and onto vermilion, depending on available IFQ to them, and so the presence of red snapper IFQ was considered at that time, and it was again considered for the continuity model.

There is a headboat index split east to west, and there's an MRIP, or the private charter, recreational index, and this was updated for the east only, and it was east only in SEDAR 45, and then, again, it uses the FES data, because that's what was available at this time, and, in SEDAR 45, this would have been done with the MRIP data.

There is also a larval survey, and the SEAMAP summer groundfish survey is in the eastern Gulf of Mexico only, and then there's a video survey, and, in SEDAR 45, the combined Panama City, Pascagoula, and FWRI surveys were considered, but they were rejected in favor of the SEAMAP survey only, and so, for the continuity purposes, we only used the SEAMAP survey as well.

Taking a look at the indices, these are the commercial fits, pre-2007, and nothing is changing, and that's all historic data, and you wouldn't expect anything to change there. Post-2007, the introduction of some new data causes some differences in fits, and some different trip selection and factors were selected in the generalized linear model approach to standardizing these indices, which accounts for the difference that you see in the most recent part of the time period.

Again, like the other slides, SEDAR 45 is shown in blue, and SEDAR 67 is shown in red, and here are the eastern indices on the left, and the rest of the indices are on the right, and they're both fairly flat, and they're not all that informative. However, the eastern index does pick up an uptick in the latter part of the time series that does not show up in the west, which was somewhat interesting.

Now we're looking at the headboat index. Again, SEDAR 45 is in blue, and SEDAR 67 is in red. The top-left is the eastern Gulf of Mexico index, and the bottom-right is the western Gulf of Mexico index, and there's not a lot of differences there. Once again, this eastern Gulf of Mexico index picks up a large uptick in estimated relative abundance, going from 2016 to 2017, that does not appear to show up in the west.

Moving on to the private charter eastern-only index, again, the large-scale differences here, especially going back historically, are due to the fact that now the SEDAR 67 run, shown in red, is using the FES-adjusted data, as compared to the SEDAR 45, shown in blue, which was using the MRIP Coastal Household Telephone Survey data.

Still, despite the shift in data, trends are largely the same,

suggesting an early steep drop-off in the late 1990s, and then gradually building, and, again, there is some evidence of an uptick in the last couple of years for the eastern part of the Gulf.

The larval index is little changed from SEDAR 45, with the exception of a few additional years of data, and the larval index, in terms of its use, is an index of spawning stock biomass, and we don't try and fit a selectivity or anything for this, but it just gives us an indication of SSB, and that was true for the continuity as well as the base that we'll see later.

The SEAMAP summer trawl survey, there is very little change here, with the exception of a few additional years of data, and it's a relatively flat index coming from the SEAMAP summer trawl in the eastern Gulf of Mexico, and the SEAMAP video survey, and, with this one, there are noticeable changes. The main difference between these two model fits were that SEDAR 67, shown in red, had some additional variables included in the standardization process, and there was a habitat indicator variable that was included in this go-round that was not available or included in the SEDAR 45 fit. Also, there were some additional variables in the standardization process that are largely responsible for the differences you see here.

The video survey, again, it seems to show a lot of these indices, and we'll go over this in-depth as we go through this whole presentation, because it's a major underlying theme of this stock assessment, but it's a large positive trend in relative abundance over especially the last data year, but certainly within the last couple of years of the time series.

Then, finally, length composition for the surveys, and the SEAMAP summer groundfish uses length composition to estimate selectivity, and the SEAMAP video also uses length composition for estimating selectivity, and both of those were updated.

Shown here is the combined plot, and there's not a lot that you can take out of these, in terms of cohort strength, necessarily, but the general take-home is these scales are not the same. The video survey, by and large, selects for larger fish, and it's picking up larger fish than the SEAMAP summer groundfish survey. Here is one of those stopping points that I mentioned, if there are any hands raised, and, otherwise, I will move on.

CHAIRMAN POWERS: Are there any questions or comments? If not, then let's move ahead.

EXECUTIVE DIRECTOR CARRIE SIMMONS: Mr. Chair, I did have a quick question, and I was going to let the SSC ask first, if I can.

CHAIRMAN POWERS: Of course. Go ahead, please.

EXECUTIVE DIRECTOR SIMMONS: Matt, on page 14 of the assessment report, it says Monroe County MRIP landings are included in the Gulf of Mexico vermilion snapper estimates, and is that a typo? Were you able to find that out for us?

DR. SMITH: Thanks, Carrie. I got your email, and I did some looking into it myself, but sections of the report there are written up by the data provisioners, and I reached out to Vivian, to try and hunt down what was going on there, whether that was just carryover from a previous working document or whether that was actually true for vermilion, and I agree with you guys that that was not the case in 45, and I don't know that we did specific requests that it be the case for 67, and so I am in the process of finding that out for you, but I, unfortunately, don't have an answer right now.

EXECUTIVE DIRECTOR SIMMONS: Okay. Thank you so much, and then one other quick question. On the calibrations, is it true that they can go all the way back to 1981? I thought the calibrations could only go back to 1986 for the MRIP FES recreational landings. Thank you.

DR. SMITH: We do see differences in -- I mean, there are MRIP data going back to 1981, and I believe they are adjusted, but, again, that is a data question, which I do not 100 percent know the answer to, but, based on what I'm looking at here, they appear to have been adjusted as well.

EXECUTIVE DIRECTOR SIMMONS: All right. Thank you. I don't think they were calibrated back for red grouper to 1986, but we will check on that, for consistency. I mean, past 1986.

DR. SMITH: I will look at that as well. I will pull up my documents here and make a note.

CHAIRMAN POWERS: If there are no other questions, then you can proceed then, Matthew.

DR. SMITH: All right. Great. Thank you, Joe. Like I said, if stuff comes up, we can obviously go back and look at things. All right. That was the data review, and a lot of that stuff

will be the same once we get to the base model, but there will be specific changes that we'll go over once we get to that point in the presentation, and so the continuity model configuration. This model is set up from 1950 to 2017. The commercial data begins in 1963, and the recreational data begins in 1981, and the shrimp effort time series begins in 1950. For the commercial and recreational data, those are extrapolated back to 1950, and so they basically start from zero removals at the beginning of the time series and then build their way up to the data, which starts at these years.

It's a one-area, one-season model. We do have some east and west, and there's a commercial east and west fleet in there, but those are sort of areas which are built in to allow for differences in selectivity, rather than a truly spatially-structured model, and so we have a one-area model here for vermilion.

The continuity model is landings only, and discards were considered in 45, but not included, and so that was, again, the case for the continuity model. We have a combined gender model, and SSB is handled in number of eggs. A Beverton-Holt spawner-recruit relationship was used, with all parameters estimated, and this was a recommendation that came out during SEDAR 45, and it freely estimated all the stock-recruitment parameters, to allow maximum flexibility at model fit.

The thinking on that has changed and evolved through time, and so a slightly different approach has been taken in the base model, but, for continuity's sake, all parameters were, again, freely estimated. Age-based selectivities were fit for all the directed fleets, with a time block on the commercial east and commercial west, and that time block fell at 2007, to again account for the red snapper IFQ being put into place, in case there were any changes in how the fleets were operated, based on the IFQ coming in.

Length-based selectivities were used for the SEAMAP trawl and video survey, and those were estimated, and the shrimp fishery had a fixed selectivity curve for it.

Two things took place in this process, or two main steps in the buildup to the continuity, and they also carried over to the base model. The first one was just switching from SS versions, and this is sort of a wonky thing, but it had to be done, and it had to be talked about, was moving from 3.24 SS to SS 3.3, and there are major changes to the interface of the stock assessment software between those two, but the underlying mechanics should

have been largely unchanged, and so we were tasked with transitioning from 3.24 to 3.3, with the hopes of seeing little to no change in the model performance, which is what's being shown here.

In this top-left panel, SEDAR 45, this was the base model run from SEDAR 45 that's in blue, and then it's transitioning that to SS 3.3, and that's in red, and there is very little change taking place here, in terms of spawning output. As far as the depletion estimates over here in the top-right, they are identical, which is what you would hope to see, and they are virtual identical estimates of recruitment as well.

Some of the wiggle that starts to show up here in the end of the time series has to do with terminal years and forecasting, and so differences occur when the model starts forecasting recruitment, as compared to when it has data to inform it, but, for those years when there is data to inform recruitment, again, the two things performed almost identically, which is what we wanted to see.

The next big thing is moving from the Coastal Household Telephone Survey to the FES data, and those are shown here. On the left panel, we see the 3.3 run in blue now, and so this was the transition run to SS 3.3 from the previous slide in blue, and now we take that model, and the only thing we changed is adding the FES data to it, and we get the red model, and so the big take-away from that is that using the FES landings from the recreational fleet causes an increase in the estimates of spawning output, and it causes an increase in the estimates of recruitment, shown over here on the right-hand slide, and this is not wholly unexpected. We have seen similar things in other assessments where the FES data has been used.

It also makes some intuitive sense, that, as removals in the model are ratcheted up substantially, part of that process is going to be increasing perceptions of recruitment, to make more fish to be taken.

Down here, in the table, we get a look at some of the stock spawner-recruit parameters from the two runs. The SEDAR 45 3.3 run is in the left column, and the FES-adjusted is in the right column, and so, overall, estimates of productivity, in terms of this R0 that is virgin recruitment, didn't change between the two, and estimates of variability remained about the same, but the perception of steepness differed quite a bit between those two, which is likely what accounts for these changes in recruitment estimates.

In terms of what the continuity model looks like, as far as just general outputs, and, again, like I said at the top of the presentation, if we really want to go and dig into the continuity model in-depth, we can later, but this is just kind of as a summary of the continuity model.

The blue line is the SEDAR 45, and this was the base run from SEDAR 45, the accepted stock assessment model, and the red line, again, is the same thing with 3.3 and the FES-adjusted data, and then the green line is now the continuity model, which is building off the red model, with all the datasets updated through 2017 and then a reweighting process put in place to balance out composition indices and landings data and to reweight those data inputs.

For the most part, up here in the top-right, when we look at basically depletion, our SPR for these different model runs, we see, in the blue, where SEDAR 45 left us, which was just above the SPR of 0.3, back in 2016 or whenever we wrapped that up. Had we had the FES-adjusted data available to us at that point in time, the red line suggests that it would have painted a much rosier picture of stock status back at the end of SEDAR 45, but then, with some additional years of data and the reweighting with the green line, we get a scenario where, historically, it matches up quite well with SEDAR 45, and then we see this dramatic increase in biomass being estimated in the last couple of years of the model, and that ties into sort of the recruitment that we hinted about in looking at the age composition and things that we'll see in much greater depth as we move along.

Down at the lower-right-hand panel, we see recruitment from those three models, and the colors are the same. Blue is the 45 base model, and the green is now the fully-updated continuity model, and here it becomes pretty obvious where that spike in biomass is coming from, and that is the 2015 and 2016, and you can't really see the 2016 as well, because it's kind of in this downward slope, but 2016 is also a large recruitment event that the model is estimating with those additional years of data.

This recruitment spike was the source of a lot of investigation internally and within the review panel, as the assessment was being developed, and there were a number of decisions made that we'll go over about that, but just keep that in mind as we go forward. Any questions on the continuity model at this point? Okay. I'm going to keep going, and, if they come up, obviously, ask later.

Moving into the base model, and, again, sort of like I said at that top of the presentation, the TORs, there were a couple of things we were tasked with examining in development of the new base model, and all the data, for the most part, was the same, with a few notable exceptions.

For the base model, we ended up going with the combined video survey, and we'll look at that in-depth in the coming slides, and the commercial indices of abundance were truncated at 2007, and so that post-IFQ period was not included, and this is something that's been done for a number of other assessments, including red snapper, that we have worked on, as well as a number of other ones, and it hinges from the fact that, in the presence of the IFQ, we have yet to come up with a good explanation of how to effectively account for that in standardizing that index for abundance, because it changes the way the fleets operate, and it makes it very difficult to interpret what the indices are telling us.

Rather than feed in suspect, or possibly errant, information, the general approach we've taken is to truncate the commercial index, and we're also considering moving away from our fishery-dependent indices in situations where we have robust fishery-independent indices as well, but, for this case, those commercial indices were truncated.

Then, finally, and this is the big one we'll talk about, discards were evaluated in-depth, and the final decision we came up with, internally and through the panel, was to include discards in the model, but to not fit them, and I'm sure that's confusing, and, hopefully, by the time we're done with this presentation, it won't be confusing anymore. Finally, new survey data were evaluated, but they were not included.

The first thing in the list is the combined video survey. In the top-right panel here, just to orient you to those surveys, we see the geographic coverage of the three different video surveys. The Pascagoula SEAMAP survey is shown here in blue, handling, by and large, deeper waters, and this is what was used for the continuity in SEDAR 45, and that is the video index that was used in those models.

The Panama City video survey is up here in red, primarily in the Panhandle region, and then the FWRI survey is down here in green, working nearshore, as is the Panama City area nearshore, to some deeper offshore waters.

The video survey index comparisons, over here on the left side of your screen, and here are the Mississippi Lab's, and this is the continuity model in blue, and the combined index is in red. There are a lot of annual differences between them, but, by and large, the trend is relatively stable, with one noticeable exception occurring here in 2016, where the combined video survey picks up a massive spike in abundance that isn't necessarily reflected in the continuity model.

We had a lot of discussions about this, as you can probably imagine, and part of the story that led the panel to eventually settle on using the combined video survey is shown over here in this table on the right, and these are the individual surveys, individual indices, and the annual values for those indices.

Here, in 2016, we see the FWRI, with the time series high index value of 13.8, roughly, and that same incredible spike also shows up in the Panama City data, at about 13.2. Again, it's a time series high, and a time series high by a lot, and it's not even close. We have two independently-operated surveys picking up an estimate of the same spike, and the difference between those two, as I sort of touched on up here in the top right, is the depths in the areas that they spend most of their time surveying.

These two handle inshore areas, and so we would expect to see smaller, newly-recruited vermilion snapper, as compared to the SEAMAP survey, which is working in deeper, offshore areas. The general feeling is that, in 2018 and 2019, which, when we get a chance to look at that data, we'll be able to test this hypotheses, is that we would expect to start to see some of this biomass that surged in the nearshore areas start to show up in the Pascagoula, in that SEAMAP survey, and we do see an uptick in that last year, but it's not as dramatic as the upticks we saw in the nearshore area, and so it's possible, in another year or two, as these fish age and move offshore, that waiting here in the shadows, in 2018 and 2019, is a big surge in biomass in that SEAMAP survey as well.

This obviously has repercussions in the assessment model fit, when you put information like this into it, and so it's not something that we took lightly, and the fact that those pulses continue through 2017 -- They are lower, but there are still massive amounts of biomass coming through both of those nearshore surveys as well. That just provided further evidence to convince the group that this was not an error, and this was not a single cell, or a couple of cells, count that showed up in one survey, and it had some weird values that threw the whole

thing off, but these represented a broad and widespread phenomenon that was occurring in these nearshore areas.

Part of using the combined video survey, and this has been a tripping point with it in other surveys, is there's a very well worked-out approach to combining these surveys, in terms of the data for the index, and the length composition is the part that always creates the hang-up, and that is, when we combine these surveys into one index, we need to estimate essentially one selectivity for them, and, if we have three different surveys that are surveying three dramatically different populations, with different length compositions, we didn't have a good way, necessarily, of approaching combining this information, and so, before we decided to move to the combined video survey, we had to explore length comp.

Here in the top-left, we see the combined, and this is all the different length data from all three surveys, the distribution for that, and then we start to break it out by survey. On the top-right, all three of the surveys are shown, and you can see, pretty quickly from looking at that, that there is general agreement between Pascagoula and Panama City, with Panama City being a little bit more selected for smaller fish, but quite a large disagreement with FWRI, where it sort of stands out on its own and is very clearly sampling much smaller fish.

One of the things that became interesting, as Kevin Thompson and others over at FWRI looked into this data, was that the breakdown in these surveys seemed to fall more along north and south, rather than individual labs, and so, down here in the lower-left, we see the lengths from the north, Zone 5, and so you've got all of Panama City, and then you've got Pascagoula there, that occurred in the north, and then, over here, we see the lengths from the Zones 5 south, which is all the FWRI data, and the Pascagoula south data.

We can see that the Pascagoula survey especially, which, when you compare it to its full distribution up here, is picking up much smaller fish in the south than it is in the north, and it more closely aligns with the FWRI data.

This didn't become critical, in terms of standardizing the composition, but it was interesting, and so I thought I would include it, just for something for you all to think about, that, as least in the case of vermilion, there appears to be some north and south stratification by size going on as well. In terms of actually bringing the composition together into one functioning length comp, we ended up using a statistical-model-

based approach, something that John Walter had developed, and it had been applied in some other situations, but it had not been considered before in vermilion snapper, and that is included in SEDAR 67, Working Paper 16, and so, for anybody who wants more information on the nitty-gritty of this process, it's laid out in great detail in that working paper.

Essentially, it uses the model-based approach to kind of standardize the length comp, and, in the final model, we have factors for year, reef type, depth, latitude, and data source, and so pretty much everything that was fed into it was significant, and, by and large, the predicted length frequency was similar to the observed, with a few differences popping up in the early years, when only the Mississippi data was available, and there are some differences, as well as in the later years, where those recruitment peaks came in.

This is the fits from that process, shown in black, and each of these plots is the observed data. Shown in blue is the model-predicted data, and so, like I said, by and large, there's a lot of general agreement. However, we do see the 2015 and 2016, and also 2014, where we have age-recruitment events that are occurring, and the observed length comp is a lot smaller than the model thinks it should be, and it doesn't really have a good mechanism for accounting for those recruitment spikes in there. We had a few differences early on with the models, where it's just the Mississippi Lab data.

After a review from the panel internally, everybody was comfortable moving ahead using this combined length comp that came out of the standardization process, as well as the combined video survey, because that's what was done for the base model.

When we looked at the effects that has, just a quick overview of this, and we'll get more into the base model fits later, but just a quick snapshot of what kind of effect the video survey decision has on things, and, over here on the left, and on the right, this continuity model is now shown in blue, and the red line shows the combined video index, and, again, the continuity model is just using the SEAMAP-only index, and that's something that came up during the assessment webinars, was, well, what happens if you don't do the video index at all, and so we did a run with no video index, to see what that would look like, and that is shown here in green.

As you would expect, you put up an index that suggests there was a time series high, and time series high, you can see over here, as being, I guess, not generous enough, but an unprecedented

recruitment event that you see increases in biomass come along with that.

What's interesting, at least to me, is that, when we did the run with no video index, and so, over here on the right, we're looking at estimates of recruitment, and, when we remove the video index entirely from the continuity model in blue to no video index, the drop in the estimated recruitment in 2015, and this is 2015 here, this big spike, which is the biggest one that the model is picking up, and it barely changes at all, which was comforting to the assessment team, because what that suggests is that this estimate of recruitment is not just being driven by the index, but it's broad-based, and, when we went and dug into things like the annual age composition and length composition and really get in there and look at them, you can see these young and small fish coming through in all the composition data, as well as in the other indices, which we kind of had a glimpse of before. That information helped convince the panel to be comfortable going ahead with the combined video index as well.

Moving on to discards, a couple of things happened with discards. There has been a change in the methodology used to estimate commercial discards, and that has occurred in a number of the assessments that you would have reviewed recently, and I think the earliest was red grouper, but I believe it's been used in other ones since, and that has become sort of our best approach at estimating commercial discards, and so it was used again here. Like I said at the top, these were included, but not set, and we'll get into that in great detail shortly.

Length composition for commercial discards was available from the Coastal Reef Fish Observer Program, but it was somewhat sparse, and, from an examination of the data, there's not a lot of discarding of legal-sized vermilion snapper going on, and so, through the panel discussions, we have decided to use knife-edge selectivity at the minimum size limits through time for all of these fleets, and, because we used that knife-edged selectivity, we were fixing it, and therefore not estimating it, and we didn't need this length composition data. It was made available to us, and we reviewed it, and it helped guide our decisions, but it wasn't included in the model.

Recreational discards, like commercial discards, were included, but not fit, and the same story goes for them. We had some data available from the FWRI observer program, and that was used to help guide the discussions, but it was not used to estimate the retention functions. They were fit using knife-edge retention.

To look at this stuff, this is the commercial discard comparison in the top-left, and we've got SEDAR 45 and 67 data here. 45 is shown in green for the east, and 45 west is in purple, up here, and we see 67 east in the blue and 67 west in the red. This has been, at least in all the ones that I have looked at, a fairly common trend, where the new commercial discard estimation methodology has resulted in a reduction from previously-estimated discards, which is saying a lot for vermilion snapper, because previously-estimated commercial discards, as you can see here, and this is in catch in metric tons, we were at sixty to eighty metric tons in the past, which is not a lot of discarding going on, and the assumption, again, and the data supported this, is that, for commercial at least, these are largely regulatory discards, and coming down even from those to now generally much smaller discards for the west.

The magnitude of these discards was a big driving factor for why they ended up not getting fit, which we'll talk about again once we get to the specifics of that. Recreational is over on the right, and, again, we're looking at thousands of fish discarded for recreational, and SEDAR 45 is in yellow, and SEDAR 67 is in blue, and the major differences here are the switch from the Coastal Household Telephone Survey to FES data for the landings, which is influential in the discards as well. As more fish are landed, you would expect there to be more discards, and that pans out here.

Like the landings, you saw that big spike in the later part of the time series, the recreational discards, and that reflects an increase in discarding as well.

Like I said, discards are very low in comparison to the landings, and what we're looking at here now on the left, again, is commercial, and on the right is recreational, and so, now, instead of having SEDAR 45 data in this green and purple, we have the landings for the commercial fleet, and so landings east is green, landings west is purple, and the discards we've got here on the bottom. Again, discards east is in blue, and discards west is in red, and so, for the commercial fleet, discarding is basically not happening, except in cases where fish are too small.

Over on the recreational side, here in the yellow we see the landings for all the fleets combined, and the raw discards, and then dead discards are in red, with an estimated discard mortality rate of 15 percent, and so the total discards, again, are quite small, and not as small as commercial, but then, once you factor in a discard mortality rate of 15 percent, the

removals from discards by the recreational fleet are estimated to be quite small.

The formulation for the discards, like I said, we had this composition data, and here we're seeing some histograms of the composition data that was made available to us to help guide our decisions, and over here in these bullets are the different minimum size limits. For commercial, we had an eight-inch through 2005, and it went up to eleven inches from 2005 to 2008, and then back down a ten-inch. It's a similar story for the recreational, with a slightly different timeline on these early shifts, but these were used to block the retention functions with knife-edged selectivity, based exactly at these minimum size limits.

Now the real fun stuff as to why these were included, but not fit. I guess we'll start here. The discards were included with a CV of 0.3, and so, right off the bat, we put them in as our least reliable source of data. For the landings, we had a CV of 0.05 for the commercial data and 0.15 for the recreational data, and that's become fairly standard practice, in terms of where we set those data sources, because the commercial stuff is coming from the logbooks, and it's much more closely followed than the recreational data, which is estimated, and there is estimation in both, but we have more faith in the commercial data.

Indices, and, again, this has become somewhat standard practice, at least with myself, is to use a CV of 0.2 for the indices, but we allow annual variability to occur, and they are just normalized around a mean of 0.2 for that CV, and so if, early in the time series, there is little data, and the original estimates of standard error were quite large, and later in the time series they get tight, we still capture those dynamics, but they center around 0.2 instead of whatever else they were originally estimated at, and that's to put all the indices on an equal footing, rather than have one like commercial index, where there is tons of data, and we would have very small standard errors estimated, and it would just totally drown out a fishery-independent indices, where there was less data.

We do this to put them all on the same footing, but we allow interannual variability, and then the initial CV for discards was 0.3, and so we tried to give the model as much flexibility as we could, or we've given it more flexibility right off the bat, and it did a poor job of fitting the discards, and what happened when we tried to fit the discards were a number of things.

The first one was it degraded the fit to the catch data, and it creates issues in selectivity, which you can see panning out over here in this lower panel, and this historic selectivity, rather than being sort of asymptotic within reason, becomes incredibly small, and it's doing all of these backflips to try and fit the discards, which are smaller than it wants them to be.

Then, down here in this table, which is a lot to look at, and the individual numbers in this table are not really all that important, but it breaks down the component likelihood coming out of the SS runs for a number of different attempts that we made, to try and coerce discards into this model.

The continuity model is shown here on the left, and then, as you kind of build through, we have the combined video, and then we add discards and the continuity, and you can see immediately that the likelihood just goes through the roof, and it struggles to fit them, and the same thing with the combined video and discards.

We did another run where we up that CV from 0.3 to 0.5, to try to give the model even more wiggle room to miss the fit on the discards, and we still see almost a tripling of the likelihood from our base, which is less than desirable, and then, finally, over here on the right, we have situations where now we've included the discards, and we haven't fit them, and we get, as you expect, basically back to where we came from, because we have taken all the tension out of the model.

On this slide, we can see the effects of discards, especially in the recreational fleet, and this is when we were trying to fit them, and what it does to the catch data. The blue here, and this is true for all of these plots, and we have recreational up here, commercial west on the top-right, and commercial east is on the bottom-right.

The blue line shows the expected catch coming out of the model when discards were included, and the orange is expected catch without discards, and then the gray is the observed catch, and we typically fit the catch data pretty tightly. It's our best available data, and we want to try and fit that as well as we can, and the deviations you can see here in the recreational from the observed catch, and so, again, gray is observed, and this expected catch with the discards just are not palatable, and, from the previous slide, in terms of the age composition, we can see these dramatic misfits, especially in the commercial fleets, where it's trying to -- It wants is to be more small

fish, so they can discard more small fish, but they just aren't there.

Dan and I spent quite a bit of time on this individually, as well as with the panel, and, through the panel discussion process, the eventual solution we came up to was that we wanted to include discards, because they provide a number of things, and having them in the model allows the model to, even if they're not fit, it allows the model to estimate discards, and it allows them to kill discards through discard mortality rate, so that we will account for this removals in the stock assessment, but fitting them, or trying to fit them, the negative tradeoffs from trying to fit them was just too much to bear, and so it came down to either don't include them, and therefore don't account for those removals, or include them and allow those removals to be accounted for, but not fit them, and so that's the path that we ended up taking.

From here, we can see the results of those decisions. The blue line on both of these slides shows the SEDAR 67 continuity model against spawning output, and this is basically SPR on the right. Combined video now, with no discards, is in green, and the combined video with discards, but not fit, is in red.

Like you would expect, by including discards, but not fitting them, you wind up fairly close to your continuity model. Excuse me. You wind up close to your combined video model, and so this is kind of the base step-one, and this is now the combined video model in green, with no discards, which you can clearly see over here on the SPR side, and those two line up almost exactly what you would expect, because those discards aren't being fit, and the two continuity models, with or without discards, line up almost exactly, because they're not being fit.

Once we get down to some model fit slides, we will see, in much greater detail, how the model ended up fitting the discards, the magnitude that it estimated, as compared to the observed values.

Then, last but not least, and this will be relatively quick, and I'm sure we'll get some questions on the previous stuff, and so we'll get to those shortly, but the IFQ CPUE truncation -- Like I said earlier, the reason for the truncating is sort of momentum at this time, and it's a decision we've made in a number of assessments, as well as the fact that we just haven't solved the puzzle, if it's even solvable, or whether it's worth the time to solve, on how to fully understand the IFQ and what those indices mean when we're trying to fit an index of relatively abundance based on fishery-independent removals in an

IFQ system.

Fortunately, the decision to remove those post-IFQ commercial indices has almost no impact on the model. The red and the green, again, are the combined video index, which is sort of the -- The red and the green represent the base that we're building off of. Here, the green has the post-IFQ, and the red has the post-truncated, and there is no difference, and the continuity model is shown in blue and yellow, and there's a very slight difference in those, but, again, it's only really in the terminal year. Otherwise, there's almost no difference in making that decision.

With our misgivings about using it in the first place, combined with the fact that removing it has little to no effect on the perceptions of biomass, we decided to go ahead and truncate that index. Then these were some of the datasets that were presented to us, and there's a repetitive time-drop drop survey with length comp from FWRI that we looked at, but it wasn't included, and then a vertical line survey as well, and the same thing. It was considered and not included. With that, we get to a break point, and I will take any questions on those data topics, if there are any out there.

CHAIRMAN POWERS: Any questions? If not, then, Matt --

DR. SMITH: Okay. Moving on.

MR. RINDONE: Joe, I don't know if you want to offer folks a couple-minute break or something like that.

CHAIRMAN POWERS: All right. We'll take a five-minute break. Matt, how much longer will the presentation be, roughly? Will be another forty-five minutes or something like that?

DR. SMITH: Yes, probably. We're a little over halfway through.

CHAIRMAN POWERS: All right. Let's take a five-minute break. We will come back in five minutes.

DR. SMITH: Okay. Sounds good.

(Whereupon, a brief recess was taken.)

DR. SMITH: Base model configuration, in the interest of time, we'll talk about the things that are different, and so everything here is the same as in the continuity model, unless it's highlighted in red. Down here at the bottom, we see that,

for this run, we end up fixing the recruitment variation at the profile minimum of 0.3. Fixing this is not uncommon in assessments, and we ended up taking this tack here as well.

A couple of changes for the fishing fleets, and we had landings only before, and now, obviously, we have those minimum-sized-based discards, with the observations not fit, and the negative log likelihood is set to zero from the discard data. For the indices, we replaced the SEAMAP data with the combined video. For the dependent indices, we get rid of the commercial east and commercial west post-IFQ index, and we also ended up dropping the time block on the commercial east and commercial west.

Then, for the discards, we had to add these retention functions, with blocking for the minimum sizes, and discard mortality, and that was fixed at 0.15 for all the fleets, with sensitivity runs that were done to explore sensitivity to that assumption.

Quickly, here we're looking at the time blocks, and the top shows what those selectivity curves look like with the time blocks in place, and you can see here, for the east, on the top-left, there was almost no difference when we estimated selectivity with that block in place, and there was a slight difference in the west, but not really that substantial.

Removing those time blocks, it's the same story as the other ones we looked at, in terms of the comparisons. The red and the green here are sort of the ongoing base model, and the green is with the blocks and red is no blocks, and the yellow and blue are the continuity model, blue with the time block and yellow no time block, and we can see, which is not unexpected, that pulling that time block out has basically no effect on the model. It doesn't change anything, and so we got rid of the time block.

Discard mortality sensitivities, we have a high mortality run, with discard mortality rates set at 0.5 and the base run with 0.15, and, as you would expect, as you kill off more fish, you would increase the discard mortality, and the model responds by basically increasing recruitment, and it generates some more fish, but, by and large, the model is relatively insensitive to the discard mortality rate, and that relates back to the fact that discards were extremely small for commercial and not that great for recreational as well.

For the final base model, we ended up using this discard mortality rate of 0.15. There are also very few studies on discard mortality rate for vermilion snapper, and it's an area

that could be potentially explored further, using independent research. Any questions about that? Probably not, and so I'm going to keep moving.

These are model fits, and here they're fits to the landings, and commercial is shown on the left, commercial east in black and commercial west in red. The CVs for these were tight. Like I said, 0.05, and so you would expect them to fit well, and they do, and, for the recreational data, we had the one combined recreational fleet, and observations of the dots prediction is the line, and the CV for this was not quite as tight, and so there is some wiggle room, but, by and large, the fit is fairly good.

Shrimp bycatch, this blue line shows the median value through the observed values for shrimp bycatch and the fit to the effort time series. It gets a little loose in the middle, but, by and large, it tracks generally well with the data.

Getting into index fits, here now we're dealing with both the pre-IFQ commercial indices fits, and they're not the greatest, but they're also not the worst, and, for a lot of these index fits, there's not a lot to say about them, and so I'm not going to waste a lot of time stumbling over them. We'll just kind of go through them and let you know what you're looking at, and we can look at them and discuss if there's any questions at the end.

The recreational CPUE fits, the two headboat indices are down here on the bottom, headboat east on the bottom-left and headboat-west on the right, and the private charter fit is on the top, and these fit fairly well.

The headboat index fit, these are sort of linked. They are different areas, but they're working off of the same selectivities, and so this fit in the west, where it's missing in these most recent years, is being driven by the data in the east, suggesting that it should be going up, but they seem to be capturing, to a certain extent, this increase in biomass that we have seen throughout the latter part of the time series.

Now we have the fishery-independent surveys. The combined video index is up on the top, and the groundfish survey is on the bottom, and the larval index is on the bottom-right. The fits to these are not great, but they are -- The most important of them being the fit to the combined video index, where this uptick in relative abundance and the uptick in the index is driving the latter part of that index fit.

This is sort of a collapsed fit to the age composition. By and large, the model fit the age composition fairly well for all of our fleets across all years, and here are annual breakdowns of that data. There is a general lack of trend. The only noticeable trend, and this was evident in SEDAR 45 as well, was a bit of a misfit in commercial west for a few years, but, by and large, there were no overly messy patterns in the residuals for the age composition.

Length compositions are, again, similar to the age composition, a fairly good fit, as seen on the left side, and there is no real trend in residuals, as shown on the right side. I am going to pause here for any questions on indices, or we can just wait until the end, if that's preferred.

CHAIRMAN POWERS: Why don't you go ahead, Matt?

DR. SMITH: Okay. Model results, shown here on the left is fishing mortality and harvest rate, and this is in total numbers killed over exploitable numbers, age-one plus, and we see that harvest intensity has increased historically, peaking in the late 1990s and early 2000s, and then dropping off in the more recent part of the time series.

Historically speaking, the largest source of mortality is estimated as being the shrimp fleet, as shown in the right-most plot, with the recreational fleet becoming the predominant source of removals in the more recent part of the time series. Here, the recreational fleet is shown in yellow, shrimp in red, commercial east in blue, and commercial west in green. The recreational fleet is really becoming the predominant source of removals for vermilion snapper.

Selectivities, once we removed the time blocks in the commercial, there were no selectivity time blocks in the final model, and it was constant selectivity throughout the whole thing, and we've got the shrimp on the left here, age-based selectivity, and the shrimp fit is this kind of teal line that spikes at age-one and then drops off to zero selectivity by age-four, essentially zero by age-three, but a little bit -- The recreational fleets, headboats, and the one commercial fleet is essentially hidden.

Commercial east is largely hidden behind this yellow curve and is asymptotic at a younger age than commercial west, which is shown by the blue diamond curve, which is somewhat selected for older fish, and we saw that in the age composition earlier.

Length-based selectivity is over here on the right for the two surveys, and, again, like we saw in the bubble plots earlier, the video survey estimated selecting the larger-sized fish than the SEAMAP survey as well.

Here we get to look at the commercial discard fits, and so, like I mentioned before, observed data is shown in the bubbles, and model fits are shown in the blue, and we did not constrain the model to try and fit the data. That being said, it ended up overestimating for both fleets what we thought the discards should be, due in large part to the very low nature of the discards, but those misses, at least for the commercial fleet, were not that great.

Scale was something to consider, and here we're in metric tons, and we're looking at between zero and 150 metric tons, at the max. In the early part of the time series, the observed discards were almost nothing, and the estimated ones were similar, twenty-five metric tons or so, with some more substantial discards for the commercial east in the latter part, but, again, it's still a fraction of what the landings were.

Commercial west, the scale is important here, and we range from zero to thirty-five, at the high end, and, again, it's a misfit for these to the high side for the model. One, there would be more discarding than was observed, and that's what it estimated, but the magnitude was small for those.

One of the things that came up in the exploration of the commercial discards especially, is that there is some evidence historically, and maybe not so much recently, but, historically, there was some records in the data, the observer data, of undersized fish being kept for bait, which may help explain some of these incredibly low estimates of discards back in the pre-2005 time period.

That is a research recommendation that came out of this study. By the time we got to the point where we were digging through the data and realized those baitfish were in there, it was too late to go back and reassess, and the number of bait observations were not so large that we were convinced that it was going to totally solve the problem.

It's going to be for the next assessment, and I will probably still be around for that one, and so I'll make sure it gets looked at when we get to the next vermilion assessment, but it's something that we need to keep in mind, especially with the

commercial discards to consider.

Recreational discards, the same thing. By and large, the model wants there to be more fish being discarded for recreational fleets, especially in the later part of the time series. The misses are fairly large, once we get further out here in the plot, but that is what it is. We didn't try to force it to fit the data.

Moving on to recruitment, we'll start over here on the right, which shows the spawner-recruit being available to fit the curve, and this is a pretty standard Gulf of Mexico stock recruitment curve, which has the quintessential shotgun blast, followed by the flat line going through it, and so, like most of our other assessments, we conclude that this is not really reliable for estimating a good stock recruitment model fit, which leads us away from using MSY-based reference points and towards proxy reference points, which we'll get into at the end, for the stock status part of the presentation.

Estimated recruitment is over here on the left, and the data, essentially, for estimated recruitment runs out to this 2015 datapoint, and that means the ones shown in blue are forecast data, and there's a little bit of age composition for 2016, but, as a general rule, when we're fitting this stuff, we don't try to use the data that estimates recruitment right up to the terminal year, which would be 2017, because we don't have the composition data to inform them at that point, and so we back it off a couple of years. In this case, we back it off three years and stop the estimation at 2015.

Again, like we saw in the video survey and some of the other slides, we have pretty standard kind of cyclical recruitment going on, periods of high and low recruitment, and, in the latter part of the time series, we are in a general period of higher recruitment, on average, with a few exceptionally strong year classes thrown in.

Stock status, it's good news for vermilion snapper. Overfishing is not occurring, and the stock is not overfished, and the model did estimate that there was a period of overfishing in vermilion snapper from 1992 to 2004, but, based on the current definition of MSST, the stock has never been overfished, and we see a drop in biomass briefly below the biomass SPR of 30 percent from about 1997 to 2005, shown here by the points in this sort of orange section, but where we are now is very good territory for vermilion snapper, and a lot of those gains are based on those 2015 and 2016 year classes coming into the exploitable biomass.

We're getting close, and I will just keep moving, and we'll come back and talk about this stuff at the end, and this is looking at some model diagnostics. Over here on the left, we're got a contour plot of steepness and sigma R, and these two parameters are highly correlated, and so Dan and I have taken the general approach of trying to profile them together, to get a better sense of the interaction between the two, and so we see the minimum, this minimum likelihood trough, and the dark blue is the lowest likelihood area.

It's quite broad. When you dial down into it, the minimum falls sort of down in this lower part of that trough, which is why we ended up settling on 0.3 as our fixed sigma R, like I pointed out at the top of this section, and the steepness values for that is -- Once you fix that within a fairly small window of likelihood profile, you more or less fix your steepness as well, which is one of the dangers of fixing these stock recruitment parameters, but it puts a reasonable steepness estimate for a species like vermilion snapper, which is pretty highly productive.

Up here in the top-right, we see the R0, the virgin recruitment, profile, and it's fairly well defined and pretty well estimated, in terms of the minimum for it occurring at around 27.3 million fish, and, like I said, these two steepness invariants are highly correlated, but we believe we're in a good spot, and just to consider that higher steepness values are certainly plausible, and, like I said over here, this minimum likelihood plateau ranges from steepness in the 0.9 range down to the 0.7 range, and so it's certainly likely, or possible, that we could have higher estimates of steepness for vermilion snapper in the future, future assessments.

Retrospective analyses, there's no pathological trends in the estimates of spawning output. Removing the two large year classes, 2015 and 2016, we basically see those go away with the two blue lines, and there is some change in the model fits as we peel off those recruitments, and one of the things it does is it tries to introduce more recruits historically, once we get rid of those big events, but certainly in spawning output, from the retrospective perspective, there is no pathological trends to worry about.

Jitter analysis, all of the components are over here on the left, and this is sort of a zoom-in on total over here on the right, and we used a jitter value of 0.2, which has become a fairly standard practice for us, and the model is relatively

stable. There is some correlation in recruitment parameters, which is not unusual, as well as some tradeoffs between the life comp and the age comp.

This large spike is essentially a non-convergence issue, when we had perhaps our catch fit extremely poorly, as compared to the normal catch fit, probably interacting with discards, which in this case would be the shrimp fishery, but, for the most part, the jitters didn't give us any hesitation over the model, and it's fairly stable.

One of the other diagnostics we do is to jackknife the different indices, where we go through and systematically remove them one-by-one, or sometimes in batches, and, in this case, we did a run where there was no video index, no SEAMAP index, no larval index, and so we removed all of the fishery-independent indices one-by-one, and then we also did a run where we pulled out all of those fishery-independent indices, just to see what the effect of dropping those was.

As we can see, the only real difference comes with the video index, and, by and large, the indices are all in agreement. If we remove the video index completely, and we saw this when we reviewed the video index, it brings down the estimates of recruitment in 2015, up here in the top right, and it also brings down the estimates of spawning stock biomass, over here on the left.

Other than that, the different runs were largely in agreement, and so the video index is a strong driver in this case, but, like I hopefully got across earlier, we spent a lot of time during the assessment webinar process going over this, and we realize that it's a strong driver, and we agreed that using the combined video index was still the best way to go, despite the influence it was going to have over stock status and the perception of the stock and available yield.

Then, just to sort of look at how the continuity model versus the proposed base model line up, here is the -- Again, like the other comparison slides, the blue and the yellow are the continuity model runs, and the green and the red are the base model runs, and the main difference, again, is coming from that recruitment pulse.

Historically speaking, the continuity model, up until around 2012 or 2013, lines up almost exactly with the new proposed base model, and the only real divergence is in these last couple of years, largely driven by the big recruitment events.

Moving on to the forecast, because the stock-recruitment relationship was weak, this was done using SPR 30 percent as our proxy, and we calculated those based on a hundred-year projections, and we assumed equilibrium over the last ten years, and so all the values that we got for the proxies came out of the last ten-year averages from those long-term projections.

MSST, minimum stock size threshold, for this species is set at 0.5 times the SSB proxy, and then, for the projections, we fixed all of the recruitment at the geometric mean from 2005 to 2014, which was done intentionally.

In general practice, like I said before, just from looking at the recruitment, we don't typically trust the last couple of years of data all that much, because we don't have strong composition for them, but, here, we also made the intentional step of excluding the 2015 year from the recruitment estimates in the projections, just because, while we strongly believe there was a recruitment spike that occurred in 2015, and probably another big recruitment event in 2016, and we don't have any real doubt that that event happened, but the magnitude of it is probably still likely to change.

When the next assessment comes around, we'll have a much more in-depth look at the age composition from those two cohorts, and we'll hopefully have a strong estimate of their magnitude, but, at this stage, we thought it was prudent not to use that big spike in calculating this mean for recruitment in the projections.

Here we have a table of the parameters in the projection setting. Relative Fs for the fleets were the average from the last three data years, and selectivity was the terminal year estimate, and, again, there was no blocking, and so there was nothing to be concerned about there. Recruitment, like I just described, was the mean from that time period, and it came out at twenty-one million, or almost twenty-two million, fish.

Shrimp bycatch, as is pretty standard practice for us by now, where we take the average mortality estimated from the model for shrimp bycatch in the last three years, and we fix that throughout the entire projection time period, so that, as the model scales up and down the directed fleet, to achieve your target, it is not going to scale up and down the shrimp bycatch fleet, because it doesn't seem logical to assume that changes in how the directed fleets operate would necessarily affect how the shrimp fleet operates.

2018, 2019, and 2020 landings, unfortunately, we had 2017 terminal year for this, and it was right before the cutoff for 2018, but we had finalized landings for 2018 that were available to use in projections, and so those were used, and they came in at 4,840,000 pounds whole weight for all of the fleets combined, and then, for 2019 and 2020, we have to do some gap filling.

Here, in this presentation, we have three-year averages used to fill those, from 2016 to 2018, and Ryan Rindone did help get me access to the 2019 provisional landings, but I didn't have time to run forecasts with them at this point.

Based on a quick overview of them, they were in the general ballpark of these assumed landings, possibly a little bit less than these, which means that any projections done with those, if they do turn out to actually be less than the ones that were assumed, it would mean that there is more biomass going forward, and the yields and the ABCs and the OFLs that we look at would potentially be slightly higher, having used the actual 2019 provisional landings, than the ones we're going to use with these assumed landings.

Uncertainty, this is always an issue in the models, and we are trying to, to the extent possible, develop our stock assessment models to incorporate as much uncertainty as possible, and that starts from the data on up, but there are a number of fixed parameters that are still being input into these, and, every time we input a fixed parameter, we remove a certain amount of uncertainty, and so things like natural mortality, the stock-recruitment parameters that we ended up fixing, the growth parameters, and there is a number of them that get fixed.

Every one of those decisions removes some uncertainty, and a part of that process, and this was certainly the case during SEDAR 45, is, by the time you get to the projections, the amount of uncertainty being forecasted through the yield does not appear to be robust enough to support the use of a P*, and that is not a decision for me to make. That's a decision for the SSC to make, but, being aware of what we did in 45, where we opted not to use a P* approach for setting ABC, we again provide similar alternatives to what we have done in the past, which was using 75 percent of FSPR 30 percent as the basis for ABC, rather than a P* approach.

Projection results, mortality rates -- Again, all values are in harvest, and these are harvest rates, which age-one-plus killed over age-one-plus abundance, and the equilibrium FSPR 30 percent

came out at about thirteen-and-a-half percent could be removed annually.

The optimum yield run, which was 75 percent of the directed fleet F, as opposed to the optimum yield run, that came out to 0.115, and so, if you do the math -- Anybody out there with a calculator who does this will see that this is not exactly 0.75 percent, or 0.135. Again, that's because this optimum yield constraint is only applied to the directed fleet and not the bycatch fleet, and so it doesn't come out exactly at 75 percent of FSPR 30.

F current, this is just the terminal year, 2017, and, down here, I was informed that now we're starting to look at geometric means more for the last couple of years, in terms of stock status, and, for vermilion, when you do that, it's almost identical to the terminal year of 0.76, which is about 56 percent of MFMT, or 0.75, which, again, is 56 percent of MFMT for this stock, and so we are clearly not overfishing, and the model suggests we're not overfishing by quite a bit.

In terms of the biomass metrics, SSB is in number of eggs, and here we have the SSB FSPR 30 percent estimate, and MSST, which as I said before, is just 50 percent of that SSB. The optimum yield SSB is slightly higher, SSB0, SSB current, and then where the rubber really meets the road down here in the rations, SSB current over the SSB proxy, and it's 1.75, well above one, and SSB current over MSST is 3.5, way above one, obviously, suggesting that we are also not overfished.

Then the SSB current over SSB0, or our depletion level SPR, came out at about 0.52, and, again, we're shooting for 0.3 in this stock, and so all of the metrics coming out of this, in terms of F and biomass, suggest that we have room to fish, and that is reflected in these yield tables that we're going to get to now.

Here I've got the first ten years of the forecast, showing the recruits, and, like I said, this is fixed at that value throughout the entire projection time period, which has risk associated with it long term, because, if for some scenario we were to fish biomass way down in these forecasts, recruitment would not respond, and it would stay high, and so there are those dangers. It's less risky in the short-term timeframe for this, and so, here, we're just considering this ten-year window.

Over here, we see the forecasted SPR starting up relatively high, 0.55 in 2021, and then declining as we fish the stock down to our target of 0.3. OFL is listed here, and then ABC is

listed here, and this ABC is based on the P* approach, and, like I said, we saw the same thing in SEDAR 45, and you can see that just kind of visually by comparing these two, and the buffer allotted by using the P* approach for ABC is relatively tight, and it does not leave a lot of wiggle room between those two values.

Optimum yield runs, inputs are all the same, and recruitments are all the same, and the only difference here is that, as we fish the stock down, we are no longer approaching our target of 0.3, as we're not fishing at that full FSPR 30 percent, and we're fishing at a slightly reduced amount.

Because we're fishing at a reduced amount, the forecasted yield and the optimum yield run is also less, all intuitive results, and we have some summary tables at the end that we'll look at again when it time to discuss, as a committee, recommendations, if we get to that point.

Another thing that I did as I was developing these, because this -- If anybody is familiar with the current regulations, the current yield, the current quotas, and what we were suggesting coming out of some of these previous slides, is that they're quite a bit different, and there's a number of things working to make them so different.

The first is the FES landings factors, and I wanted to explore how just the data itself adjusted this, and so I did a couple of runs, and shown here in the table is kind of a summary of those results. This top line is the SEDAR 45 result, and this is the foundation of the current catch advice.

This next line is sort of a hypothetical, and it's based on SEDAR 45, if we had been using FES values instead of the Coastal Household Telephone Survey values, and what would our advice look like at that point in time. Going through that run, we find that the equilibrium yield coming out of that was 5.19, and so quite a leap up from where it was with the Coastal Household Telephone Survey numbers.

Then the last line is the SEDAR 67 base model, which we just went through, and that winds up at 5.91, and so the difference between this middle row and the last row is those additional data years and the inclusion of those big recruitment events, and so there is a large amount of recruitment coming in, and it's responsible for a lot of the sort of ski slope, and we'll talk about this quite a bit at the end of the presentation, but, from an equilibrium standpoint, despite the fact that these

values are quite a bit higher than what we were saying was sustainably harvestable back in SEDAR 45, a big chunk of that difference comes down to a data shift, and a smaller, but still substantial, chunk comes down to changes in productivity that come about from some additional data that we have available to us.

We're in the home stretch, and this is just to recap on the important things that changed. The first was the migration from SS 3.24 to 3.30, and we'll now be using 3.30 for this, until such a time as Rick puts out 3.40, and then we'll transition to that. The next big one was the transition to FES MRIP data, and that resulted in noticeable, but expected, increases in estimates of SSB and recruitment and stock status.

Then we added the discards, included but not fit, and we switched over to the combined video index in favor of the continuity, which was a big driver, in terms of near-term yield estimates, and we truncated the commercial CPUE time series, and then the projections underestimated uncertainty, requiring these alternative methods to account for our uncertainty buffer.

The stock is in a good spot. Again, in a plot shown here by 2017, we are well within the green, not being overfished, and overfishing is not occurring, and, the last couple of years, and this is just sort of to fill the gap between 2017 and the terminal data year and 2020, which we're in now, the F is not estimated to have gone up, and it's basically been flat, and SPR is estimated to have continued to increase since our last data year, to where we are now, which results in our stock status being even further into the green than we are here in 2017.

This is getting into something that came up from a question that Bob Gill sent to me last week, which was trying to make sense of these big yield spikes that we see in our stock assessments, and so these are fairly common, and they come out of most of our stock assessments, and shown here on the right is the results from this one that we just looked at, SEDAR 67, and then down here on the bottom is the SEDAR 61 projections, which was red grouper, which will be familiar to a number of you, where, again, we see a stock having a large estimated increase, or potentially large estimated increase, in sustainable yield right out of the gate.

These are two different situations. Vermilion, from the assessment model, appears to be in a very healthy spot, and red grouper appears to not be in a very healthy spot, but we see the same phenomenon, and this has raised a number of questions that

have been lingering around for I guess it's a few years now about whether or not this behavior reflects an error in the projection methodology or something that we should expect to see.

We've had a number of conversations internally, as well as with Rick Methot and others at Headquarters about this, to try and get to the bottom of it, and the basic conclusions that we've come to is that these spikes are not being produced in error, and they come from three main factors that we're going to walk through now, and those are comparing the existing age composition to the age composition at equilibrium, the ratio of current F to FMSY, and then, in some specific cases, we have actually been asking SS to try and solve an intractable problem for us in the forecasting steps, which results in some behavior that we're gradually starting to better understand, but it's still not fully -- We haven't fully come out with a way to address this last issue in a unified fashion yet, but conversations around it are actively underway.

The first thing we're going to look at is the existing age composition going into the projections versus the equilibrium age composition, and, here, Skyler put together this beautiful histogram plot from red grouper, and so what we're looking at right now are SEDAR 61 composition data.

She's got two different scenarios here, sort of the base scenario on the left, and on the right is a scenario where they are excluding some big recruitment deviations. What we see on the left is we start with this top graph, which is 2018, and we compare that to the bottom graph, which is 2,117, and so this is clearly equilibrium age comp, and this is what we get after years and years and years and years of constant recruitment, this nice, well-behaved age composition, and we compare that to where we're at at the beginning of the projections, and what we see are the remnants of a large year class, a couple of large year classes, as well as a new one that's coming into the fishery, and this would be sliding right into highly-selective years for those fisheries.

On the right, when those year classes are removed, or at least some of the more recent ones, you see that big spike, and the five-year-olds up here kind of go away, just to demonstrate this.

Essentially, what that does is, when we have this big cohort moving in, there's a lot more exploitable biomass available to the fishery early on in the projections. When we look at the

impact of this down the road, we can see it, to a certain extent, in these plots, and taking out that big year class doesn't fully get rid of the spike, but it shaves off a bunch of the spikes, and so here we have now retained yield slides, and all these different scenarios are red tide scenarios, which are not pertinent to the discussion right now, but were left over from red grouper, and so this is focused on the red, the base case.

In the base case, when we have that extra year class, these extra five-year-olds in here, we get this steep spike. when those five-year-olds are removed, part of that spike goes away, and there is still some increase, but you can clearly see the effect of popping that biomass out of there, and, once we get to an equilibrium standpoint, everything is smoothed out, but one component of these spikes is the disconnect between existing biomass and equilibrium biomass.

The next component is the ratio of current fishing mortality to the equilibrium fishing mortality, and so here in the top table, and this is the SEDAR 61 output again, red grouper, and down here at the bottom is vermilion snapper, what we were just looking at, and highlighted in the circles is that ratio of F to MFMT, and so, in both cases, you can see that, historically, and this should be expected in a well-managed fishery, or I guess in a managed fishery, is that we were fishing slightly below the FMSY or proxy, and, in some cases, like vermilion, these last couple of years, we're fishing quite a bit below that proxy.

The result of this is that, once we go into the projections, that first year of the projections, we immediately ramp up the F from whatever it has been, and, in vermilion snapper's case, it's about 0.56, roughly 50 percent of FSPR 30 percent, and we immediately ramp that fishing pressure up to FSPR 30 percent, and we hold it there throughout the course of the projections, and so a big part -- Again, here we just focus on the red in this top-left quadrant from red grouper, and a big part of this jump, of this spike, is the fact that we ramp up F quite a bit, and another substantial part of it has to do with the difference between the age composition.

Then the last thing, which was not an issue for vermilion, because we don't have fleet allocation, but it has shown up in some of our other fisheries, like red snapper, which is what we're looking at right now, is that we can't ask SS to old fleet allocation and relative F constant throughout the projections when those different fleets have different selectivities, and when the age composition is not stationary yet.

Over here in these tables is the exploitation from the SS report file from red snapper in the projection years from SEDAR 52, and there's a lot of numbers, and the numbers aren't important, or the specific numbers aren't important, and down here in the yellow are all of the discard fleets, and these are all held constant through the projections, and they behave as they should. All of the Fs for every year are constant throughout the time period.

The directed fleets in red snapper, which we have allocations for, are up here in the top table, and what you can see is that, while they don't change by much, these relative Fs throughout the early part of the time series are changing, and so part of what's happening there is SS sort of has to make a decision. Does it hold the allocation and adjust these Fs, adjust these efforts, to basically compensate for the differences in age comp, those years classes that are coming through and the differences in selectivity between the fleets, and does it abandon the allocation and keep the Fs constant.

Here it is keeping the allocation and adjusting the Fs, and it does so throughout the projections, until, down here after this breakpoint, these are some of the long-term equilibrium projections, once the age composition is stabilized. Once that composition is stabilized, you can see that it no longer has any problem keeping everything constant.

To our knowledge, there is no way to hold all of these things constant in the projections under these scenarios, where you have different selectivities between your fleets and a non-equilibrium age composition, and we haven't yet finalized a best practices, what to do, when we are faced with stock assessments that do have important allocation components to them, and so that is yet to be decided, and expect to hear from us when we do decide, but the important thing is, from the situations that I have looked at where this does occur, the contribution of this component to those spike formations is much less than the contribution of the F to FMSY issue and the age composition issue, and so this part right here is not the major driving factor of the spikes, and it might contribute to it, but it's not the underlying cause.

Now, just to circle this all back around to vermilion, which is today's topic, up here in the left, you see the biomass at-age for vermilion, and the yellow histogram shows the 2017 assessment terminal data year, and here we have the 2015 and 2016 year classes clearly coming in, those big year classes

coming into the stock, and blue, in 2021, is the first year of the projections.

By this point, those two large year classes are now age-five and six, which, when we look over here to our selectivity plot, we see that age-five and six are right in the wheelhouse of being fully selected by all of our fleets, and so this represents a large amount of biomass that is immediately available to all of our fleets in the first year of projections.

Then we also have the situation where the recent F for vermilion snapper is about 50 percent of FSPR 30 percent, and so, right out of the gate, we also effectively double the F that we're fishing at. Combine that with a lot more available biomass, and you get a big spike, until those cohorts get gradually fished out and we settle on equilibrium composition, going forward, and sort of this smooth tail-end of the projections.

Hopefully that is a primer on the spikes, and it helps to put to rest some of the concern about them, and I know that they're not pretty to look at, but, like I said, we've looked into it, and we've had lots of discussions, and we, at this point, don't believe that they occur as a result of an error or a deficiency in the methodology, but rather they're things that we should expect to see in well-managed fisheries, to a certain extent, and the magnitude of them will be partially driven by this disconnect between the existing age composition and equilibrium composition.

This brings me to my second-to-last slide, with only the questions and parting-ways slide left, and I can potentially just leave it on this, if you would like to facilitate the discussion, or we can come back to it, but this is basically the proposed ABC yield streams coming out of this stock assessment through 2025.

We have the OFL, and then, down at the bottom, we have a three-year average, which is the first three years, a five-year average, all five of the years you see here, and then a ten-year average, which includes 2026 through 2030, at the bottom.

P* for this middle ABC column was 0.398, and that was a carryover from SEDAR 45, and this may or may not need to be reconsidered by the SSC, depending on what you decide to do, and then, the ABC at 75 percent FSPR 30 percent, this is essentially the ABC advice, or this 75 percent FSPR 30 was the basis for the ABC advice during SEDAR 45, and so we produced that as well, as well as these average constant catch variants of those.

With that, with a few minutes left for discussion, that wraps up this presentation, and I would like to thank Dan, who I think was listening into this, and maybe not, for all the hard work and for being a good office mate for the last five years, as well as the whole Sustainable Fisheries Division.

Everybody has really taken an active role in all of these things and fostered a collaborative environment over there, and so everybody has a hand in all of these assessments at this point, and a big thanks to them, and so, without further ado, questions and discussion.

CHAIRMAN POWERS: Thank you, Matt. Are there questions and discussion? One of the things that I was thinking of, in regard to the last slide and the question of that spike, is you had made the comment that it was incompatible to fix the ratio, the F ratio, and the allocation, but it would seem to me that the management system was set up in terms of an allocation, and so that should be the driving force, but, again, I understand what's going on there and why it's happening, but my first reaction is the allocation should be the driving force, and is there any discussion?

DR. SMITH: My two-cents on that is that I don't disagree with you. The only problem is in terms of which way SS goes in these projections. To my knowledge, it's not a decision that we get to make from the analytic side. It's basically baked into the software.

Like, taking red snapper for an example, we didn't make a conscious decision to have it go one way or the other. It's just how it internally handles those issues when it's faced with them.

CHAIRMAN POWERS: I mean, I have been aware of those kinds of issues, from a practical standpoint, a lot, and it particularly shows up with recreational, when you're converting numbers into weight and allocating weight and those sorts of things. It really gets convoluted very quickly, but, anyway, that was my point.

As we begin this discussion, there are two different levels of things that we have to deal with. One of them is to rule on best available science relative to the assessment itself, and the other is determinations of overfished and not overfished and overfishing and overfishing and these yield streams, the ABC sorts of things, and so let's begin with the assessment itself

and people's reaction, in terms of the best available science, and, again, I am not looking for motions right at the moment, although, if somebody has one, feel free. The first hand up is Will Patterson.

DR. PATTERSON: I actually had a question about that last slide, the one that's up now, but, if you want to handle this in the opposite order, we can come back to it.

CHAIRMAN POWERS: Go ahead.

DR. PATTERSON: I am curious if Ryan, or anybody else there from the council staff, has what the ACLs were for this fishery in 2018, 2019, and 2020. I appreciate Matt going through this diagnosis of potential causes of what may cause the spike in the first year of the projection and then, as the stock gets fished back down toward the MSY proxy, how that levels off, but I am curious what the ACLs were in those last few years and whether the estimated landings were anywhere close to the ACLs.

MR. RINDONE: The ACLs for vermilion snapper, and, again, it's a stock ACL, because there are no sector allocations for this species, and it was 3.11 million pounds whole weight, and that was based on the equilibrium yield from SEDAR 45, and so, as Matt demonstrated in one of his previous slides, going from CHTS in SEDAR 45 to FES in SEDAR 67 constituted a large proportion of the estimated increase in biomass.

CHAIRMAN POWERS: So it was 3.11 for all three --

MR. RINDONE: Yes, and it's like an equilibrium, where it's not changing, and Dr. Patterson had asked about how we were doing on the ACLs, and I think last year we landed 84 percent. I am waiting on the SERO website to pull up right now, and I can tell you exactly what it was.

In 2019, we landed 83.9 percent of the ACL, and historical landings for 2018 -- In 2018, we were at 103.3 percent. In 2017, it was 91.9. In 2016, it was 76 percent, and this is all on the NMFS ACL monitoring webpage, and so we did have a slight ACL overage in 2018, but we did not have one prior to that, and we did not have one last year.

DR. PATTERSON: Thanks.

CHAIRMAN POWERS: Ultimately, it was operating more or less around the three-million-pound one, right?

DR. PATTERSON: It has to be scaled up based on the FES, right?

DR. SMITH: Right, but that's kind of what I was trying to show in this table that Ryan referenced. That was a big part of the jump from where we have been to where we're going to be, but it's just switching the language that we use to count fish. We can move it to the FES based, and so it's equilibrium and not the OY, which was the basis of that 3.11, and so these numbers are slightly different, but the equilibrium yield from the OFL from that was 3.35, and then, just switching the language, just going from Coastal Household to FES, it bumps that up to 5.19, and so, if we had been, the last couple of years, fishing based on FES numbers, the yield would have been somewhere around five million pounds, instead of 3.11 million pounds.

DR. PATTERSON: Last year, it was 4.8 landed, and so this is one of my concerns, is -- Then we're recommending going -- Not recommending, but the projections are above twelve for the OFL, and so that's two-and-a-half-times greater than what the fishery has been landing, and so this isn't just a small -- I don't remember seeing as large of a spike as this one.

DR. LORENZEN: I am trying to juggle all this in my head, but it seems that -- One of the things that happened was that big recruitment in the last years, and so the model is predicting a really big increase in biomass, among other things, as a result of that, and so the fishery would have taken roughly the ACLs, based on the last assessment, but a lot less than what it could have taken, based on the current assessment, on the new assessment, and I guess that seems to explain the big jump, because then, in the projections, we're going up to basically taking the ABC, right, and that's why we're getting this big jump.

CHAIRMAN POWERS: Yes, that's my interpretation. I mean, that's essentially what Matt's discussion was saying, is that, in terms of the age composition and length composition, it's operating off of those year classes moving through, and so that's another impetus to do that.

It does -- I mean, one of the things that this reminds me, and I think it should be reminded to the council as well, is this is a transitional sort of issue, and, if one were to increase the ABC greatly, there is no expectation that that would actually be maintained. In fact, the expectation is that it would slowly decrease, and so that's an issue that I think the council should be aware of. Ryan, did you want to make a comment?

MR. RINDONE: Yes, Dr. Powers. I just wanted to reply to something Will had said about the last time that we had seen a jump like this, and the last time you guys saw something like this was Spanish mackerel, back in 2013, and Spanish went from something around four million pounds or so to almost thirteen million pounds, and it was under a similar, but probably to a larger degree, situation than vermilion, where there were some strong year classes, and the stock had not been harvested, historically, at F at MSY, and so there was a presumed larger amount of biomass available than the model had predicted would have been, had fishing been occurring at F at MSY, and so there was a large jump in the projections following the terminal year, and so this is something that has been shown before for species that are not undergoing overfishing and are not overfished, and they're actually being harvested at less than optimum yield.

CHAIRMAN POWERS: Thank you. On the list here, the only person I see is Bob Gill, who has the solution to this, I believe.

MR. GILL: Well, Mr. Chairman, you should ignore my raised hand, since my machine puts it up routinely, and I take it down routinely, but so I will pass at this moment, and I do have some discussion later, but not at the current moment.

CHAIRMAN POWERS: All right. Thank you. All right. Is there any more discussion on this item?

MR. BLANCHET: Mr. Chairman, I am going back quite a way, to the assessment itself, and I had a relatively basic question in the assignment of CVs. They used a 0.15 for the recreational fishery, and I'm not that familiar with how precisely FES is estimating the eastern Gulf of Mexico vermilion snapper, but why would not the actual CV around the catch estimate be used?

DR. SMITH: Well, we could, I guess, in theory, use those CVs around the catch estimate. I do not know, off the top of my head, what the estimated ones were, and, when I hop off the mic here, I will look and see if I can pull those up real quickly and get back on and answer that.

The CVs for the data are largely used to weight the individual data components against each other, and those 0.05 and 0.15 have been kind of the standard that we've used for those two components, for commercial fleets and for recreational fleets, for the last couple of years, which is why they are used here as well, and that's what they were in SEDAR 45, but, if there is reason to believe that the FES data is less precise than the Coastal Household Telephone Survey data was, then that's

possibly something that we could revisit at the Science Center level.

To my knowledge, we have not used the actual error for the data for a while, and part of that is a legacy of SS not being set up to accept annual estimates, and so you would have to come up with some kind of average value for those datasets, but I believe that is no longer an issue in SS 3.30, and I'm pretty sure that we can input annual estimates of error, and so I'll see if I can dig those numbers up, just to get an idea of where they fall, in terms of scale, compared to 0.15, but it's definitely something we can take a look at going forward, is maybe going back to using those annual estimates for the landings.

MR. BLANCHET: I am just thinking that we have probably got better estimates of landings of something like red snapper than we do of golden tilefish, but, if we continue to use 0.15 for both of those, maybe we're giving too much credit, in some cases.

DR. SMITH: That may very well be true, and it's a good point, and it's something that, like I said, we have probably shied away from addressing in the past, because we didn't have the technical capability to incorporate those values into the model, but I'm pretty sure that we do now, though I have not done it yet myself, but I think that is one of the things that got updated in 3.30, in terms of the abilities that we have, and so it's a good point, Harry, and I will see if I can find those values, just to let you know what they look like. Otherwise, point well taken, and that's something we'll consider going forward.

CHAIRMAN POWERS: Thank you. Next up, we have Luiz, and then Jim Nance, and then Will Patterson. Luiz.

DR. BARBIERI: Thank you, Mr. Chairman. Matt, thank you for the great presentation. It was a long presentation, and there is a lot to talk about, and you always do a great job explaining complicated things in very simple terms. For those of us who haven't been diving into the details of this assessment, it was great to hear your presentation, and so thank you for that.

My question is just clarify, on the recreational fisheries data, and I guess your Slide 82, that had the projections that had the landings for 2018, 2019, and 2020, and so I think that what you meant -- What this situation here is is that these landings are already in FES-calibrated currency, but that the reference

point, the ACL, that Ryan mentioned was in CHTS.

DR. SMITH: Yes, that's true, and that's part of why -- I don't know where the slide is, but that little experiment where I tried to step through going from CHTS to FES, is that the existing 3.11 is being counted in old CHTS numbers, and we're going to move to a situation now where the ACL will be set in FES, and hopefully the monitoring will be done in FES, so that we're doing apples-to-apples going forward, where the quota is based on FES and the monitoring will be based on FES.

DR. BARBIERI: That sounds good. Got you. If I may, Mr. Chairman, just one more minor comment.

CHAIRMAN POWERS: Yes.

DR. BARBIERI: Matt, your Slide 88, and I think Slide 47 as well, and this is something relatively minor, in terms of content, but I just wanted to bring this up, to avoid confusion, and you have there "target" on the right-hand-side slide, and, of course, I understand that that's the target biomass that the projection model is trying to reach there, but putting "target" -- It could get people confused with like a target reference point, and you're actually talking about the limit reference point.

CHAIRMAN POWERS: I was actually going to bring this up in relation to the executive summary, because the word "target" is mentioned there, and my first reaction was target would be the OY, and so I think you just need to clarify it, because, to me, target was something that you're trying to achieve and not --

DR. SMITH: Great point, and these plots came straight from the executive summary, and they're plots that we made, and they're not coming out of the package or anything, and that's something that we can definitely fix in the executive summary, and then, any other time I take those slides and use them for my presentation, we can fix it in there too, but I will make a note of that, and, when we get together and discuss how to improve our executive summary, we will incorporate that change, Luiz, and thanks.

DR. BARBIERI: Thank you, Matt.

CHAIRMAN POWERS: Thank you. Jim Nance.

DR. NANCE: Joe, thank you very much. Matt, I just wanted to say that what you've done on this presentation, and also on the

assessment, is that you and the Center really have answered all the questions that we had during the webinar and during this assessment, and I just want to say that I appreciate you guys working on all those different issues.

As I look at the ABC recommendations and things, I think it's -- That spike, and it seems like it's always there, and I appreciate you guys looking at why it's there, but, because of that, I think it would be beneficial to, maybe, as we go through the ABC recommendations, we look at averages and not years, particular years, and I just wanted to put that out there, Mr. Chairman.

CHAIRMAN POWERS: Thank you. Next up is Will Patterson.

DR. PATTERSON: I just wanted to make a comment here, and really Jim said a bit of it in his statement there, but, throughout the process of this -- We all know that, when you're on one of these panels, and you have webinar after webinar after webinar, it's hard to keep track of all the moving parts and stay fully engaged in the process, but, for this particular assessment, there was a lot going on with FES and with the discard issue that Matt talked about and with the length comp issues in the surveys, and I thought he, and when Dan was still involved as well, just did a really nice job working with the various groups who were providing data and fully addressing everything they could under the format of this.

I think the panel itself, by the time they got to the end, didn't have any significant questions about approach or methodology or output. I think this process was really complete, and obviously the presentation today reflected that.

CHAIRMAN POWERS: Thank you, Will. Dave Chagaris.

DR. CHAGARIS: Thank you, Mr. Chairman. Just kind of thinking a little bit more about the spike, and this is just sort of a comment and not necessarily a question, but I mean, to me, it seems like the projection model is behaving as you would expect it to.

Like, in this case, your F ratio was about 0.5, and so you quickly double that, and so you get almost a doubling in yield, and then you combine that with a strong year class coming through, and so that all seems to be working okay, and I think you pointed out some other issues with allocation and discard F that I hadn't really thought much about, but just focusing on those two, and so then, you know, if the projection methodology

is working fine, from the perspective of Stock Synthesis and the assessment itself, but it might not be working so well for us, and so I'm wondering if there's been any thoughts or discussions about trying to disconnect the projection module from the transient dynamics of the stock assessment, potentially like running it to equilibrium under current F and then build your projections with that age and size distribution and if that might help.

The question really then becomes do we want to try to chase these recruitment events over the course of the ACL projection years, and, if the answer to that question is yes, then we follow with this advice. If the answer is no, then we need to think about another way to possibly do these ACL projections. That's all I wanted to point out.

CHAIRMAN POWERS: Equivalently, that's kind of like sort of averaging, and, I mean, basically, when you're assuming a constant recruitment, the equilibrium is more or less kind of like a yield per recruit problem, and so it's just how quickly do you achieve that, and, again, this is kind of --

In terms of the projections themselves and how we formulate management advice, those are two different things to me, and that, because of the discussion we've had about those peaks, it implies to me that the council themselves probably have less understanding, and so it would behoove us to, as I mentioned before, to reiterate that, yes, these are projections based on a set of assumptions, and that, if those hold true, those projections would be extant, but you're also saying that, if you raise the ABC to 9.37 million pounds, within four years, you would expect it to be about two-thirds of that, and so those are the kinds of issues that I think we need to express.

Part of the problem is that, typically, in terms of the way that management plans are formulated, we're supposed to give a five-year yield stream, essentially, and I'm not sure exactly what wiggle room we have, but this slide itself indicates that, well, if you wanted to use a three-year average, for the OFL anyway, it would be 9.7. If we wanted to do a five-year average, et cetera, and so I guess what I'm asking is how much flexibility we have in terms of defining yield streams. Do we have to use annual, or can it be average? Before I get to Jim Tolan, Ryan, maybe you could comment on that.

MR. RINDONE: Yes, Mr. Chair. You guys have the option of selecting annual or average yield streams, or yields, excuse me, out to the extent to which you believe they are well supported

by the data. In the past, you guys have limited it to three years, and you have usually provided some recommendation like -- Lately, it's something like do an interim analysis every year, or every other year, or this stock should be re-assessed every three years, or what have you, so that we don't get into a position where we have projections on the books that have been on the books for a very long time without being updated, and Spanish mackerel comes back to mind in that case, and so it's really up to you guys and what you're comfortable recommending to the council.

CHAIRMAN POWERS: Thank you. We have Jim Tolan, followed by Doug Gregory.

DR. TOLAN: Thank you, Mr. Chairman. I will echo what everyone else has said about the quality of the presentation and the quality of the assessment. I just want to make one more observation on -- I appreciate the explanation of the spike and where it's coming from, and I thought that red grouper was the perfect example to show that, because, if I read this correctly, when the strong recruitment classes were eliminated, there was still a spike in red grouper, and it didn't eliminate it by a fraction, maybe 10 percent, and so, like Dave was saying, if we're chasing these strong recruitment classes, I didn't see a big effect of recruitment classes, in terms of the spike showing up every single assessment, and so, unless I read that slide incorrectly.

CHAIRMAN POWERS: Matt, do you want to comment on that?

DR. SMITH: I don't think you read that slide incorrectly, Jim. When she took that recruitment event out, you did see sort of a rounding off of the spike, and I don't know exactly what percentage it was, but it was not the bulk of the spike. Again, red grouper was in a situation where the F to FMSY ratio was also well below one, and not because -- It was just because the fish weren't available, and not because they didn't want to catch them, but they just couldn't catch them, and so it was another situation where that F rate immediately jumped up as well, which maybe accounted for a decent sized portion of that spike.

I agree that in the summary, in the stock assessment report summary for projections -- My recommendation is an average approach as well, and it's what you guys ended up doing for SEDAR 45, and that 3.11 value is based off of an average from the 75 percent run, and it seems prudent at that time as well, just because you avoid the issues of dramatically changing ACLs

every year, which are troublesome for fishers to try and plan their years, and you also don't end up chasing, quite as hard, those recruitment events, and the same thing can weigh into our decision to not include 2015 in the recruitment for the projections, to exclude that value in there as well, just to not chase that so hard until a couple of years down the road, when we have a better idea of it.

DR. TOLAN: Again, thanks a lot for trying to chase down sort of the mechanisms behind this spike we see in all the projections, and so, again, good job.

DR. SMITH: You can thank Bob for that. He sent me a question a week ago and brought it up, but you're welcome.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: I just wanted to add to what Ryan said about the ABCs. In the beginning, the SSC was giving the council annual ABCs with the spike and going down, and the council started requesting averages, because it was easier, and it made more sense for the public, and not having the quotas change so much from year to year, but, in doing that, the SSC was giving the council -- Here is your five years of ABCs or the average, and you choose, and, if the average turns out to be higher than one of the five years, I believe NOAA General Counsel said that the council could not choose that average if it exceeded one of the other ABCs, and so we need to either give the council an annual ABC series or an average, but not both.

CHAIRMAN POWERS: Thank you.

MR. GILL: This discussion is one of the topics relative to this assessment that I wanted to talk about, and Dave opened it up, and you amplified on it, and I appreciate that, and so, before I get started, Matt, thank you very much for your responsiveness and the clarity, and particularly identifying the rationale for the spikes to this committee, and I think it's well done and well worth it.

One of the distinctions we have for this assessment is we now have a basis for believing the spike, as opposed to being concerned about it, which, to me, changes the game plan a little bit. For one, what it says is that we have what I would call a built-in biomass moving through the system, because we never harvest the yield in the first two years, at least for the years that we're considering in the projections, and so have this built-in biomass, and, in the case of vermilion, you've got two

generations created during a five-year projection period, and two of those are producing also progeny for the future, and so we have this build-in of some sort of biomass that we don't take into consideration, however we provide ABC recommendations.

I think this has opened new territory, in terms of how we handle this, and I think it has opened new territory for how the council handles this, and so I'm in full agreement with you, Mr. Chairman, that we've got ourselves a new playing field, and so I would like to suggest that we take this issue of how to handle this problem, and it's not a problem, and it's a nice problem to have, of how we handle this in the future and put it as a future agenda item, and that the committee, Ryan, and the Center work together to build the basis for that discussion of that agenda item. I think we have some potential for doing things differently, and I would expect better, but, nevertheless, a different way of doing business in the future. Thank you, Mr. Chairman.

CHAIRMAN POWERS: Thank you, Bob. This sort of brings to mind management strategy evaluations, and one of the things that typically happens is, if you ask fishers whether they're willing to trade off a short-term yield gain versus a longer-term stability, most often they will pick stability, and this is kind of the same thing that we're dealing with here, and so I think, as Doug suggested, we might consider making our recommendation in terms of some sort of averaging.

Time is flying by, and we need to generate some advice relative to this assessment, and so I would hope that -- I would entertain motions to address both the quality of the assessment and then, secondly, the overfished and overfishing and ABC and ACL issues.

MR. GILL: I have some motions that I would like to proffer.

CHAIRMAN POWERS: Okay. Thank you, Bob.

MR. GILL: Jessica, would you pull up the BSIA motion?

CHAIRMAN POWERS: Okay. This is the motion from Bob. Is there a second?

DR. NANCE: Second.

CHAIRMAN POWERS: Jim Nance seconds. Any discussion? No discussion? **Is there any objection to this motion? No objection, and the motion carries.**

MR. GILL: Mr. Chairman, I have a motion for OFL and ABC, if you would like it.

CHAIRMAN POWERS: Yes, please.

MR. GILL: Jessica, would you pull up the OFL/ABC recommendation motion? Mr. Chairman, this one will probably get some discussion, and maybe a lot, but, nevertheless, I offer it as our OFL and ABC.

CHAIRMAN POWERS: Okay. Let me read it here.

DR. NANCE: Bob, are you meaning 2012 or 2021?

MR. GILL: Good point. Thank you. 2021. That's my typo. My apologies.

CHAIRMAN POWERS: All right. Is there a second?

DR. BARBIERI: Mr. Chairman, I will second.

DR. NANCE: Is this a five-year average?

MR. GILL: Yes, that's correct. Part of the rationale for the five versus the ten-year, despite the fact that it's a huge increase, is the exceptional productivity of the stock. Then, when you couple that with the fact that we're not going to utilize the first couple of years of this yield stream and the 50 percent maturity on top of it, you've got some built-in buffers that I think preclude considerable concern over increased risk, and so I offer a five-year average as the way we could go.

CHAIRMAN POWERS: One of the reasons for shorter-term averages, like five years, is basically remember these projections are being operated off of a constant recruitment, and constant recruitment, or something close to it, one would expect over the next few years, but, the longer you go, you would expect to have a good year class entering in, or a bad year class entering in, and so that's another issue, for me, about not getting into ten-year projections. Any more discussion on this?

MR. GREGORY: More and more, I am leaning toward just choosing the OFL and ABC based on equilibrium projections, and, according to the graph, we get near equilibrium by 2030, and we're going to have interim update assessments, and so we'll be able to adjust this up and down, depending on the circumstances of the

fishery at that time.

We do see these spikes often, I think, and I think Bob alluded to it earlier, but part of it is because the assumed landings for 2019 and 2020 may be less than what they really are, and so that starts the projections off at a high end, but, on average, the fishery is going to operate at equilibrium, all things considered, and so I am a bit uncomfortable with these high numbers, but I certainly understand them, and it's a unique circumstance for us to have an assessment with a population that's fished as much as this fish is, has been, to be as healthy as it is. Thank you very much.

CHAIRMAN POWERS: Thank you. We have Will Patterson, followed by Sean Powers and Jim Nance. Will.

DR. PATTERSON: Doug's comment about the equilibrium values notwithstanding, with the current motion, we typically only recommend the projections for three years, instead of five, and the other issue here is that the ABC computed in Matt's table was based on a P* that was a holdover from the last assessment. Do we need to recalculate the P*, or are we fine with the P* from last time?

CHAIRMAN POWERS: That's a rhetorical question. Bob.

MR. GILL: I would disagree, Will. That ABC is the OY average and not the P* average.

DR. PATTERSON: Thanks, Bob.

CHAIRMAN POWERS: All right. Sean.

DR. POWERS: (Dr. Powers' comment is not audible on the recording.)

CHAIRMAN POWERS: Thank you. Jim Nance.

DR. NANCE: I am going to agree with what Bob has done here. I like the five-year average, and it cuts down -- I don't like having that -- For one, you're having twelve million, and, I mean, that's just way over, but, having it on an average of five years, you get 8.6, and they haven't fished their quota it sounds like ever, about around 80 or 90 percent of it, and so having it around 8.6 I think gives them the ability to come up a little bit, but not to the point where you might have overfishing.

CHAIRMAN POWERS: Thank you. In terms of the discussion, we've had some disagreement about how to approach this. We do have the motion on the board, and we can vote it up or down, and, if it's voted down, then obviously we'll have to come up with some alternative. Harry.

MR. BLANCHET: My concern is twofold. First, because this ends in 2017, we're talking about four years after that, and those fish that they observed in the video survey are already getting to be a size where they're getting really almost out of what the normal fishery is going to be harvesting, and so we might be looking at, if we're looking at 2021 or 2022, maybe a couple of years, and, after that, those fish are going to be out of there, if they ever existed.

The reason I say that is we saw it in the video, and we did not see it in the trawl survey, and it goes back to the uncertainty that you have for that recruitment. I am not going to say that that doesn't exist, but, on the other hand, if it does exist, there's only a couple of years where they're going to really have access to it, and so, if we're setting something for five years, and they've only got access to that fish for a couple of years, I'm not sure if that's really the best approach to go.

CHAIRMAN POWERS: Thank you. I think we've reached a point where either we vote on this or someone gives a substitute or an amended motion. I think the structure of it people tend to agree with, and, basically, this is what we're trying to do, but it's the details of the amount here.

DR. PATTERSON: Joe, I have a question here, because the mean over the five years, three of the years, the OFL projections --

CHAIRMAN POWERS: What Doug said though was don't give them a choice, because, if you give them a choice of annual versus average, then, if any of the averages are greater than the annual, then the lawyers objected to it.

MR. GILL: My recollection is slightly different than Doug's, and recollect back in 2013 that we had this discussion over the red snapper assessment, but my recollection was that, as long as they're well-based, you can offer alternative ABCs that the council then has the option to decide which way to go, but the crux is that they're well-based scientifically, and so my understanding is that we can offer the other one, although, in this case, I don't think I would support following the yield stream.

CHAIRMAN POWERS: Thank you. Again, we are at the point where either we vote on this or somebody has to provide a substitute motion or an amended motion.

MR. GILL: Mr. Chairman, I call the question.

CHAIRMAN POWERS: All right. We are now going to vote on this motion. We will give plenty of time for people to enter in their votes. I will ask first if there is any objections to the motion, and, if there is, then we'll go through a visual vote count. Are there any objections to the motion?

MR. GREGORY: I do. Why not just have staff do a roll call vote, like we did in the beginning? That would be quicker than us entering stuff in the chat box.

CHAIRMAN POWERS: I didn't suggest that we enter anything in the chat box.

MR. GREGORY: I apologize.

CHAIRMAN POWERS: So we will go through the roll call vote now.

MS. MATOS: Lee Anderson.

DR. ANDERSON: Yes.

MS. MATOS: Luiz Barbieri.

DR. BARBIERI: Yes.

MS. MATOS: Harry Blanchet.

MR. BLANCHET: Yes.

MS. MATOS: Dave Chagaris.

DR. CHAGARIS: Yes.

MS. MATOS: Benny Gallaway.

DR. GALLAWAY: Yes.

MS. MATOS: Bob Gill.

MR. GILL: Yes.

MS. MATOS: Doug Gregory.

MR. GREGORY: No.

MS. MATOS: Jeff Isely.

DR. ISELY: Yes.

MS. MATOS: Walter Keithly.

DR. KEITHLY: Yes.

MS. MATOS: Kai Lorenzen.

DR. LORENZEN: Yes.

MS. MATOS: Camp Matens.

MR. MATENS: Yes.

MS. MATOS: Jim Nance.

DR. NANCE: Yes.

MS. MATOS: Will Patterson.

DR. PATTERSON: No.

MS. MATOS: Joe Powers.

CHAIRMAN POWERS: Yes.

MS. MATOS: Sean Powers.

DR. POWERS: No.

MS. MATOS: Ken Roberts.

DR. ROBERTS: No.

MS. MATOS: Steven Scyphers.

DR. SCYPHERS: Yes.

MS. MATOS: Jim Tolan.

DR. TOLAN: Yes.

MS. MATOS: I will move on to the Reef Fish SSC. Jason

Adriance.

DR. ADRIANCE: Yes.

MS. MATOS: Jud Curtis.

DR. CURTIS: Yes.

MS. MATOS: John Mareska.

MR. MARESKA: Yes.

MS. MATOS: Jack Isaacs.

DR. ISAACS: Yes.

MS. MATOS: Andrew Ropicki.

DR. ROPICKI: Yes.

MS. MATOS: That's all.

STOCK ASSESSMENT EXECUTIVE SUMMARY

CHAIRMAN POWERS: Thank you. **The motion carries.** I believe that completes the agenda item on the assessment itself, and, again, thank you, Matt, for a thorough discussion of this. Then we're moving on then to the executive summary, and I really like the idea of these executive summaries, because it kind of puts all of the relevant information, both scientific and management and laypersons, in a quick summary, which is what an executive summary is supposed to do.

I did mention before that, in terms of editorial things, that this reference to targets to should be cleared up in exactly what it is you mean when you're saying "targets". Are there any other discussions relative to the stock assessment executive summary? Before we do that, Ryan, you're not looking for a motion here, but mostly just input, correct?

MR. RINDONE: Correct, Mr. Chair, and we're going to help Matt with making any tweaks that you guys propose, and, ultimately, like we said, this document is meant to be digested by a wide audience, and this is only our second one of these that we've done, and so we're still kind of learning about how to present the information and what's most important to present where.

CHAIRMAN POWERS: All right, and so that's one thing to think

about, is the order of things, as well as just the wording. Do we have any other feedback at this point in time?

MR. BLANCHET: Mr. Chairman, the only suggestion I had is on Figure 4, and they've got an average recruitment from 2005 to 2014, and I think that might be getting a bit more in the weeds, and it's not otherwise referenced in any of our discussions.

MR. GILL: That was the average used for projections.

CHAIRMAN POWERS: It says that in the caption, too.

MR. BLANCHET: I missed it. Sorry.

CHAIRMAN POWERS: That's all right. Any other feedback at the moment? If somebody has some -- After this meeting, if you have some suggestions, feel free to provide Ryan those, although I think you have to turn this around fairly quickly, and so, if you do have suggestions, you better do it quickly.

DR. PATTERSON: My only suggestions have to do with the order of things, in that you would start with data and assessment and then go to assessment results and then projections and then the socioeconomic considerations. That seems like a logical flow there. The only other comment, and Joe already mentioned it earlier, is this issue of the usage of the word "target" in the document.

CHAIRMAN POWERS: Okay. Thank you. Ryan.

MR. RINDONE: Thank you, Mr. Chair. Part of the reason why we have the stock status upfront is because, typically, that's the thing that people are most interested in knowing right upfront, and then we progress through the rest of those items I think almost exactly in that order, and the socioeconomic considerations might be -- I think they are up towards the front middle, but we could certainly move those back if you guys think that that order should change, but one of the requests that we got from council members was that the stock status be the first thing that's listed.

CHAIRMAN POWERS: That sort of -- I mean, they're the major client here for that, and so, I mean, that was one of the things that I thought about too, and Will was suggesting about how you would make a logical argument, and you would go in the order that he suggested, but that isn't necessarily what's needed for this executive summary. Any other suggestions? If not, then that completes that agenda item.

I believe we are on to Other Business, and there were two items that we were going to talk about. The first is Michael Drexler wanted to spend a couple of minutes, and then, after that, Ryan was going to talk about the June 29 or whatever it is meeting, webinar. Michael.

OTHER BUSINESS
PUBLIC COMMENT

MR. MICHAEL DREXLER: Thank you, Mr. Chair and everyone, for sort of maintaining a spot on the agenda. I'm Michael Drexler, at the Ocean Conservancy, and I have one question and one comment. First, I guess thank you to Matt and Dan and the Science Center for exploring the spike. I was not expecting that, but I was going to inquire about the status of the ABC Control Rule Working Group within the SSC, which somewhat relates to that, and I guess that's my first question, I guess maybe to the Chair.

Then second is just a comment. I know issues relating to the calibration of state and federal landings will be working their way through the council and the SSC starting at the FES workshop in a month or so, and, given there are seven disparate methods to estimate landings in the Gulf right now, for red snapper at least, developing calibrations and understanding biases between the programs is needed for the purposes of the stock assessment, but also in-season management and ACL monitoring.

To that end, I just wanted to plug a project that I've been working on with TBD Economics, exploring the use of economic indicators as a potential tool for calibrating landings across the Gulf states, and, really briefly, the method uses software to track fishing rate expenditures across the economies of two states, and we looked at Texas and Louisiana, and compare how spending tracks recreational landings.

In addition to the comparisons of how those dollars spent in each state tracks landings, we also proposed a new metric of economic output per pound of fish as another line of evidence to calibrate landings across the Gulf states, and it could be particularly useful in Texas, for example, which doesn't have a side-by-side comparison.

Obviously, we're not going to get this published within the timeliness of this, and I just wanted to share it with you, and I didn't know the opportune time to discuss it, looking on the horizon of the agendas, and I wasn't sure of the most

appropriate way to do that, and so thanks again for the comment, and, I guess, if anyone is interested, I can be reached at mdrexler@oceanconservancy.org, and thank you again for the opportunity to comment.

CHAIRMAN POWERS: Thank you. Your first question, about the control rule, it hasn't gone -- It hasn't made progress, largely because of me, and it has to do with the lockdowns and things like that, and so, at this point, basically, it falls to me, and I will try to get that moving again. All right. Then, Ryan, the June 29 meeting.

MR. RINDONE: Yes, sir. I will mention that, since we allowed a slot for a public comment, we should probably see if anyone else has a comment that they would like to offer.

CHAIRMAN POWERS: Yes. I'm sorry. What we should do is, if the public is listening in and you want to raise your hand, go ahead and raise your hand, but, in the meantime, Ryan, why don't you go ahead and talk about the June 29 meeting.

DISCUSSION OF JUNE 29 MEETING

MR. RINDONE: Sure. Thank you, Mr. Chair. Last week, the council received a request for comment on procedural guidance for changing assessed stock status from known to unknown from the National Marine Fisheries Service, and the council has until July 1 to provide a comment.

I sent you guys a link that will take you to the document, so that you guys can give it a look, and we'll get that posted to the council's website. I had also sent out a doodle poll to everyone, to try to get an idea of when we could have a couple-hour webinar to talk about this, and that webinar will be held on June 29, from 10:00 a.m. to 12:00 p.m. eastern time. You guys will be receiving an email to that effect, and Dr. John Froeschke on the council staff will be your lead for that.

If my wife's induction date has anything to say about it, I will have a one-day-old baby boy on that day to be helping to take care of, and so --

CHAIRMAN POWERS: That's assuming constant recruitment.

MR. RINDONE: Yes, that is very true, and so a topic that I hesitate to try to broach with my wife, but we will get everything taken care of for you guys, and it will all be posted on the council's website, and you will have access to all of the

stuff in advance, and, again, the main point of this particular webinar will be for you guys to provide feedback on this document, and you will be providing that feedback after the council has seen it, and so the council won't have an opportunity to review your feedback and then adjust theirs accordingly, and so staff will do their best to combine those comments together to provide a letter detailing the council and its SSC's position.

CHAIRMAN POWERS: All right. Thank you then. We do have, in terms of the public, one hand raised, and that's Mr. Ed Swindell. Do you want to make some comments or ask questions?

MR. ED SWINDELL: Thank you, Mr. Chairman. Just briefly, I assume that none of this stock assessment has taken into account any socioeconomic items with this assessment, and is that correct?

CHAIRMAN POWERS: Well, indirectly, I mean, how fisheries operate, but that's not really what you're asking. What you're asking is -- The assessment itself is based on biological criteria and not socioeconomic, and so, from that standpoint, you are correct.

MR. SWINDELL: Is the SSC ever going to take up the socioeconomic portion of recommendations for this stock assessment?

CHAIRMAN POWERS: Well, it's not for the stock assessment, but there is --

MR. SWINDELL: No, it's not. It's for the OY, Mr. Powers.

CHAIRMAN POWERS: The socioeconomic group has the opportunity to make comments on the assessment. It wasn't under this agenda item, and I understand that what you're really asking is the SSC should -- I think what you're suggesting is that the SSC should be revisiting what is OY, optimum yield, and that's certainly a relevant comment, but we haven't had it on the agenda.

MR. SWINDELL: Thank you, sir.

CHAIRMAN POWERS: Thank you. Any other suggestions? In terms of the previous comment, that's one thing that I will take to the council too, in terms of people's interest in revisiting, or at least one person's interest in revisiting, the optimum yield, and that's something that also relates somewhat to the control rule that we've just been talking about as well, and so I will

certainly relay this on to the council. Thank you. If there is any other suggestions or comments, and, if not, I will entertain a motion to adjourn.

MR. GILL: So moved, Mr. Chairman.

CHAIRMAN POWERS: Bob Gill moves to adjourn. There's a second by --

DR. NANCE: Second.

CHAIRMAN POWERS: Jim Nance. Are there any objections? If none, thank you very much, and, again, I would thank Matt for the very good presentation. Thank you.

(Whereupon, the meeting adjourned on June 1, 2020.)

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