Standing, Reef Fish, Mackerel, Shrimp,
Ecosystem, and Socioeconomic SSC
Webinar Meeting Summary
May 3 – 4, 2021

The webinar meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Standing, Reef Fish, Mackerel, Shrimp, Ecosystem, and Socioeconomic Scientific and Statistical Committees (SSC) was convened at 9:00 AM EDT on May 3, 2021. The agenda for this webinar meeting and the minutes from the March 30 – April 2, 2021, webinar meeting were approved. Verbatim minutes from past SSC meetings can be reviewed here.

Dr. Kai Lorenzen will serve as the SSC Representative at the Council's June 21 – 25, 2021, hybrid meeting in Key West, Florida.

Management Considerations for Using Interim Analyses

Dr. Carrie Simmons (Council Staff) provided a presentation about the interim ABC analyses (IA) generated by the Southeast Fisheries Science Center (SEFSC). IAs are a procedure for updating catch advice in between full stock assessments. IAs use a representative fishery-independent index of relative abundance, evaluated against the stock's catch limits, to update catch level recommendations. Dr. Simmons noted that this tool can be used to generate catch advice, or function as a health check on a stock. Three IAs have been performed for Gulf red grouper, which had its catch levels adjusted in response to the 2018 red tide episodic mortality event. Dr. Simmons reviewed the landings history for red grouper, pointing out trends in recent history where recreational and commercial harvest has not reached catch limits. She also discussed the status of the Council's current preferred alternatives in Amendment 53 to the Fishery Management Plan for Reef Fish Resources in the Gulf (Reef Fish FMP Although the 2020 Gulf red grouper IA suggests the catch limit can be increased by approximately 1 million lbs (mp) whole weight (ww), this increase is not based on Council's current preferred alternative for sector allocations. Until the Council decides on sector allocations and corresponding catch advice (overfishing limit [OFLs], acceptable biological catch [ABC], and annual catch limits [ACL]), from SEDAR 61, IAs should not be used to modify catch advice for Gulf red grouper at this time. Instead, staff recommends that the Gulf red grouper IA be used as a health check. Future IAs can be updated with revised sector allocations from Reef Fish Amendment 53, and the corresponding OFLs and ABCs. The Council can consider changes to catch advice through a Framework Action or other vehicle when appropriate.

The SSC agreed that the current Gulf red grouper catch limits were dependent on the sector allocation specified in the projections, and that catch advice should not be re-specified when the sector allocations are being reconsidered. However, the IAs can provide an indication of how a stock is performing considerate of current fishing activity.

Review of Gulf Red Grouper Updated Indices of Abundance

Dr. Skyler Sagarese from the SEFSC reviewed the 2020 Gulf red grouper IA. The first red grouper IA was conducted in October 2018, and the Council has requested they be provided annually in time for the January SSC meeting. The 2020 red grouper IA updated the IA presented in 2019 to adjust harvest recommendations based on stock conditions, and uses the NMFS Bottom Longline (NMFS BLL) index as its representative index of relative abundance. The last approved stock assessment for red grouper, SEDAR 61, used a terminal year of 2017, with assumptions made in the projections regarding the impact of the 2018 red tide event. SEDAR 61 also used the recreational catch and effort estimates calibrated to the Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES). The first red grouper IA validated the assumptions made in these projections which showed a decline in abundance likely attributable to that 2018 red tide. For 2020, there is divergence from the full-area NMFS BLL index resulting in incomplete spatial coverage due to COVID, weather, and mechanical issues. Other indices were not shown due to various limitations related to spatial coverage and data availability. Constrained spatial sampling conducted in 2020 was compared to those same areas in previous years and revealed little difference in trends in red grouper observations. The harvest control rule function of the IA uses a beta scalar that requires the IA to either prioritize tracking of the index (low beta) or the ABC (high beta). For red grouper, the SSC has historically used a beta of 1 (out of 9). This beta application would indicate that the ABC could be increased to 5.948 mp gutted weight (gw), over the current ABC of 4.9 mp gw for the reduced area index. Using the full area index (again, cautioned for use due to missing data from 2020), the ABC recommendation was for 6.522 mp gw.

Dr. Simmons asked whether the beta scalar should be re-evaluated, given that the catch limits are not being met by the directed fleets. Dr. Sagarese said that the SSC could help inform how to set the beta scalar. SSC members noted that the OFL for red grouper remains higher than the ABC (approximately 7 mp gw higher), and given the performance of the fishery in recent history, perhaps the OFL should be re-evaluated also. The Council's initial request for annual IAs for red grouper was to have greater resolution into the health of the red grouper stock post-SEDAR 61. Though the IAs can update the catch advice, that utility may not be necessary annually, at least for red grouper. The SEFSC noted that they can provide updated fishery-independent indices, and are planning to work more with social scientists and economists to provide a more holistic perspective on the performance of a fishery. Generally, video indices take longer to process; however, the processing for other indices, like the vertical line and longline surveys, have much shorter turnaround times. The SSC talked about the ability of the 2020 data to adequately capture the stock dynamics to accurately estimate the condition of the stock for that year. The uncertainty in SEDAR 61 does not appear to be carried forward in the IA; an SSC member doubted that the point estimates were significantly different from one another. The uncertainty in the point estimates appears underrepresented, and should be noted. The SEFSC agreed, adding that the IA tool will continually be improved with additional work on the management strategy evaluation component. Council staff reiterated that the Council requested the red grouper IAs annually to monitor the health of the red grouper stock after the SEDAR 61 assessment and the 2018 red tide. The SSC agreed and suggested that integration of socioeconomic indicators could further enhance the value of IAs to monitor stock condition and directed fleets. Thus, the SSC requested that relevant socio-economic information that may inform markets prices and landings information also be included in the materials for discussion of these IAs. An SSC member added that recommending catch advice based on the IAs should be done with a better understanding of the uncertainty in the resultant catch recommendations.

Dr. Simmons reviewed the Council's proposed IA schedule through 2024, which includes red grouper and other species, considerate of the terminal years for the species-specific indices of relative abundance. The SSC did not provide any other recommendations for the Council's IA schedule. Staff will work on a revised IA schedule that better reflects when the Council anticipates receiving catch advice versus updated indices of abundance for health checks.

Review of Gulf Penaeid Shrimp Working Groups

Dr. Michelle Masi (SEFSC) provided an update on the five shrimp working groups (shrimp fishery effort estimation; SEAMAP shrimp indices; shrimp life history and environmental data; shrimp catch estimation). The shrimp fishery effort estimation working group is on hold until establishment of a new effort data collection program. The SEAMAP shrimp indices working group has concluded and a report is being drafted on the outcomes from these meetings. Dr. Masi reviewed the four objectives of that working group and the progress accomplished. Dr. Masi then discussed the shrimp life history and environmental data working group's objectives and current progress. Updating life history parameters is still underway, and Dr. Masi reviewed the work being conducted. The shrimp catch estimation working group has concluded, and a final report is available for review. Dr. Masi reviewed the four objectives of that working group and the progress accomplished. Lastly, Dr. Masi reviewed the shrimp bycatch estimation working group's progress on its two objectives.

One SSC member commented that it would be helpful if the shrimp catch information could be collected and processed more quickly. Council member Bosarge suggested it would be helpful to have final presentations attended by each of the various working groups, and Dr. Masi responded that she did have plans to do so. Another SSC member inquired what the potential benefit would be of adding Gulf shrimp dealers to the Gulf and South Atlantic dealer permit, and Dr. Masi replied that reporting would be conducted weekly rather than monthly. The SSC member further cautioned that there could be trade-offs between data quantity and frequency versus data quality by moving forward with the inclusion of shrimp dealers.

Review of Gulf Royal Red Shrimp Index

Dr. Masi presented the 2019 royal red shrimp index, with landings from 1962-2019. To account for confidential data, mean landings were shown for 2002-2004 and 2013-2019. The ACL was established in 2011 at 337,000 lbs of tails and is based on 1994 landings. 2019 landings showed a slight increase over 2018, by roughly 17,000 lbs of tails.

One SSC member commented that more information and context is needed for discussion, including effort data and socioeconomic information. He noted that, since 1994, landings have decreased which might suggest that the stock is suffering. However, the landing trends over the entire timeframe suggest that a thorough understanding of the stock does not exist. Another SSC member inquired how the ACL was set. Dr. Masi also noted that the ACL was set based on the landings from 1994. Dr. Masi noted further that, other than ELB data, no other data is available for vessels fishing solely for royal red shrimp. And due to confidentiality data issues, socioeconomic information would be limited Dr. Travis (SERO) emphasized the confidentiality

issues that would arise. He also noted that their economic surveys are not stratified specifically for the royal red fishery.

Council member Bosarge commented that information on permits landing royal red shrimp could be useful in explaining fluctuations in landings as imports (i.e., Argentine royal reds) can drive these variations. Dr. Travis responded that import data is not available to the specific level of Argentine royal reds.

SEDAR 74 Participant Solicitation

Dr. Kai Lorenzen (SSC Acting Chair) noted that SEDAR 74 is the first research track assessment for Gulf red snapper, and that the assessment would consider a great deal of new information including the Great Red Snapper Count and the Gulf state survey programs.

Mr. Ryan Rindone (Council Staff) solicited the SSC for participants for the assessment development team (ADT) and the Data Workshop (DW). The ADT is responsible for seeing the assessment through from start to finish, providing feedback and decisions along the way. The DW panel is responsible for evaluating the data inputs into the model, and will be held from November 1-5, 2021 in New Orleans, Louisiana. Unprocessed data (length and age data) for the DW are due on September 30, 2021, and recreational and commercial harvest data are due October 15, 2021.

The following SSC members volunteered for the ADT: Drs. Luiz Barbieri, Will Patterson, Jim Nance, Dave Chagaris, Kai Lorenzen, Benny Gallaway (reserve), and Judd Curtis (reserve). The following SSC members volunteered for the DW Panel: Drs. Benny Gallaway, Judd Curtis, and Steven Scyphers; and, Jason Adriance and John Mareska.

Joint Grouper-Tilefish and Red Snapper IFQ Review

SSCs reviewed the RS and GT-IFQ Programs Review (Review), which is the first joint review of both Gulf programs. SERO staff provided a history and overview of the IFQ programs and presented summary information pertaining to changes in accounts, shares, allocation over time.

SSC members asked about share prices and suggested alternate data sources to compare with the data provided by participants through the online program portal to examine arms-length transactions. SERO staff noted some of the difficulties in examining transactions due to complex ownership among related accounts, which are distinct businesses but may have one or more owners in common. An SSC member suggested that the interpretation of some of the information provided in tables could be aided by presenting it in figure form as well.

Information was presented on the number of accounts with shares broken down into bins for small, medium, and large shareholdings. An SSC member inquired about the distribution of the shareholdings within each size bin, which would enable consideration of the amount of shares held among the large accounts, and to examine how this may have changed over time. SSC members also expressed interest in whether the entities holding the largest percentages have changed over time, to determine turnover within this group. SERO staff responded that in general, the large shareholders hold about 50% of the shares per share category and there has not been much shift in

this percentage over time. She added that the largest shareholders have held from 46% to 49% of the red snapper shares throughout the time period, and there have only been one or two entities who have exited, to be replaced by other large shareholders. Staff noted that market concentrations for the shares, allocations, and landings markets have been analyzed.

Staff reviewed studies on ex-vessel price changes, market power, and measures of inequality. Staff highlighted the need to consider vertical integration. SERO staff noted that NMFS now collects ownership data from dealers for future analysis. Although the distribution of shares was found to be highly unequal, these inequalities were present in catches before program implementation and thus, are not a result of the IFQ programs.

Safety-at-sea studies conducted by SEFSC found that safety was improved following implementation of both IFQ programs. This was likely due to the multi-species aspect of the program and the overlap between the two programs.

Conclusions of this joint RS and GT-IFQ programs review include that the programs have been relatively successful in meeting their objectives. Overcapacity has declined, however; further consolidation is possible as fishing capacity remains large relative to the available quotas. There is no evidence of market power in any of the markets (shares, allocation, and landings). And finally, during the review period, the cost recovery fees that were collected had fully funded the administrative costs of the Gulf IFQ programs. SSCs expressed their appreciation for the data and analyses presented and did not raise objections relative to the material presented. SSCs approved the following motion with no objection.

> **MOTION: The SSC reviewed the material with respect to the joint red snapper grouper tilefish IFQ and finds it acceptable for review by the AP panel and the Council.**
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> *Motion carried with no objection.*

Allocation Review Guidelines

Council staff explained the difference between a fisheries allocation review and an evaluation of fisheries allocation options. An allocation review is only an assessment to determine whether or not the development of allocation options is warranted. The evaluation of allocation options, typically done through an FMP amendment, considers reallocation alternatives and allows the Council to adjust allocations if needed.

Staff reviewed the projected initial review timeline specified in the Council's allocation review policy. Staff noted that the Council has the latitude to start allocation reviews and evaluations of allocation FMPs whenever deemed necessary. For example, the Council is currently developing several FMP amendments considering allocation options, e.g., Reef Fish Amendment 53 (red grouper allocation), Reef fish Amendment 52 (red snapper allocation), and CMP Amendment 32 (Gulf Cobia allocation).

Staff discussed a two-tiered allocation review system. The first tier would address allocation reviews for recreational and commercial allocations that were established to facilitate the distribution of commercial quotas for the G-T IFQ program. Species aggregates included in this tier are the shallow-water grouper aggregate (Black grouper, yellowmouth grouper, yellowfin grouper, and scamp), the deep-water grouper aggregate (yellowedge grouper, snowy grouper, Warsaw grouper, and speckled hind), and the tilefish aggregate (golden tilefish, blueline tilefish, and goldface tilefish). Allocation reviews for these IFQ species aggregates could be limited to a review of the FMP objectives and evaluations of changes in ACLs and quotas, recreational and commercial historical landings and trends, and quota utilization rates by sector. The second tier of allocation reviews would include all other Gulf fisheries allocations. The second tier would potentially be controversial and time and resource consuming. In addition, data required to perform these allocation reviews may not always be available. The specification of a predetermined list of analyses and evaluation criteria to complete may be too prescriptive and may limit the Council's flexibility. An alternative approach would, on a case-by-case basis, include review criteria in the terms of reference for each allocation review. The terms of reference for each review would be subject to Council's approval. Staff indicated that the allocation review working group is scheduled to meet May 25 and is expected to discuss these issues. SSC members noted that, while discussing allocation reviews, SSCs should limit their comments to the scientific aspects of allocation reviews.

Review of ABC Control Rule

Mr. Rindone and Dr. Lorenzen described the impetus for revisiting the Council's ABC Control Rule, the application of which has a propensity for resulting in narrow buffers between the OFL and ABC which do not adequately characterize the scientific uncertainty in the stock assessments.

Dr. Shannon Cass-Calay (SEFSC) presented an alternative for the Council's ABC Control Rule, focusing on Tier 1, which addresses species for which more data are available and more robust stock assessments are used. The ABC Control Rule is used to create a buffer between the OFL and the ABC, based on the scientific uncertainty in the stock assessment and the Council's risk tolerance. The determination of ABC should be based, when possible, on a probability that a catch equal to the stock's ABC would result in overfishing (P*). The probability of overfishing cannot exceed 50% (per the Magnuson-Stevens Fishery Conservation and Management Act; MSA), and should be a lower value. Each Council must establish an ABC Control Rule based on scientific advice from its SSC. The ABC Control Rule is used by the SSC to provide catch advice, which is binding to the Council per the MSA. The SSC can recommend an ABC that differs from the result of the ABC Control Rule, but it must then provide justification for doing so. An ABC Control Rule can apply to data-rich and data-limited assessments, and can involve complex drivers based on measured stock biomass, measured uncertainty, forecasts of environmental effects, etc. Many Councils use a tiered approach for their ABC Control Rule. Tier 1 for the Gulf Council is conditioned on the stock assessment estimating maximum sustainable yield (MSY), or its proxy, and produces a probability density function (PDF) of the OFL. The OFL equals the yield at the maximum fishing mortality threshold (MFMT), and the ABC equals the yield at the P* percentile which represents the acceptable risk of overfishing (risk tolerance), from the projection of MFMT (or $F_{REBUILD}$ in the case of stocks subject to a rebuilding plan).

Under the Council's present ABC Control Rule, the choice of P* is based on the degree to which a stock assessment is judged to encapsulate the true level of uncertainty in sustainable catch levels. A risk determination table is used to consider the level of assessment and the use of F_{MSY} (or its proxy; e.g., F_{SPR30}%, $F_{0.1}$); the characterization of uncertainty (e.g., fully integrated, sensitivity runs, none); the severity of any retrospective patterns; and, the incorporation of environmental covariates. When an assessment is judged to underestimate true uncertainty, the table produces a lower value of P* (reducing risk tolerance). The current approach to determining P* therefore conflates the characterization of uncertainty (a science issue) with the level of risk tolerance (a policy issue) by lowering the risk tolerance when uncertainty is not perceived to be well characterized.

The SEFSC proposes that the risk of overfishing (P*) and scientific uncertainty (σ) be considered separately. The acceptable risk of overfishing is the prerogative of the Council and the scientific uncertainty is the responsibility of the SSC to characterize. The width of the PDF derived from stock assessment tends to underestimate of the true scientific uncertainty (because some parameters are fixed without error, and the variance of some data inputs is capped), resulting in buffers between the OFL and ABC that are too narrow. Calculating the ABC requires quantifying uncertainty. The variance of the PDF is estimated as part of the assessment. When this is not possible or the results not plausible, the variance can be estimated external to the assessment by using another assessment of a similar species, or computed from comparisons of estimates from multiple past assessments, hereafter referred to as the Ralston method (Ralston et al. 2011[1]). This method examined uncertainty by calculating log-scale deviations from mean biomass from all historical assessments of 17 Pacific stocks. Then, the aggregate distribution of log-deviations was pooled with the fit of a normal distribution. This fit results in a wider PDF that is more considerate of the actual scientific uncertainty. A tiered system is recommended where σ increases as data quality/quantity declines, resulting in larger buffers between OFL and ABC for lower tiers.

Furthermore, per the SEFSC proposal, the ABC Control Rule should reduce fishing mortality (F) below MFMT proportionally as stock size declines below B_{MSY}. It should also reduce F to zero at some level of depletion to prevent stocks from reaching a level below which successful reproduction becomes unlikely. Previously, the minimum stock size threshold (MSST) was based on natural mortality (M). Rebuilding plans were required when the biomass of the stock (B) was less than (1-M)*B_{MSY}. MSST is now often set to 50% of B_{MSY}. The stock may then be reduced to a point well below the level that produces MSY before any action is taken to reduce F. This can result in the need to enact large reductions in F (and catch) and long rebuilding plans in order to rebuild a stock when, if action had been taken sooner, a less drastic reduction may have been plausible. To reduce the likelihood of long and/or harsh rebuilding plans, the SSC could consider reducing F when B < B_{MSY}. The SSC could also reduce F to zero at some level of depletion. The result is a ramped approach to establishing the buffer between the OFL and ABC based on the degree of depletion below B_{MSY}.

The SEFSC proposal for Tier 1 assumes a "data-rich" stock, which is defined as using a full stage-structured assessment where reliable time series on catch, stage composition and index of abundance are available, and the assessment provides estimates of MSST, MFMT, and a PDF of the OFL. Under this proposal:

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[1] https://media.fisheries.noaa.gov/dam-migration/ns1-ralston-et-al-2011.pdf

- MFMT = F_{MSY} (or proxy)
- MSST = 0.75 * B_{MFMT} (MSY or proxy)
- MSY = Long-term yield at MFMT
- OFL = Yield at MFMTABC = dX*
  - X* is the yield that is produced at the percentile of the PDF of the OFL corresponding to the P* determined by the Council, and the PDF is determined from the assessment (subject to $\sigma > \sigma_{min}$).
  - d reduces MFMT as B declines.
    - d = the scalar if B > B_{MSY};
    - d = Scalar * (B-$B_{Critical}$)/ (B_{MFMT} − $B_{Critical}$) if B < B_{MSY}
    - $B_{Critical}$ = minimum level of depletion at which fishing would be allowed
    - Scalar = 1 if P* < 50% specified by Council, < 1 otherwise

The SSC discussed the proposal, with some members questioning whether the proposal was really much different from the current form of the Council's ABC Control Rule. The SSC cautioned against any modification to the ABC Control Rule that would create other or more potentially arbitrary decision points in selecting an appropriate ABC. A member also advised that any modification to the ABC Control Rule focus efforts on generating an ABC without involving any modifications to OFL, which would further complicate the decision-making progress. Another approach by Restrepo et al. (2011[2]) was discussed as an alternative that should also be evaluated. The Ralston approach may also suffer from narrow PDFs. Dr. Cass-Calay replied that the Ralston method uses the log-scale deviations from the PDFs considered in the meta-analysis, such that the scientific uncertainty (σ) values of the individual PDFs are less consequential. A Gulf-specific meta-analysis of Gulf stock assessments will be needed to define a Gulf value for σ_{min}, which will take some time. SEFSC proposes using Ralston σ_{min} as a proxy until the Gulf value can be estimated or some other value the SSC thinks to be more plausible. Another SSC member inquired if any collaboration with the NMFS Beaufort Laboratory and SEFSC had begun to compare methodologies being developed with their office. Dr. Katie Siegfried indicated that work within NMFS was be conducted to design approaches to better capture uncertainty (i.e. red tide events) within the stock assessments which would could then be reflected in through projection analyses.

An SSC member noted that it was unlikely that the assessment process would ever be able to fully characterize uncertainty, adding that the ramping technique was not necessarily accounting for the true probability of overfishing. Setting the MSST at 50% of B_{MSY} sets the threshold for action at a point where B is already well below 50% of virgin biomass. Combined with episodic mortality, continuing relatively high F levels close to MFMT while the stock biomass declines below B_{MSY} could result in a stock being driven well below MSST at 50% of B_{MSY}.

Dr. Lorenzen presented a perspective about the current ABC Control Rule demonstrating how a narrow PDF results in an underestimation of uncertainty. Examining the cumulative probability of overfishing using the Ralston method may more appropriately scale catch based on risk tolerance and this adjusted perception of uncertainty. When applying the ABC Control Rule to this approach using the P* method, the ABC can be derived from the estimate of the OFL based on the risk of overfishing. The difference between the perceived risk and the actual risk of overfishing

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[2] https://www.st.nmfs.noaa.gov/Assets/stock/documents/Tech-Guidelines.pdf

can be understood by the difference between the application of the current P* approach versus applying it to the Ralston approach as a proxy for the unknown, true uncertainty, with the latter demonstrating the risk to actually be higher than perceived. Applying the Council's formal risk tolerance to PDFs derived from the Ralston approach would likely result in a lower ABC than the status quo approach.

Dr. Lorenzen continued with some options for SSC consideration. The SSC and Council can keep the current ABC Control Rule. The consequence here is that the uncertainty estimate is unrealistically low and the risk level is greater than formally assumed. The SSC can transition to a new ABC Control Rule using the Ralston σ_{min} as a proxy for true uncertainty and keep the current formal risk tolerance policy in place. The consequence here is that the ABC may be set approximately correct for the intended risk level; however, the ABC may be set lower than under the current control rule. The SSC could also make the current *de facto* risk policy the formal risk policy, thereby formally acknowledging the associated *de facto* risk levels. The risk policy could also be amended now or later towards an intermediate solution representing a compromise between reduced risk and maintaining catch levels.

SSC members discussed balancing the performance of the current ABC Control Rule with the Council's accepted level of risk tolerance, acknowledging that uncertainty is underestimated in the current assessments and thus, in the control rule. The SEFSC clarified that it is interested in learning what the SSC's intentions may be for how to modify the current control rule, so it may prepare for these ongoing discussions. An SSC member noted that P* is not in fact a measure of the risk of overfishing, but rather the probability of overfishing. From an economic perspective, determining risk is more complicated than estimating the probability of overfishing; changes in opportunity costs at varying levels of F also need to be considered. The SSC member thought the SSC should also consider how well the current control rule has performed in the past. Further, consideration of foregone yield is important because this missed opportunity for harvest is not accounted for in projections assuming the ABC will be harvested. Also, management buy-in costs are affected when buffers are maintained even when stocks are at levels well above B_{MSY}. The SSC member proffered that the buffer between the ABC and OFL should reduce as B approaches or exceeds B_{MSY}. Adding a component to the control rule that removes accountability measures on management when catch exceeds the limit when $B > B_{MSY}$ could address this point. Dr. Cass-Calay stated that the SEFSC would pull all proposals presented on the ABC Control Rule to the SSC over the years, noting that all Science Centers have been working on these control rules concurrently. The SEFSC can compare examples with the SSC, and can consider alternative approaches as recommended by the SSC.

Dr. Cass-Calay demonstrated the application of the Ralston approach for three examples using Gulf species: vermilion snapper, king mackerel, and greater amberjack. Generally, as the estimate of scientific uncertainty is increased, the buffer also increases, thereby reducing the ABC compared to the OFL. This increase is amplified with a decreasing risk tolerance for the probability of overfishing. Generally, healthy stocks where $B > B_{MSY}$ would have a narrower buffer between the OFL and ABC. For stocks for which $B < B_{MSY}$, but $>$ MSST, the buffer between the ABC and OFL would be larger than for stocks where $B > B_{MSY}$, with the buffer increased by using the combination of the Ralston σ_{min} and the ramping effect to rebuild the stock to B_{MSY}. For stocks for which $B <$ MSST, the linear relationship between the Ralston σ_{min} and the

ramping feature becomes very pronounced, resulting in a considerably larger buffer between the OFL and ABC, appropriate to the depressed nature of the stock biomass and the need for a rebuilding program.

The SSC discussed the approach demonstrated by the SEFSC, agreeing in principle with an increasing buffer as the stock biomass is reduced below B_{MSY}. Some SSC members postulated different slopes for the ramp when $B < B_{MSY}$ and when $B < B_{MSY}$ **and** MSST. The slope of the decline in ABC recommendation can be explored further. Other hinge points for adjusting the slope besides B_{MSY} and MSST can also be proposed and considered. Dr. Cass-Calay reiterated that the SEFSC would intend to apply the Ralston approach until a meta-analysis of Gulf stocks could be completed to regionally inform σ_{min}.

SSC Discussion

To better organize discussion of research priorities requests for the SEFSC to address, the SSC compiled a list of questions to considering when exploring modification to the ABC Control Rule.

Question 1: Fundamentally, should the new ABC Control Rule be based on P with a better characterization of uncertainty?* SSC Members discussed the merits of the Ralston method (using uncertainty estimates derived from a meta-analysis) versus other approaches such as the Restrepo et al. approach (applying an F multiplier to set a buffer) which do not rely on an explicit statistical characterization of uncertainty. Several members voiced concern with using an F multiplier conceptually linked to F at optimum yield (F_{OY}) as a characterization of uncertainty reiterating previous discussion on the difficulty of assessing OY when relevant socio-economic information is lacking. The SSC expressed concern that the lack of understanding of OY could result in large buffers for relatively healthy stocks that could affect the socioeconomics and management buy-in of a fishery. Dr. Cass-Calay agreed and also stating that there are instances where F_{OY} can exceed $F_{SPR30\%}$ and this is generally an avoided practice. Another SSC membered replied that some arbitrariness is inherent in developing any ABC Control Rule because the exact level of uncertainty resulting from the stock assessment is impossible to ascertain. Therefore, even relatively qualitative approaches are not intrinsically unscientific when coupled with professional knowledge to interpret management tool results. Dr. Lorenzen summarized the discussion and concluded that the SSC was not yet prepared to remove alternatives to the Ralston method from further consideration for the new ABC Control Rule.

Question 2: What harvest control rule(s) (how "F_{Limit}" changes with stock size) should be considered? The discussion of question 2 focused on the feasibility of the ABC Control Rule. The SSC agreed that the ABC Control Rule should be simple, clear, and effective. They determined that the single listed alternatives for the harvest control rule be explored. However, they suggested, if reasonable to interpret, an alternative considering multiple 'hinges' to inform the scalar function could also be investigated.

Question 3: What information on performance of alternative control rules is the SSC requesting from the Science Center? For question 3, the SSC reiterated the importance of reviewing past performance when modifying the ABC Control Rule. Dr. David Chagaris inquired if any simulation testing of episodic events (i.e. multiple years of low recruitment, variable natural

mortality, or red tide events) had been conducted as similar work on menhaden has been completed to better understand these dynamics. He stated that understanding these performance metrics would help gain a better understanding of how these processes translate into management measures such as fishery closures. Dr. Cass-Calay stated that the SEFSC recognized the importance and need for these types of analyses, but stated that no solid results on those effects were currently available. She stated that she is amenable to receiving and sharing any resources available on the subject.

Question 4: What information can we (the SSC and the Science Center) to help the Council consider their risk policy when we take that issue to them as part of the control rule revision? Question 4 addressed the SSC's role in providing information to the Council that would aid them when considering risk policy as part of recommending catch advice. A member stated the Council should have information regarding what a reduction would translate into economic loss in both harvest pounds and value. Dr. Cass-Calay also mention that it would be important for the Council to consider the cost associated with overharvesting a stock. She stated that if MSST is set at 50% B_{MSY} and action to reduce F is not taken until a decrease below that threshold, that longer rebuilding plans can also result in economic losses. The SSC agreed that effective communication between the SSC and the Council in interpreting catch advice is imperative to effective fishery management.

Gulf Gray Triggerfish Age Validation Challenges and Recommendations

Due to the COVID-19 pandemic, the Council has unspent funds, primarily from travel savings in 2020. The Council requested to consider use of these unspent funds to fulfill special research and data needs; for example, through an age validation study for Gulf gray triggerfish. Dr. Carrie Simmons presented an overview on the current management status and most recent assessment of gray triggerfish, gray triggerfish aging issues, and potential methodologies that may assist with bridging data gaps in future stock assessments. She further outlined specific questions for the SSC to consider prior to bringing this request before the Council at its June meeting. The last approved stock assessment (SEDAR 43) had a terminal year of 2015; the most recent assessment (SEDAR 62) was terminated because of irreconcilable data issues. A research track assessment was recommended instead of an operational one to address the concerns. Council requested staff to evaluate research gaps, including any contributory research for the research track assessment scheduled to start in 2023; however, the study must be completed to provide results by the time the assessment is ready. Dr. Julie Neer stated that the assessment has been pushed back to 2024 due to scheduling issues from COVID-19. The Council is also considering using the funds to assist with an expansion of a pilot project for effort monitoring in the shrimp industry through electronic logbooks.

Dr. Simmons provided some examples of gray triggerfish aging issues where spines have historically been used for aging because otoliths are fragile difficult to extract. There is also a need for sex-specific age and growth curves and validation of potential aging bias between spines and otoliths. Some studies have attempted to validate this bias through bomb radiocarbon dating and developing new methodologies for extracting otoliths. Bomb radiocarbon validation may be more accurate for aging hard parts but can be expensive. A mark-recapture study may be useful

but could be expensive if it requires large amounts of field work and may not be feasible to attempt within the given timeframe. If a study to acquire age data for the stock assessment is funded, Dr. Simmons provided some assessment considerations to the Committee including likelihood of application in SEDAR, specifically relating to sex-specific growth curves, the practicality of aging large numbers of gray triggerfish in the future, determination of a correction bias for historical samples, and if hard part sampling protocols will need to be amended. The SSC was asked to consider the feasibility of the proposed timeline, the value of the chosen study results to stock assessments and management, and if the proposed funds are adequate. Dr. Simmons briefly reviewed the draft request for proposals by giving an example of information that will be necessary to provide, such as background, sample size and methods. Request for proposals will be posted as part of a competitive process and subsequent review.

An SSC member asked if proposed age validation studies could be completed within the requested time frame. Dr. Will Patterson stated that study completion is likely; however, there appear to be confounding effects of region and fishery sector so that component would need to be addressed if the Council is requesting specific size-at-age comparisons. He also noted the difficulties with aging using otoliths. Dr. Simmons stated that the Council is trying to focus on age validation so that a calibration can be used on previously collected fishery dependent samples. Committee members also asked about the funding amount. Dr. Simmons stated that there are some limitations on field work within the grant provisions and that the committee should consider use of samples that have already been collected by agencies and if new samples will need to be collected and the associated costs.

Dr. Shannon Cass-Calay said the Science Center can assist by providing feedback on prioritizing data needs for the upcoming assessment. Spatial information, such as east and west of the Mississippi River could be useful but the information would likely be used conditionally. Most historical samples are dorsal spines; due to the well-known bias in age between spines and otoliths, it would be useful to have information on the bias so that a vector can be applied between the two or new age composition data from otoliths can be created. Overall, investigating regional and sex-specific dynamics may be useful for the next assessment but previously collected samples still pose a problem as assumptions would have to be made for potential differences by sex and region. Dr. Patterson noted that there is continued effort on age validation; it has become fairly well-established that spines underestimate age by approximately two years and he believes that age validation is essentially complete although it has not yet gone through peer review. He suggested that the funds could go towards further age validation and selectivity from the various commercial and recreational fleets.

Dr. Simmons expressed concern about the time and money needed to do a Gulf-wide selectivity study. Dr. Cass-Calay responded that using any age composition data from a single study within a short span of time can produce confounding results based on non-representative sampling. A selectivity study is likely too time-consuming and complex to be completed with this funding mechanism. Dr. Patterson suggested a comparison of regional differences and examination of fleets that contribute the most to gray triggerfish landings followed by validation of regional age composition data and providing information on sex-ratio at size and age. This would also allow for examination of uncertainties in order to better inform future assessments. Dr. Katie Siegfried confirmed Dr. Patterson's suggestion would help the assessment. Since otoliths now appear to be

a better approach to aging than spines, this requests for proposals may be an opportunity to find a method of integrating old and new data or mark the transition of attempting to use new methodologies for future assessments. Staff will continue to work with the Science Center staff to refine the call for proposals before it is presented to the Council in June.

Public Comment

One public comment was given by Dr. Mike Drexler from the Ocean Conservancy. In relation to the ABC Control Rule discussion, he stated that he had previously provided a qualitative comparison of historical OFLs to ABCs, illustrating discrepancies ranging from 30% to 50% when comparing intended limits to actual landings. However, he noted that the Tier 1 P* approach generally estimates buffer sizes from 3% to 5%. He questioned the small percentage of scientific uncertainty when the range accounting for management and scientific uncertainty is much higher. He also commented on the list made by the SSC to generate alternative control rule approaches and asked the Committee to consider: the historical approach using either the Ralston method or consideration of a rule on a species-by-species basis, providing a qualitative sigma for use in the current ABC Control Rule, using multi-model inference to generate estimates of uncertainty, or a probabilistic-based framework to capture model process uncertainty. He also stated he believed the ramps to be the most important part of the process in generating a resilient control rule.

Other Business

SSC Reappointments

Staff reminded the SSC that the three-year term appointments of SSC members are expiring this summer (2021), and that current SSC members who wish to be considered for continued appointment will need to reapply. Applications for new and current SSC members will be due by May 14, 2021.

SEDAR 68: Southeastern U.S. Scamp Review Workshop Appointments

Mr. Rindone solicited the SSC for participants for the Review Workshop (RW) for the SEDAR 68 research track assessment of scamp. The RW panel is responsible for evaluating the entirety of the assessment process, and will be held from August 31 – September 3, 2021, via webinar. Dr. Luiz Barbieri will serve as a RW panelist. No SSC members volunteered to chair the RW; for now, Mr. Rindone will serve as the Chair unless another SSC member volunteers for the role.

Council Facebook Page and Blog

Dr. Ken Roberts discussed the contents of the Council's Facebook page and the blog hosted on the Council's website. Dr. Roberts thought it may be prudent to discuss what constitutes the best scientific information available, in light of recent decisions made at the March/April 2021 SSC

meeting and the April 2021 Council meeting. Ms. Emily Muehlstein (Council Staff) replied that the topic of BSIA is one of many to be discussed on the Council's blog and that it would be moved to the top of the list.

The meeting was adjourned at 4:30 pm eastern time on May 4, 2021.

Meeting Participants

Standing SSC
Kai Lorenzen, *Acting Chair*
Lee Anderson
Luiz Barbieri
Harry Blanchet
Dave Chagaris
Benny Gallaway
Bob Gill
Doug Gregory
Walter Keithly
Camp Matens
Jim Nance
Will Patterson
Sean Powers
Ken Roberts
Steven Scyphers

Special Reef Fish SSC
Jason Adriance
Judd Curtis
John Mareska

Special Mackerel SSC
Jason Adriance
John Mareska

Special Ecosystem SSC
Cam Ainsworth
Mandy Karnauskas
Paul Sammarco

Special Shrimp SSC
Peyton Cagle
Thomas Shirley

Special Socioeconomic SSC
Jack Isaacs
Andrew Ropicki

Council Representative
Leann Bosarge

A list of all meeting participants can be viewed here.

APPENDIX

List of SSC questions and requests: ABC Control Rule

1) Fundamentally, should the new ABC control rule be based on P* with a better characterization of uncertainty?
   - Use conceptual basis of new ABC as proposed with Ralston method as σ_{min}?
   - Use conceptual basis of new ABC as proposed with a different default σ_{min}?
   - Consider conceptually different approach (e.g., F_{OY}-based, F-multiplier based [e.g., 75% of $F_{30\%SPR}$], other qualitative approach)

   <u>SSC Determination</u>: Further exploration of available options is necessary. Interest in the Ralston method versus other approaches.

2) What harvest control rule(s) (how "F_{Limit}" changes with stock size) should be considered?
   - Status quo is OFL = yield at MFMT when B > MSST and ABC is set below OFL; when B < MSST, OFL = yield at MFMT and ABC is computed as the yield at $F_{Rebuild}$
   - Ramp from B_{MSY}
   - Ramp from MSST
   - B_{CRIT}
   - Consideration of M in the slope for the HCR

   <u>SSC Determination</u>: Provide options, considerate of simplicity.

3) What information on performance of alternative control rules are we requesting?
   - Past performance of current ABC control rule (existing doc?)
   - Past performance of deviations from the current ABC Control Rule (e.g., F-multipliers, and examining the reduction between the OFL and ABC between assessments in terms of a percentage reduction from F_{MSY} or its proxy)
   - Simulation performance of alternative rules
     - Consider recruitment, episodic mortality
   - Implications of alternative rules for ABCs of Gulf stocks

4) What information can we provide to help the Council consider their risk policy when we take that issue to them as part of the control rule revision?
   - e.g., risk of overfishing vs. fishing opportunity foregone
     - Re: foregone yield, consider lost harvest in terms of both pounds and value
     - Costs of overharvesting to stock and stakeholders
     - Consideration of phase-in of changes in catch limits
     - Evaluation of linkages between social indicators and the application of the ABC Control Rule
     - Costs to management for addressing overfishing/overfished stock status
       - Further, social costs to management buy-in