Standing, Reef Fish, Mackerel, Ecosystem, and Socioeconomic SSC
Webinar Meeting Summary
January 5-7, 2021

The webinar meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Standing, Reef Fish, Mackerel, Ecosystem, and Socioeconomic Scientific and Statistical Committees (SSC) was convened at 9:00 AM EDT on January 5, 2021. The agenda for this webinar meeting was approved as modified, and the minutes from the Gulf SSC's September 14-15, 2020, webinar meeting were approved as written. Verbatim minutes from past SSC meetings can be reviewed here.

Drs. Joe Powers and Kai Lorenzen will develop the materials to present to the Council at its January 25-28, 2021, virtual meeting.

Review of SEDAR 70: Gulf of Mexico Greater Amberjack Stock Assessment

Assessment Presentation and Stock Status Determination

Ms. Nancie Cummings of the Southeast Fisheries Science Center (SEFSC) reviewed the results of the SEDAR 70 stock assessment of Gulf greater amberjack, which incorporated a number of modifications from the previous stock assessment (SEDAR 33 Update 2016). For SEDAR 70, an updated version of the Stock Synthesis software was used, with a terminal data year of 2018. The recreational data inputs were updated to incorporate the Marine Recreational Information Program's Fishing Effort Survey (MRIP-FES). Additionally, three fishery-independent video surveys (SEAMAP, NMFS Panama City Laboratory, and Florida Fish and Wildlife Research Institute) were combined into one index (hereafter, "combined video survey"). The Data Workshop panel excluded the commercial vertical line index, as recent anomalies in landings could not be attributed to changes in stock biomass, but rather in fishing behavior that is thought to be a result of the individual fishing quota programs. An SSC member asked if excluding the commercial vertical line landings changed how the model considered selectivity. Ms. Cummings presented results of sensitivity analyses which indicated that selectivity was not affected by the removal of the commercial vertical line input, as it represents a relatively small component of total landings. Other modifications to the model inputs included the treatment of age and length composition data. Length compositions for all fleets were weighted by their landings using a multinomial distribution, which produced improved model fits to observed length data. Age composition data were re-weighted using the weighted length composition data, and annual proportion of age samples by age bin. Catch-per-unit-effort (CPUE) indices for the recreational fleets were not updated from SEDAR 33 Update (2016) because of management bias introduced from fishery closures in recent years.

Several life history parameters including maturity, natural mortality, age and growth were updated with contemporary research. The model struggled to fit for discards, especially for the commercial longline fleet and, in some years, for the charter/private combined fleet. Length composition analyses indicated that the combined video survey captured occurrences of juvenile and sub-adult individuals, while fishery-dependent landings data mostly represented sexually mature adults. The

SSC inquired whether the model was capable of assigning annual coefficient of variation (CV) values about the landings data for each sector. Ms. Cummings explained that while the model can calculate annual CVs, they are highly variable. Instead, a single value considered as an average was used. Steepness, used to represent the stock-recruitment relationship, was fixed at 0.777 based on simulations. The SSC asked how that value for steepness related to a maximum sustainable yield (MSY) proxy of a 30% spawning potential ratio (SPR30%). SEFSC staff indicated that a previous manuscript had estimated a steepness value of 0.8, based on the data used in SEDAR 33 (2014). Ms. Cummings indicated that steepness for the model was chosen from an analysis that considered a range of steepness profiles from 0.4-0.99, which was used to inform the steepness determination for SEDAR 70.

Preliminary results from LGL Associates on greater amberjack surveys of oil and gas platforms in the western Gulf showed a significant fraction of the stock, based on estimates of stock size from SEDAR 33 Update (2016), occurring on these artificial structures. To properly incorporate these data into the SEDAR 70 model, a complete restructuring of the model would have been necessary; there was not time enough for this effort in SEDAR 70. This work has been recommended to be incorporated in a future assessment of greater amberjack.

Base model fits to fishery-dependent indices were good for all fleets, but with a greater degree of uncertainty expressed in SEDAR 70 compared to the previous model (SEDAR 33 Update). Fits to length composition data were fair to poor, with poor fits demonstrated for discards data. Pearson residuals analysis shows a marked decrease, though, in model over- and underestimation of observed lengths, which is an improvement over SEDAR 33 Update (2016). Fits to age composition data are also improved, particularly for the youngest and oldest fish.

The majority of fishing mortality comes from the combined charter and private fleets, followed by the commercial vertical line fleet. The commercial fleet landings have decreased in magnitude substantially over the last 25 years, while the combined charter and private fleet has increased substantially. The commercial fleets tend to select for larger fish (more so the longline fleet) than the recreational fleets, a result which also translates to the ages selected by the fleets (with recreational fleets selecting for comparatively younger fish).

Estimates of total and spawning biomass have decreased steadily since the 1950s, with current estimates of each only marginally higher than their lowest points on record. SEDAR 70 produced marginally higher terminal estimates of both compared to SEDAR 33 Update (2016); however, the confidence about the estimates from SEDAR 70 are greater than those from SEDAR 33, accounting for greater uncertainty from the use of the new MRIP-FES data calibrated back to 1986. The spawner-recruit relationship remains poorly defined, and recent recruitment remains below the long-term average. Diagnostics indicated a generally stable model, converging on the same result 96% of the time. An alternative model was briefly explored (A Stock Production Model Incorporating Covariates [ASPIC]), but not to the same degree as the base model, and similar management benchmarks were not produced.

The Gulf greater amberjack stock remains overfished ($SSB_{Current}/SSB_{MSST} = 0.68$) and undergoing overfishing ($F_{Current}/F_{MSY} = 1.729$). Greater amberjack has been overfished and undergoing overfishing almost continuously since 1980.

Motion: The SSC determined that the SEDAR 70 operational assessment of Gulf of Mexico Greater Amberjack represents the best scientific information available, and, based on the assessment results, the stock status is overfished and is undergoing overfishing.

Motion carried 16-8 with 3 absent.

Projections

Recruitment for the projection period was fixed at the mean of 2009 – 2018. 2019 preliminary landings data were used for 2019, which have since been reclassified as "final". 2020 data are unavailable, and management changes are not expected to be implemented until the 2022 fishing year. As such, the mean of landings for 2016 – 2018, combined with the rebuilding target of 2027, was used to project yields for 2020 and 2021. Projections were run for 100 years to reach equilibrium, which was determined from the mean of the last 10 years of the projections period. The projections scenario shows increasing yields from 2022 – 2027, with the spawning stock biomass (SSB) > minimum stock size threshold (MSST) in 2027, and SSB > SSB_{MSY} in 2036.

When considering the effect of the inclusion of the MRIP-FES data, the SEDAR 33 Update (2016) model would have estimated an equilibrium yield of approximately 5.968 million pounds (mp) whole weight (ww) compared to 3.706 mp ww using the MRIP Coastal Household Telephone Survey (CHTS) data; however, SEDAR 70, using MRIP-FES, estimates an equilibrium yield of 3.969 mp ww, meaning that the stock has been further depleted since the 2015 terminal year of the SEDAR 33 Update. Management changes (i.e., reductions in recreational and commercial catches, increasing the recreational minimum size limit, changing the recreational fishing year, and reducing the commercial trip limits) in the last decade seem to have been ineffective at changing the trajectory of the trend in SSB, which is unusual when compared to other Gulf species. It is possible that these management changes have not been in place long enough to be effective.

In 2019, recreational fishing only occurred during the fall months, resulting in lower annual landings, thus not a good representation of greater amberjack landings during a typical fishing year. The SSC was concerned that the projection table of annual fishing mortality in relation to $F_{SPR30\%}$ never reached a ratio value of 1, which would be required for overfishing to end, and for the stock to recover. SEFSC staff indicated that this result is an ongoing issue with the Stock Synthesis projection software, and occurs when certain model considerations (i.e., sector allocations and fishing mortality) are held static and the model compensates by attributing higher levels of fishing at an older average age structure. The SEFSC added that it is actively working to address this, and the representation of uncertainty in projections to better explain how that uncertainty changes with time into the projection period. Changes from MRIP-CHTS to MRIP-FES will likely result in a change in sector allocations by the Council, which will in turn change the projections. The SSC pointed out that the $F_{Rebuild}$ goal was to achieve recovery by 2027; therefore, fishing mortality would need to be greatly reduced. The SSC also stated that the fishery has recently experienced elevated harvest levels, specifically on juvenile fish, and that recent management measures may not have been in place long enough to observe any effects on population dynamics.

Motion: The SSC accepts SEDAR 70 and recommends the greater amberjack OFL as based on the yield at $F_{SPR30\%}$, and ABC as based on the yield at $F_{Rebuild}$ (by 2027) for 2022-2024:

OFL (mp ww)
2022   1.637
2023   2.223
2024   2.781

ABC (mp ww)
2022   1.255
2023   1.767
2024   2.270

Motion carried with no objections.

Many SSC members were concerned that the model relied heavily on limited biological data, poorly characterized discard information, demonstrated highly variable recreational data landings, and could not incorporate the recent LGL Associates study suggesting much of the population biomass is unexploited around artificial structures throughout the Gulf. Other members recognized that incorporating many of these concerns were out of the scope of an operational assessment, and that perhaps a research track approach would be appropriate in the future.

Something's Fishy – Greater Amberjack

Ms. Emily Muehlstein (GMFMC Staff) presented results from the Something's Fishy tool for greater amberjack, which is designed to gain information on observed trends in fish stocks through solicitation of comments from active fishermen prior to each assessment. The results will be shared with the SSC each time the tool is used prior to the completion of an assessment. Sixty-four responses were received from April 26, 2020 to May 26, 2020. Respondents were not limited to a single response or sector; however, the majority of responses were associated with the recreational sector. Manual sentiment analysis showed a majority of respondents had an overall positive or neutral sentiment while automated analysis reported an overall positive or negative sentiment. Dr. Kai Lorenzen (University of Florida) concurred with the overall positive sentiment as he and his team have recently conducted 90 in-depth interviews with greater amberjack stakeholders from all sectors.

Manual analysis categorized responses on whether they were related to stock abundance. Responses that included both negative and positive sentiments, such as a positive view of the stock, but a negative view of stock management, received a neutral score. Most responses were gathered off central Florida and the Panhandle. The majority of negative responses were located in the Big Bend of Florida, west Texas, and Louisiana. Through automated analysis, the most frequently used negative words may be indicative of anglers seeing smaller fish and dissatisfaction with the size limit.

An SSC member asked if the analysis could separate questions about satisfaction with management from trends in abundance; however, due to the Paperwork Reduction Act, questions asked of stakeholders must be generic rather than specific. SSC members provided suggestions regarding categorizing responses. Finally, Ms. Muehlstein responded to questions regarding solicitation of stakeholder response by stating that state agencies certainly help amplify responses to Something's Fishy when they share to their respective outreach outlets.

Stock Assessment Executive Summary

The SEDAR 70 stock assessment executive summary was reviewed by the SSC, with some recommendations offered to clarify information provided within the summary. Specifically, the SSC requested that the figure depicting the years for which data are unavailable for the combined video survey index reflect that data gap (no data between 1998 – 2001, and 2003).

Research Recommendations

The SSC provided the following as additional research recommendations for SEDAR 70:

- Evaluate SEAMAP vertical line survey data and compare to commercial vertical line data to see whether the CPUE for the commercial data are reasonable.
- Evaluate expansion of the combined video survey index into the western Gulf.
- Evaluate the use of cameras mounted to remotely operated vehicles for abundance estimates and length composition data.
- Evaluate the Great Red Snapper Count and the upcoming similar greater amberjack survey processes and methods that may prove useful for developing fishery-independent monitoring sampling regimes for monitoring other stocks, particularly acoustic methodologies.

Discussion of Sea Grant/NMFS Greater Amberjack Research Program

Dr. Kai Lorenzen presented an outline of a comprehensive research project for greater amberjack in the Gulf of Mexico and South Atlantic. The United States (US) Congress has allocated ten million dollars for the study, and the objectives are similar to the recently completed Great Red Snapper Count (GRSC). The project encompasses three phases (i.e., visioning, implementing, and documentation), and an associated project steering committee will oversee the project progress. Broadly, the project's goal is to provide an independent estimate of greater amberjack abundance through their US continental range.

During the visioning phase a number of directed stakeholder interviews and informational webinars were conducted to draft research priorities and identify existing information. The results from the visioning phase will be used to develop a request for proposals that will solicit researchers to address identified data gaps. Specifically, knowledge gaps associated with greater amberjack abundance, distribution, and movement. While similar to the objectives outlined in the GRSC, greater amberjack research presents some unique challenges. Greater amberjack species identification is confounded by similarly-looking species while behavior response to survey

equipment and vertical movements in the water column can make counting individuals arduous. Additionally, there is a paucity of basic life history information along with a lack of understanding about stock structure which creates uncertainty in the stock assessment.

The SSC inquired as to whether the main focus of the greater amberjack research project would be estimating absolute abundance or addressing the numerous research priorities developed during the most recent stock assessment. Dr. Lorenzen indicated that, while the intent of the congressional directive was to estimate greater amberjack abundance, examining some basic biological questions would also be a focus of the project. He also stated that having SSC members comment on the development of survey and experimental designs would be beneficial to research outcomes. Given the broad spatial context of the project, the SSC asked how regional considerations would affect project outcomes. Dr. Lorenzen explained that comparison between the Gulf of Mexico and South Atlantic would be examined. He indicated that the steering committee may create subgroups that may be region-specific to oversee project implementation.

Review of Red Grouper Recreational Landings Data

Dr. Sagarese (SEFSC) presented on red grouper recreational landings, highlighting the causes for differences between historical recreational landings time series. She noted that the data provided in SEDAR 61 used recreational landings in number of fish, and not in weights. While commercial landings are input in weight, recreational landings are input as numbers for stock syntheses assessments, and the model produces an expected output based on multiple inputs.

The assessment model assumes greater uncertainty in recreational landings (30%) compared to commercial landings (15%). These percentages were set at the SEDAR 42 workshop. As a result of the assumed uncertainty, predicted landings are not identical to input landings. The assessment model uses a length-weight equation to convert predicted landings (in number of fish) into weight units. The ACL Monitoring Unit obtains weight measurements that are observed, followed by a calculation of the stratified mean weight. SEDAR has used recreational landings in numbers of fish, as they have been the most reliable measure in past assessments. Consideration can be given to modeling recreational landings in weights instead of numbers for ongoing research track assessments, but that will require an assumption about the coefficient of variation around these estimates.

An SSC member suggested inclusion of mean weight by fleet for stock assessment models, rather than converting landings to weights. Dr. Sagarese responded that this type of data is available and could be considered for the scamp research track. One SSC member suggested not using assessment data for anything other than stock determination and asked if the input data for stock assessment was the same as the ACL Monitoring Dataset. Dr. Sagarese stated that the data files are the same, but the weight estimates were not included in SEDAR 61. Another SSC member asked for clarification on the magnitude of discards for the recreational sector. Dr. Sagarese noted that discard mortality from the recreational sector is about 11%. An SSC member noted that from an assessment standpoint, the best information is being used.

Dr. Froeschke (GMFMC Staff) stated that the alternatives that provide new percentages for sector allocations in Reef Fish Amendment 53 were computed using the ACL Monitoring Dataset, and he asked for the SSC's input that this approach reflects best scientific information available (BSIA). An SSC member noted a reservation in describing the revised sector allocations as having used BSIA without an accompanying analysis of the impact of allocation changes on overall fishing mortality. Ms. Leann Bosarge (GMFMC) asked for confirmation that the number of fish is input into the assessment models from the ACL Monitoring Dataset, and not the pounds. Dr. Sagarese replied that the number of fish is input from the MRIP FES files. Dr. Sagarese noted that, traditionally, for the recreational sector, the number of fish is input for stock assessments, and not just for red grouper. Ms. Bosarge inquired as to the ramifications on the OFL when the stock assessment models use the length-weight equation and generate different numbers than the poundage from the ACL Monitoring Dataset. Dr. Sagarese responded that, in these cases, they are fitting to different inputs and also have uncertainty built into the assessment model. An SSC member stated that the ACL Monitoring Dataset should be used for allocation purposes.

Review of Council Proposed Interim Analysis Schedule

Mr. Ryan Rindone (GMFMC Staff) reviewed a proposal for scheduling interim analyses for Gulf species. The proposed schedule considered factors such as: fishing seasons; representative indices of abundance and when their data become available; the current SEDAR schedule; pending management actions; and other factors. The SSC noted that the 2021 red snapper interim analysis, which considers the GRSC, would require more effort than is typical of an interim analysis. SEDAR staff also clarified that use of the SEAMAP Larval Survey index requires consideration of the 18-month sample processing time for those data. The SSC was encouraged to review this proposed schedule often, as changes to some factors, such as the best index to use, may necessitate changes to terminal year and delivery date for a species. Lastly, the SSC acknowledged that 2020 was an atypical year for fishery-independent data collection in the Gulf as a result of the COVID pandemic, and may require special consideration.

Preview of Great Red Snapper Count

Dr. Greg Stunz of the Harte Research Institute presented a preview of the results of the Great Red Snapper Count (GRSC), which was a Gulf-wide collaborative research project to estimate absolute abundance of age-2 and older red snapper in the Gulf. Red snapper abundance sampling was stratified by habitat type, estimated using direct visual counts, acoustic surveys, depletion surveys, and a Gulf-wide tagging program. Dr. Stunz detailed the technologies used to survey red snapper across varying habitats and depths, and presented videos of these technologies in use. The tagging portion of the GRSC will make it possible to examine effort by region. Tagging was done primarily over artificial and natural bottom; however, future tagging studies should include uncharacterized bottom based on visual survey results. Any areas without reliable habitat characterization were lumped into "uncharacterized bottom", which Dr. Stunz stressed were areas where further study was needed. Tag returns varied somewhat by region, were incentivized with monetary rewards, and accounted for approximately 30% of all tagged fish. Length composition data were collected and compared between habitat and depth strata. The GRSC focused on "age-2" and larger fish, or those fish that were at least 254 mm total length. This determination may

result in an overestimate of length in some regions (e.g., the eastern Gulf) and an underestimate in others (e.g., the western Gulf). Larger fish make up a greater proportion of fish found over uncharacterized bottom habitat; however, fish from all observed lengths were found over each of the three habitat types.

Abundance estimates from the four regions were presented as follows (approximately): Texas, 23,000,000 fish; Louisiana, 29,000,000 fish; Mississippi and Alabama, 10,000,000; and Florida, 48,000,000 fish. Of the 110,000,000 fish estimated to be present (11% CV), approximately 52% are thought to occur in the eastern Gulf, and 48% in the western Gulf. Larger fish are still proportionately more abundant in the western Gulf. The GRSC project leaders will continue working with state and federal partners to review and integrate their findings for stock assessment and management applications; these data will be used in the 2021 interim analysis of red snapper, which will be delivered to the Council in March 2021 for SSC review.

The SSC asked about the possibility of using the data collected to better inform natural mortality. Dr. Stunz thought there were possibilities for better informing natural mortality, discard mortality, and exploitation. The 11% CV estimate was questioned, as it is more in line with estimates of relative abundance as opposed to absolute abundance. Dr. Stunz clarified that CVs were estimated by habitat strata, depth, and region, and the 11% estimate was an overall estimate across all depths and for all strata Gulf-wide. He further clarified that additional details surrounding the generation of the estimates of absolute abundance by strata, including how the CVs were constructed, will be presented in the GRSC final report. It is expected that many peer-reviewed manuscripts will be generated as a result of the GRSC. The SSC agreed that care needed to be taken in the evaluation of the GRSC data and its use for informing management.

SEFSC integration of GRSC data into interim analysis process

The SEFSC plans to present the results of the requested interim analysis of red snapper, using data from the GRSC, in March 2021. One proposed approach is to use the fishing mortality at age from the SEDAR 52 rebuilding projection, combined with the number of fish at age from the GRSC. This approach was noted to be novel, in that the ABC estimates in this approach would not be derived from the old ABC estimates. The other proposed approach would consider the numbers and catch at age by depth and habitat strata to generate estimates of fishing mortality at age to generate ABC advice. However, there may not be complete length composition data for the whole Gulf to make the second option feasible, as the length composition would be needed to inform the ages. The SEFSC intends to also explore the effect of fitting the GRSC abundance estimates within the model, the effect of fishing at the new ABC on stock biomass trajectories, and the effect of presuming a higher proxy for F_{MSY}.

The SEFSC expressed concern about the availability of the data and thorough documentation for the GRSC, which the GRSC team has promised will be available soon. Also, the GRSC absolute abundance estimate is approximately three times greater than that estimated by the SEDAR 52 assessment. The estimates of biomass over artificial and natural hardbottom habitats is similar between SEDAR 52 and the GRSC; however, the former lacks the data to estimate abundance over uncharacterized bottom. Further, estimates of removals may be higher than previously assumed (changing from MRIP-CHTS to MRIP-FES). These factors may influence perceptions of stock

productivity, which may necessitate reconsideration of the current F_{MSY} proxy ($F_{26\%SPR}$). Lastly, biomass on uncharacterized bottom may be less accessible to fishing effort, which could lead to localized depletion of red snapper on otherwise more accessible habitats (natural hardbottom and artificial habitats).

The SSC expressed concern about using the first approach, which combines the use of data from SEDAR 52 with that of the GRSC. Further, the use of the GRSC, which has not gone through the same stock assessment vetting processes as other indices, is uncharacteristic of the stock assessment and interim analysis processes. Some SSC members shared recent observations of changes in the composition (length, age) of the stock in certain areas of the Gulf, which may affect assumptions necessary to perform the first analytical approach, and should first be evaluated. The SSC also discussed the merits of reconciling discrepancies between the estimates of SEDAR 52 and those estimated by the GRSC, with the goal of improving the collection and treatment of the data used in the assessment in the future.

> **Motion: The SSC moves to request an expedited review of the Great Red Snapper Count results by an independent panel including SSC representatives and CIE or other independent reviewers with expertise in the methodologies used.**

> *Motion carried with one abstention.*

Review: Testing Assumptions about Sex Change and Spatial Management in the Protogynous Gag Grouper, Mycteroperca microlepis

Dr. Sue Lowerre-Barbieri (FWC-FWRI) gave a presentation on testing assumptions about sex change and spatial management in gag grouper. The overall goal of the project to explore sex-change drivers in gag and the extent to which sex ratios matter to reproductive success and stock productivity. Spatio-temporal traits can have a large impact on reproductive success. Although there have been studies specifically on gag life history traits that affect species abundance, there are still many unknowns and confounding results. Gag is a very complex species that doesn't tend to follow traits of other protogynous and even closely related species. There are concerns about low male sex ratios and sperm limitations that may be contributing to a potential decline in the health of the stock. The most recent gag stock assessment (SEDAR 33 2014) illustrated the differences in results of stock status when using female-only compared to combined sexes; however, use of combined sexes seemed unrealistic as it suggested the stock had been overfished since the 1960s. The model projected a low male sex ratio, but the model predictions also indicated male abundance could be increased using protected spawning sites. Based on previous studies, it is believed that sex change almost exclusively occurs on the spawning grounds. Despite gag being a highly regulated species, they may still be in jeopardy because of the uncertainty of sex-change cues, the efficacy of MPAs to increase male sex ratios, the optimal male sex ratio and if male sex ratios have even increased above 2 to 3% since the 1990s.

Data were collected from MPAs, along with an open area near Madison-Swanson, and integrated with data collected from the Florida Wildlife Commission (FWC) Fishery-Independent Monitoring survey, FWC fishery-dependent sampling, and commercial hook-and-line fishermen. Dr.

Lowerre-Barbieri summarized the results of several hypotheses. Among them, that females consistently form pre-spawning aggregations in shallow water in December, January, and February. This hypothesis was not supported by observations of large spawning aggregations in these months; however, smaller and thereby less detectable spawning aggregations may be present. Another hypothesis, that males only occur at deep water sites. There is some evidence of females aggregating and migrating to spawning grounds; however, some adult females may also remain in the MPA year-round, based on sampling during and outside of spawning season and examination of reproductive phases. Yet another tested hypothesis was that males and females overlapped at spawning grounds during spawning months. This hypothesis was supported by observed sex ratios, which vary monthly and are affected by females migrating to the spawning grounds; the male sex ratio in the MPA was only 5% during the spawning season when both sexes were present. The male sex ratio along and outside the edges of the MPA was 0% during the spawning season, and only 1% based on all fishery independent samples outside the MPA. Dr. Lowerre-Barbieri addressed the dogma that sex change occurs only on the spawning grounds by providing a description of a new sex change conceptual model detailing the complexities of gag mating strategies and sex change drivers. This study found a few transitionals, and although rare, they were not limited to the spawning grounds or by a threshold size indicating transitions can occur in pre-spawning aggregations. It was also discovered that sex change duration is relatively long compared to other species, assumed to take approximately two months. Female-to-female interactions play an important role, with selection for the most aggressive females to change to males prior to the spawning season.

Dr. Lowerre-Barbieri concluded her presentation with concerns and implications for future stock assessments. In recent years, commercial fishermen have not been meeting their quota which may be an indication of a depleted stock. In general, it's also possible that many fish are being caught before they are able to reach the spawning grounds. Despite Madison-Swanson being the most productive spawning grounds in the Gulf, it still only has a male sex ratio of approximately 5%; male sex ratios outside the preserve may be as low as 1%. These ratios are much lower compared to other protogynous species and lower than the historical sex ratio of 15%. Dr. Lowerre-Barbieri emphasized the importance of integrating males into the measure of reproductive potential rather than using female only spawning stock biomass (SSB). She also suggested a future workshop to determine the best measure of reproductive potential for future assessments.

Concerns from SSC members included the highly skewed sex ratio, transition rates and the number of fish that survive to transition considering sample sizes of transitions are fairly rare. Other questions centered on how the stock assessment can be improved using this new information while keeping in mind anecdotal information provided such as responses from the Something's Fishy tool. Responses are still being gathered and analysis has not yet been completed. There was also discussion regarding a potential problem with male recruitment; the MPAs have increased the sex ratio and population but probably not enough to make a marked difference. Dr. Cass-Calay (SEFSC) reminded everyone that the current stock assessment for gag (SEDAR 72) is already underway. Any information is welcome; the appropriate contacts are on the assessment schedule (https://sedarweb.org/docs/supp/S72_schedule_FINAL_v5.pdf).

Habitat Research Presentation

Dr. Murawski presented the results from the habitat mapping efforts on the West Florida Shelf (WFS). The project focused on designing a sampling system to quantify and estimate absolute fish density. This project sought to look at ways to strengthen the sampling methodologies to capture habitat used by economically-important species, and inform management decisions. The target species for this effort were snappers and groupers and the sampling sites were prioritized through VMS data for Reef Fish fishery. In addition, to the distribution of reef fish within habitat of the WFS, the study found a high density of sea turtles associated to the WFS pipeline. Dr. Murawski also suggested further understanding of what this would mean for the interaction between fishing practices and these protected species.

The SSC asked about relationships between species richness and benthic relief, as other studies in the Gulf of Mexico suggest a positive correlation between the two. Dr. Murawski mentioned that there are benthic species that are key to identifying the type of bottom habitat. The nature of the methodology allows for rapid data collection over a large area, thus there is opportunity to further explore hypotheses between the relationship of bottom type and species sustained by habitat type. Dr. Murawski also highlighted that frequent monitoring some of these places over time would allow management agencies to track changes in biodiversity throughout the different structures.

The SSC also asked about other limitations of the methodology in addition to avoidance/attraction to the camera and limited water clarity, as when working with complex habitats, fish have more opportunity to hide and reduce detectability by video. Dr. Murawski mentioned that when doing these types of survey, one has to account for trade-offs. Towing a video camera allows for larger area-coverage within a shorter amount of time. In addition, one would need to consider the limitations related to species size, since organisms smaller than 15 cm were harder to detect and identify during this project. Other techniques such as remotely operated vehicles, and SCUBA divers do allow for surveying shallower or more discrete areas, but would take a longer amount of time to survey large areas.

The SSC highlighted the large scale of lionfish presence and concerns about the types of implications to gag and other grouper populations. Dr. Murawski also mentioned the results from other studies looking at red grouper holes which also reported the presence of lionfish. He suggested that at this point lionfish are considered to be ubiquitous and expected to be found in any type of habitat, natural or artificial.

Request for Participants: SEDAR 79: Southeastern U.S. Mutton Snapper

Mr. Rindone solicited the SSC for volunteers for the Data, Assessment, and Review Workshops for the SEDAR 79 stock assessment for southeastern U.S. mutton snapper. The assessment will be conducted by FWRI. Drs. Jim Tolan, Jim Nance, Judd Curtis, and Paul Sammarco volunteered for the Data Workshop. Mr. Bob Gill and Dr. Dave Chagaris volunteered for the Assessment Workshop. Drs. Joe Powers and Kai Lorenzen volunteered for the Review Workshop.

Consider Carryover of Uncaught Commercial Quota for IFQ Managed Species

Dr. Jessica Stephen (NMFS SERO) gave a presentation on the 2020 IFQ Fishery Pandemic Impacts and Carry Over Needs. Dr. Stephen reviewed 2020 landings by IFQ share category and compared them to landings in previous years. For each share category, she provided pounds of quota and percentage of quota landed annually. Dr. Stephen noted that for red snapper and gag, percentages of the respective quotas landed in 2020 were similar to percentages landed in previous years. For red grouper, deep water grouper, shallow water grouper, and tilefish, percentages landed in 2020 were lower than previous years.

Dr. Stephen discussed flexibility measures in the IFQ programs including deep water and shallow water flexibility and gag and red grouper multi-use share categories. She also noted that SERO migrated the online IFQ management system to a new platform. For each IFQ share category, she provided the number of accounts with remaining allocation. Dr. Stephen provided OFLs and ABCs and discussed the size of the buffer between the respective OFLs and ABCs relative to the maximum amounts that could be carried over. She noted that carryovers would be more straightforward for share categories with a buffer between OFL and ABC greater than the potential carryover.

SSC members inquired about comparisons between 2020 dockside prices and prices in previous years. Dr. Stephen noted that information on ex-vessel values was included in the supplemental slides at the end of the presentation and indicted that red snapper prices seem to have recovered. Council staff noted that Dr. Stephen has provided updates on ex-vessel price fluctuations during Council meetings. SSC members also inquired about the modalities of previous Council carryover actions. Council staff indicated that the Council has not established carryover provisions in the past.

One SSC member commented about the lack of analyses on the biological or economic impacts regarding the overage for IFQ species from 2020, thus limiting the ability of the SSC to comment on the science behind carrying over foregone yield from 2020. Therefore, whether to do so is solely a policy decision for the Council. Another SSC member expressed support of the previous SSC member's comment and stated that the overage should be allowed so long as it did not affect the biological health of the fishery, and emphasized that the economics should not overrule the biologics. An SSC member commented that it can be difficult to determine how much of the overage can be attributed to the pandemic versus normal year-to-year fluctuations. Another SSC member suggested the Council consider correction of a 1-year impact over two to three years, instead of one year. Dr. Stephen noted that, in addition to the pandemic, multiple hurricanes impacted the Gulf, which could have also contributed to the overage.

Council staff clarified that the carryover for IFQ species being considered would be from 2020 to 2021 only, and is not intended to repeat. SEFSC simulation testing of the effects of carryover indicated that any overages would need to be paid back in the following year if carryover were implemented, to balance out removals from the stock with foregone yields. The SSC expressed concerns about allowing carryover at this time for certain species, regardless of currently published stock status (e.g., gag). The impetus for examining carryover for 2020 is to help commercial fishermen who leased shares from other shareholders for the 2020 fishing season, and didn't catch

those pounds, thereby losing the money spent on those pounds because they don't automatically carry over to 2021. The SSC didn't think trends for 2020 are that far removed from fishery performance in previous years. The SSC also expressed reservations with the idea of the Council intervening to alleviate economic burdens on fishermen due to unforeseeable circumstances. The primary goal with respect to a species with conservation concerns should be for the conservation of that stock. Ultimately, the SSC thought the issue was mostly a policy issue.

Other Business

Benefit of having a one-day SSC meeting to discuss Tier 1 of the ABC Control Rule

The SSC acknowledged difficulties with the use of Tier 1 of the ABC Control Rule as modeling environments and data collection programs have evolved. In the beginning, probability density functions were developed to generate catch estimates; however, a recurring issue has been the resultant buffer from the application of the ABC Control Rule's P* method for creating the difference between the OFL and ABC. This buffer has recently been quite narrow for many species, thereby suggesting low scientific uncertainty between those catch limits, which the SSC finds unreasonable. As such, a one-day workshop to discuss modifications to Tier 1 of the ABC Control Rule is requested.

> **Motion: The SSC requests the Council ED convene an SSC meeting to review and discuss the Tier 1 ABC Control Rule.**
>
> *Motion carried with no objection.*

SSC Application and Appointment Process

Dr. Carrie Simmons (GMFMC Staff) notified the SSC of the application deadlines and process for reappointments to the SSCs in 2021. The Council will send out applications for the Standing and Special SSCs in early April 2021 and the Council will make selections during its June 2021 meeting in closed session. Currently Standing or Special SSCs members will need to reapply to be considered for appointment to SSC for the next 3-year term.

SSC Participants

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

Andrew Ropicki

Special Reef Fish SSC
Jason Adriance
Judd Curtis
John Mareska

Special Ecosystem SSC
Paul Sammarco
Mandy Karnauskas
Cam Ainsworth

Special Socioeconomic SSC
Kari Buck
Jack Isaacs

A list of all meeting participants can be viewed here.