Standing, Reef Fish, Socioeconomic, Shrimp, and Ecosystem SSC
Meeting Summary
March 7 – 9, 2023

The meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Standing, Reef Fish, Socioeconomic, Shrimp, and Ecosystem Scientific and Statistical Committees (SSC) was convened at 8:30 AM EDT on March 7, 2023. The agenda for this meeting was approved along with the minutes from the January 2023 SSC meeting. Verbatim minutes from past SSC meetings can be reviewed here.

Dr. Jim Nance will represent the SSC at the Council's April 3 – 6, 2023, meeting in Gulfport, Mississippi.

Review of Shrimp Effort Estimation

Mr. Dettloff (Southeast Fisheries Science Center [SEFSC]) presented on a new method for estimating effort Gulf shrimp fishery. He reviewed how vessel position data for Gulf shrimp vessels are collected by cellular electronic logbooks (cELBs) and then identified the goals of the new methodology, which continues to use vessel position data to generate effort estimates. One change in the methodology involves scaling of effort to the total fleet; in doing so, matching of trip tickets with vessel position data is no longer required, which allows for more complete use of data as not all trip tickets were matched. Mr. Dettloff also discussed assumptions required for the effort estimation method, such as catch per unit effort (CPUE) of vessels with cELBs on board being representative of the total fleet. He then reviewed how vessel speed is categorized as either steaming or fishing (towing).

Zones 17-21 were separated from zones 1-14 in the effort algorithm as determined initially by port sampling. An SSC member commented that, while zones 13-21 are west of the Mississippi River, vessels shrimping from zones 11-12 usually also shrimp in zones 13-14. Another SSC member inquired how clustering is denoted in the presented effort distribution map. Mr. Detloff noted that, at the trip level, a binary response for fishing is recorded. The SSC member then asked why four clusters were decided upon, instead of five or six. Mr. Dettloff responded that a clear break at four clusters occurred, when examining data from 2014-2020, and provided fine enough resolution. The SSC member then encouraged exploring resemblance profiles for determining clusters.

Mr. Dettloff reviewed the effort estimates under the current approach and the new approach for the areas monitored for red snapper bycatch and noted that they are similar with both approaches. Mr. Dettloff added that cELB data begins in 2014, so it is not possible to evaluate effort with the new method prior to that year. He stated that the 2020 target reduction for juvenile red snapper in zones 10-21 in the 10-30 fathom depth zone is 77.2%.

An SSC member inquired if any ground truthing occurs to ensure accuracy of tow speeds. Mr. Dettloff responded that comparisons have been made using observers and cELBs on the same vessel. Another SSC member asked if randomized draws from the industry to carry cELB units was being considered. Dr. Gloeckner (SEFSC) responded that a randomized sample versus full

coverage is still under discussion, but the type of device to replace the current cELB units needs to be determined first.

An SSC member noted that the assumption that the reporting of landings is similar between ELB and non-ELB vessels should be further explored, as there are ELB non-reporting vessels currently. He suggested looking at historical landings and effort for ELB non-reporting vessels to see if this assumption still holds. Mr. Dettloff responded that they could explore that issue. Another SSC member inquired how the compliance rate for returning secure digital (SD) cards has looked over the past two years and how the Council is moving forward to replace the cELB units, which no longer transmit. Dr. Lowther (SEFSC) responded that the return rate is roughly 60%.

Council staff noted that the Council's Outreach and Technical Committee also discussed how to improve return rates and provided recommendations to NMFS. Council staff noted that the Council, at its April 2023 meeting, will receive presentations comparing data collection from cELB units with cellular vessel monitoring systems (VMS) and other units on the same vessels; the Council has a draft framework action to determine how to replace the cELB units, which no longer transmit. Further, the Council will accommodate time to allow for the adoption of the any replacement system for the current cELBs. The Council also recognizes that these effort data are essential for evaluating proposed closed areas, offshore aquaculture and energy leases, and other marine spatial planning and use issues. An SSC member noted that the effort data stream from the Gulf shrimp industry is critical as well for other species, such as red snapper and sea turtles. Another SSC member said that universal adoption could be a benefit to the industry, as data have previously been used to inform potential impacts of spatial management measures (e.g., sanctuaries, habitat areas of particular concern, wind energy lease areas) and minimize impacts to the industry.

Dr. Tom Frazer (Council representative) inquired what the observer coverage is on Gulf shrimp vessels. An SSC member responded that it is roughly 1-2% of the industry. Another SSC member inquired if double-counting of effort could occur if shrimp vessels had permits for other fisheries. An SSC member responded that the activity for shrimping would look very different than that used for other fishing activity. Council staff noted that, as of July 2021, there were 1,360 vessels in the Gulf with valid shrimp permits. Of those vessels, 465 had permits in other Gulf commercial fisheries, and 113 of those had to comply with VMS requirements as a function of their participation in other fisheries. An SSC member recommended that a randomized sample of vessels to carry cELB units every couple of years would better support the assumptions built into the effort estimation model. Mr. Dettloff responded that it was something that could be explored.

An SSC member inquired if the decrease in mailouts for SD cards was due solely to attrition or due to damaged cELB units. Dr. Lowther noted that, when requested by shrimpers, only replacement antennas have been sent in recent years. No new cELB units have been sent out since 2019, so the decrease in mailouts for SD cards could be due to both attrition and damaged equipment. Dr. Lowther added that if an SD card with no data is received, it could mean no fishing occurred, the cELB units were off or not recording properly, or the shrimper mailed back the same SD card without installing it.

An SSC member noted that despite some concerns with data collection, the new effort estimation model is reliably functional. He further noted that a census approach for devices collecting vessel position data would reduce scientific uncertainty. Another SSC inquired why the confidence interval is not changing from 2014-2020, as the number of cELB vessels reporting has decreased. Mr. Dettloff responded that this is due to the relative change in proportion of cELB vessels reporting to total vessels, and both numbers have decreased.

Dr. Frazer noted that there is a deteriorating data stream but that the integrity of the data for management of shrimp and into the management of other species needs to be considered. An SSC member requested information behind the assumptions in the presentation and how NMFS plans to address any shortcomings. Another SSC member noted that census coverage would address assumptions 3, 4, and 5 from the presentation and that observer coverage would address assumptions 1 and 2. An SSC member recommended using the current observer coverage to test the assumptions. Mr. Dettloff confirmed that a similar pattern of declining effort exists for the eastern Gulf as in the western Gulf, and that the confidence intervals were similar in both regions.

> **Motion: To test to the extent practicable, given currently available data, the five assumptions underlying the analysis used to estimate fishing effort in offshore waters for the GOM shrimp industry and that those results be brought back to the SSC for consideration.**
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> 1. **ELB devices are capturing all fishing activity**
> 2. **There is no systematic bias in classification of effort from ELB devices**
> 3. **CPUE of vessels with ELBs on board is representative of the total fleet**
> 4. **Spatial distribution of ELB vessels is representative of the total fleet**
> 5. **Reporting of landings is similar between ELB vessels and non-ELB vessels**
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> *Motion carried without opposition.*

An SSC member thought those assumptions are testable for vessels with reporting and non-reporting cELB units. Another SSC member inquired how these data were originally recorded; an SSC member responded that port agents used to collect those data prior to cellular data transmission. An SSC member then inquired if a simulation could be used to test these assumptions. Dr. Mike Travis (Southeast Regional Office [SERO]) stated that, to determine whether the fleet with cELB data is representative of the total active fleet, particularly starting in 2021, the SEFSC can look at whether the characteristics of the former and latter are similar using data from the permit forms and vessel/gear forms. From the permit forms, they can look at the age of the vessel, freezer capability, length, horsepower (HP), crew size, and hailing or homeport/hailing city/state. From the vessel/gear form, they can look at the number of days fishing and whether the vessel is run by an owner/operator or hired captain (HC). He stated that, based on existing estimates, that there has been a trend toward greater HP, more freezer vessels, and more HC vessels and that it also appears the vessel fleet has aged. Dr. Travis stated that the question is whether or not these changes in the characteristics of the total active fleet are being seen in the fleet covered by the cELBs.

An SSC member asked what method is to be used in the interim. Another SSC member responded that the new approach is the only way forward and that it is not possible to utilize the old approach.

Motion: The SSC supports NMFS' continued examination of new technology and its potential acceptance in the industry for passive spatial monitoring in the offshore GOM shrimp industry to aid in meeting the assumptions of the current methods of calculating effort.

Motion carried 21-1 with 3 abstentions and 2 absent.

Motion: The SSC supports consideration of universal adoption, among other levels of coverage, of a passive electronic monitoring system for federally permitted vessels in the GOM shrimp industry.

Motion carried 19-2 with 1 abstention and 2 absent.

An SSC member noted that randomized sampling would, in theory, lead to all vessel owners eventually having a vessel position monitoring device, so it could then be census-level data colleciton. He encouraged the Council to consider the motion as an alternative. Another SSC member commented that more data is generally better, particularly given the shrimp industry's impact on other fisheries. An SSC member then commented that consideration of universal adoption also addresses concerns of data degradation. Another SSC member noted that universal adoption of VMS in other fisheries was for enforcement purposes, rather than for scientific data, which is what the data is used for in the Gulf shrimp industry.

Review of New Shrimp Assessment Models

Dr. Molly Stevens and Dr. Steven Munch (SEFSC) presented an update on the development of empirical dynamic models (EDMs) for predicting brown and white shrimp abundance in the Gulf. These models are being prepared for consideration in the Southeast Data, Assessment, and Review (SEDAR) 87 research track assessment, which will focus on Gulf brown, white, and pink shrimp. Workshops to develop these models were convened in 2022 to review EDM theory and examples in fisheries applications, and an overview of current Gulf Shrimp EDM methods, results, and proposed next steps. EDMs have two key advantages: data on all variables are not needed to make accurate predictions, and if enough data is available, equations are not needed to estimate effort.

Dr. Munch demonstrated a three-species model with type-2 functional response (see Holling 1966[1]). He showed how feedback loops between the focal stock being assessed, and other parts of ecosystem, are likely important; however, he noted that assessment scientists won't have data to characterize every relationship with the focal stock. Thus, a method to implicitly account for these interactions is necessary for examining these species, acknowledging that there may not be sufficient data on all variables to characterize those feedback loops. Delay coordinates allow the model to use lags in fisheries for a long time period as approximations to an age-structured model.

[1] Holling, C. S. 1966. The functional response of invertebrate predators to prey density. Memoirs of the Entomological Society of Canada 48:1–87.

Finding reference points and establishing control rules for EDM requires factors like maximum sustainable yield (MSY), defining optimal control rules, and applying harvest control rules. For a standard assessment approach, a model is fit to the data, with a fixed harvest rate, and run to equilibrium to find MSY. Under the EDM approach, the EDM is fit to the abundance and landings data, or landings and effort. The harvest rate is again fixed, and the model is run to equilibrium to find MSY. In both examples, harvest rate can be varied to find MSY. Testing the EDM to find MSY requires considering one of three exploitation scenarios: effort increases linearly with time; effort plateaus at an upper asymptote with time; and, effort peaks and then decreases with time (modal).

An SSC member asked how the EDM approach differs from the standard delay difference model. Dr. Munch replied that the EDM approach is more general, except that lags are used to represent everything not explicitly included in the model, and that the model does not use a fixed functional form. He added that the analyst isn't trying to forecast far into the future, but rather to find the steady state where the abundance estimated at one point in the future is similar to the subsequent points in time.

Previously, spatial hierarchical models were developed using only Southeast Area Monitoring and Assessment Program (SEAMAP) and *in situ* environmental data. Using the SEAMAP summer index was favored by modelers as the first version model potentially used for index-based management. Dr. Munch and colleagues investigated the aggregated Gulf-mean SEAMAP and fishery catch data for the EDM forecasting. Additionally, environmental variables (e.g., temperature, oxygen, salinity) and Louisiana recruitment indices (i.e., statewide, west, east) were investigated at the aggregated Gulf-mean scale, together with shrimp catch data. These models included lags of CPUE and catch, and predicted accuracy was assessed with leave-one-out forecasts to test the model's ability to predict SEAMAP trends. An SSC member asked why some workshop participants disagreed with pairing the model's performance to the SEAMAP survey. Dr. Munch replied that those in opposition were mostly shrimp fishermen; he also said that researchers conducting the SEAMAP survey thought that it was representative of abundance.

Dr. Munch displayed model performance comparisons showing that the use of lags in the EDM approach helps the EDM perform with 2-3 times greater accuracy than standard surplus production models. Other factors to serve as predictors of abundance besides SEAMAP and catch data included bottom temperature, dissolved oxygen, and salinity.

Dr. Munch encouraged the SSC to consider whether there was merit in continuing development of the EDM approach. He acknowledged that there were likely additional data that could be considered and that the approach would continue to be refined with time and practice. An SSC member remarked on differences between brown and white shrimp with respect to how they respond to changes in temperature and salinity. He thought these needed to be treated separately.

Dr. Munch said that models using SEAMAP and fishery catch data, in general, outperformed the models including environmental variables (e.g., bottom temperature, oxygen, salinity). Models using SEAMAP and fishery catch data, in general, performed equally well with the models including Louisiana (juvenile) recruitment indices. Dr. Munch stressed that this does not mean that these other variables are irrelevant; rather, it means that the information they provide is

already contained in the lags for shrimp. Dr. Munch noted that it is possible to do the same types of post-hoc calculations typical of a production model (e.g. stock status, etc.), and to use the best-fitted EDM to produce benchmarks for constant catch and determining effort policy. He also noted that some fishermen expressed concern about trying to predict shrimp abundance from the available data.

Dr. Stevens reviewed the status of the shrimp SEDAR research track assessment (SEDAR 87). Data providers have been identified, and panel participants are being solicited. Ahead of the Data Workshop, the analysis will construct a conceptual model along with the data provision. An SSC member asked about the sorts of information to be considered in SEDAR 87. Dr. Stevens replied that all data, including landings reports, life history, history of the development of the Gulf shrimp fishery, and more will all be evaluated. An SSC member encouraged the inclusion of physical and chemical parameters from the inshore nursery grounds as potential influencers of brown shrimp recruitment in particular. An SSC member noted the importance of maintaining consistency in the data considered for evaluating shrimp, especially since there are considerable data gaps in 2020 in many data products due to the pandemic. Dr. Stevens replied that the data scoping and data workshop phases are designed to identify and evaluate those data, respectively, ahead of further model development.

Review of Royal Red Shrimp Landings

Dr. Molly Stevens summarized the 2021 landings of royal red shrimp, relative to the annual catch limit (ACL). She stated that the landings have remained below the ACL and that the landings data were confidential in some years and thus reported as multi-year average where necessary. She also noted that imported shrimp from Argentina may be reducing the economic viablility of this fishery.

SEDAR 87 Gulf of Mexico Shrimp TORs, Schedule, and Participants Approval

SEDAR 87 will be a research track assessment to develop newly proposed models for penaeid shrimp in the Gulf. The SSC discussed the merits of explicit consideration of social science and economic factors, and included consideration of as much in the Data and Assessment portions of the TORs. The SSC also noted the use of a Gulf shrimp fishery-wide estimate of optimum yield (OY). An SEFSC staff recalled previous requests to evaluate the economics of the Texas Shrimp Closure, and the SSC agreed that such an analysis should be considered as part of SEDAR 87.

Drs. Jim Nance and Benny Gallaway volunteered to participate on the Assessment Development Team. Dr. David Griffith, Peyton Cagle, Jason Saucier, and Don Behringer volunteered to participate as Data Workshop panelists.

These TORs and participants will be reviewed for approval by the Council in accordance with its SEDAR approval process.

Review of SEDAR Schedule and Planned Interim Analyses

Council staff reviewed the Gulf SEDAR assessment schedule that was updated after the February 2023 Steering Committee meeting. Dr. Katie Siegfried confirmed that the SEFSC was planning to delay the SEDAR 74 (Red Snapper) Review Workshop from the late July 2023 dates at the Council office to a later date in the fall of 2023. Further, the review of SEDAR 81 (Gulf Spanish mackerel) will be delayed to the July 2023 SSC meeting. Official memos are being drafted for the SEFSC Director to approve. An SSC member asked what the plan was for species like red drum and goliath grouper regarding conducting a data poor assessment. Council staff responded the last time an assessment for red drum was considered, it largely focused on the various escapement methodologies used by the Gulf states. Even though these escapement rates are considered acceptable for management, they would be very difficult to compile for a stock assessment, particularly due to the limited information on the spawning stock biomass (SSB) in the western Gulf. One SSC member recommended working with the SSC and Gulf States Marine Fisheries Commission to determine what datasets are available for red drum between now and 2026 or 2027, when there may be an opening for a data-limited assessment or other evaluation. It was also recommended that the start of the greater amberjack research track be pushed back one year to accommodate the ongoing research being conducted in both the Gulf and South Atlantic.

Staff reviewed the proposed Interim Analysis (IA) schedule. SEFSC staff provided feedback and updates on the candidate indices listed for each IA. An SSC member noted the need to discuss the process and application of IAs at a future SSC meeting, including timing of indices processing, catch advice changes, overfishing limit (OFL) and acceptable biological catch (ABC), and time limits on using IAs for catch advice so many years after the terminal year of the stock assessment. The SSC discussed the need for a health check versus updated catch advice, and the resources involved to conduct an IA without catch advice.

The SSC also discussed the delivery dates and timing of the fishery-independent indices processing compared to the delivery date of the IA. SEFSC staff suggested including IAs in the SEDAR process, and also noted a 2-year lag for all IAs needing processing of fishery-independent video data. Council staff countered that the current process of IAs being organized external to SEDAR provided responsiveness and flexibility that would be compromised by the nature of the SEDAR process. The SSC then discussed overall changes to indices such as the combined video survey compared to the GFISHER survey. An SSC member noted there has been ongoing coordination between the Fish and Wildlife Research Institute (FWRI) and the SEFSC to increase capacity for processing video data. An SSC member asked about the differences in the combined video index versus the GFISHER index and their use in stock assessments, versus their use in IAs. A truncated index using GFISHER has been recommended just for the requested gag IA, and uses the same sampling stratification as the combined video index.

Review of Red Grouper OA TORs and Participants Approval

Council staff reviewed the proposed terms of reference for the upcoming SEDAR 88 operational assessment of red grouper. This assessment will also consider the State of Florida's State Reef Fish Survey (SRFS) landings data for the recreational private vessel fleet, and updated red tide

mortality modeling. An SSC member noted that the necessary satellite data are no longer being maintained by the National Aeronautics and Space Administration, and thus data for evaluating red tide will need to be determined during the assessment process. Another SSC member recalled that FWC excluded 2020 during its evaluation of calibration ratios for red snapper.

Council staff also requested volunteers for the topical working groups (TWGs), which will specifically address the incorporation of SRFS and new red tide data, respectively. A single pool of TWG participants will serve on both TWGs, which will meet virtually between the fall of 2023 and spring of 2024. Drs. Jim Tolan, Dave Chagaris, and Luiz Barbieri from the SSC volunteered. Dr. Brendan Turley from the SEFSC will also participate.

These TORs and participants will be reviewed for approval by the Council in accordance with its SEDAR approval process.

Solicitation of Volunteers for SEDAR 74 Red Snapper Research Track Review Workshop

Council staff requested volunteers for the Review Workshop (RW) for the SEDAR 74 research track assessment for red snapper. The RW is currently planned to be held in-person at the Council Office in Tampa, Florida, from July 31 – August 4, 2023. However, the RW is expected to be delayed into the fall (November 6-9; or, December 11-15). Drs. Sean Powers, Roy Crabtree, Steve Saul, and Mike Allen volunteered to be reviewers, and Dr. Jim Nance volunteered to serve as the RW Chair.

These participants will be reviewed for approval by the Council in accordance with its SEDAR approval process.

Scamp and Yellowmouth Grouper Updated Projections within the Shallow-water Grouper Complex

Dr. Skyler Sagarese (SEFSC) presented updated projections for the Council's shallow-water grouper complex, which includes scamp, yellowmouth grouper, black grouper, and yellowfin grouper. Scamp and yellowmouth grouper were recently assessed in SEDAR 68, which examined both species together as a complex, and found these species to be healthy. The Council did not express interest in creating a new individual fishing quota (IFQ) program share category for scamp and yellowmouth grouper; therefore, the SEFSC was requested to update the projections for the entire shallow-water grouper complex, which necessitated calibrating historical landings for black grouper and yellowfin grouper to the Marine Recreational Information Program's Fishing Effort Survey (MRIP-FES) data units, to match the data units with those used for scamp and yellowmouth grouper in SEDAR 68. The species in the shallow-water grouper complex do not use sector allocations.

Dr Sagarese reviewed a decision by the SSC in September 2022, to use the mean recruitment over the last 10 years for which recruitment data were available (2008 – 2017. The SEDAR 68 OA

base model did not estimate recruitment deviations through the terminal year (2020); it stopped in 2017 due to a lag in encountering scamp in the requisite data sets. For 2018 – 2020, the model predicted recruitment estimates from the spawner-recruit curve (~1.2 million scamp in each year) based on the Beverton-Holt stock recruit relationship. When projecting with recent mean recruitment (2018 – 2020), the model did not converge; thus, those recruitment estimates were replaced with the recent mean, which was much lower. Dr. Sagarese noted that for the OFL projection, the model was modified to estimate recruitment deviations through 2020 to enable projections, with the 2019 and 2020 estimates of recruitment remaining highly uncertain.

Dr. Sagarese reviewed updated projection settings for scamp and yellowmouth grouper. The projections assume the recent mean recruitment, where the MSY proxy equals the yield when fishing at 40% SPR ($F_{40\%SPR}$), and OY equals 0.9 * MSY proxy (i.e., $F_{40\%SPR}$). Dr. Sagarese showed that the lower recruitment setting translates to lower SSB and stock status ratios. Council staff asked why the projections appeared to show that the stock was being fished down to MSST, as opposed to $SSB_{40\%SPR}$. Dr. Sagarese replied that if the projection was carried forward beyond the typical 5 years, that the stock would be fished to a lower biomass level corresponding to the lower estimate of recruitment. However, these projections aren't meant to be viewed in the context of achieving equilibrium, but rather that recruitment is not expected to be as optimistic as the model-derived values from the base model in the short term. The long-term projections would still be based on the long-term average recruitment, and not the 10-year average used for these projections.

Alternative projections for scamp and yellowmouth grouper were shown, with a version beginning in 2024, and assuming landings in 2023 will be the same as those from 2022, which were based on the average from 2019 – 2021. Another correction was shown, correcting a discrepancy with the 2021 charter/private recreational landings. Those landings were reduced from 96,068 to 83,595 fish (data correction for charter in West Florida in all waves of 2021), which also updated the 2019-2021 average landings (this average also informs 2022 and 2023). A projection for ABC was also provided assuming the ABC would be set equal to 75% of the yield at $F_{40\%SPR}$. Dr. Sagarese said that this was just one way in which the ABC could be addressed.

An SSC member commented on how the recent landings show a decrease over the last 10 years, and noted that the stock may be responding to fishing pressure. Another SSC member asked which fishery-independent index was primarily informing the model. Dr. Sagarese replied that the combined video index was the only fishery-independent index informing the model.

The SSC discussed options for how to set the OFL and ABC, while retaining all four shallow-water grouper species within the shallow-water grouper complex. SSC members discussed some of the difficulties with breaking scamp and yellowmouth grouper out in the context of the commercial IFQ program. One option discussed was to use the projections for scamp and yellowmouth grouper from SEDAR 68, and use a reference period to inform the catch limits for black grouper and yellowfin grouper. An SSC member noted an allowance for landing scamp specifically under both the shallow-water grouper and deep-water grouper complexes within the Grouper-Tilefish IFQ program. Another alternative discussed was to revise the scamp and yellowmouth grouper portion of the shallow-water grouper complex, without updating the black grouper and yellowfin grouper catch limits, and then adding the four species together. However,

this method would require re-examining the black grouper and yellowfin grouper landings in MRIP-FES to make them comparable to the data units in SEDAR 68. The SSC would need to select a reference period to inform catch for black grouper and yellowfin grouper. An issue with summing the results of SEDAR 68 with a Tier 3a approach for black grouper and yellowfin grouper is that if harvest of scamp and yellowmouth grouper exceed the OFL projections from SEDAR 68, overfishing of those species within that year would be estimated to have occurred. This is particularly an issue with the IFQ program, as once allocation is released to shareholders, it cannot be recalled. Another alternative is a proportional approach based on the fraction of landings attributable to each species; however, this approach yields catch limits which infer that black grouper and yellowfin grouper are in a similar stock condition as scamp and yellowmouth grouper, which cannot presently be verified.

The SSC thought it was most appropriate to address the results of SEDAR 68, and provide an OFL and ABC to the Council for scamp and yellowmouth grouper. The SSC could then discuss how to address black grouper and yellowfin grouper at a subsequent meeting. Some SSC members expressed concern about not providing combined OFLs and ABCs for the shallow-water grouper complex as a whole, since that is how the included species are presently managed. Another SSC member discussed the merits of acknowledging the results of the SEDAR 68 projections in the context of the application of the ABC Control Rule, but not yet setting the catch limits for shallow-water grouper as a whole complex.

> **Motion**: **The SSC moves to accept the updated projections for the SEDAR 68 Gulf of Mexico Scamp and Yellowmouth OA. Accordingly, the SSC recommends that catch level recommendations for OFL and ABC for the period 2024-2026 be set as the yield (million pounds gutted weight; mp gw) at $F_{40\%SPR}$ and ABC as the yield (mp gw) at $0.75*F_{40\%SPR}$.**

Year	OFL (mp gw)	ABC (mp gw)
2024	0.271	0.203
2025	0.263	0.203
2026	0.257	0.203

> *Motion carried 19 – 2, with 3 absent.*

The SSC determined that it would need recreational and commercial catch for black grouper and yellowfin grouper, dating back to 1986, with recreational catch in MRIP-FES data units. These data would then be considered under Tier 3a for establishing an OFL and ABC. For discussion, reference periods reflective of those considered in the Generic ACL/AM Amendment, and for the last 10 years (2012 – 2021), could be provided. An SSC member suggested that new SSC members review past discussions of the data used in the Generic ACL/AM Amendment prior to the next SSC meeting in May 2023.

Incorporating Socioeconomic Data into Stock Assessments and its Effect on Status Determination Criteria

Dr. Steve Saul (Arizona State University, Ecosystem SSC member) presented research examining methods for incorporating social and economic data into stock assessments with an emphasis on agent-based modeling. While most research attention is focused on uncertainty around biological data, resource users may respond to policies in unintended ways, which also increases uncertainty. He described how the spatial patterns of directed fishing effort introduce biases to assessments and provided an example using a simulation model with fish population dynamics and fishing fleet behavioral dynamics, to demonstrate how agent-based modeling could be used to simulate such complex dynamics of social and biological interactions. Dr. Saul proposed that agent-based modeling could be more appropriate than traditional models for capturing some of the important and dynamic human and fish population interactions and their feedback mechanisms.

Dr. Saul described two versions of an agent-based simulation model he developed with different spatial, temporal, and species parameters: a "Legacy" and a "Full Gulf" version. The Legacy version incorporates only the west Florida shelf (WFS) and covers a time period ending with the implementiong of the IFQ program. It includes fishery-dependent data on four species: red grouper, gag, mutton snapper, and red snapper. The broader Full Gulf version encompasses the entire Gulf of Mexico region and includes years both before and since implementation of the IFQ program. The Full Gulf version adds the following species to those included in the Legacy version: gray triggerfish, tilefish, vermilion snapper, and yellowfin grouper. Dr. Saul further summarized the data inputs, which were organized into structural, ecological, and human layers, including the data limitations therein.

Presenting the simulation model results, Dr. Saul returned to the question of where human behavior could be incorporated into stock assessments. After describing the typical CPUE index as standardly used in stock assessments, he presented an extended CPUE standardization in which he incorporated additional factors, such as market prices and vessel characteristics. He then compared the outputs from using the two approaches to calculating CPUE to examine how the inputs concerning fisher behavior may bias the stock assessment. Ultimately, additional work is needed for an improved index, but the work on expanding the variables factored into a CPUE index is promising.

Summarizing some of the differences between the models, Dr. Saul described how the spatial distribution of fishing effort is incorporated into assessments may lead to an assessment that misses areas of high biomass outside of locally depleted ones. He suggested the need for improved spatial resolution in the commercial logbook data, and to place fishery-independent surveys in areas with low fishing effort to fill in spatial gaps in fishery-dependent data. Dr. Saul compared the simulation model to a real world example that uses VMS data for vessels harvesting red grouper and gag, and noted where there was spatial agreement. He also provided an example of agent-based modeling used in the U.S. west coast groundfish fishery.

Finishing with suggestions for future Gulf of Mexico research, Dr. Saul noted the need to better incorporate information on fisher behavior into stock assessments and fisheries management. He suggested the need to find ways to combine or embed discrete choice models into stock

assessments and to incorporate additional variables in CPUE standardization. He suggested the use of agent-based models to improve projections that account for fisher behavior and to trial proposed management scenarios. He finished by thanking the fishers he worked with on these projects and emphasized the importance of the ethnography he did to understand the fishery, to learn how the fishery works, and to understand how the fishers themselves understand fish abundance and biomass.

Discussion of Decision Points for Evaluating Proxies for Maximum Sustainable Yield

Dr. Bill Harford (Nature Analytics) gave a presentation regarding best practices for selectng MSY proxies for Gulf managed stocks, focusing on representative snappers and groupers as case studies. He summarized important biological and ecological factors that should be evaluated when considering an MSY or proxy value. He discussed steepness in stock assessents and some of the factors and expected consequences for typical settings when steepness is fixed or externally informed. Steepness refers to an estimate of the reproductive capacity of a stock relative to the reproductive capacity of that same stock in an unfished condition. Steepness values closer to 1 indicate a more productive stock that is likely more resilient to high levels of fishing mortality. In practice, estimating steepness for a particular stock can be highly uncertain and Dr. Harford presented an approach to incorporate this uncertainty in the decision making process to establish a steepness estimate. With regard to equilibrium catch levels at a given MSY (or proxy), estimates will be higher with increasing steepness estimates (i.e., closer to 1); however, these levels may not account for uncertainty and may overestimate the reproductive capacity of the stock, and could subject the stock to an increased risk of overfishing and/or stock depletion. Dr. Harford conducted a simulation-based study that examined the influence of uncertainty on steepness values and the corresponding effect on recommended MSY proxy values for a particular stock. He examined three levels of uncertainty, characterized by different distributions (i.e., a point estimate, bell-shaped, and uniform distributions) corresponding to increasing levels of uncertainty. He performed the simulations for 17 snapper and grouper stocks in the Gulf of Mexico and U.S. South Atlantic. For snapper stocks, the greatest probability of achieving MSY in the long-term was found using an $F_{40\%SPR}$. For hermaphroditic groupers, $F_{50\%SPR}$ produced the greatest likelihood of achieving MSY over the long-term. For both groups, incorporating uncertainty into the estimates of steepness led to increased F_{SPR} estimates necessary to achieve MSY.

Dr. Harford noted that his simulation results assumed fleet selectivity occurred at the length in which 50% of individuals are sexually mature (L_{50}). He stated that this is reasonable for most Gulf stocks but then discussed that the guidance may not be applicable if harvest begins either well above or below L_{50}. Harvesting below L_{50} is more risk prone, while harvesting above the L_{50} is more risk averse but may lead to forgone yield. Finally, he suggested that reference points for hermaphroditc species should be calculated using total biomass rather than female only biomass that was previously commonly applied to Gulf stocks.

An SSC member asked whether this guidance is a limit reference point or if it includes a buffer to account for unanticipated events, and how could this be applied with reasonable management timelines (e.g., 10 years). Dr. Harford noted that this guidance is a limit rather than a target reference point. Another SSC member asked how the catch advice would change with a steepness values closer to 1. Dr. Harford replied that the stock can be fished harder but the SSC member noted that this is similar to establishing MSY proxies and these two management metrics need to be considered in tandem. An SSC member then asked if the simulation could evaluate steepness

values at smaller incresments than the 0.1 gaps included in the results presented. Dr. Harford indicated that this is possible but was not part of the work presented.

Explicit Temporal Modeling of Recruitment Residuals from Stock Synthesis

Dr. Josh Kilborn (University of South Florida; Ecosystem SSC) presented the use of asymmetric eigenvector mapping (i.e., temporal factors) to account for variability in Stock Synthesis (SS3) new recruit estimates for a number of different species. The presentation focused on some of Dr. Kilborn's work that highlights a few species that show regular periodicity in their recruit deviations, and relationships with environmental covariates that operate at those same timescales. Dr. Kilborn investigated temporal variability in stocks' recruitment deviations in the Gulf of Mexico large marine ecosystem, with the intention of explicitly accounting for temporal autocorrelation. Recruitment variability was related to ecological considerations. He described and interpreted the ecosystem trajectory for the Gulf's complex adaptive fishery ecosystem (Gulf CAFE), and discussed potential impacts to decision making and stock assessments.

Dr. Kilborn discussed the mechanics of a redundancy analysis (RDA), which examines response indicators (things we care about) against predictor indicators (which are things hypothesized to affects the things we care about). The predictor indicators have an effect on the response indicators. The RDA is a form of a constrained principal components analysis (PCA), which allows for summarizing the multivariate relationships between the response and predictor indicators. Axes are sorted according to the increasing percent of variability in the response indicator explained by the predictor indicator. Dr. Kilborn next discussed asymmetric eigenvector mapping (AEM), which introduces time (temporal indicators) into the relationship between the predictor and response indicators. These temporal indicators provide an additional structure to the sampling universe within the AEM, and along with the response indicators, uses forward variable selection to determine the optimal model. Factors like fishery abundance levels and recruitment deviations can be further explained by these temporal eigenvectors. The result of this selection process is a temporally structured, and a non-temporally structured, recruitment deviation model. Between these, Akaike's Information Criterion is used to select the most parsimonious model, given the data available as predictors in both.

To set up the model, the response indicators are first identified. In an example using greater amberjack, Dr. Kilborn described how the Beverton-Holt model in the stock assessment has been routinely overestimating recruitment over time compared to the SS-predicted recruitment. For greater amberjack, different temporal scales were used for different predictor indicators. Different temporal scales were also applied for the broader reef fish model. To model life history for greater amberjack, Dr. Kilborn described the southbound and northbound movement of propagules by month, and related that movement to predictor indicators that may affect those propagules as they move and grow from larvae to juveniles. Dr. Kilborn discussed the predictor indicator models used for evaluating greater amberjack, which included general ecological model indicators (climate, perturbance, temperature, trophic level status), eutrophication (dissolved oxygen, nitrogen oxides, total phosphate), and artificial habitats. For evaluating reef fish, predictor

indicator models included climate and sea surface temperature, food web, stock status, water bird indicators, and eutrophication (dissolved oxygen, nitrogen oxides, total phosphate).

Model results for greater amberjack revealed that habitat, ecological factors, eutrophication, and sargassum were all statistically significant ($p<0.05$) predictor indicators of the recruitment deviations for the species. Between 8- and 11-year "decadal" signals were apparent in 60% models, and an approximately 25-year "multi-decadal" signal was present in 40% of models for greater amberjack. For the reef fish model, the temporal indicator was only significant for gray triggerfish recruitment deviations. When examining the timescales for the AEM contributions to model fitting, approximately 84% of gray triggerfish recruitment deviation was explained by 3 synthetic AEMs, with the long-term 26-year "multi-decadal" signal being most dominant. Further, sea surface temperature and the combination of predictor indicators appeared to be significant predictors of recruitment deviation variability.

An SSC member asked why AEMs work for recruitment deviations in SS, noting that it is generally unknown why those recruitment deviations vary because the data are generally lacking. The SSC member thought that the apparently significant relationship between white ibis (shore bird) and gray triggerfish was spurious, since the two species would not be expected to interact in the wild. Another SSC member noted that one of the reasons for discontinuing the last stock assessment of gray triggerfish was related to issues with estimating recruitment, and that the assessment prior was modeled under varying recruitment scenarios because no single scenario garnered overwhelming confidence. Dr. Kilborn replied that in most cases, the Beverton-Holt (B-H) relationship is used within SS, with a number of relationships assumed to inform that model. The SSC member replied that in many cases, the stock recruit relationships from SS are not thought to be reliable. They also added that there may be factors that affect the signal that are occurring outside of the larval or juvenile classes. The SSC member thought Dr. Kilborn's work was a good first step to understanding changes in the recruitment deviations. An SSC member noted that to some degree, many of these effects are incorporated into the model through process error, although their specific effects may not be fully understood. They added that adding specific predictor indicator models into the stock assessment may help link a predictor to the recruitment deviations, and would allow for testing those hypotheses.

An SSC member thought that an overview presentation of the integrated ecosystem programs from the SEFSC for the SSC was overdue. They thought that Dr. Kilborn's work represented a start to an effort for integrating more covariates into the stock assessment process to better explain the response indicators being observed. The SSC member also asked how efforts like Dr. Kilborn's work could be integrated into a larger regional effort to explore these ecological processes and their relationships with assessed species, acknowledging the work being done in ecosystem modeling by others. Dr. Frazer noted that the examination of patterns in the AEM approach is being investigated against predicted, model-derived values, and not necessarily what is truly occurring with recruitment. He thought it important to note the theoretical nature of some of the work, but also that it showed promise in invoking deeper investigations into why the stock assessment model is predicting the recruitment deviations it is for these species.

Dr. Kilborn continued by discussing ecosystem trajectories, which considers the more holistic integrated socio-ecological system of the Gulf. Again, using AEM to determine the periodicity of

observed effects, a constrained analysis framework was used to inform those effects on the response indicators. In total, the consideration of these predictor indicators was estimated to explain 76% of the variability in the model. Results indicated increases over time in indices for species like red snapper, king mackerel, red grouper, and menhaden; and, decreases for species like gray triggerfish and vermilion snapper. Temporally structured predictors affecting model trends included a net change in number of oil platforms Gulf-wide, effects of the Atlantic Multidecadal Oscillation (AMO), increases in the total number of recreational fishing trips taken, and changes in sea surface temperature (SST) in the eastern Gulf.

An SSC member noted that the starting point of the analysis is limited by the data, which begin in 1986. However, the SSC member thought this work was worth tracking over time to get a better understanding of ecosystem-level changes over time. Another SSC member noted that one of the factors being included in the discussion of the model was commercial revenues, which were driven in the late 1980s by a robust shrimp fishery that wasn't yet competing with the influential imported shrimp market. The SSC member thought some work to review these types of market-informed parameters would be worth including to better elucidate true drivers for response indicators. Dr. Kilborn thought there could be market indicators that could inform directional change.

Evaluating Bottom Fishing Seasonal Closures in the Recreational Fishery

Dr. David Chagaris (University of Florida, Standing SSC) provided a presentation titled *Recreational Seasonal Closures: Tradeoffs and Uncertainties due to Species Seasonality and Angler Effort Dynamics* conducted from 2016 through 2018. The main goal of the project was to examine whether a bottom reef fish fishing season for the Gulf of Mexico private recreational sector would result in conservation gains and expanded fishing opportunities. Over time, recreational seasons have become shorter with little overlap among reef fish open seasons, allowing regulatory discarding to continue. The authors wanted to determine how managers might better control or consolidate effort to reduce discards and increase allowable harvest.

The study was based around two major considerations, with angler effort responses being divided into short-term and long-term responses. There are many attributes that might drive fishing effort: consideration 1: What would anglers do if a 'bottom fishing' closure was implemented?; and, consideration 2: consider seasonal patterns, because timing matters and some species may be more readily accessible during certain seasons than other species. The investigators focused on contrasting patterns in groupers and snappers. Further seasonal considerations noted that effort is highest in May through August (waves 3 and 4), and a summer closure might have severe social and economic consequences; also, a winter closure might be ineffective for some species.

The investigators built a multispecies model to evaluate bottom fishing closures in the Gulf recreational reef fish fishery. Multiple age-structured projection models were linked together with monthly effort dynamic models for the private recreational fleet, analyzing gag, red snapper, red grouper, greater amberjack, gray triggerfish, and vermilion snapper. The selectivity of the recreational sector for each species, spawner-recruit curve, and biological parameters from SEDAR stock assessments were included. Dr. Chagaris reviewed two important limitations of the model: 1) can only model closures in addition to existing (2012-2015) species-specific harvest

closures, with no catch rate data for an "all open" scenario; and, 2) single-species harvest seasons were fixed, and do not adapt to changes in stock status. Only private recreational fishing mortality is included. Dr. Chagaris noted that this model allows for the implementation of closures of one or more months and estimates changes in population size, harvest, discards, and fishing effort.

Effort was quantified as: long-term – effort in each year is predicted as a function of fish abundance in the prior year, summed over all species; and, short-term – some fraction of affected trips are allowed to redistribute to open months. The investigators incorporated species seasonality in monthly catch, harvest, and discard rates estimated from 2012-2015 using generalized linear models (GLM). Model results and tradeoffs were then analyzed for 16 different scenarios. Dr. Chagaris noted tradeoffs occur in almost all scenarios, but highlighted the spring versus fall closure on gag and red snapper. Therein, affected trips accumulate into months with higher catch rates, causing a net increase in harvest and declines in biomass. Next, he noted that closures occurring in late winter and early spring (March and April) were anticipated to successfully reduce discards and improve harvest efficiency. Over the long term this could result in greater SSB. Dr. Chagaris noted that results are sensitive to angler response (lambda value), and timing of any scenario is likely to have disproportionate impacts across all species. Any scenario must be weighed against the social and economic tradeoffs, as impacts are likely to be intense and broad.

One SSC member asked whether, due to the overall landings largely driven by Florida since it has the largest proportion of the landings for two of those species, it was fair to say that much of the effort trends in fishing mortality used in the model are driven by Florida. Dr. Chagaris agreed that gag and red grouper are primarily landed in the eastern Gulf. He further noted that red snapper and greater amberjack were the only other reef fish species substantially landed outside of Florida. Dr. Frazer asked if the angler population was constant in the model or if investigators were able to capture the demographic as a more dynamic population over time. He also inquired if a complete season closure would be needed to discern effort displacement, or could there also be a similar effect from bag limit closures. Dr. Chagaris responded that the total number of anglers can be increased in the model. The other question regarding bag limits and size limits in the model was not possible across all species in combination, and they wanted to isolate the effect of the fishing closure for this exercise.

Council staff asked if if was possible to differentiate between constrained recreational seasons and bag limits versus a complete recreational harvest closure. Dr. Chagaris said it probably wouldn't be that difficult to include variable discard mortality rates, but many assumptions in the model would remain necessary about high grading and increased discards and overall angler behavior. Council staff asked to define the harvest closure, which was a complete prohibition on harvest, and not catch and release. It was clarified that the current project does include state and federal waters in this prohibition exercise. He also inquired about the years of effort used in the study for red snapper, when the recreational seasons were tightly constrained. Dr. Chagaris suggested that the increased red snapper seasons length in more recent management years could impact gag discards proportionally. Another SSC member agreed that recreational effort drops of a lot in the western Gulf in the fall. Another SSC member inquired about the spatial resolution of the model, and whether it could it be tied to economic impacts for specific ports across the Gulf. Dr. Chagaris responded that this model included the entire Gulf but regional closures and species could be established and considered external to the model. Another SSC member inquired about what

would happen if everything were open all year, but only certain areas at certain times of the year. Would effort be forced in the open areas and those areas would quickly decline in resource health; resulting in effort declining naturally as a result. Dr. Chagaris has used other models to look at rotating spatial closures, the difficulty would be stakeholder buy-in but couldn't remember the resource benefits. They can't do that with this particular model. The Committee completed the discussions with future efforts focusing on the need to incorporate seasonal and regional considerations, and updating effort information due to the changes in the recreational data collection programs.

Discussion of Greater Amberjack Discard Mortality

Dr. Kelly Boyle (University of New Orleans) presented the results of a post-release mortality study on Gulf greater amberjack (GAJ). Data were collected on release condition, how quickly the fish was able to descend on its own, depth, swim patterns via tail-beat accelerometry, and tagging methodology (i.e., internal versus external placement). Depredation was not incorporated as predation events were not visually captured.

Overall survivorship was calculated at 85%. No signs of barotrauma were observed during the study and the use of a descending devices did not suggest an increase in post-release mortality. An SSC member asked if the study reported any relationship between fight time from capturing the fish and an increased risk of mortality. Dr. Boyle responded that neither fight time nor size of the fish seem to have a relationship with increased mortality. Another SSC member asked about the depth at which the fish were captured. Dr. Boyle responded that depth was recorded for the site, but that it was not a representation of the depth at which the fish was caught, as fish could have been landed at a depth between the surface and the bottom. This could also explain why no visual signs of barotrauma were observed.

Dr. Boyle also discussed the changes in fishing patterns post-release, with swimming activity being altered during the first 5 days after release and regaining traditional Diel migration in the following days. The study also recorded changes in depth use during cyclonic events, where fish would emigrate from artificial reefs, prefer shallower sites, and increased swimming activity.

An SSC member asked how the post-release mortality estimates compare to the stock assessment, which used 10% for recreational and 20% for commercial fleets, assuming that commercially caught fish came from deeper depths. The overall post-release mortality estimates are similar to the scenarios used in the stock assessment. The higher mortality rates observed for legal-sized fish may be an area to be explored further.

Update on the Great Amberjack Count

Dr. Powers and Dr. Mark Albins provided an update on the GAJ count, a project funded by the US Congress to estimate absolute abundance, help guide management, and build stakeholder confidence. Different than the Great Red Snapper Count (GRSC), this effort does account for/collaborate with NMFS data. The request for proposals stipulated that funding could not be

used for habitat mapping; thus, habitat will be extrapolated from previously published literature, which the team recognizes will increase uncertainty. Sampling efforts include habitat characterization, video and acoustic data collection, environmental DNA (eDNA) technology, and calibration to understand potential biases with each data collection method. The project is expected to be completed by April/May 2025 and will undergo a peer-review similar to the GRSC.

The project is currently at the calibration and sampling design stage. The goal is to also have even dispersion of conventional tags across all sites. Acoustic tags will inform on habitat use (e.g., type, depth, site fidelity), and to estimate movement and mortality between regions. The collection of eDNA will inform the presence of other *Seriola* species. Currently, the team is working on finding ways to increase efficiency of eDNA sampling. Genetic material is also being used to study the genetic structure of the GAJ population and connectivity between the regions. An SSC member asked about the distance between bottom structure and water collection site for eDNA analysis. Dr. Albins responded that the team is still working on determining the best distance, as there have been detection issues. Another SSC member asked if an extension could be requested to increase the time and effort spent on calibration. Dr. Powers responded that, at this time, the timeline cannot be modified.

Preliminary video and acoustic results indicate the presence of many mixed schools of *Seriola* spp. (GAJ, almaco jack, and banded rudderfish) at all locations. The SSC discussed concerns regarding detectability with the sampling methodologies, as GAJ spend most of their time above the seabed by at least a few meters. Dr. Albins responded that fish will still be accounted for during the descent of the cameras, as some fish are curious and swim around the equipment to investigate, and that the data would also be supported by active acoustic sampling.

Habitat synthesis includes a list of artificial reefs and scalable maps. This will be used to extrapolate a habitat-specific GAJ abundance estimate. No scalable map products are available for the South Atlantic region. SSC members also discussed the types of statistical analysis that will be used for this project and expressed caution related to the uncertainty of variance with Bayesian models. Dr. Powers responded that there will be more opportunity to provide feedback as the team plans to provide regular updates to NMFS scientists and the SSC.

Examination of an Alternative Allocation Approach

Dr. John Ward gave a presentation on an alternative allocation approach based on a model that could integrate economic, social, biological, and ecological variables. Dr. Ward discussed the assumptions and steps to consider in the proposed modeling approach, including a surplus production model and derived biomass and effort levels. He noted that the objective function to maximize could include profit from commercial fishermen, utility levels from recreational anglers and from non-consumptive users of the fishery. He proceeded to discuss a derived supply curve and, with the addition of a demand curve, highlighted equilibrium price and quantity, provided abundance and rent estimates. He noted that specifications for market demand for fish should account for different fish class sizes. Dr. Ward stated that the approach could include additional variables such as ecosystem variables and discussed long-run equilibrium solutions for the model proposed. He discussed interactions between ecological and human dimensions and considered the

effects of these interactions on markets. He discussed various scenarios including open access and fisheries managed with an ACL and an IFQ program.

The Committee asked whether either approach proposed could be used to assist in allocating resources between the recreational and commercial sectors. Dr. Ward replied that it would depend on the manner in which the different user groups are specified in the function to maximize. Committee members inquired about the magnitude of rent estimates provided and suggested that estimated average rent per year would be informative. Committee members inquired about reasons that could explain the observed similarity between the consumptive and non-consumptive supply curves. The Committee also asked why stock abundance appears to be unresponsive to management regime changes. Dr. Ward indicated the model specification could explain these observations.

Dr. Ward noted that the bioeconomic simulation he presented could help determine optimal allocation of fishery resources. It was noted that for some species, changes to allocations between sectors would result in ACL variations. The SSC noted that more information was needed to develop a clear understanding of the approach presented. The Committee stated that the availability of a paper providing documentation on the modeling approach would be needed to fully evaluate the modeling approach proposed.

Review of Wenchman and Mid-water Snapper Historical Landings

John Mareska (ALDNR) and Donna Bellais (GSMFC), presented historical wenchman state trawl landings. Previously, the SSC recommended removing wenchman from the mid-water snapper complex, but could not set an OFL without first determining the magnitude of historical trawl landings. Mr. Mareska provided abundance and length composition data from fishery-independent surveys, age composition, and reviewed commercial harvest to refine reference years for the OFL. Despite the persistence of the butterfish fishery since the 1980's, landings of wenchman, which is caught primarily with butterfish in trawls, have been erratic. Fishery-independent trawls were examined to determine the proportion of wenchman caught in these trawls. Wenchman susceptible to trawls tend to be 10 inches fork length or less. Samples were then obtained from the commercial butterfish fishery in Alabama to determine age structure and composition. Otolith opaque zones may be affected more by environmental drivers and less from annual growth; however, age estimates are not yet validated. Wenchman trawl landings predominantly occur in the northern Gulf. The smallest increment of commercial trawl landings reported to the states was a five-year average due to confidentiality issues related to the small number of fishermen and seafood dealers catching and buying wenchman.

SSC members asked about the amount of catch from hook gears compared to trawl gear, and about the nature of uncoded gear. SSC members also questioned if wenchman has always been landed with butterfish, or if the recent increase in wenchman landings indicates it was being discarded previously, or simply not being reported. Based on the data deficiencies (erratic landings, large time period averages with large standard deviations), life history unknowns, and outstanding questions as to the large increase in wenchman landed in 2020 and 2021, some SSC members contemplated if wenchman should be considered as an ecosystem component species, or if it

should be removed from the FMP; an alternative option would be to federally manage the butterfish fishery, which the SSC did not think necessary for either butterfish or those who fish for it. Wenchman appears to be caught more so as bycatch to butterfish, and very infrequently otherwise, which is causing landings to reach or exceed the ACL for the mid-water snapper complex. SSC members agreed that the data available are unreliable for establishing catch limits for wenchman

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One SSC member suggested determining an estimate for the standing stock biomass of wenchman in the northern Gulf based on the SEAMAP trawl data and the age data provided by Mr. Mareska. The Council would need to consider how or if to manage wenchman if there is not enough reliable data to set an OFL or ABC. Once a Council decision is made, the SSC could reconvene to look at the landings for the remaining species in the complex. The SSC reiterated their previous motion and added language regarding the lack of data.

> **Motion: The SSC reiterates their previous recommendation to the Council that GOM wenchman be removed from the mid-water snapper complex. However, due to the commercial catch data confidentiality limits, and the near absence of recreational landings available to the SSC, the SSC currently cannot recommend catch advice for GOM wenchman.**
>
> *Motion carried without opposition.*

Public Comment – Summary from All Days

Dr. Michael Drexler (Ocean Conservancy):

- He appreciates the SSC proceeding cautiously when considering changes to the shallow-water grouper complex; the SERO ACL Monitoring page indicates that quota attainment has hovered around 50% for some time and he is concerned that increasing the quota could cause scamp to approach becoming overfished based on prevailing ecological conditions.
- It appears that many Gulf stocks are struggling and not achieving set reference points. He encourages the Council to set more resilient reference points, especially considering future climate change impacts on stocks, and to increase short-term adaptability through management measures such as IAs. He also recommends the use of other harvest-based control rules.
- He supports the use of agent-based models as presented by Dr. Steven Saul.

Captain Eric Schmidt:

- He agrees that wenchman should be removed from the mid-water snapper complex; it should not be a federally managed species.
- He understands why some for-hire fishermen did not like the VMS portion of the Southeast For-Hire Integrated Electronic Reporting program, but he also questions if stopping the entire program will have larger implications besides not allowing captains to build a catch history. Red grouper may close early and the red tide this year is the worst he has seen in many years. For these reasons and others, he is going to request that the Council consider sector separation for the for-hire industry.

- Greater amberjack management changes have had little to no effect on helping the stock. Management changes, and even the stock assessment model may need to be reconsidered.

Captain Bob Zales II:

- He agreed with the presentation that indicated that jack species release mortality increases as the fish grows; he argued that it is higher than the 40% indicated. He believes that increasing the minimum size limit will also increase the release mortality. Fisheries managers need to pay close attention to the minimum size limits and how they impact release mortality. This is only part of a larger problem with greater amberjack.

Other Business

No other business was brought before the SSC.

The meeting was adjourned at 5:00 pm eastern time on March 9, 2023.

Meeting Participants

Standing SSC
Jim Nance, *Chair*
Luiz Barbieri, *Vice Chair*
Harry Blanchet
David Chagaris
Roy Crabtree
Benny Gallaway
Doug Gregory
David Griffith
Paul Mickle
Trevor Moncrief
Sean Powers
Steven Scyphers
Jim Tolan
Richard Woodward

Special Reef Fish SSC
Jason Adriance
Mike Allen
John Mareska

Special Ecosystem SSC
Mandy Karnauskas
Josh Kilborn
Steven Saul

Special Socioeconomic SSC
Luke Fairbanks
Cindy Grace-McCaskey
Jack Isaacs

Special Shrimp SSC
Don Behringer
Peyton Cagle
Jason Saucier

Council Representative
Tom Frazer

A list of all meeting participants can be viewed here.