Gulf of Mexico Fishery Management Council
Standing, Reef Fish, Mackerel, Ecosystem, and Socioeconomic SSC
Webinar Review of:

SEDAR 70 – Gulf of Mexico Greater Amberjack
Operational Stock Assessment

January 5, 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. Verbatim minutes from past SSC meetings can be reviewed here.

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.

Standing, Reef Fish, Ecosystem, and Socioeconomic SSC Hybrid Meeting Summary September 27 – 30, 2021

The hybrid meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Standing, Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees (SSC) was convened at 8:30 AM EDT on September 27, 2021.

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

Dr. Siegfried provided an overview of the projection settings for greater amberjack from the January 2021 SSC meeting:

Parameter	Value	Comment
Relative F	Average from 2016 – 2018	Average relative fishing mortality over terminal three years (2016-2018) of model
Selectivity	Average from 2016 – 2018	Average fleet specific selectivity estimated over terminal three years (2016-2018) of model
Retention	Average from 2016 – 2018	Average fleet specific retention estimated over terminal three years (2016-2018) of model
Recruitment	Average from 2009 – 2018	Average recruitment over last 10 years
2019 and 2020 Landings	158.11 mt (Commercial Vertical Line), 12.4635 mt (Commercial Longline), 44.9437 thousands of fish (Charter/Private), 1.3209 thousands of fish (Headboat)	Average 2017-2019 landings
Allocation Ratio	27:73	commercial:recreational

In the SEDAR 70 model, the steepness profiles indicated that the model-identified lower likelihoods for steepness showed that values between 0.7 and 0.8 were equally likely. The lowest likelihood was at a steepness value of 0.777. Numerous retention blocks were used for greater amberjack to accommodate management modifications through time. Specific to the revised projections for greater amberjack, the recruitment facets of the projections settings that are being reconsidered are the timeline for fixing recruitment and the treatment of recent landings. For the latter, excluding terminal years of data has an effect on the projections; this decision may have merit if the year(s) to be excluded represent some atypical retention scenario (e.g., due to a change in effort unrelated to management, like COVID).

Differences in the estimated numbers of recruits (millions of fish) varied based on the time series of recruitment used. If using the most recent 10 years (2009 – 2018), the assumption becomes that the stock is now less productive than in the past, and recruitment is estimated at 1,650 million fish. If using the long-term average (1970 – 2018), recruitment is estimated at 2,805 million fish. If using the "data rich" time period (1984 – 2018), recruitment is estimated at 2,156 million fish. High uncertainty is observed in the annual recruitment estimates pre-1984 and from 2016 – 2018.

An SSC member commented that the SSC normally recommends catches for three, and not more than five, years into the future. Under these circumstances, looking at the recent recruitment to inform the subsequent three to five years of catch recommendations is appropriate, because it reflects the most recent state of nature for the stock's recruitment patterns. In the short-term, it may not be appropriate to assume a fixed level of recruitment from a longer-term average, as such an estimate may be too optimistic or pessimistic, depending on the data. Specific to greater amberjack, this may mean that a lower equilibrium yield must be accepted in the short-term, as it best reflects the current state of nature; however, as greater amberjack is continually reassessed, the SSC will be able to continually re-evaluate recruitment through time. Dr. Siegfried cautioned that using the more recent recruitment for greater amberjack will result in lower yield projections,

and assumes a lower rebuilding threshold because the recent recruitment implies a regime shift to a stock that is no longer as productive as in years past. Implying this regime shift means rebuilding will be faster at the same fishing mortality rate because the stock doesn't have to reach a higher rebuilding threshold. The SSC member cautioned that fixing some model parameters, and also using a model-derived SRR, as a source of considerable uncertainty. Fixing steepness is expected to have a predictable effect with respect to SPR; thus, fixing steepness and using a model-derived SRR may be masking the model's true uncertainty.

An SSC member inquired about the new projection procedure in association with the requirements of the MSA. If there is a regime shift assuming that the stock will not return to its historical productivity, would that conflict with the objectives of MSA for managing stocks? Dr. Siegfried indicated that this aspect had not been yet been discussed. It is unclear how a dynamic R_0, as representative of a regime shift, would integrate within the rebuilding requirements of the MSA. An SSC member asked how the benchmark reference points estimated from the model yield projections can apply to the stock's condition in the future. Dr. Siegfried replied that the SSC needed to determine to what level the stock would be considered rebuilt using the settings applied to the recruitment and other factors for the yield projections.

An SSC member noted that using the approach with a stock experiencing a regime shift presents a special case. There may be merit in projecting an OFL using a long-term time series to inform recruitment when the stock was at a historical state; however, use more contemporary years for forecasting recruitment within a regime shift period to calculate ABC. It is then likely that the recommended OFL may be substantially higher than ABC. These dynamics will need to be accurately communicated to the Council to aid in interpretation of the catch advice.

Dr. Siegfried compared the results of using the revised projections code by Dr. Vaughan versus the previously used method from January 2021. Under the new method, the stock is no longer expected to be overfished relative to the MSST; however, the stock is not expected to completely rebuild to SSB_{MSY} ($SSB_{SPR30\%}$) by 2027. This result contradicts the stock status reviewed by the SSC in January 2021, which found the stock to be overfished and undergoing overfishing. Council staff clarified that the stock can be considered to no longer be overfished, yet not rebuilt, as the latter requires the ratio of the $SSB_{Current}$ to the SSB_{MSY} to be greater than or equal to 1.

SSC members discussed the plausibility of the estimates of $SSB_{Current}$ against the virgin SSB (SSB_0), the MSST, and SSB_{MSY}. The SSC questioned whether the stock could ever rebuild to the rebuilding target at SSB_{MSY}, given the current assumptions about SSB_0 and R_0. Dr. Siegfried noted that the methods in the assessment were accepted, and that if the settings for the projections are modified by the SSC, then adequate justification should be recorded and new projections can be generated. An SSC member asked about the degree to which the data used in the SEDAR 70 assessment focused more so on the eastern or western Gulf. Dr. Siegfried and Council staff replied that the fishery-independent data were solely from the eastern Gulf via several video surveys.

An SSC member noted that the SSB_0 is the same as that calculated in SEDAR 70; however, the ratio of SSB to SSB_0 is less than half of that observed in SEDAR 70. He contended that this scenario may not be a regime shift, but rather recruitment overfishing. Dr. Siegfried referenced a

peer-reviewed journal article (Klaer et al. 2015[1]) which has guided the SEFSC's discussion of what constitutes a regime shift and will provide that article to the SSC. SSC members encouraged additional discussion about the probability of a regime shift for greater amberjack at a future meeting.

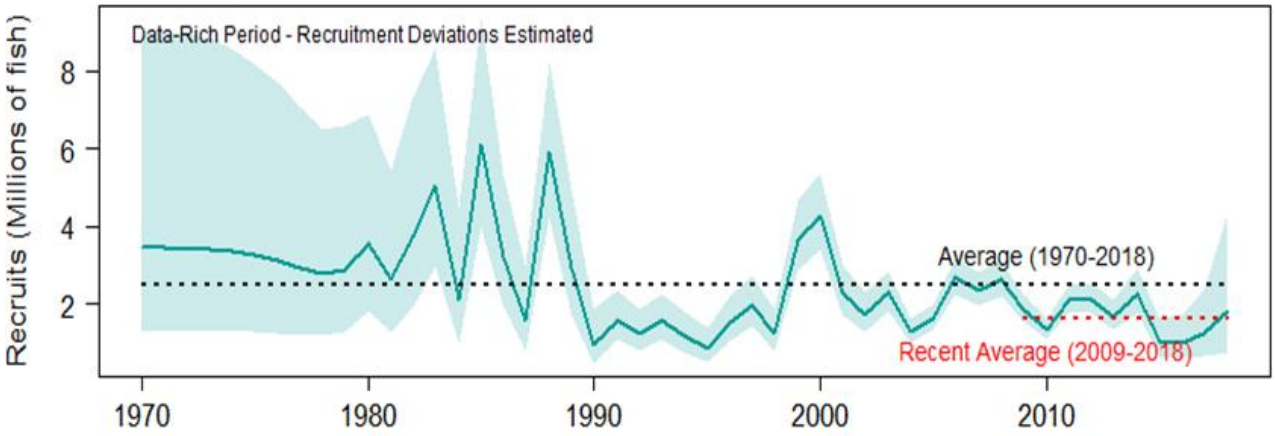

Figure 1. Recruitment for Gulf greater amberjack from SEDAR 70. Dotted lines indicate long-term (black) and short-term (red) averaging periods.

Dr. Siegfried asked that the SSC provide input on how to set up the projections for SEDAR 70 for generating catch advice for greater amberjack and to discuss the treatment of recruitment in the future. Further, the use of SPR proxies as opposed to using a proxy level of depletion as a target should be discussed.

Projections Parameter Definitions for SEDAR 70: Gulf of Mexico Greater Amberjack		
Parameter	**Value**	**Comment**
Relative F	Average 2016-2018	Same as SEDAR 70
F Current	Geometric mean 2016-2018	Same as SEDAR 71
Selectivity	Average 2016-2018	Same as SEDAR 72
Retention	Average 2016-2018	Same as SEDAR 73
Recruitment (OFL)	Average 2009-2018	Same as SEDAR 74
Recruitment (ABC)	75%SPR30	Same as SEDAR 75
Landings	Average 2017-2019	Used in 2020-2021
Allocation ratio	27:73	Plus, allocation ratio requests
Steepness	0.777	-

An SSC member was cautious about assuming future recruitment would increase so optimistically to allow for setting recruitment at a level equivalent to the long-term average. The SSC then drafted a table detailing its preferred projection settings for SEDAR 70, noting which settings would mirror SEDAR 70 and where those settings differed. Discussion of the time period to use

[1] dx.doi.org/10.1016/j.fishres.2015.03.021

for recruitment was discussed, with the SSC noting the consequences of selecting the recent or longer time series of data. Specifically, the SSC did not want to set catch advice which was overly optimistic based on a higher average recruitment than maybe biologically plausible.
The SSC discussed considering recruitment specific to setting the OFL and the ABC separately. An SSC member thought revising the data-rich period from 1984 – 2018 to 1990 – 2018 would be appropriate, as doing so would omit years in the data where recruitment oscillates strongly and data collection methods were more varied. Dr. Siegfried replied that the inclusion of 1984-forward in the "data rich" period was taken from the deliberations from SEDAR 70, in which those years ought to have been modified otherwise if the data merited doing so. An SSC member suggested beginning the recruitment period in 1995 when data collection became species-specific for jacks.

Other SSC members commented that they thought setting the OFL based on a longer-term average recruitment had merit, as that would be the rebuilding goal; in contrast, the ABC could be set to a more recent recruitment level to better reflect contemporary stock dynamics and the associated effects from fleet-specific selectivities and retention parameters. Ultimately, the SSC decided to use the recruitment period of 2009 – 2018 to inform projections of OFL. Dr. Vaughan cautioned that, since the prescribed time period for the OFL is so close to the rebuilding date of 2027, the $F_{Rebuild}$ yield projections are not much decreased from the OFL yield projections. As such, the SSC maintained setting the ABC equivalent to 75% of $SSB_{SPR30\%}$, as was done when the SSC last revised greater amberjack catch limits following its initial review of SEDAR 70.

The SSC further reviewed revised projections for greater amberjack on Thursday, September 30. Dr. Siegfried reviewed the SSC's earlier preferred settings for the projections. OFL and ABC projections based on the sector allocation options requested by the Council were compared, with the ABC projections performed to rebuild the stock under each scenario by 2027. The current rebuilding plan uses the stock recruitment relationship (SRR) curve; deviating from that decision reduces the expected long-term yield and recovery target. Generally, as additional fish are allocated to the recreational sector, the overall predicted yields are reduced. By using recent years of recruitment for greater amberjack, a regime shift to a lower level of stock productivity is inferred. This is expected to result in fewer recruits, a reduced stock size, and lower yields in the long-term. As previously discussed, a lower than expected stock size under a regime shift scenario will be easier to achieve.

An SSC member asked if the projections had been performed with the long-term recruitment average, expressing some hesitancy in accepting that a regime shift has occurred. The SSB for greater amberjack has oscillated, but remained generally consistent, since the 1990s. The SSC recognized that defining the conditions of a regime shift is difficult. Changing the assumptions about recruitment were noted to affect the decisions to be made regarding how to define the ABC. The SSC thought that it would be more appropriate to continue using the current F_{MSY} proxy of $F_{SPR30\%}$, also using the current SRR curve. The SSC also thought that the recent recruitment period (2009 – 2018) was more appropriate for informing recruitment in the near-term, while still targeting a rebuilding date of 2027. The SSC also recognized the reductions necessary for the fisheries, and thought that careful consideration would be needed in determining future management of catch and effort.

Motion: To continue with the 30% SPR reference point rebuilding projections using the spawner curve recruitments and ABC based on the low recruitment scenario (2009-2018) for greater amberjack.

Motion carried 14-8, with three abstentions.

Motion: the SSC determined that the SEDAR 70 operational assessment of GOM greater amberjack represents the best scientific information available and based on assessment results, as of 2018, the stock is undergoing overfishing and is overfished.

Motion carried 17-5 with three abstentions.

Standing, Reef Fish, Ecosystem, and Socioeconomic SSC Hybrid Meeting Summary November 18, 2021

The hybrid meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Standing, Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees (SSC) was convened at 8:30 AM EDT on November 18, 2021.

Evaluation of SEDAR 70 Projections for Gulf Greater Amberjack

Dr. Katie Siegfried from the Southeast Fisheries Science Center (SEFSC) gave an updated SEDAR 70 projection presentation for Gulf greater amberjack, highlighting model corrections, modified projections based on the SSC specifications, and reviewing various requested allocation scenarios. Projections presented at the January 2021 SSC meeting had two misspecifications: spawning stock biomass ($SSB_{30\%}$) was used instead of the spawning potential ratio of 30% ($SPR_{30\%}$) as a proxy for the SSB at maximum sustainable yield (MSY), and the long-term average of recruitment was used for benchmarks and projections instead of the recent estimated mean. Also, interim landings changed to accommodate recent 2019 landings that had been updated since the last SSC meeting. These updated interim landings reduced the assumed harvest estimates from the 2019 – 2021 fishing years. Dr. Siegfried reminded the SSC of the base run projection settings: $SPR_{30\%}$ was used as the SSB_{MSY} proxy, the spawner-recruit curve was used to calculate recruitment for determining management benchmarks, the recent low recruitment rate was used for the projection period (assuming low recruitment will continue in the short term), and overfishing limit (OFL), acceptable biological catch (ABC) and rebuilding projections were made in order to rebuild the stock by 2027 to $SSB_{SPR30\%}$.

Recent average recruitment (2009 – 2018) is the lowest of the entire time period (1970 – 2018) and this lower recruitment is assumed into the future. An SSC member asked why the ABC was not set equal to the yield at $F_{REBUILD,}$ considering the stock is in a rebuilding plan. Dr. Siegfried responded that the SSC could make that change, but the assumption is that it would not allow for

the stock to rebuild by 2027. Dr. Siegfried postulated that this is not the first time that a rebuilding plan has been set and not achieved within the prescribed timeframe. Overfishing was occurring in 2018 (terminal year of stock assessment) and the stock is considered to be overfished.

The OFL, ABC, and updated rebuilding projections were provided using results from runs using four additional allocation scenarios requested by the Council. It was clarified by Council staff that the model inputs were the allocation percentages for the fleets and explained the Council's rationale for the range of years for each scenario. These allocation scenarios, collectively, resulted in OFL values that differed from one another by 5% or less. Low ABC and annual catch limit (ACL) levels (in millions of pounds, whole weight) resulted across all allocation scenarios for rebuilding; a sharp increase in yields is then projected in 2028 after the stock is estimated to have recovered. Dr. Siegfried suggested focusing on the early years prior to stock rebuild in 2027, because projected allowable catch does decrease again after 2028.
An SSC member asked how the Council would interpret the results of the allocation scenarios based on the SSC discussion and clarified by saying that fishing at 75% of the fishing mortality rate at an SPR of 30% ($F_{SPR30\%}$) did not achieve the rebuilding target; however, fishing at the yield stream of $F_{REBUILD}$ would achieve the rebuilding goal and is therefore the only valid option. Dr. Siegfried noted that the stock status changed when benchmarks were re-estimated using the updated projection code from September 2021, along with the assumed low level of recruitment in the near-term. This low recruitment scenario, based on a decrease in the historic estimate of recruitment derived in the base model, also leads to a lower rebuilding biomass target than initially projected in January 2021. She also noted that it is worthwhile for the SEFSC to closely monitor stock recruits each year, and the recruitment trend, with the anticipation that future recruitment will respond to an increase in SSB as the stock rebuilds. She explained that even with the model assuming different allocation scenarios, the stock will not rebuild until 2027. An SSC member expressed concern about sensitivities in rebuilding scenarios based on the steepness level. Dr. Siegfried answered that the steepness was fixed at global minimum log likelihood profile. The SSC agreed that an SSC member made a valid point to note the continued use of the spawner-recruit curve and increased projections for a rebuilding timeline but to assume catch levels at a low recruitment scenario until evidence suggests higher recruitment levels are again plausible.

> **Motion: The SSC determined that the projection methods presented for the SEDAR 70 Gulf Greater Amberjack stock represent the best scientific information available and are appropriate for consideration by the Council. Based on these projection settings the stock is overfished and undergoing overfishing.**
>
> *Motion carried with no opposition.*

Council staff requested that stock status be addressed when making catch level recommendations in motions. The SSC asked how often projections would be revisited and if stock status would change frequently as a result. Council staff stated interim analyses could be used to inform changes in catch levels or update yearly management advice, but that stock status would not change until another stock assessment is completed.

The SSC advised they would make a motion to accept the methodology used to make the projections on the different allocations, but would leave the decision to the Council to choose an allocation based on the scenarios provided.

<u>Motion</u>: Based on the projection settings accepted by the SSC for the SEDAR 70 operational assessment the SSC recommends the following catch level recommendations for Gulf Greater Amberjack: OFL be set as the yield (million pounds whole weight) at $F_{30\%SPR}$ and ABC at the yield (mp ww) at $F_{rebuild}$ through the end of the projected rebuilding period of 2027.

Start Year of Projections	Year	OFL	ABC	Allocation	Source
2022	2022	2.102	0.521	73-27	Table 9/11
2022	2023	2.236	0.649	73-27	Table 9/11
2022	2024	2.343	0.77	73-27	Table 9/11
2022	2025	2.419	0.875	73-27	Table 9/11
2022	2026	2.472	0.964	73-27	Table 9/11
2022	2027	2.507	1.035	73-27	Table 9/11
2022	2022	1.996	0.497	84-16	Table 12/14
2022	2023	2.13	0.621	84-16	Table 12/14
2022	2024	2.234	0.739	84-16	Table 12/14
2022	2025	2.305	0.842	84-16	Table 12/14
2022	2026	2.354	0.929	84-16	Table 12/14
2022	2027	2.387	0.999	84-16	Table 12/14
2022	2022	2.052	0.509	78-22	Table 15-17
2022	2023	2.186	0.636	78-22	Table 15-17
2022	2024	2.292	0.756	78-22	Table 15-17
2022	2025	2.365	0.86	78-22	Table 15-17
2022	2026	2.417	0.947	78-22	Table 15-17
2022	2027	2.451	1.018	78-22	Table 15-17
2022	2022	2.033	0.505	80-20	Table 18-20
2022	2023	2.167	0.631	80-20	Table 18-20
2022	2024	2.272	0.75	80-20	Table 18-20
2022	2025	2.345	0.854	80-20	Table 18-20
2022	2026	2.395	0.941	80-20	Table 18-20
2022	2027	2.429	1.012	80-20	Table 18-20
2022	2022	2.028	0.641	fixed com	Table 21-23
2022	2023	2.16	0.757	fixed com	Table 21-23
2022	2024	2.265	0.87	fixed com	Table 21-23
2022	2025	2.339	0.97	fixed com	Table 21-23
2022	2026	2.389	1.055	fixed com	Table 21-23
2022	2027	2.423	1.124	fixed com	Table 21-23

Motion carried with 1 abstention and 4 absent.