NOAA Science and Technology Calibration Workshop for Red Snapper
Webinar
August 5, 2020
9:30 AM – 5:00 PM eastern time

Overview Presentation: Need and Current Status of Recreational Red Snapper Data Calibrations with the Gulf States

Dr. Richard Cody from the National Marine Fisheries Service (NMFS) Office of Science and Technology (OST) provided an overview of the need and current status of red snapper data calibrations between the Marine Recreational Information Program (MRIP) and the catch and effort surveys developed by Louisiana, Mississippi, Alabama, and Florida. The objective of this workshop was to review the ratio-based survey calibration methods, and the methods being used by the NMFS Southeast Regional Office (SERO) for converting the MRIP Fishing Effort Survey (FES)-based catch estimates back to the MRIP Coastal Household Telephone Survey (CHTS) data currency. This conversion step is necessary for linking past and future stock assessments to quantify changes in trends in the red snapper stock. Workshop participants also discussed the next steps for the MRIP transition team, data access, and research recommendations.

Three prior data workshops were held between 2013 and 2014, which focused on developing participating state-specific surveys for Gulf of Mexico (Gulf) red snapper. Coordination among the four states and MRIP, and integration of the surveys into MRIP, was emphasized to meet fishery management and stock assessment needs. Other options for survey development were also reviewed, including integrated improvements to the federal survey and state-specific surveys.

By 2018, all Gulf state survey designs had been certified or were pending certification as being statistically valid by NMFS. The fourth red snapper workshop in 2018 focused on options for calibration, and on producing an integrated Gulf-wide catch estimate by integrating MRIP-FES into conversion efforts for generating Gulf-wide catch estimates. Modeling and ratio-based approaches were considered; however, modeling efforts would require additional years of data. The ratio method was reviewed with respect to minimum data needs like annual catch limit (ACL) development, survey spatiotemporal compatibility, the relationship of trend data among surveys, and the application of the method at the domain level (by species, area, and time).

NMFS has released a transition plan to integrate data from state-specific programs into Gulf-wide composite estimate of catch and effort. This transition plan requires development of calibrations to account for differences in comparisons of survey estimates among states necessary to create a common currency for use in fishery management efforts. All four states have completed some period of benchmarking between that state's survey and MRIP-CHTS and MRIP-FES data currencies.

NMFS published a white paper in July 2019 (*Recommended Use of the Current Gulf of Mexico Surveys of Marine Recreational Fishing in Stock Assessments*) that outlined the sequential order in which different methods, as they are developed, could be used to inform stock assessments

and subsequent management action. Priority was given to using the fully-calibrated state catch and effort data.

Overview Presentations of Each States Methods and Resulting Calibrations

Alabama

Mr. Kevin Anson from Alabama's Department of Conservation and Natural Resources (ALDCNR) provided a review of the methodology used for creating state-specific ratio calibrations between MRIP-CHTS, MRIP-FES, and Alabama's Snapper Check survey. Specifically, the calibrated ratios were generated to compare federal and Alabama estimates of private recreational red snapper landings in both numbers and pounds of fish. Only private recreational data were considered for comparison because the federal surveys and Snapper Check have different methods for assigning state and charter vessel effort. Harvest for the purpose of the analysis was defined as catch including dead discards. The years 2014-2019 were used in the analysis for generating ratios. MRIP-CHTS landings in pounds was not available for 2019, so annual landings for that year was estimated using a calibration ratio of FES to CHTS informed by annual landings in weight from 2014-2018. Results from 2014-2017 were highly variable likely due to discrepancies between the duration and timing of the state and federal red snapper fishing seasons. Mr. Anson then provided a number of tables comparing red snapper recreational harvest between surveys in both numbers and pounds, and the calculated calibration ratios. To calculate calibration ratios for each comparison scenario, annual harvest estimates from the federal survey were divided by the harvest estimates from Snapper Check to generate a ratio for converting Snapper Check estimates to federal estimates. Similarly, annual harvest estimates from Snapper Check were divided by those generated by the federal surveys to obtain a ratio for converting from federal estimates to Snapper Check. In summary, Mr. Anson indicated that the ALDCNR recommends: that calibration ratios be informed using data collected from 2018-2019, which had more consistent fishing season lengths and is less variable than other years in the time series; that calibration ratios be informed by harvest weight since management thresholds are monitored in harvest weight; and that the monitoring of discards should be standardized for in- and out-of-season periods between the federal and state surveys. Based on these recommendations, ALDCNR calculated a calibration ratio of 0.5259 for converting MRIP-CHTS to Snapper Check and a ratio of 0.1843 for converting MRIP-FES to Snapper Check for landings in pounds. Lastly, he stated that comparison of federal and state-specific surveys is needed before the next red snapper stock assessment to determine the best scientific information available.

Florida

Ms. Beverly Sauls from the Florida Fish and Wildlife Conservation Commission (FWC) gave an overview of the state's calibration process for adjusting their Gulf Reef Fish Survey (GRFS) to MRIP-CHTS. Development of the calibration method began in March 2020 and the proposed methodology was submitted for approval in June 2020. The FWC implemented GRFS in May 2015 and uses the Access Point Angler Intercept Survey (APAIS) dockside intercept data from MRIP along with a GRFS-specific effort survey to estimate effort. The GRFS covers the Gulf coast of the Florida peninsula, excluding Monroe County. Monthly effort, landings, and discards

data are collected for nine reef fish species. As of July 1, 2020, the state expanded the survey to include the Florida Keys, the Atlantic coast, and changed the name to State Reef Fish Survey. Fishing effort data are collected via monthly mail surveys to registered GRFS anglers and combined with MRIP dockside reef fish angler intercepts to estimate harvest.

A comparison between survey data reflects similar estimates between MRIP-CHTS and GRFS while estimates from GRFS calibrated into MRIP-CHTS compared to MRIP-FES were consistently two to three times higher than GRFS for multiple reef fish species. Currently, red snapper management targets are based on MRIP-CHTS data, but will transition to MRIP-FES after completion of the next red snapper stock assessment. The calibration process seeks to convert catch advice between GRFS and MRIP-FES and ultimately MRIP-CHTS.

Since recreational harvest has varied across seasons and state and federal jurisdictions, calibrations at a fine-scale for historic time-series (e.g., by month) were not deemed appropriate. For each species, annual estimates were calculated by a summation of data across years, two-month waves, and areas fished, which resulted in 18 pairs of GRFS and MRIP-CHTS sums for six species (i.e., gag, gray triggerfish, greater amberjack, red grouper, red snapper, and vermillion snapper) and three variables (i.e., number of fish landed, pounds landed, and number of fish released).

Ratios were calculated as the total GRFS estimate divided by the total MRIP-CHTS estimate. Although GRFS incorporates catch data collected through MRIP, the degree of correlation is unknown. Knowing that the correlation is larger than 0% attributed to unknown correlation factors, but less than 90%, a value of 0.5 was recommended to estimate the variance. Ms. Sauls then showed plots comparing the results from the species-specific calibrations, which showed a reduction in landings and releases in GRFS compared to MRIP-CHTS, while maintaining the same trends throughout the time-series. Based on this, FWC recommended a calibration ratio of 1.0692 for calculating MRIP-CHTS to GRFS for landings in pounds whole weight.

Louisiana

Mr. Jason Adriance from the Louisiana Department of Wildlife and Fisheries (LDWF) reviewed the direction for LDWF to calibrate its independent LA Creel survey data MRIP-CHTS, and was applied to the private vessel mode's landings only. The only data available for this effort in Louisiana are from 2015, and the calibration method for red snapper differs from other state-managed species. Those species that are not quota-limited (like red drum), when comparing LA Creel and MRIP-CHTS landings and effort data, yield similar values. However, this was not the case when applying the same method for Gulf red snapper, with the primary difference occurring on the effort side of the survey (catch estimates were similar between LA Creel and MRIP-CHTS). Effort by wave for 2015 was examined and compared between LA Creel and MRIP-CHTS, with effort in wave 5 (September and October) seeming to be above the mean, including when compared to historical landings back to 2000. Thus, LDWF has determined that direct landings estimates can be used to calibrate between LA Creel and MRIP-CHTS, assuming any differences observed are consistent through time. The ratio between the 2015 LA Creel and MRIP-CHTS data for private vessels is considered by LDWF to be the best available adjustment, with this method resulting in a landings ratio between LA Creel and MRIP-CHTS of 1.06.

Mississippi

Dr. Paul Mickle and Mr. Trevor Moncrief from the Mississippi Department of Marine Resources (MDMR) provided an overview of Mississippi's Tails n' Scales (TNS) program updated recommended calibrations ratios for TNS and MRIP-FES survey estimates. Mr. Moncrief began the presentation highlighting background information on TNS, and identifying differences between the MRIP-FES general survey and TNS. TNS monitors red snapper landed in Mississippi by requiring trip authorization numbers, prior to fishing, for every trip targeting red snapper. Compliance is approximately 95%, largely due to a number of methods used on land and on-the-water for validation purposes and angler buy-in. Mr. Moncrief compared 2016-2019 TNS raw data to MRIP-FES wave-specific estimates for those same years. The MRIP-FES estimates of red snapper harvest appear to be highly skewed and inconsistent across years and waves. MDMR suggests this is due to low sample sizes, low number of intercept surveys, and inaccurate estimates of angler effort. Mr. Moncrief stated that these factors were leading to inflated estimates of annual red snapper harvest in Mississippi and large fluctuations in distribution of effort across waves. Mr. Moncrief expounded on this by highlighting discrepancies in the number of MRIP-APAIS intercept surveys capturing red snapper landings, stating it is not indicative of anglers' harvest trends over time. He also showed that MRIP-FES annual red snapper harvest estimates are up to five times higher than annual TNS estimates; the harvest comparison ratio also remains inconsistent, even between the 2018 and 2019 seasons, which were likely the two most similar years in Mississippi with respect to ACL and season length.

Mr. Moncrief also noted that MDMR was not informed that preliminary calibrated state-specific quotas were that provided by NMFS would be considered for adjusting Mississippi's red snapper quota. Based on the inconsistencies within the MRIP-FES harvest estimates for Mississippi, and the dissimilarities between MRIP-FES and TNS estimates, Mr. Moncrief suggested conducting the red snapper stock assessment prior to promulgating any rules that would shift state quota allocations, after which NMFS should collaborate with MDMR to develop a calibration method. In conjunction with this, NMFS should continue to refine the MRIP-APAIS intercept survey by region and investigate the increase in harvest estimates with the implementation of the MRIP-FES survey.

Dr. Mickle described an updated methodology for calculating calibration ratios based on a meta-analysis strategy. Survey design differences within both MRIP-FES and TNS methods generate differing proportional standard errors (PSE), a measurement of uncertainty about the resulting estimates. These PSEs can be used to create a weighting procedure by year for calibrating the TNS data to MRIP-FES. The PSEs for MRIP-FES were consistently higher than those for TNS, which Dr. Mickle attributed to the high compliance rate and temporal resolution employed with TNS. These PSEs were used to inform the weighting meta-analysis which down-weighted MRIP-FES and upweighted TNS. Based on the estimate uncertainty of TNS compared to MRIP-FES landings for 2016-2019, the weighting procedure annually down-weighted MRIP-FES below 1.0 and up-weighted TNS landings estimates above 1.0 based on the ratios of PSEs between the MRIP-FES and the TNS survey. Applying the meta-analysis across years allows for a calibrated average, yielding a TNS to MRIP-FES ratio of 2.04. Ultimately, this would result in Mississippi receiving an ACL similar to what is currently allocated to the state. Following the

presentation, Dr. Cody clarified that the consultants did not approve estimates from calibration procedures, but rather only general survey methodologies. Dr. Sean Powers asked Mr. Moncrief to what he thought the discrepancies between TNS and MRIP estimates can be attributed; Mr. Moncrief thinks the differences are largely driven by effort estimation. MDMR recommends the following approach and ratio of TNS to MRIP-FES of 2.040446.

Summary of Calibration Presentations and Next Steps for Completion of the Review Process

Dr. Cody provided a verbal review of the four state presentations and requested input from the participating calibration consultants. Dr. Lynn Stokes inquired about the calibration approach and associated calculation spreadsheet presented by MDMR. Specifically, she asked if the standard error values presented in the spreadsheet represented PSE and how they were calculated. Dr. Mickle stated that the values labeled standard error in the spreadsheet were PSE. He also clarified that the PSE values for the MRIP-FES survey were obtained from published values from NMFS and indicated that he used the same methodology that NMFS uses for MRIP to generating PSE values for TNS. Dr. Clay Porch indicated that a calibration ratio of approximately 2.0 generated from the meta-analysis may indicate more a of relationship between MRIP-FES and a weighted average between the two survey estimates, instead of a direct calibration between MRIP-FES and TNS. However, further investigation of the meta-analysis approach would be necessary to interpret the ratios. Dr. Ginny Lesser also indicated an interest in further researching the literature used to inform the presented meta-analysis. She also inquired about the reasoning for selecting a correlation variation value of 0.5 for the survey correlation analysis presented by Florida when calculating their state-specific calibration ratios. Ms. Beverly Sauls stated that linear regression analysis comparing MRIP-CHTS and GRFS estimates indicated that a variation value less than 0.9 was likely appropriate. However, discussions with the calibration consultants had resulted in the acknowledgement that some unknown correlation exists between the federal and state surveys as they are collecting similar data with different methodologies. Therefore, an intermediate variation value of 0.5 was assigned for the correlation analysis by FWC.

Discussion and Recommendations for Next Steps

This workshop was designed to examine the calibration ratios as presented and possible improvements moving forward. Some changes proposed by the states may require further evaluation. Mississippi's proposal of using weighting by PSE was discussed, as it represents a different method than has been applied to the ratio adjustments for the other three states. The method by which PSEs are determined between MRIP and TNS are very similar. However, the application of that re-weighting procedure may require further consideration by the consultants, including review of the referenced manuscripts used in its creation and application.

Overview Presentation: Preliminary Gulf Red Snapper State Private Quota Estimates

Mr. Jeff Pulver from SERO presented the methodology used to calculate state-specific calibration ratios to generate preliminary private recreational quota estimates for each state. The current red snapper management thresholds were derived from the last stock assessment which

used recreational data collected from MRIP-CHTS; therefore, a calibration between MRIP-FES and MRIP-CHTS is needed for quota monitoring. The years 2015-2019 were used for generating calibrations between MRIP-CHTS and MRIP-FES. Mr. Pulver outlined several pros and cons associated with generating calibration ratios from either a three-year (2015-2017) or five -year (2015-2019) average, which result in differing calibration ratios. Louisiana's LA Creel survey was run concurrent with MRIP-CHTS in 2015, and only requires one calibration ratio step between LA Creel and MRIP-CHTS to generated calibrated landings for Louisiana. Mississippi's, Alabama's, and Florida's state surveys were run concurrent with MRIP-FES, so a two-step process is required. First, a ratio calibration between MRIP-FES and the state surveys is calculated, then a second step allows for converting to MRIP-CHTS so revised state-specific landings can be directly compared to published management thresholds. Mr. Pulver provided summaries of state-specific calculated calibration ratios and revised quotas in calibrated state currencies informed by the three- and five-year averages.

Dr. Luiz Barbieri asked if any analysis had been conducted to quantify uncertainty about the calibration ratio estimates between using the three- and five-year averages. Dr. Cody indicated that an approach had not been considered as of yet, but was something that could be explored. Mr. Pulver indicated that the Council's Science and Statistical Committee (SSC) could be available to provide recommendations about which average would be appropriate at the upcoming SSC meeting. Dr. Barbieri stated that having some knowledge about potential selection criteria, such as uncertainty about the estimates, would help inform the SSC to provide guidance as to what might be appropriate. Mr. Harry Blanchet inquired as to why the landing estimates from the federal and state survey recreational harvest estimates from Mississippi were so low in 2015. Mr. Pulver indicated that a shorter fishing season in that year may have been the cause of the low harvest estimates. As a note for clarification purposes, after the 10-day federal season closed in 2015, Mississippi extended the red snapper fishing season in state territorial waters. The lower harvest estimates in 2015 are more likely due to the lack of MRIP-APAIS surveys that were conducted to capture in-season red snapper harvest, as well as decreased angler effort that year within the shortened federal season.

Workshop Discussion and Recommendations for Next Steps

Dr. Frazer gave a synopsis of the meeting and reminded everyone of the overall goals. Each state had been provided a chance to offer new proposals for calibration approaches and he asked the consultants to reflect on the state presentations and the new approaches given by MS and AL. He stated that any updated calibration procedures would be reviewed by the SSC in the upcoming meeting. Dr. Frazer asked Dr. Cody if he would agree to be the point person to work with states should they have any remaining questions for NMFS or the consultants on calibration procedures.

Gulf Transition Team Sub-Group

Process for Revisiting and Updating Calibrations

Dr. Cody summarized the participation of the Gulf MRIP Transition Team, noting the need of the team to identify necessary materials before the scheduled Gulf SSC meeting for August 11-

12, 2020. Dr. Frazer identified that two of the states have proposed modifications to their respective calibration procedures (Mississippi and Alabama). These modifications will need to be evaluated for their appropriateness and if appropriate, certification as best scientific information available. If the ratios ultimately affect state allocations of the red snapper stock ACL, then the Council will need to address state allocations in a future amendment. Further, a measure of uncertainty will need to be examined at both the state level and when comparing the state and federal data. SSC members present at the workshop expressed a desire to have the requested information, including all the materials presented at this workshop, that could be made available before the August 11-12, 2020, SSC meeting in order to make well-informed recommendations to the Council. Specifically, SSC members requested an assessment of sample sizes between the state and federal surveys, the pros and cons of the proposed methods against the status quo, and variance estimates around the data used to determine the ratios. It was appreciated that the turnaround time between this workshop and the August 11-12, 2020, SSC meeting was less than one week.

Transparency in Data Delivery, Management, Accessibility, and QA & QC

Mr. Gregg Bray from the Gulf States Marine Fisheries Commission (GSMFC) discussed the capability of the Commission to serve as a data repository to make the data (raw, metadata, spatial data) more easily accessible. Ideally, the data would already be curated (QA & QC) by the states before being submitted to the GSMFC. The GSMFC already hosts data from Louisiana and Texas, so the infrastructure is in place to include data from other states.

Future Research

Dr. Cody reiterated the need for transparency of the calibration procedures and the outcomes of this workshop. He stated that the working group for the calibration process has largely been made up of the Gulf States Marine Fisheries Commission Fisheries Information Network (FIN) Committee and some additional state and federal partners; this team would be a good vehicle for discussion around other data needs. He expressed concerns about privacy and security surrounding electronic data as well as QA/QC procedures, suggesting that translation of data to comparable formats and efficiency in this process are critical as these groups continue to move forward with calibrations. To best address specific future research needs, Dr. Frazer asked each state to identify state and MRIP-FES calibration issues in a manner that incorporates research needs to address problems. For Louisiana, Mr. Adriance suggested side-by-side dockside comparisons to further examine aspects of surveys that may get less attention, such as economic drivers. Ideally, with increased time and funding, there are a plethora of survey comparisons that could be performed. This sentiment was echoed by representatives from other states.

Mr. Anson said Alabama mentioned using artificial intelligence and cameras at public ramps to count fishing boats as they egress coastal passes a metric of effort. Mr. Anson noted effort estimates are driving the discrepancy between Snapper Check and MRIP-FES. This technology could be paired with on-the-water intercept surveys to ask anglers questions pertaining to private versus public access sites to better inform Snapper Check landings. Additional questions focusing on residency and private or public access point usage would be beneficial, and especially the ratio of in-state to out-of-state anglers using public access sites since Snapper

Check does not have access to anglers launching from private docks. Dr. Barbieri asked Mr. Anson to clarify the incorporation of discard data in Alabama's proposed calibration method. Mr. Anson said he understood harvest to mean landings plus dead discards that are unobserved by the creel sampler (B1). These are fish that are released at sea and represent a small proportion of the landed fish (harvest). Mr. Anson suggested that these fish also be considered in the Snapper Check survey so it is consistent with his understanding of what is needed for assessment purposes. This led to a broader discussion of what information states should be monitoring for their state quotas and how discard data from the MRIP survey is integrated into quota monitoring and stock assessments. Currently, the Mississippi and Alabama programs do not account for out-of-season discards; however; MRIP surveys aim to capture these discards. Drs. Cody and Crabtree stated the discussion was outside the scope of this calibration workshop, but that the issue could perhaps be brought before the SSC. Dr. Frazer suggested, for clarification to Council members, that Council staff give a brief presentation on what constitutes catch types, landings, and discards (released alive versus dead discards) for the total harvest estimates for the recreational sector. Mr. Anson also recommended that the calibration ratios be calculated using the data as used for quota monitoring purposes (i.e., in pounds of fish as opposed to numbers of fish).

Ms. Sauls mentioned Florida has several ideas for future research and gave a few examples of projects that have already been completed or are in progress. This included a literature search on similar surveys conducted around the world to gain a better understanding of other validation measures used, and to improve the accuracy of the State Reef Fish Survey (SRFS, formerly the Gulf Reef Fish Survey, GRFS). FWC recently finished a two-month vessel count survey that counted vessels as they passed through primary inlets used by recreational anglers. The results were similar to those produced by the GRFS survey. This survey could be expanded to other locations. Similar to Alabama, Ms. Sauls agrees that effort is a determining factor in the harvest estimate discrepancies. Enough differences in the MRIP-FES and GRFS mail surveys exist to warrant a more in-depth investigation of design and sample stratification using a simulation study or various side-by-side survey approaches. This would also allow for further validation of survey methodologies by comparing those used in SFRS and MRIP-APAIS and MRIP-FES.

Mr. Moncrief encouraged research that verifies the accuracy of the TNS effort estimates. Due to the COVID-19 pandemic, a private versus public access site project was delayed; the incorporation of geofencing into TNS will be used with a sub-group of private access anglers to quantify any differences in catch metrics. MDMR also conducted a separate effort survey in 2019 to ascertain state angler response rate and response preference. Dr. Mickle asked what measures are being taken by NMFS to consider ways to increase the accuracy of the MRIP-FES survey. Dr. Cody responded that it is imperative to investigate drivers that are causing the substantial differences between state and MRIP-FES estimates. For the MRIP-FES survey, this includes improving sample sizes across the Gulf and increasing accuracy of estimates when imprecise or low sample sizes are the only ones available, as well as pilot studies to determine non-response rates and other factors that introduce or increase bias. When the consultants were asked about the merits of these future research needs, Dr. Lesser agreed that analyzing response rates and creating alternative approaches to maintain a higher level of response rates is critical; response rates across all surveys have been decreasing.

Examining Drivers for Differences between Survey Estimates

Mr. Harry Blanchet and Dr. Kai Lorenzen reiterated the importance of identifying how survey differences arise and how these differences influence recreational harvest estimates. Identifying these differences would allow for efficient examination of these surveys which can be costly to implement. It was emphasized that continued improvement of both federal and state recreational survey designs is critical for fisheries management.

Wrap-Up and Next Steps

Dr. Cody will coordinate with the state representatives and the MRIP consultants to organize and develop the materials necessary for the Gulf SSC meeting on August 11-12, 2020. Dr. Cody will work to organize the parties involved and submit briefing materials next week. Dr. Frazer encouraged presenters to provide as much material to the SSC prior to its meeting to better inform any recommendations that body makes to the Council. Further, Dr. Frazer highlighted the need to continue developing and pursuing research recommendations by both the states and MRIP.