

GSMFC-NOAA Fisheries Workshop on Red Snapper

August 5, 2020

Workshop Summary Report

Draft<sup>1</sup>

<sup>1</sup> Revised August 13, 2020.

## Background

The Gulf Surveys Calibration workshop webinar represents the fifth in the series of workshops initiated in 2013 to coordinate on the development and implementation of state run general (LA) and supplemental (AL, FL, MS) surveys. The surveys shared common goals of providing more precise and timely estimates of Gulf of Mexico red snapper recreational catch. The first three workshops, held in a 13-month period in 2013-2014, focused on meeting management and assessment needs, coordination between state, regional and federal partners, and integration of the specialized surveys into MRIP. The consultant report from the first workshop presented two options for survey operation: standalone targeted surveys; and, integrated improvements to the MRIP survey. For either approach, the need to better identify the universe of anglers was considered a necessary first step. The two basic approaches identified in the first workshop report became the basis for the second workshop discussion of: options for improvement or expansion of MRIP; the potential for using permit and license databases to characterize the “red snapper” angler universe; onsite validation of reported information; model based approaches to predict total catch from monitored catch. Also discussed was the potential of a longitudinal fishing effort panel survey as a complement to MRIP. In the third workshop which occurred in December 2014, participants decided on two survey approaches: 1) validated self-reporting and probability based complemented intercept surveys with the probability based angler intercepts serving to validate the self-reported catch, and 2) complemented surveys design with separate onsite and offsite surveys similar to the existing MRIP approach. To help ensure that survey designs developed and tested would meet standards for consideration in stock assessments and management, a review process to certify survey designs as statistically valid was described. The certification process also required plans for transition to the new survey methods before their implementation. [Transition planning](#) and [certification](#) processes for recreational fishing catch and effort surveys were later formalized in the NOAA Fisheries Policy Directive System. The data collection challenge represented by the short red snapper season relative to the two survey approaches were examined: for formal probability based onsite/offsite intercept surveys (coined the direct approach during the workshop) sampling efficiency gains from using permit files to improve sample sizes would need to be evaluated in terms of the additional cost for those improvements. Challenges to effective implementation of capture-recapture approaches which only require probability based sampling for the recapture phase, included matching trips from both phases and the potential for correlation bias (violation of the assumption that data collected during the two phases are independent).

Following the third workshop (in consultation with MRIP statistical consultants), the states developed and tested a standalone general survey alternative to the MRIP catch and effort surveys in Louisiana (LA Creel) as well as specialized survey designs to supplement MRIP in AL, MS and FL and the TPWD Creel Survey in Texas. In Florida and Louisiana, the direct approach was used in developing survey designs where in Texas, Alabama, and Mississippi, survey designs were based on capture-recapture methodology. As of December 2018, all states that had

requested reviews had their survey designs certified by NOAA Fisheries as statistically valid. Texas did not request a certification review of their methods although collaboration with MRIP consultants on pilot testing of the voluntary iSnapper data collection did contribute to the development process for capture-recapture methods. Consistent catch trend information based on Texas Parks and Wildlife Department's creel survey estimates, which predates the federal data stream, is incorporated into stock assessments.

The fourth workshop, which occurred in the fall of 2018 asked four basic questions - (1) How do we make best use of the supplemental and general surveys? - (2) How do we maintain a comparable time series of red snapper catch estimates in each state? - (3) How do we ensure comparable red snapper catch estimates across states in any given year? - (4) How do we work together to develop and implement a Transition Plan? As each of these questions had integration and calibration considerations, the bulk of the workshop focused on a discussion of options for both. Composite estimation and small area estimation were among the techniques presented to address integration of estimates to produce a Gulf-wide estimate of catch. Composite estimation pursued for initial evaluation by consultants following the workshop did not show promise for automated production of an integrated estimate based on all surveys for a number of reasons, including a concern over bias associated with estimators (based on non-overlapping confidence intervals) and a lack of independence because MRIP intercept data is used by more than one survey. Consultants recommended that the problem of integration should continue to be evaluated, but that the priority should be on development of calibrations. In terms of calibration options, consultants presented two approaches: simple ratio based calibrations, which could be completed relatively quickly; and, more sophisticated techniques such as modeling (used for development of the MRIP effort survey calibrations), which would take more time to investigate and may not be necessary (i.e., may not produce an outcome very different from the simple ratio based calibrations). In spring of 2020, MS, AL, and FL, with MRIP consultant input, presented initial simple ratio-based calibrations to convert between MRIP FES-based catch estimates and the state survey estimates. LA had been working with the Office of Science and Technology since 2017 on their calibration methods and presented the simple ratio based approach in the 2018 workshop. In the workshop the FES-state option was preferred to a CHTS-State calibration for a variety of reasons: the CHTS was no longer in use and the FES had been identified as the official NOAA Fisheries method beginning in 2018; a fully calibrated time series was already available for the FES; in their 2017 review of the FES the National Academies endorsed the FES as a major improvement over the CHTS; CHTS based catch estimates had been shown to be biased low; and calibrations to create CHTS like estimates moving forward are expected to degrade over time.

### Why is calibration needed?

Catch and effort surveys and associated estimates of catch must meet competing stock assessment and management needs. On one hand, annual trend information for catch over the range of a fish stock is desirable for a meaningful evaluation of the status of the entire stock.

On the other hand, needs for quota management at the state level may present a challenge to a general survey designed to produce catch estimates for a large number of species over a large area. The development of specialized surveys designed to provide catch estimates at the state level, for a single species or small suite of species, that are more precise and timely addresses the latter but also presents a scenario in which two estimates of annual catch are produced. The need for a consistent time series that accounts for changes in survey methods is critical to a meaningful interpretation of catch trends and indices of abundance derived from survey estimates and underlies the need for calibration when comparing estimates produced using different methods. The purpose of calibration is simply to allow estimates produced using one method to be expressed in the units of a different method. In the case of the Gulf of Mexico red snapper, calibrations facilitate conversion of annual catch limits derived using estimates based on the now replaced Coastal Household Telephone Survey (or CHTS) to the state survey units in which the CHTS-based annual catch limits are monitored. Calibration facilitates conversion of estimates produced using different methods in each state to a common standard, which greatly facilitates a representative Gulf-wide estimate of catch that is consistent with catch trend information.

The various calibration scenarios were described in terms of their statistical defensibility and practicality in a white paper jointly produced by NOAA Fisheries Office of Science and Technology and the Southeast Fisheries Science Center.

## AM Session

### Overview

The workshop began with a statement of workshop objectives and an overview of previous workshop findings. Workshop participants would:

- Be presented with ratio-based calibration methods and methods developed by NOAA Fisheries Southeast Regional Office for converting FES based catch estimates to CHTS ‘currency’ (standard for the most recent stock assessment completed in 2018)
- hear MRIP statistical consultant input on those methods
- and determine next steps (including improving transparency through establishment and support for a transition team sub-group to guide implementation of the state surveys in coordination with MRIP, definition of a data management structure, consideration of research needs as they pertain to improving the understanding of drivers for differences between estimates and coordinating future calibration efforts to reduce disruption to the time series and ACL development).

A number of key questions were posed at the beginning of the workshop. Those included:

- Are the ratio based approaches presented reasonable?

- What is the proposed Transition Team Sub Group’s role? And related to the Transition Team SG’s role;
  - How will data be managed to better facilitate transparency?
  - What is a reasonable timeline for revisiting calibrations as more data become available? (Model-based and alternative approaches as well as state coordination with MRIP, being mindful of disruptive nature of calibration/recalibration on management)
  - What are the drivers for differences between survey estimates?

While the afternoon session was largely concerned with next steps, the morning session focused on providing context for the current workshop and presenting calibration methods.

Also included in the initial overview was a description of the basic objectives of the workshop as described in the workshop agenda. Those objectives were:

- (1) To clarify for all parties involved the processes and methodologies employed to establish calibration ratios that allow state collected survey data (i.e., data collected by Alabama, Florida, Louisiana, and Mississippi) to be converted to red snapper recreational catch information that is consistent with and comparable to allowable catch limits that were developed and established using the most recent red snapper stock assessment and CHTS derived data.
- (2) To identify a process, or key elements of a process, going forward that will enable the Gulf of Mexico Fishery Management Council to make informed management decisions based on the best available information and science.

Emphasized in the initial overview of the process was the role of the MRIP consultants, which was to provide recommendations based on their expertise as to the “reasonableness” or suitability of the calibration methods presented by the states. Consultant recommendations would not reflect any endorsement of proposed state quotas presented but would be available for consideration by the Gulf Council Scientific and Statistical Committee.

#### State presentation summaries

Each of the states had presented calibration approaches to the consultants and received consultant feedback prior to the workshop.

AL: Due to time constraints as a result of technical issues that delayed the workshop for approximately one hour and in the interests of completing workshop objects, background information provided in the AL DCNR presentation was not presented. Instead, the presentation focused on calibration development, which included ratios calculated for Snapper

Check to MRIP CHTS and FES standards for private-rental boat anglers only. Ratios were developed for harvested fish in both numbers and pounds with the latter being the preferred option because quotas were presented in weight. Data from 2014-2019 were examined and based on the stability of the ratios, 2018-2019 estimates were recommended by the state for use. There were concerns expressed regarding the accounting of out-of-season discarded catch.

FL: The Florida Fish and Wildlife Conservation Commission was a participant in all of the previous red snapper workshops and initiated development of a Gulf Reef Fish Survey (GRFS) calibration in 2020. The calibration was reviewed by consultants in March 2020 and input provided. A final report detailing the approach was submitted in June 2020. An overview of the GRFS was provided which included reference to the current survey coverage relative to MRIP and state plans to expand coverage throughout the state. The presentation on GRFS also described its focus on providing monthly estimates of landings and discards for a select suite of reef fish species for the private boat mode only. The calibration approach combined wave level data across all years for which the MRIP and GRFS surveys overlapped to produce a single calibration ratio. A variance estimate was then calculated for the ratio based on the *Delta* method and FES based estimates converted to the GRFS standard. A correlation coefficient of Rho=0.5 was presented as compromise between extreme values of 0 and 1.

LA: In their overview, the need for a LA Creel calibration was presented in terms of monitoring requirements for ACLs established in the SouthEast Data, Assessment, and Review (SEDAR 52) Gulf red snapper stock assessment in 2018, developed using the CHTS standard. Louisiana was limited to a single year of side-by-side comparisons of CHTS, FES, APAIS and LA Creel. The last year of the full APAIS in the state was 2013 with LA Creel becoming the general survey in 2014. The APAIS was conducted once more in 2015 alongside LA Creel for comparison purposes, and both the FES and CHTS were conducted in 2015-2017 in the state. Ratios were examined at the wave level to exclude from consideration waves that the Louisiana Department of Wildlife and Fisheries (LDWF) felt were not consistent with historic MRIP or recent LA creel estimate distributions. Ratios presented were based on all six waves, although MRIP wave 5 estimates for 2015 were considered inconsistent with other years.

MS: In contrast to other states, Mississippi Department of Marine Resources (MDMR) presented an alternative option to the ratio-based calibrations presented earlier to the consultants. In their previous version, ratios were developed using a readily available R program software package developed to yield ratios. MS provided an overview of the Tails n' Scales survey describing the unique ability of the survey design to accurately match validation intercepts with reported trips and a compliance rate of 95%. Concerns expressed by MS included potential sample size effects on MRIP FES estimates of fishing effort. The case was made that the relationship between APAIS intercepts with red snapper harvest and catch estimates was weak, with the Tails n' Scales survey showing a much stronger correlation. This

is expected since a goal of Tails n' Scales is to provide more precise catch estimates. It should be noted that the trends shown are similar in direction. FES based private boat effort estimates by wave were presented to also illustrate potential low sample size effects. The case was made that effort estimates should show a consistent pattern or distribution across waves. However, no measures of precision were provided and no tests of comparison were presented. While it must be acknowledged that low sample size effects is a concern in probability based sampling survey designs and the reliability of estimates can be impacted at higher levels of resolution, measures of sampling error are available. MRIP estimates of directed effort were presented relative to Tails n' Scales estimates to demonstrate the inaccuracy of information provided using FES methods under the untested assumption that Tails n' Scales estimates are unbiased. The distribution of trips per registered Tails n' Scales user was presented but a similar distribution for the FES was not offered for comparison. Also, it is not clear if annual patterns are very different. Concern regarding the precision of MRIP estimates and the effectiveness of the MRIP design at current sampling levels in MS is acknowledged in the underlying objectives of specialized survey methods, which were designed to address needs for greater temporal and spatial resolution offering more precise estimates for the short season recreational red snapper fishery. The argument made that MRIP and Tails n' Scales estimates are not comparable reinforces the need for calibrations to allow for more appropriate comparisons.

Recommendations made by MS in their presentation included: determine BSIA and complete the assessment before promulgating any rules that would shift states' established quotas; based on those assessment outputs states can work with NOAA Fisheries through GSMFC to develop calibrations in each state's management units; continually review the FES to determine feasibility and explain why estimates have increased dramatically since implementation.<sup>1</sup>

MS presented a meta-analysis based approach. The approach was premised on the assumption that the true estimate lies between the two estimates being considered. Under the approach the less precise MRIP estimates were down-weighted while the more precise Tails n' Scales estimates received a higher weight. The measures of precision for both sets of estimates were used as "quality scores" which were then used to construct a ratio. This approach is similar to the composite estimation methodology initially evaluated by the MRIP consultants and found to be problematic as described earlier.

In a wrap up of the morning session activities, the approaches presented by each state were summarized for participants. To help consultants prepare for private deliberations scheduled to occur during lunch and immediately following the afternoon session, they requested clarification on a number of points presented by MS and had a question for FL regarding the choice of correlation coefficient. To better understand the new methods presented by MS, consultants would need some time outside of the workshop, to review the applicability of the approach and literature cited in the MS presentation. Consultants also requested points of contact for the states and NOAA should they have questions that require immediate attention given the short turn around for recommendations in time for the Gulf SSC meeting on August 11-12.

## PM Session

The afternoon session began with an overview of the method used by the SERO to express the CHTS based ACLs in state survey units.

SERO: In the presentation by the NOAA Fisheries Southeast Regional Office, the basic approach used to convert CHTS based ACLs to state based estimates was presented. Two options were considered. The first option limited estimates to 2015-2017, which corresponded to the benchmarking years for the FES and CHTS and included data from the state surveys. The second option looked at the entire period for which data were available for the state supplemental surveys (2015-2019). Ratios were produced for the FES : CHTS and FES : State survey estimates and combined to produce a conversion for the CHTS based ACLs to the State surveys. Pros and cons were presented for both methods. A pro for the shorter time series was that it included true estimates and did not include modeled CHTS-like estimates for 2018-2019. Cons were that the time series included reduced sample sizes for the FES while it was being conducted side by side with the CHTS and state surveys were still in development. Pros for using the extended time series were that it included the entire time period in computing an average and that it included more recent years where FES sample sizes were increased and the state surveys had been certified and were considered more stable in terms of their calibration ratios. A con was that CHTS like estimates had to be modeled for 2018-2019 and the reliability of the estimates might be expected to diminish over time.

SSC participants had questions regarding measures of uncertainty around calculated ratios. Clarification was sought by NOAA Fisheries Office of Science and Technology on the provision of variance estimates and the format of the information requested. SSC members requested a more detailed presentation of the pros and cons for the two time series presented.

## Gulf Transition Team Sub Group.

Based on the effectiveness of the MRIP transition team in defining a transparent and inclusive process for the transition from legacy MRIP/MRFSS methodologies to the new MRIP methods, development of FES and APAIS calibrations, a logical progression was to extend this model by establishing a Gulf sub group (SG) of the transition team that would manage transition of the new specialized state surveys. Responsibilities would include defining partner roles in data management and accessibility as well as quality assurance measures. As a number of the representatives on the GulfFIN committee were also members of the transition team, and the GSMFC already managed the APAIS data collection efforts as well as state commercial data, it was logical that the Commission would play a central role in data management. As the data are likely to be used in science and management, NOAA analysts have requested to make them as easy as possible to access securely. It was noted that the data housing infrastructure was already in place at GSMFC to do this. GSMFC offered that they would support making available whatever data are needed (raw data, estimate data, metadata, etc.,), contingent on partner consent for and agreement on the proposed level of transparency. The commission views itself as a conduit for making data available, but

the assumption is that QA/QC would already be completed at the state level and the role of the Commission would be ensure data compatibility and formatting requirements were met. During discussion, it was noted that care should be exercised to ensure that the overlap in membership between the GulfFIN committee and transition team SG did not result in unnecessary duplication of effort by either entity and confusion over roles and responsibilities.

The transition SG would be best suited to address calibration related research needs, including improvements to the understanding of drivers for the differences between survey estimates. States presented their initial ideas for future research, which included the need for additional side by side comparisons between MRIP and LA Creel, evaluation of methods to corroborate survey estimates such as artificial intelligence (AI) augmented boat counts with a validation component and assessment of differences between private and public access angler fishing behavior. There was some discussion of evaluating alternative treatment of discards and their impact on season length. Mentioned also was the potential for comparisons between GRFS and FES telephone survey recall periods and questionnaire changes to better understand field survey based adjustments to effort estimates. Verification of effort was a common theme and suggested as a starting point for examining differences before expensive comparisons of field survey components was undertaken. There was interest expressed in ongoing work in the Office of Science and Technology on alternative estimation approaches for rare event species. MRIP was asked what the program was pursing to evaluate the accuracy of their estimates. The FES non-response survey was provided as an example as well as pilot testing of a web push design. It was again stressed that examination of drivers for differences between survey estimates by necessity included both MRIP and the state surveys and that any efforts to better understand those differences would require collaboration to be successful.

In a wrap up of the meeting, there was clarification of SSC needs for more detailed information to which FL offered as potentially helpful, a matrix/table they developed for a Gulf Council presentation. A workshop report that included consultant recommendations on calibration approaches was requested in time for the SSC meeting and a table with additional information to help the SSC in their deliberations on the merits of the methods proposed.

1. Please refer to the South Atlantic Fishery Management Council's website for briefing materials related to a Council requested SSC workshop on MRIP to better explain differences between estimates produced based on the discontinued CHTS survey and the FES which was implemented in 2018. <https://safmc.net/briefing-books/briefing-book-ssc-mrip-workshop-august-2019/> Please also note that a similar workshop was conducted by the Gulf Council in July 2020. Briefing materials for that workshop can be found at the following url: <https://gulfcouncil.org/calendar/gulf-ssc-mrip-workshop/>