Atlantic States Marine Fisheries Commission

Red Drum Stock Assessment Subcommittee and Technical Committee Call

Draft Agenda

November 29, 2022

1:00 p.m. - 4:00 p.m.

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

Webinar: https://meet.goto.com/524030605
If you can't connect to the webinar with computer audio, you can dial in at:
Phone: +1 (571) 317-3116
Access Code: 524-030-605

1. Welcome & Introductions (*E. Simpson*) 1:00 p.m.

2. Review Terms of Reference and Preliminary Timeline (*J. Kipp*) 1:05 p.m.

3. Continue Discussion of American Saltwater Guides Association's Request 2:05 p.m.
    - Review use of app recreational discard length data in past assessments
    - Discuss expectations for how data will be used
    - Discuss data element recommendations

4. Tasks and Next Steps 3:50 p.m.

5. Elect Vice-Chair 3:55 p.m.

6. Adjourn 4:00 p.m.

TERMS OF REFERENCE

For the 2024 ASMFC Red Drum Benchmark Stock Assessment

Board Approved [Month and Year]

Terms of Reference for the Red Drum Assessment

1. Respond to Simulation Assessment Peer Review Panel recommendations for the simulation-based analyses used to guide assessment approaches in this benchmark assessment.

Simulation analysis recommendations

a. Demonstrate that the Stock Synthesis estimation model for the southern stock can reproduce the dynamics of the operating model when given data without observation error.
b. Repeat the Traffic Light Analysis grid search using only the 'burn in' and pre-2023 periods to see if the reference points identified were similar to the ones identified in the presented assessment.
c. Evaluate robustness of simulation results to number of operating model iterations.
d. Conduct further exploration of how bias in growth parameters could influence the estimation model results.
e. Conduct sensitivity analyses to explore how changes in the selectivity curves influence estimation model predictions when given data without observation error.
f. Conduct sensitivity analyses to evaluate how the size and number of discarded fish could influence the assessment trends and reference points.
g. Explore the effect of start year on estimation model results.

Benchmark data analysis/modeling recommendations

h. Consider alternate growth curve formulations using *in situ* data.
i. Consider combining indices using a variety of different options.
j. Explore the relationship of the indices to each other through correlation analyses.
k. Conduct new analyses of the tagging data to obtain estimates of harvest rate information.

Data collection recommendations

l. Improve data collection of discard numbers and sizes.

2. Characterize precision and accuracy of fishery-dependent and fishery-independent data used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data).
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors).
    d. Justify inclusion or elimination of available data sources.

3. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, aging accuracy, sample size) on model inputs and outputs.

4. Develop model(s) used to estimate population parameters (e.g., F, abundance) and reference points, and analyze model performance.
    a. Describe stability of model (e.g., ability to find a stable solution, invert Hessian).
    b. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    c. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    d. Clearly and thoroughly explain model strengths and limitations.
    e. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature.
    f. If modeling approaches differ from those recommended during the Simulation Assessment, discuss divergence from these recommendations.

5. State assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs. Examples of assumptions may include (but are not limited to):
    a. Choice of stock-recruitment function.
    b. Calculation of M. Choice to use (or estimate) constant or time-varying M and catchability.
    c. Choice of reference points.
    d. Choice of a plus group.
    e. Constant ecosystem (abiotic and trophic) conditions.

6. Characterize uncertainty of model estimates and reference points.

7. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective pattern for uncertainty in population parameters (e.g., F, abundance), reference points, and/or management measures.

8. Recommend stock status as related to reference points (if available). For example:

    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?

9. Other potential scientific issues:
    a. Compare trends in population parameters and reference points with current and proposed modeling approaches. If outcomes differ, discuss potential causes of observed discrepancies.
    b. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.

10. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.

11. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.

12. Recommend timing of next benchmark assessment and intermediate updates, if necessary, relative to biology and current management of red drum.

Terms of Reference for the Red Drum Peer Review

1. Evaluate responses to Simulation Assessment Peer Review Panel recommendations. Identify those adequately addressed and those that still need further work.

2. Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:
    a. Presentation of data source variance (e.g., standard errors).
    b. Justification for inclusion or elimination of available data sources.
    c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, aging accuracy, sample size).
    d. Calculation and/or standardization of abundance indices.

3. Evaluate the methods and models used to estimate population parameters (e.g., F, abundance) and reference points, including but not limited to:
    a. If modeling approaches differ from those recommended during the Simulation Assessment, were these differences warranted and appropriate?
    b. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of red drum?

    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).

4. Evaluate the diagnostic analyses performed, including but not limited to:
    a. Sensitivity analyses to determine model stability and potential consequences of major model assumptions.
    b. Retrospective analysis.

5. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

6. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.

7. Recommend best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative estimation methods.

8. Evaluate the choice of reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.

9. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

10. Review the recommended timeframe for future assessments provided by the TC and recommend any necessary changes.

11. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

2024 Red Drum Benchmark Stock Assessment (see proposed spot and croaker timeline below this for reference)

- TC/SAS webinar to finalize TORs and timeline: Late November 2022
- SAS webinar to discuss simulation assessment tasks, data formats, data tasks: Early January 2023
- Data request: January 30, 2023
- Data deadline: May 1, 2023
- Data Workshop: June 2023
- Assessment Workshop 1: October 2023
- Assessment Workshop 2 (finalize model results/stock status determination): March 2024
- Assessment report draft finalized by SAS: Mid-May 2024
- Assessment reviewed by TC: Early June 2024
- Assessment report provided to SEDAR for peer review panel: July 1, 2024

Peer Review coordinated by SEDAR – see schedule for review-related items below provided by Kathleen Howington on 9/14/2022

- RW Working Paper Submission ....July 22, 2024
- Final AW Report distribution ....July 22, 2024
- Pre-RW Conference Call (Analytical team, RW Chair) .... week of July 29, 2024
- RW Panel Introductory Conference Call (RW Panel, Chair) .... week of July 29, 2024
- Review Workshop: (Charleston, SC) ....week of August 12, 2024
- Review Reports due to Chair .... August 30, 2022
- Review Reports to Assessment Team .... September 6, 2022
- Assessment comments due to Chair... September 20, 2022
- Review Workshop Addenda, and Revision Reports due to Chair and SEDAR September 20, 2022
- Review Workshop Reports due to SEDAR Staff .... October 4, 2022
- Complete Assessment Report Submitted to Councils/SERO/SEFSC .... October 11, 2022

2024 Spot and Atlantic Croaker Benchmark Stock Assessment

- Late November/early December, 2022: TC planning call (TORs, timeline, data requests, etc.); Board nominates SAS members
- December, 2022: SAS call to discuss assessment and data request forms
- January, 2023: Circulate data request forms to states
- Mid-March, 2023: Data templates due with a 2022 terminal year
- April ~15th: Landings validated via ACCSP
- May, 2023: Data Workshop (virtual)
- September, 2023: Assessment Workshop I (virtual or in-person)
- February, 2024: Assessment Workshop II (virtual or in-person)
- Summer, 2024: Peer Review Workshop

- Annual Meeting, 2024: Present Assessment and Peer Review Reports to the Board

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Summary of Feb 2, 2012 Workshop on Opt-In Angler Panels

The workshop was originally titled as a workshop on "Volunteer Angler Surveys" but "Opt-In Angler Panels" more accurately describes the topic of the workshop. Opt-in angler panels recruit participants to report catches or fishing effort through a variety of means, including mail-in forms, online forms, and phone-based applications. The types of recreational fishing information collected vary from program to program, but a key similarity of all opt-in angler panels is that they are comprised of self-selecting individuals who volunteer to participate. In other words, an opt-in online angler panel is not a probability sample, and consequently quite unlikely to accurately represent all anglers. As discussed below, this means that traditional analysis methods may be inappropriate for use with opt-in angler panel data and that opt-in angler panel data will likely be biased, depending on the variables being examined.

On February 2, 2012 the Mid-Atlantic Fishery Management Council (MAFMC - www.mafmc.org), in cooperation with the Marine Recreational Information Program (MRIP - www.countmyfish.noaa.gov), brought together a group of people who are involved with programs that collect opt-in angler data in order to examine questions such as: "Which data needs can be best filled by this kind of data?" and "How can such programs establish and sustain angler enthusiasm and support?" This document summarizes the results of the workshop and proposes a framework for evaluating whether and how opt-in angler panel data should be solicited and/or used. A webinar of the workshop was recorded and is available at: http://www.mafmc.org/events/volunteerdata.htm. There is a wealth of information recorded on the webinar and this summary focuses only on key, generalizable findings. A spreadsheet summarizing many of the Atlantic Coast programs that collect opt-in angler data was constructed by the workshop participants and is also available at that site.

The workshop was divided up into three parts and this summary maintains that structure. First, several state and independent programs described their programs, and participants discussed the attributes, challenges, and lessons-learned for those programs. Second, experts in survey design described statistical properties of both opt-in panel data and probability sample data. Third, the workshop had a general discussion on a potential framework for evaluating and using self-reported data. This summary was initially drafted by Jason Didden of the Mid-Atlantic Fishery Management Council (the organizer of the workshop) and then circulated among the workshop participants for comments. Afterwards, this document will be presented and reviewed by the MRIP operations team to determine its usefulness as a general guide related to the collection and use of opt-in panel data for fisheries management purposes.

Part 1: Program Descriptions (States and Independent Groups)

The presentations and webinar recordings of the presentations are available at: http://www.mafmc.org/events/volunteerdata.htm. Four primary points are summarized below from the program descriptions and subsequent discussions:

1. Self-reported data have been very important for developing bag/creel and size limit regulations for some states. Predicting the impacts of many bag/creel and size limit regulations requires knowledge of the distribution of lengths of fish caught, including discards. Having enough reported fish lengths facilitates regulatory analysis on critical species such as summer flounder and black sea bass. This is especially true for released fish, as data on released fish are necessary to predict the impacts of any regulation that involves lowering size limits (including slot limits). Self-reported lengths have also been used for allocating striped bass catch between separate resident and migratory fish quotas in the Chesapeake Bay based on fish length.

2. There is a subset of avid anglers who are very keen to provide their data and also very suspect of MRFSS/MRIP data primarily because they (or their friends) were not interviewed. The concern is how to use such data since avid anglers may have different catch rates from the average angler, and if participants are opting into a program, it will not be known how they differ from the average person. Also, there may be a tendency for self-reporters to only report successful trips, which would make catch rates from self-reported data appear higher than the actual average catch rate and bias any estimates that are made based on self-reported data by opt-in participants.

3. Some programs have had substantial drop-offs in participation after the first year or two. Incentives, such as obtaining a bonus fish tag, shirts, or other rewards can help participation. Acknowledging receipt of data, allowing people to see that their data have been recorded, and providing feedback about how the data have been used are equally critical. Stating upfront how data are likely to be used is important to establish accurate expectations. Some have, but quite a few programs have not fully settled into a regular suite of outreach methods that they feel are sufficient to obtain reports from a large and diverse group of anglers that will participate consistently over the long run.

   Programs need to make it easy to participate. For example, the Virginia rack collection program provides freezers at certain ports for anglers to donate carcasses for length measurements and age samples. The donation aspect may be a sufficient incentive to anglers as the samples can contribute to stock assessments and other analyses to track the health of fish stocks. However, the most popular programs have material incentives along with a history of their data getting used in assessments or management.

4. New technologies have increased reporting options. For example, GPS-equipped smartphones allow apps to upload real-time or near real-time reports with either rough or detailed location information. Satellite uplinks can also facilitate uploading in remote or offshore locations. Real-time uploads can also facilitate assignments of dock-side validation for retained catch, but validation of discarded catch is more difficult, requiring expensive and/or impracticable human observers or possibly video monitoring technology. MRIP is exploring video monitoring technology in other projects.

Part 2: Statistical Considerations

The workshop included presentations from two sampling design experts: Kristen Olson, PhD from the University of Nebraska-Lincoln's Survey Research and Methodology Program, and Cynthia Jones, PhD from Old Dominion University's (Virginia) Center for Quantitative Fisheries Ecology. Dr. Olson provided an overview of probability sampling and opt-in online panels from a "general survey quality" perspective, while Dr. Jones focused on fisheries-specific data collection issues. Together they provided a big-picture perspective of issues with both surveys and opt-in online panels.

For a survey, the goal is to obtain a sample that is representative of a target population, or at least understand why a sample is not representative, so that responses can be adjusted or weighted accordingly. This is accomplished through probability sampling – units are randomly sampled from a clearly defined frame (potential contacts) with known probabilities of selection. In a probability sample, the participants are selected by the researcher using a chance or probability mechanism – being a part of the sample is independent of the characteristics of members of the sample. Because of this probability selection approach, the process of selecting a sample can be replicated by an outside researcher. Probability samples have the advantage that survey results can be linked back to the target population with quantifiable precision levels.

Probability samples stand in contrast to an opt-in panel in which the participants are selected through their own decision making processes – being a part of the sample may depend in part or wholly on their characteristics. Unlike probability samples, opt-in panels do not have the advantage of replicability – every opt-in panel may yield a different answer. It is difficult to predict how different these answers may be, because opt-in panels cannot be directly linked back to the general population. Although probability samples can be affected by selected persons not participating, or by incomplete sample lists, these errors are measurable in a probability sample. In an opt-in panel, there is no list from which the sample is drawn and the differences between those who participate and those who do not are not known. For a fishing survey, if the likelihood of certain anglers or trips getting contacted (or participating once contacted) is different from the universe of anglers or trips, and the fishing activity of those anglers or trips is different from the universe of anglers, survey results will be biased.

Thinking about angling avidity highlights this issue as it relates to using opt-in panel data to estimate the broader population's fishing activity. If you mostly talk to avid anglers (those who fish most frequently), or mostly talk to people who successfully catch fish, you can't use that information to extrapolate up to the general population without introducing bias. For example, if only avid anglers are talked to, and they have higher catch rates or fish more than average, using their information to extrapolate up to the general population will result in biased catch and effort estimates (too high in this case). Similarly, estimates will be biased high if people who don't catch anything are less likely to respond than people who do catch fish (and a relatively high percentage of MRIP intercepts report no fish being caught). The old saying that a few anglers catch most of the fish comes to mind, and it seems at least possible that highly skilled and avid anglers are the ones most likely to be interested in participating in an opt-in panel.

These statistical considerations make self-reported data from self-selecting people very difficult to use when making generalizations about a population. Since such individuals are more likely to be avid anglers, their data can't be used to extrapolate to the total population without biasing the estimates. Again, this is because the self-selecting anglers are probably different from the average angler - they are after all spending a lot of time to record and report their catches, which is not done in a systematic manner by most anglers.

The degree of bias depends upon the relationship between the variables being measured and the likelihood of participating in the data collection program. If the two are highly correlated then there is a high likelihood for bias. A scenario with a high likelihood for bias is in estimating catch rates, where volunteers are more likely to be avid anglers who may have different catch rates than the average angler. A scenario with a lower likelihood for bias might be collecting fish racks for biological research such as determining the relationship between age and fish length. It would seem unlikely that avid anglers would fish on a population of fish that had different growth rates than the average fish.

Data from opt-in panels are currently being used to examine the length distribution of released fish. If the released catch of panel participants is different from the general angling population, then estimates of length distributions will be biased, which could affect predictions about the results of length-based regulations that are based on such data.

For data on a group of anglers that fished in a particular location or at particular time, such as a tournament, if all anglers participate in reporting then you can use the data for that particular group, especially if at least some validation of catch is done. This would be a census of catch for the event. Extrapolating beyond the group that actually reported data is where bias becomes an issue.

<u>Part 3: General Discussion and a Framework for Evaluating and Using Self-Reported Data</u>

The afternoon discussion centered on trying to figure out if, when, and how to use self-reported data from self-selecting anglers, and more generally how best to use the energy and desire of anglers to participate in data collection. Ultimately discussion centered on a set of considerations that should be evaluated regarding self-reported data. It would not be possible to create a complete decision framework in the course of a one day meeting, and often data need to be evaluated on a case-by-case-basis depending on both the characteristics of the data and the decision being evaluated. These considerations include:

What is the likelihood, based on the characteristics of respondents and the kind of data being reported, that data are biased?

- Variables that are closely correlated with the decision to participate in an opt-in panel have a high likelihood for bias.
- Collecting fish racks for size-aging studies would be an example of low likelihood of bias. It seems unlikely that avid anglers would catch faster growing fish.
- Gathering catch per trip information would be an example of high likelihood of bias. It seems likely that avid anglers would be more likely to participate in an opt-in angler panel and have different catch rates than the average angler.

- Using avid anglers to provide qualitative information, such as identifying or describing fishing access sites is likely to improve the completeness and quality of onsite sample frames and therefore reduce the potential for bias.
- Opt-in panel data should not be used without clearly identifying the potential for bias.

Are there other sources for the kind of data being reported?

- If providing the only sources of data or filling a major information gap, such as lengths of released fish, then self-reported data from an opt-in program may be the only information that data managers can obtain. However, making decisions with data that is potentially biased carries risks, even if it is the only source of information. The tradeoffs of using other data that may be less informative but unbiased would have to be weighed against data that on the surface appears more informative but is potentially biased.

What is the risk (fishery closures, overfishing) of using data that are likely biased without ways to examine and correct for such bias?

- If the data in question are being used for fishery quota monitoring, then the risks appear relatively high that unnecessary closures could occur (with negative socio-economic impacts) or closures may not be implemented early enough, resulting in negative biological impacts (overfishing and potentially long-term negative socio-economic impacts).

How well were the volunteers trained?

- Managers would want to be more cautious about data collected by volunteers with less training if measurement error or species identification were important for the topic being investigated. Measurement error and species identification errors can be minimized by good angler training. Conversely, training volunteers may alter their fishing behavior, which could also introduce bias.

What was the level of participation in each kind of data collection?

- Results from programs with very low participation rates would normally be treated more cautiously than programs with higher participation rates. Participation needs to be considered relative to the entire population. For example, a program with 1,000 participants is not necessarily better than a program with 100 participants if both are only covering 10% of the total angling population. Although a higher participation rate indicates a lower risk of bias, it does not indicate whether there is actually bias. The participants and non-participants may have very different fishing activities in a program with a high participation rate, as well as in one with a low participation rate.
- For opt-in panel data, it can be very difficult to assess the level of participation since there is no defined sample or sample frame.

Regardless of the answers to these questions, managers must always be informed in a very direct and upfront way about the potential for bias. It is not enough to relegate such discussion to a reference in an appendix in a historical document. Any time information that is likely biased is used, those biases must be described to decision makers if decision makers are to be able to effectively evaluate the data and make appropriate decisions.

A key challenge is that anglers are most interested in providing data on topics like catch and effort, which are also the topics most prone to bias related to participation from more avid (and skillful) anglers in a non-probability sampling framework such as opt-in panels. One point that should be highlighted is that MRIP survey data collection is also 100% dependent on angler participation since 100% of the data in MRIP are from anglers voluntarily participating in MRIP surveys. Once the primary MRIP improvements are in place, MRIP needs to work on informing anglers about how MRIP improvements will result in unbiased data.

MRFSS estimates have been susceptible to bias for a variety of reasons over the years. MRIP has been systematically rooting out sources of bias, but it has taken a long time to do so. This was necessary because of the complex statistical issues involved and the need to pre-test and review alternative survey designs through pilot tests and peer reviews. Once MRIP can show that unbiased designs are in place (or at least that any design-based biases have been examined and corrected), angler trust and enthusiasm for providing data may be able to be harnessed within the survey framework of MRIP. Broad-based outreach about ongoing improvements and additional outreach once the main MRIP components have been implemented will be critical given the current level of distrust with MRFSS. Once improvements are in place, there will still be the issue of how much sampling is done to get a given level of precision. Even if probability sampling is used, unbiased estimates that are highly imprecise will still not be of great use to managers or earn anglers trust. Increasing sampling rates so that more anglers are contacted and therefore know their data are getting into the system could be useful for outreach as well as getting better precision with estimates.

An additional discussion noted that while opt-in data likely have bias problems, using self-reported data from a panel of anglers chosen randomly from a license frame is not as susceptible to these same sources of bias. One way to harness the energy of anglers who really want to participate in data collection could be to incorporate those avid anglers in efforts to get good participation in these panel-type surveys, where the self-reported (but not self-selected) data from a group of anglers are tracked and used to ground-truth other estimates. Getting champions for such programs outside of an agency could be useful for securing good participation.

Conclusion

Many areas of scientific inquiry have made good use of citizen science. From birds, butterflies and frogs to water quality and weather, science has benefited from citizen science. With fishing, since the people likely to have high catches seem more likely to participate, a special problem arises. It is similar to posting to CNN or Fox News and asking a group of avid politics watchers to predict the results of the next election. They will want to provide input and will give very good input, but it is not likely that such a group will correctly predict the outcome of the next election. Conversely, talking to a tiny fraction of randomly selected likely voters can get very close to actual election results (http://www.realclearpolitics.com/bush_vs_kerry.html; http://www.realclearpolitics.com/epolls/2008/president/us/general_election_mccain_vs_obama-225.html). Fisheries data are a lot more complicated than the A or B choice usually involved in politics, but the underlying principles are the same.

Opt-in angler data may be useful for certain kinds of data that are not likely to be susceptible to bias, although it is difficult to anticipate what these data may be. However, the unique characteristics of self-selected participants are likely to introduce bias into certain kinds of data, especially catch and effort data. Managers must be made aware of such biases, and the likely extent of such biases should be examined when implementation of these programs is considered.

If anglers are asked to report information but then that information is not used due to these biases, it is possible that more harm than good will be done as a result of the program in terms of angler trust and confidence in recreational data collection overall. However, for certain kinds of information (for example biological specimen collection) opt-in participation by volunteer anglers may be a good way to harness anglers' sincere desire to participate in data collection that improves the science and management of recreational fisheries. In addition, more research should be conducted to examine possible ways to correct for bias when possible, in order to make the best use of the data that anglers do go through the effort of providing.