Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Sciaenids Management Board

FROM: Red Drum Stock Assessment Subcommittee

DATE: October 16, 2024

SUBJECT: Response to 2024 (SEDAR 93) Red Drum Review Workshop Report

The Red Drum Stock Assessment Subcommittee (SAS) expresses some concerns about the peer review panel's (Panel) report summarizing their conclusions and recommendations from review of the 2024 Red Drum Benchmark Stock Assessment. These concerns could not be addressed prior to release of the report to the Sciaenids Management Board. Per the agreed upon review workshop schedule, the report was to be made available to the SAS for review on September 6, 2024 (https://sedarweb.org/documents/sedar-93-red-drum-review-schedule_assessmentreview-pdf/), but was not made available to ASFMC staff until October 8. This delay meant the report was released to ASFMC on the date of the deadline for ASMFC Annual Meeting main meeting materials resulting in the SAS not having the opportunity to review the report, seek any necessary clarification from the Panel, or provide any comments they felt necessary to be considered with the report in main meeting materials. Although the entire Red Drum Technical Committee (TC) could not gather during the brief period between receiving the report and the deadline for Annual Meeting supplemental meeting materials (October 16), the SAS was able to outline their concerns in the following response to the report.

Stock-Recruitment Relationship Steepness

The recommendation from the Panel not to fix steepness of the stock-recruitment relationship at 0.99 is in direct conflict with the recommendation from the simulation assessment peer review panel to fix steepness at 0.99. The benchmark assessment report includes a reference to this recommendation in the simulation assessment peer review report (ASMFC 2022) as justification for fixing steepness at 0.99, and the decision was not "arbitrary and ad-hoc" as described in the Panel's report. This treatment of the stock-recruitment relationship, along with use of SPR-based proxy reference points, is a common practice among stock assessments along the US Atlantic Coast that have limited information to inform a reliable steepness parameter estimate. The Panel noted in the report that setting steepness to 0.99 implies no stock-recruitment relationship, "despite biological evidence suggesting otherwise." It is not clear what evidence the Panel is citing here, as there was not discussion about data during the workshop indicating a defined stock-recruitment relationship for Atlantic coast red drum.

The Panel requested a sensitivity run during the workshop with steepness fixed at 0.84, based on the Shertzer and Conn (2012) meta-analysis and the steepness value assumed in the simulation assessment operating model. The assessment model was not particularly sensitive to this alternative steepness value (Figures 1 and 2) and the alternative value does not affect stock status estimates. The SAS believes the steepness value of 0.99, as recommended during the simulation assessment peer review, is most appropriate. Further, it is important to note the SAS conducted a sensitivity analysis using the base model configuration with the only change being to try and estimate steepness as part of the sensitivity

analysis described in the assessment report. Under this run, the estimate of steepness hit the upper bound (0.99), effectively converging on the base model run and was the observed pattern noted by the simulation assessment peer review panel, which indicates lack of information in the data to estimate a stock-recruitment relationship and was a primary reason for their recommendation to fix steepness at 0.99.

Index Data

Index Exclusion/Inclusion

The Panel expressed concern that "clear analyses were not presented to demonstrate the time series included in the assessment models were all indexing stock abundance and there were no conflicts between the time series." While the SAS recognizes these concerns, it is unclear what additional analyses would alleviate these concerns given a primary assumption of any index is that it is accurately representing true, unknown stock abundance trends for the stock being assessed. For the southern stock, the SAS provided figures during the workshop illustrating broad spatial synchrony across sub-adult and recruitment surveys during periods of temporal overlap (Figure 3). Second, at the request of the Panel, the SAS provided age-specific indices to evaluate the ability of the southern stock sub-adult surveys to track year classes through time to support the concept these surveys were representative of stock abundances (Figure 4). Unfortunately, similar analyses were not possible for the northern stock owing to only a single fishery-independent recruitment, sub-adult, and adult survey available which the model used to characterize abundance trends for the northern stock and lack of age composition data to split the sub-adult aggregate index into age-specific indices. However, the SAS did inform the Panel of a publication cited in previous red drum assessments that evaluated the NC recruitment survey and validated the index from this survey by showing strong correlations with fishery catches two years later (Bacheler et al. 2008). Third, of the ten surveys retained in the southern (n = 7) and northern (n = 3) SS models, a version of all but one (the SC rotenone survey representing recruitment in the mid- to late-1980s) was included in the previous benchmark assessment (ASMFC 2017; SEDAR 2015) as nominal indices presumably less representative as an index of stock abundance. Justification for inclusion of the additional SC rotenone survey was provided in the simulation assessment report (ASMFC 2022), which the Panel was not tasked with reviewing and was understandably missed with review focused on the benchmark assessment.

Index Standardization

The Panel expressed concern with indices used in the assessment developed from standardization methods that did not produce diagnostics they considered adequate. Although some diagnostics were not considered adequate for some indices, the SAS moved from nominal (e.g., simple arithmetic mean) indices to standardized indices that account for extraneous catchability effects during this assessment, which represents an advancement in index data treatment. While this was the first-time standardized indices have been developed for all surveys during a red drum assessment, as noted above as an advancement relative to prior assessments, previous red drum review panels have thoroughly reviewed the surveys and indices used. Therefore, the SAS approached index development as a routine process and focused extra time on other challenging areas experienced in past assessments and reviews (development of proxy size composition data for recreational discards and use of tag-recapture data).

During the review workshop, a reviewer developed an alternative index from the SC Trammel survey using spatio-temporal methods with alternative covariates considered (month as a factor instead of day of year as a continuous variable; estuary (coarser scale) instead of strata, i.e. sub-estuary, a finer scale spatial variable; the exclusion of a site level random effect; inclusion of year by area and month by area

random effects). This alternative index indicated a lower relative abundance in recent years than the index used in the base assessment model (Figure 5). The reviewer noted when providing the alternative index for a requested assessment model sensitivity run that "while environmental covariates improved the fit (AIC, the qqplot did not change much), this requires some changes to the way we generate the indices i.e. making a prediction grid in space with the values of all environmental covariates for that year and location so I did not test due to lack of time". Further, it used a spatial variable deemed inferior (based on model selection criteria) to the strata spatial variable used in the SAS developed index and one not recommended for use by the data provider to characterize the spatial effect on catchability given sub-estuary red drum distribution patterns. The SAS has concerns about using an alternative index that did not have adequate time and consideration to develop. However, even with these concerns, the alternative index sensitivity run (Figures 1 and 2, Trammel) showed similar trends in both SPR and SSB as the base model run though the estimates were scaled higher.

Following the review workshop, the SAS spent additional time developing an alternative index using spatio-temporal methods, suggested by reviewers, while considering environmental covariates and evaluating diagnostics recommended by the Panel. This alternative index was similar to the original index used in the base assessment model, particularly in recent years (Figure 6). The SAS recognizes the Panel's point that the assessment model is sensitive to alternative calculations of this index, but the report does discuss stock status estimates from the assessment model run with the alternative reviewer-provided index and we do not think the model results using the alternative index developed during the workshop should be interpreted as a plausible "state of nature", the typical interpretation of final sensitivity runs, until more time and consideration goes into developing this index. We also note that it is not unexpected to see assessment model sensitivity to alternate data sets used in the fitting process.

Additional Peer Review Workshop Runs

Several analyses were conducted during the course of the review workshop that are discussed in the report, but are not supplemented with information reviewed during the workshop (e.g., comparison figures). The SAS believes these materials, which are not available for reference anywhere else, are important context to the report (Figure 1 and 2).

The report notes "plots of SPR, spawning stock biomass, and relative spawning stock biomass indicated that while most analyses resulted in proportional shifts, only the removal of the Florida haul index data and the update of the South Carolina trammel index led to a change in stock status." This is misleading, as no sensitivity runs requested during the review workshop led to a change in overfishing status. Overfished status changed for the two runs noted, but it's important to consider the change quantitatively which is not described in the report. Terminal three-year (2019-2021 fishing years) average relative SSB ($SSB/SSB_{30\%}$) used to determine overfished status changed from 0.881 in the base model to 1.008 and 1.025 in runs with the removal of the Florida haul age data and the alternative South Carolina trammel index (again, we do not think this should be considered a plausible run), respectively. A value less than one (the threshold) indicates an overfished stock status determination. With additional consideration of the consistent downward trend of SSB and the preliminary 2022 fishing year estimates, it is very likely an overfished status would be estimated in these runs using the three-year average SSB from 2020-2022.

TLA Reference Period

The Traffic Light Analysis (TLA) reference periods chosen during the assessment were based on the previous peer reviewed and management board-accepted stock assessments. The SAS used the periods when the stocks were determined not to be overfishing in these assessments, as described in the assessment report. Although the SAS thinks the methods used in the previous assessments needed improvement, the previous assessments stood as the best scientific information available (BSIA) for the SAS to consider during development of the current assessment. No improved, alternative reference period choice was recommended by the Panel for the SAS to consider against their choice during the assessment, so the SAS believes the reference periods chosen during the assessment are the best available.

The Panel notes that robustness testing is needed to understand choices of reference period. However, the SAS conducted sensitivity testing during the assessment around reference period choice and the Panel acknowledged, particularly for fishery performance measures indicative of fishing mortality, that results were "largely in agreement" across choices tested. Management strategy evaluation (MSE) was suggested by the Panel as a way to test the TLA for the purpose of operationalizing a control rule, but the SAS notes MSE is outside the scope of a traditional stock assessment and that they used the TLA in the assessment to provide qualitative stock status determinations, not to implement a specific control rule. The SAS agrees with the recommended MSE approach for testing the TLA to implement a specific control rule, but notes this would need to be a separate process similar in duration and resources as the benchmark assessment.

2025 Assessment Update

The Panel's report recommends a short-term update of the assessment in 2025 that incorporates:

- The most recent data available, including catch, biological, and abundance indices information.
- Updating the model according to Panel recommendations, specifically including the approach to standardization of abundance indices and in the testing and selection of retained abundance indices.
- Expected changes in the catches derived from MRIP, if available.

The SAS does not believe this update will result in substantial changes for reasons discussed below and has concern spending additional time, if made available, on model updates will lead to delays in action to address unfavorable stock status determinations. A red drum assessment update is not currently accounted for on the ASMFC stock assessment schedule and TC-generated updates to input data and technical analyses by the SAS would require time for other responsibilities be shifted to this unplanned assessment update.

Second, the alternative SC Trammel index developed after the review workshop and discussed above shows minimal changes to the index trend that are unlikely to change the conclusions of the assessment. This conclusion is supported by the runs conducted at the review workshop using the alternative index developed by the Panel member (see discussion above), which showed greater divergences in time series patterns (Figure 5 vs. Figure 6), and still resulted in no change in stock status (Figures 1 and 2; Trammel). Similar treatment of other southern stock SC indices post-review workshop suggest similar results, with no reason to believe changes to spatio-temporal modeling and inclusion of comparable covariates would result in large deviations in relative abundance trends.

Third, removing the longline survey data altogether, a recommended model update from the Panel, was done as a sensitivity run at the request of the Panel. The change impacted historical stock estimates, but the model was relatively insensitive to the removal of these data in recent years (Figures 1 and 2, No Longline). As discovered during model development and discussed during the review workshop, the contemporary SC longline survey provides age data critical to informing early recruitment deviations used to modify an unrealistic equilibrium age composition in the model start year (Figure 7) and is the primary data source informing the model of growth for older, mature fish. For these reasons as noted in the assessment report, the SAS believes these data are beneficial to the assessment model and should not be removed from the base model.

Finally, as discussed at the review workshop, potential MRIP catch estimate changes will not be finalized until Spring 2026. To include these data, an assessment would not be completed until late 2026 or early 2027. This would represent a significant delay in potential management action with sensitivity runs exploring the impact of a proposed constant 30% reduction in catch (both in the assessment report and additional multi-factor sensitivity changes requested during the review workshop and presented in Figures 1 and 2, herein) suggesting no change in stock status determination. While such changes affect the scale of the population (i.e., absolute SSB, absolute numbers, average recruitment), there is also a proportional change in reference points associated with $SPR_{30\%}$ and $SSB_{30\%}$. This effect was anticipated by the SAS and confirmed via these sensitivity runs and hence, while potentially a significant change to the catch stream, given the red drum fisheries are not managed via annual catch limits across both sectors, the scale changes are not as impactful for management considerations.

References

ASMFC. 2022. Red Drum Simulation Assessment and Peer Review Report. ASMFC. Arlington, VA.

Bacheler, N.M., L.M. Paramore, J.A. Buckel, and F.S. Scharf. 2008. Recruitment of juvenile red drum in North Carolina: Spatiotemporal patterns of year-class strength and validation of a seine survey. *North American Journal of Fisheries Management* 28:1086-1098.

Shertzer, K. and P. Conn. 2012. Spawner-recruit relationships of demersal marine fishes: Prior distribution of steepness. Bulletin of Marine Science 88. 10.5343/bms.2011.1019.

Figures

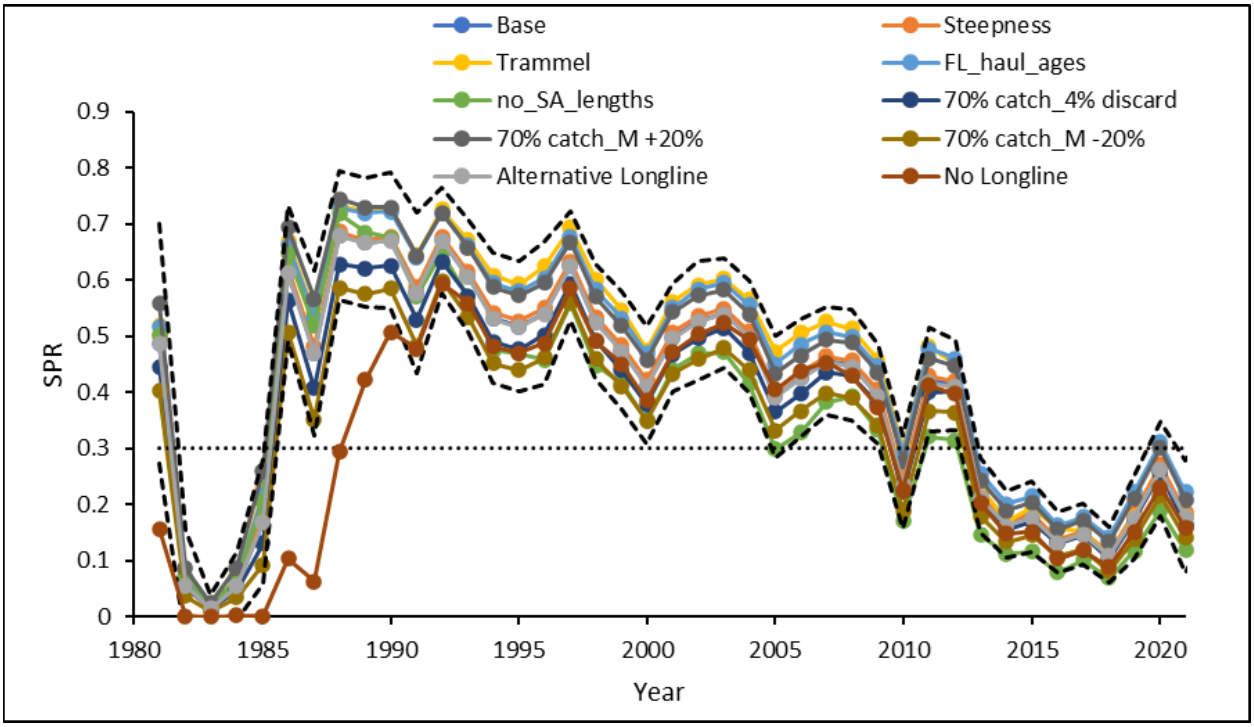

Figure 1. Spawning potential ratio (SPR) estimates from the base SS model for the southern red drum stock compared to sensitivity runs requested during the peer review workshop. The dotted line is the 30% SPR threshold. Sensitivity runs include: changing stock-recruitment steepness from 0.99 to 0.84 (Steepness), using the alternative SC Trammel index calculated during the review workshop (Trammel), excluding early years of age composition data for the FL Haul Seine survey (FL_haul_ages), excluding length composition data for sub-adult surveys (no_SA_lengths), reducing recreational catch by 30% with a 4% discard mortality instead of 8% (70% catch_4% discard), reducing recreational catch by 30% with an increase of the base natural mortality by 20% (70% catch_M +20%), reducing recreational catch by 30% with a decrease of the base natural mortality by 20% (70% catch_M -20%), using an alternative index for the SC Longline survey calculated during the review workshop (Alternative Longline), and dropping all longline survey data (No Longline).

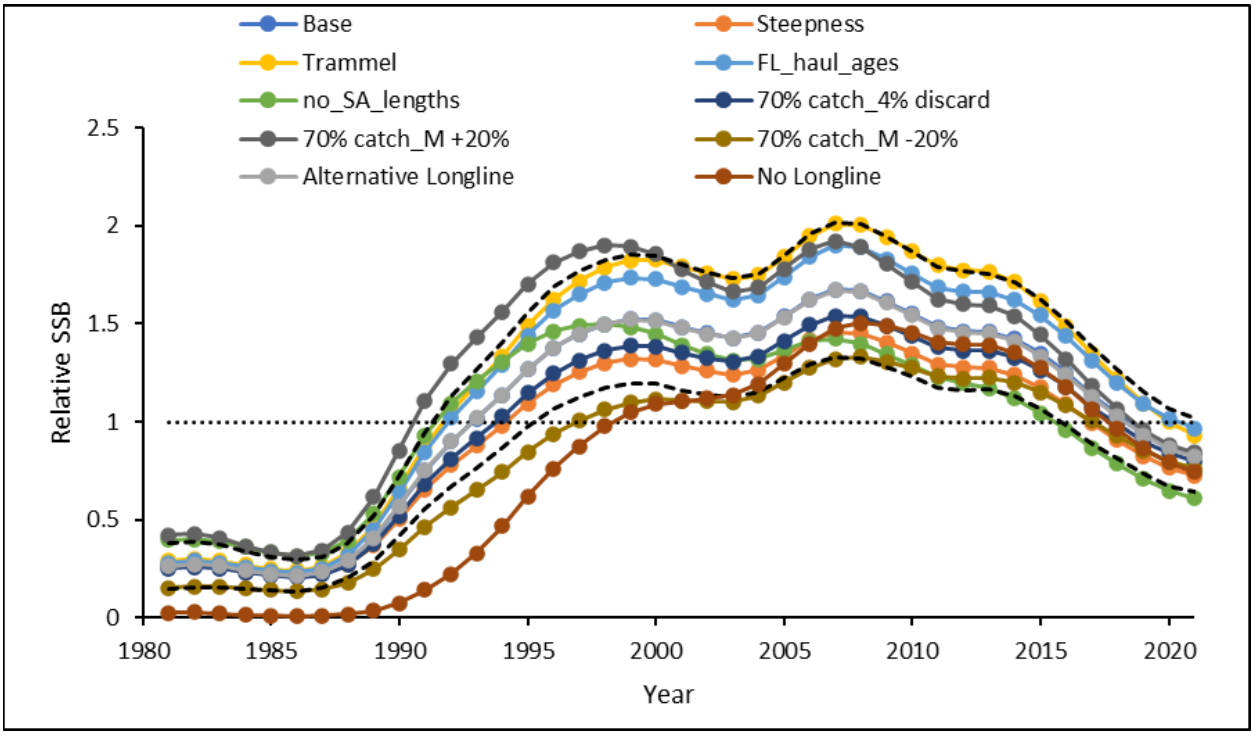

Figure 2. Relative spawning stock biomass ($SSB/SSB_{30\%}$) estimates from the base SS model for the southern red drum stock compared to sensitivity runs requested during the peer review workshop. The dotted line is the threshold (i.e., $SSB=SSB_{30\%}$). Sensitivity runs include: changing stock-recruitment steepness from 0.99 to 0.84 (Steepness), using the alternative SC Trammel index calculated during the review workshop (Trammel), excluding early years of age composition data for the FL Haul Seine survey (FL_haul_ages), excluding length composition data for sub-adult surveys (no_SA_lengths), reducing recreational catch by 30% with a 4% discard mortality instead of 8% (70% catch_4% discard), reducing recreational catch by 30% with an increase of the base natural mortality by 20% (70% catch_M +20%), reducing recreational catch by 30% with a decrease of the base natural mortality by 20% (70% catch_M -20%), using an alternative index for the SC Longline survey calculated during the review workshop (Alternative Longline), and dropping all longline survey data (No Longline).

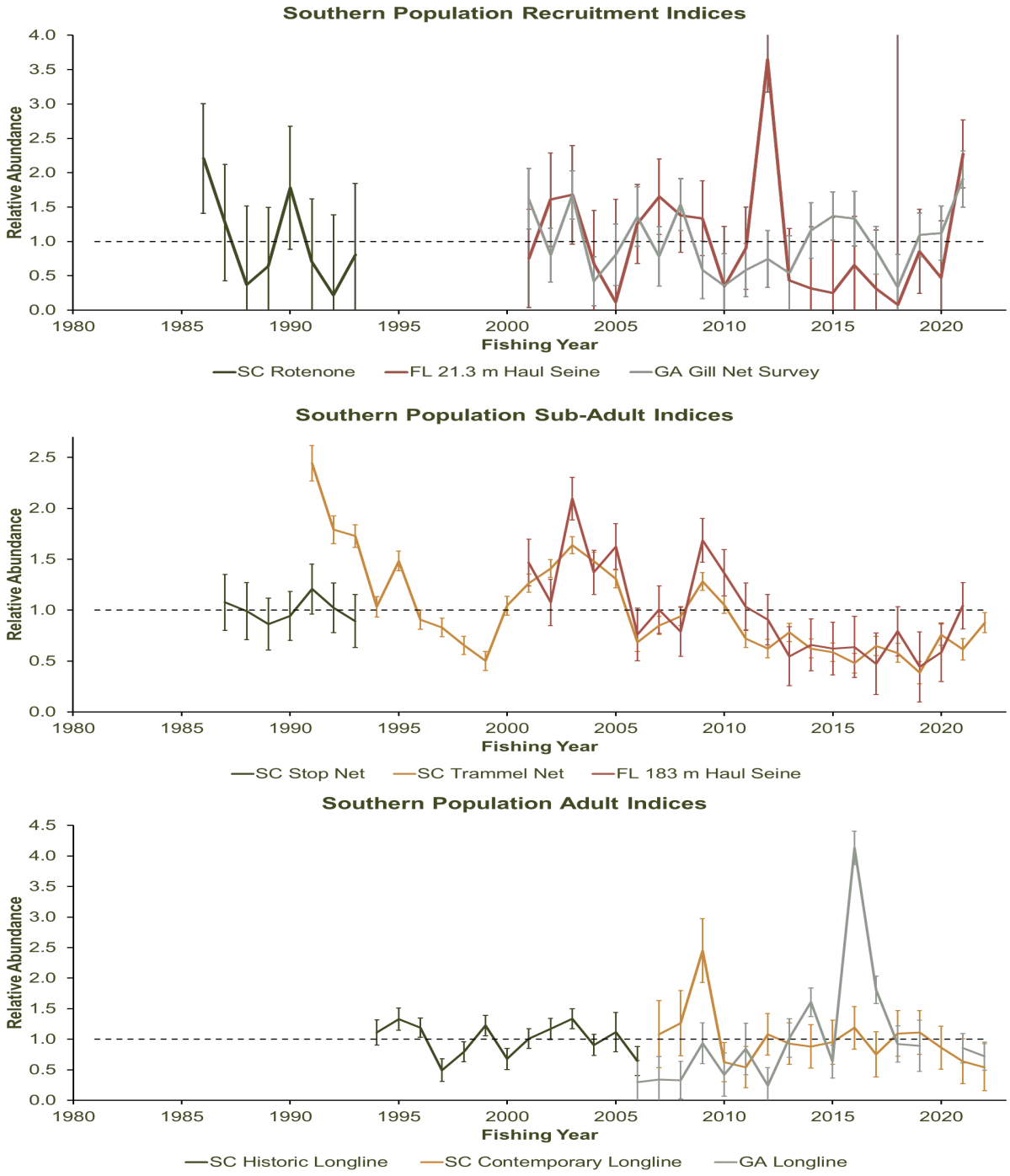

Figure 3. Combined plot of southern population recruitment indices (top panel), sub-adult indices (middle panel), and adult indices (bottom panel) illustrating broad synchrony in abundance signals across surveys encountering similar size and age red drum throughout the region. The most conflict is between the two contemporary longline surveys with the SC index suggesting stable to decreasing abundance while the GA longline suggesting stable to increasing abundance. Due to concerns regarding the ability of the GA longline survey to represent changes in adult red drum abundance due to low encounter rates, survey design changes and other factors, the SAS recommended, and the Panel concurred with, removal of the index from the base model for the southern stock.

Figure 4. Age-specific indices of abundance from the SC Trammel Survey lagged, where necessary, to match their year class. Age-0 and age-3 index values are on the secondary axis due to lower catch rates of these age classes to give a better comparison of trends.

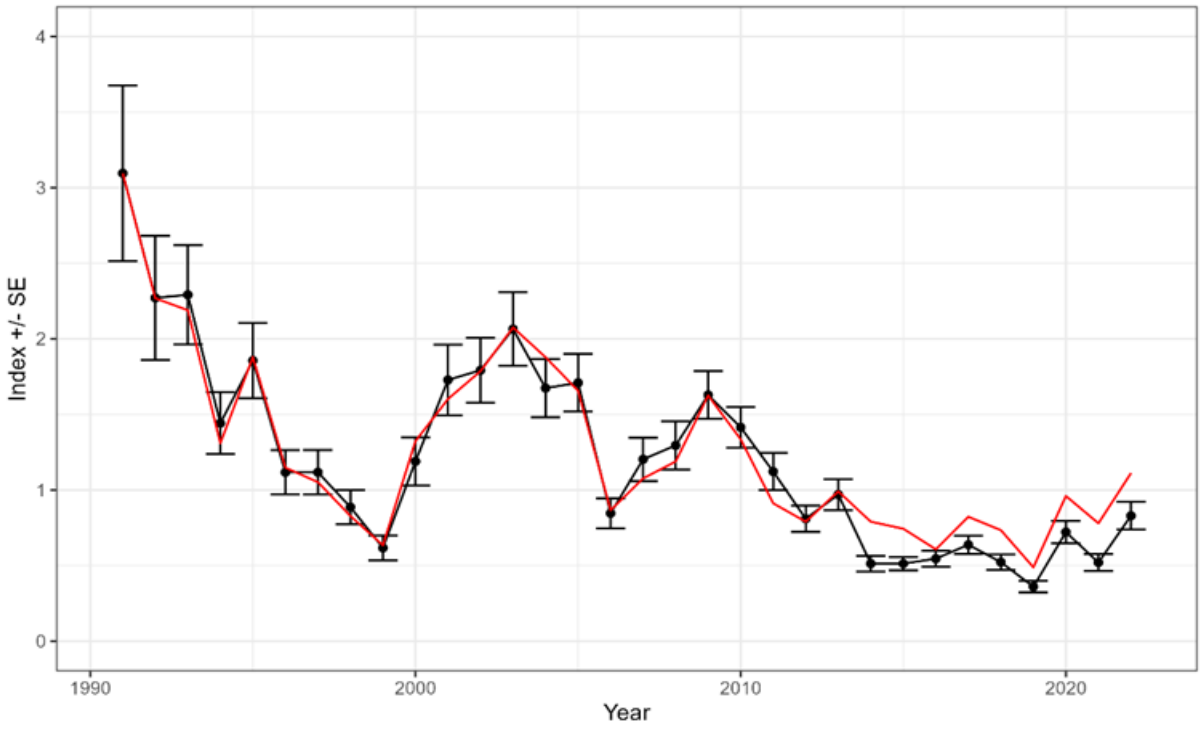

Figure 5. Alternative SC Trammel index calculated by reviewers during the review workshop (black with error bars) compared to the index used in the base assessment model (red).

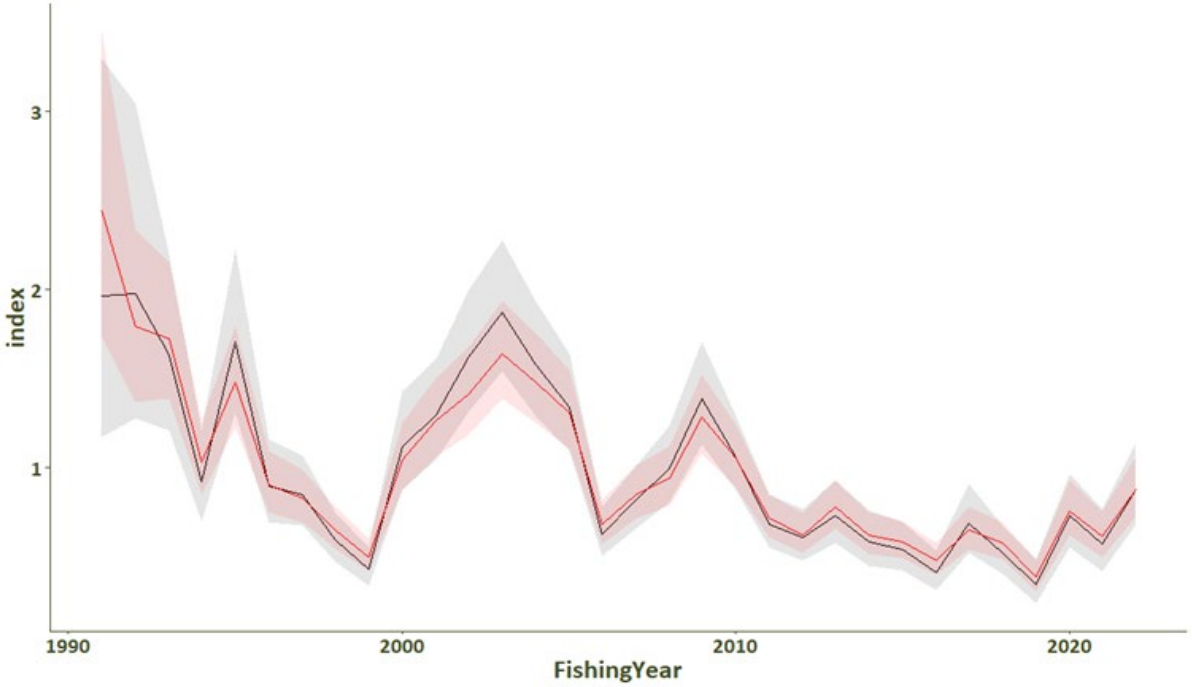

Figure 6. Alternative SC Trammel index calculated by the SAS following the review workshop using a spatiotemporal delta-truncated negative binomial model with random effect for site, and fixed effects for fishing year, month, and tidal stage in both model components (black line with grey shaded 95% CIs) compared to the index used in the assessment base model (red).

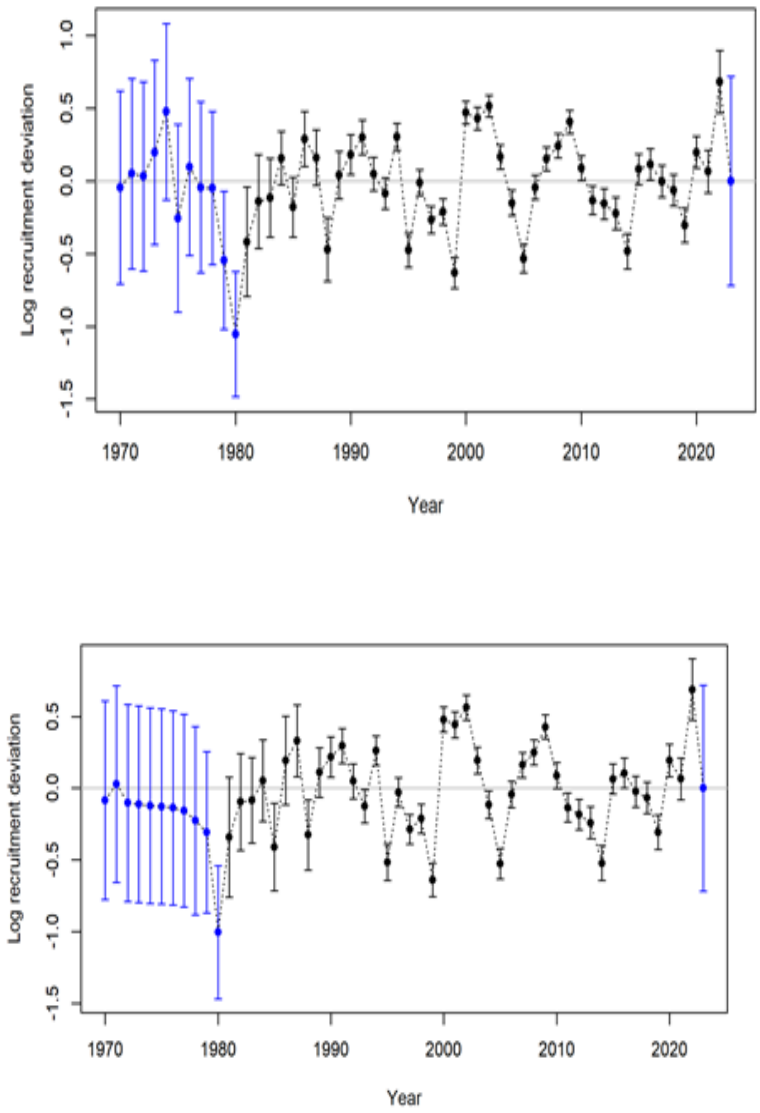

Figure 7. Recruitment deviation estimates from the southern base assessment model with (left) and without (right) SC Longline age data.

Atlantic States Marine Fisheries Commission

Preliminary Red Drum Risk and Uncertainty Report

October 2024

The following report details the preliminary inputs for the Red Drum Risk and Uncertainty Decision Tools. There are two decision tools, one for each red drum management region: New Jersey through North Carolina (northern stock) and South Carolina through the Atlantic side of Florida (southern stock). The report summarizes both technical inputs (scores) and weightings for the decision tools. The technical inputs characterize components of the red drum stock and fishery that may contribute to risk and uncertainty, while the weightings indicate the relative importance of each component to management considerations for red drum.

Preliminary Risk and Uncertainty Decision Tools for Red Drum Management Regions

Weightings in table below are only default values until Sciaenids Management Board input has been collected and summarized.

	Northern		Southern	
Decision Tool Component	Weight	Score	Weight	Score
P(SSB < SSB threshold)	0.10	0.00	0.10	1.00
P(SSB < SSB target)	0.10	0.30	0.10	1.00
P(*F* > *F* threshold)	0.10	0.00	0.10	1.00
P(*F* > *F* target)	0.10	0.80	0.10	1.00
Model uncertainty	0.10	4.00	0.10	2.00
Management uncertainty	0.10	3.75	0.10	3.50
Environmental uncertainty	0.10	4.00	0.10	4.25
Ecosystem/trophic importance	0.10	2.18	0.10	3.00
Short-term commercial socioeconomic effect	0.10	*	0.10	*
Long-term commercial socioeconomic effect	0.10	*	0.10	*
Short-term recreational socioeconomic effect	0.10	*	0.10	*
Long-term commercial socioeconomic effect	0.10	*	0.10	*

*A portion of the socioeconomic scores will only be calculated if a management action will be initiated. See the Socioeconomic Considerations for further details and socioeconomic sub-scores.

Region: New Jersey – North Carolina (Northern)

The following technical inputs were provided by the Red Drum Technical Committee.

Stock Status

All stock status inputs are based on the 2024 Red Drum Benchmark Assessment.

Spawning Stock Biomass (SSB) Threshold
Probability that SSB is less than the threshold (range: 0 – 1): 0.00
SSB Target
Probability that SSB is less than the target (range: 0 – 1): 0.30
F Threshold
Probability that fishing mortality (*F*) is more than the threshold (range: 0 – 1): 0.00
F Target
Probability that *F* is more than the target (range: 0 – 1): 0.80

Additional Uncertainty Considerations

Model Uncertainty
Score (range: 0 – 5): 4
Justification:

- The Traffic Light Analysis (TLA) was used to determine stock status due to instability of SS model.
- The TLA does not integrate data but rather evaluates data sets individually.
- Adult abundance metric proportion red threshold halved from grid search optimum due to concerns that the metric would fail to detect declines in older age-classes.
- Fishery performance status was found to be sensitive to the reference period (2 of 8 alternate reference periods resulted in overfishing determination).
- There are catch data for areas north of NC, but no fishery-independent abundance data.
- There were contradictory conclusions about overfishing between the preferred TLA method and the Skate method, with the Skate method identified as the more risk adverse method due to its shorter timeframe to indicate overfishing.

Management Uncertainty
Score (range: 0 – 5): 3.75
Justification:

- Uncertainty in the TLA results during the mid-to-late 2010s being influenced by the strong 2011-year class.
- Lack of abundance information north of NC and overall data limitations due to lack of good fishery dependent and independent mortality data.
- Assessment peer review concerns of unrealistic decline in abundance over the time series.
- The Skate Data Limited Control Rule method suggests F is too high in recent years, so there is trouble constraining catch.
- Uncertainty around MRIP estimates and regarding effectiveness of management actions.
- The current FMP has prescriptive goals, but its ability to assess management performance has been highly uncertain.
- Current management is restrictive (narrow slot limits and low bag limits), but legal harvest is almost exclusively of immature fish.

- Fishery trending toward overfished/experiencing overfishing and there is potential for population expansion north.

Environmental Uncertainty
Score (range: 0 – 5): 4
Justification:
- There is a link between recruitment success and environment, specifically directionality and intensity of wind during the spawning (Goldberg et al. 2021) but this link is not accounted for in the TLA.
- There is evidence of range expansion into VA and MD based on MRIP data but there is no fishery-independent data to corroborate. Climate projections tend to favor potential for expansion northward.
- The species is moderately sensitive to climate change and experiences high climate exposure according to climate change vulnerability assessments (Hare et al. 2016.)
- There is a large variation in M.

Additional Risk Considerations
Ecosystem/Trophic Importance
Score (range: 0 – 5): 2.18
Justification:
- Red drum is a higher trophic level piscivore in estuarine systems and forage fish for marine mammals.
- Since this stock is at the northern extent of range, there are other piscivores (e.g., striped bass) that are likely more important.
- There is a lower abundance of red drum in northern part of the range, so they will have less trophic interactions and ecosystem impacts.
- Effective predator at adult stages, but there is little research done to characterize their importance as a prey species.

Socioeconomic Considerations
See socioeconomic considerations section below.

Region: South Carolina – Florida (Southern)

The following technical inputs were provided by the Red Drum Technical Committee.
Stock Status
All stock status inputs are based on the 2024 Red Drum Benchmark Assessment.
Spawning Stock Biomass (SSB) Threshold
Probability that SSB is less than the threshold (range: 0 – 1): 1.00
SSB Target
Probability that SSB is less than the target (range: 0 – 1): 1.00
F Threshold
Probability that fishing mortality (*F*) is more than the threshold (range: 0 – 1): 1.00

F Target
Probability that *F* is more than the target (range: 0 – 1): 1.00

Additional Uncertainty Considerations

Model Uncertainty
Score (range: 0 – 5): 2
Justification:

- The asymptotic standard errors that were used in the SS model are considered a minimum quantification of model uncertainty.
- Relative to the management threshold of 1.0, the terminal three-year relative SSB upper 95% confidence interval limits were 1.15 (2019), 1.07 (2020), and 1.02 (2021). Relative to the management threshold of 30%, the terminal three-year SPR upper 95% confidence interval limits were 0.25 (2019), 0.35 (2020), 0.28 (2021).
- One of nine sensitivity runs estimated a different overfished status than the base model, with this run's terminal three-year relative SSB estimates above the base model 95% CI; estimates below base model 95% CI for one additional run. No sensitivity runs estimated a different overfishing status.
- No retrospective peel estimates during terminal three years were outside the base model's 95% CIs. One retrospective peel SPR estimate was outside base model's 95% CIs.
- The different assessment methods used in this stock assessment for the southern stock (SS, TLA, Skate) agreed on overfishing status, differed on overfished status based on the inclusion of GA Longline index in the TLA.

Management Uncertainty
Score (range: 0 – 5): 3.5
Justification:

- Lack of good fishery-dependent and -independent mortality data on the oldest and most fecund age classes.
- Potential effect of MRIP effort changes.
- State-specific assessments have indicated concern or poor stock status.
- The FMP has prescriptive goals, but its ability to assess management performance has been uncertain.
- Current management is restrictive (narrow slot limits and low bag limits), but legal harvest is almost exclusively of immature fish.
- Overfished/experiencing overfishing is likely, suggesting F is too high and indicating management has had trouble constraining catch.
- There are no effort controls, only harvest controls which appear ineffective at constraining total removals.

Environmental Uncertainty

Score (range: 0 – 5): 4.25

Justification:

- There needs to be more comprehensive abiotic/biotic metrics due to the correlations generally being weak, and there is a need to incorporate spatial aggregations.
- In Florida and other southern states, red tide and other HABs need to be considered.
- The link between recruitment success and the environment determined by Goldberg et al. 2022 is not accounted for in the 2024 assessment model and will not be accounted for explicitly in projections.
- This species is moderately sensitive to climate change and experience high climate exposure according to climate change vulnerability assessments (Hare et al. 2016.).
- There is uncertainty about annual recruitment variability due to acute environmental impacts as well as long term climate change.
- There was no spawner-recruit relationship detected in the assessment.
- There is a lack of understanding of environmental drivers' impact on recruitment and there has been depressed recruitment for 10+ yrs. Fish kills are also occurring in shallow water estuarine environments.

Additional Risk Considerations

Ecosystem/Trophic Importance

Score (range: 0 – 5): 3

Justification:

- Based upon assessment report, red drum does not appear to have an important link to the ecosystem.
- It is an important predator, but likely a minor threat to endangered or other managed species.
- It's an effective predator at adult stages, but little research has been done to characterize their importance as a prey species.
- There is a larger abundance in comparison to the northern region, with similar trophic interactions and ecological impacts.

Socioeconomic Considerations

See socioeconomic considerations section below.

Socioeconomic Considerations

The following technical inputs were provided by the Committee on Economics and Social Sciences (CESS). After comparing regional data, the CESS decided to provide a single coastwide score for each socioeconomic component.

Commercial Value

Score (range: 0 – 5): 1

Justification:

- The red drum commercial fishery economic value importance indicator was calculated using a three-year average of coastwide ex-vessel value.
    - A value of 0 was assigned if there were no reported commercial landings in the time period. A value of 1 was assigned if the ex-vessel value of the commercial fishery was <1 million dollars.
    - A value of 2 was assigned if the ex-vessel value of the commercial fishery was between 1-10 million dollars.
    - A value of 3 was assigned if the ex-vessel value was between 10-30 million dollars.
    - A value of 4 was assigned if the ex-vessel value was between 30-100 million dollars.
    - A value of 5 was assigned if the ex-vessel value was >100 million dollars.
- The average ex-vessel value from 2020 to 2022 was $514,347 which indicated a value of 1.

Commercial Community Dependence

Score (range: 0 – 5): 1

Justification:

- The red drum commercial fishery community dependence indicator was calculated using a ratio of the red drum ex-vessel value to the total ex-vessel value of the top ten communities each averaged over three years (2020-2022).
- In the period there were publicly available state level landings in North Carolina and Virginia, therefore the average ex-vessel value of the top ten communities included two communities, North Carolina and Virginia.
- The scores were assigned based on the relative ex-vessel value of red drum to total ex-vessel value of the commercial fleets in each community.
    - A value of 0 was assigned if there were no community fishing.
    - A value of 1 was assigned if the ratio of red drum ex-vessel value to total ex-vessel value was between 0%-5%.
    - A value of 2 was assigned if the ratio of red drum ex-vessel value to total ex-vessel value was between 5%-15%.
    - A value of 3 was assigned if the ratio of red drum ex-vessel value to total ex-vessel value was between 15%-25%.
    - A value of 4 was assigned if the ratio of red drum ex-vessel value to total ex-vessel value was between 25%-50%.
    - A value of 5 was assigned if the ratio of red drum ex-vessel value to total ex-vessel value was >50%.
- The ratio of red drum ex-vessel value was averaged from 2020 to 2022, and the total ex-vessel value was 0%, which indicated a community dependence value of 1.

Recreational Desirability

Score (range: 0 – 5): 4

Justification:

- The red drum recreational fishery importance indicator was calculated by identifying the total coastwide annual targeted trips as a percentage of the total coastwide trips averaged over three years from 2020-2022.
- Trips were defined as a trip where red drum was the primary or secondary targeted species. Using this methodology recreational trips are not cumulative across species.
    - A value of 0 was assigned if there were no recreational fishing trips where red drum were the primary or secondary target.
    - A value of 1 was assigned if the percent of Red drum trips was between 0-0.5%.
    - A value of 2 was assigned if the percent of red drum trips was between 0.5-1.5%.
    - A value of 3 was assigned if the percent of red drum trips was between 1.5-5%.
    - A value of 4 was assigned if the percent of red drum trips was between 5-10%. A value of 5 was assigned if the percent of red drum trips was >10%.
- The percent of red drum trips to total recreational trips was 8%, which indicated a score of 4.

Recreational Community Dependence

Score (range: 0 – 5): 2

Justification:

- The red drum recreational community dependence indicator was calculated by identifying the average target trips of red drum as a percent of total recreational trips for the top ten communities averaged over three years from 2020-2022.
- There were six communities where NOAA reported recreational red drum trips that were statistically different from zero. Those communities were Florida, Georgia, Maryland, North Carolina, South Carolina, and Virginia.
    - A value of 0 was assigned if there were not any red drum trips in any communities from 2020-2022.
    - A value of 1 was assigned if the number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was between 0-3%.
    - A value of 2 was assigned if the number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was between 3-10%.
    - A value of 3 was assigned if the number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was between 10-15%.
    - A value of 4 was assigned if the number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was between 15-20%.
    - A value of 5 was assigned if the number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was >20%.

- The number of red drum trips as a percentage of all recreational trips averaged over the top communities from 2020-2022 was 9%. which indicated a score of 2.

Commercial Short-term Management Change
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

Commercial Long-term Management Change
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

Recreational Short-term Management Change
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

Recreational Long-term Management Change
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

Preliminary Decision Tool Weightings

This section will be completed once Sciaenids Management Board input has been collected and summarized.

The following weightings were produced based on Red Drum Management Board input. The Board provided input on priorities for risk considerations in tautog management via a webinar poll and survey. Each component of the Risk and Uncertainty Decision Tool was scored on a scale of 1 to 5, where 1 = this component is much less important than other components, 3 = this component is equally important as other components, and 5 = this component is much more important than other components. Responses were averaged and converted to the weighting scale.

Component	Score	Weight
SSB Threshold	0.00	0.00
SSB Target		
***F* Threshold**		
***F* Target**		
Model Uncertainty		
Management Uncertainty		
Environmental Uncertainty		
Ecosystem Importance		
Commercial Short-term		
Commercial Long-term		
Recreational Short-term		
Recreational Long-term		

Literature Cited

Goldberg, D. A., Paramore, L. M., & Scharf, F. S. (2022). Analysis of environment-recruitment associations for a coastal red drum population reveals consistent link between year class strength and early shifts in nearshore winds. *Fisheries Oceanography*, *31*(1), 56-69.

Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, et al. 2016. A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf. PLOS ONE 11(2): e0146756. https://doi.org/10.1371/journal.pone.0146756

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MEMORANDUM

TO: **Sciaenids Management Board**

FROM: **Black Drum Technical Committee**

DATE: **October 15, 2024**

SUBJECT: **2024 Black Drum Data Update**

Background

The 2023 Black Drum Benchmark Stock Assessment determined the Atlantic coast stock was not overfished nor experiencing overfishing in the terminal year of the assessment (2020). However, the assessment acknowledged lack of contrast in black drum data sets coupled with high uncertainty in model-based estimates**.** To this end, the Black Drum Technical Committee (TC) recommended close monitoring of empirical stock indicators annually between stock assessments to identify any concerning trends in a timely manner. The next black drum stock assessment is tentatively scheduled for 2027. Should any concerning trends occur, the TC may recommend an expedited assessment.

Indicators developed during the stock assessment include abundance (young-of-year, age 0-1, subadult, and exploitable abundance), range expansion, recreational live releases and harvest, and commercial landings. Additional details on these indicators are available in Section 6 of the 2023 stock assessment report. At the conclusion of the assessment, indicators overall did not appear negative.

The first data update was completed and presented to the Sciaenids Board (Board) at their October 2023 meeting. The update showed mixed signs of stability and declines since the assessment, but the TC did not believe there was cause for concern and recommended no change to the current black drum stock assessment schedule. During the meeting, the Board requested the TC consider the frequency of data updates given the long lifespan of the species and make any recommended changes during the next data update.

This memo provides results and recommendations from the second data update since the assessment with data through 2023.

Results

Overall, indicators showed similar conditions to the terminal year of the assessment, with signs of increases in 2023 in the South Atlantic.

- Mid-Atlantic abundance indicators (all YOY) have varied around their time series means during the three update years (Figure 1).

- South Atlantic abundance indicators were all below their time series means, but two indicators showed consistent increases from lows in 2021 to levels above the terminal year of the assessment (Figure 2).
- The MRIP CPUE (exploitable abundance indicator) increased above the time series mean in 2023 and just below levels in the terminal year of the assessment after the previous two update years were below the mean (Figure 3).
- The range expansion indicator was not available for 2021 and remained below the time series mean in 2023 at levels similar to 2022 (Figure 4).
- Recreational live releases varied around the time series mean in the Mid-Atlantic, and in 2023 were slightly below the time series mean and the level in the terminal year of the assessment. Recreational live releases in the South Atlantic remained above the time series mean during update years and increased for the first time in five years during 2023 to levels above that in the terminal year of the assessment (Figure 5).
- Recreational harvest has varied slightly during update years within regions, with all update years below the time series mean and levels during the terminal year of the assessment in the Mid-Atlantic and all update years above the time series mean and levels during the terminal year of the assessment in the South Atlantic (Figure 6).
- Commercial landings have shown a similar pattern to the recreational harvest with all update years below the time series mean in the Mid-Atlantic and above the time series mean in the South Atlantic (Figure 7). South Atlantic commercial harvest in 2023 increased markedly and was the highest since 2008.

Recommendations

The TC met on October 2, 2024 to discuss the data update to the indicators and make recommendations to the Board for their October 2024 meeting. The TC agreed that, generally, there were no concerning trends in the indicators relative to coastwide stock status at this time, as the 2023 data continued to fall within their respective historical ranges. The TC did note increases in black drum recreational and commercial landings in the south, which could indicate higher availability of fish, that fishing pressure is increasing, or both, and that some of these increases may be driven by more localized (e.g., state-specific) changes that could cause concern at these localized levels. An example was provided for North Carolina where increased regulations for other species (i.e., southern founder) may be leading to increased fishing pressure on black drum. The TC recognizes this will be important to follow in future years.

Following the Board's direction to the TC at their October 2023 meeting, the TC next discussed the appropriate timeline for future updates to the indicators. When considering how frequently the indicators should be updated, the TC also considered the timing of future stock assessment update and benchmark stock assessments. **The TC recommends scheduling the next data update to the indicators in 2026, and moving the scheduled black drum stock assessment from 2027 to 2028.** At that time, based on the results of the stock assessment, the TC will discuss the future schedule of data updates to the indicators.

The following points were discussed by the TC, as a part of making this recommendation:

- TC members agreed the indicators do not need to be updated annually at this time, especially as the TC decided at their October 2023 call that there would need to be several years of decline to cause concern. As a result, the TC discussed moving the next data update to 2026. However, it was noted that the TC would also be gathering data for the tentatively scheduled 2027 assessment at that time. The TC felt it was unnecessary to update the indicators if an assessment is scheduled to be complete the following year. It would be more appropriate to schedule an indicator update in between assessments, unless concerning trends suggested otherwise.
- It was noted by several TC members that there will likely not be a lot of new information on black drum or new stock assessment methodologies to consider for a stock assessment in 2027. In fact, it was noted that Delaware age data collections have actually been reduced due to decreased demand for black drum. Black drum is not a high priority species for ASMFC member states, and so a majority of the research recommendations from the 2023 benchmark stock assessment will not be addressed before the tentatively scheduled stock assessment in 2027.
- The TC also discussed the possibility of delaying the assessment further, due to the aforementioned lack of new information. Several TC members opposed any delays beyond one or two years due to the issues that can arise with the stock when it is not closely examined in a full stock assessment regularly (i.e., lack of updated stock status estimates).
- Updates to Marine Recreational Information Program (MRIP) data are expected to be released in 2026. Since black drum is primarily a recreational species, it will be important to incorporate these updated MRIP data into the next black drum stock assessment. There is always the potential for a delay in the release of results by MRIP staff, so shifting the stock assessment to 2028 will ensure the updated MRIP data will be available for use in the assessment.

Figures

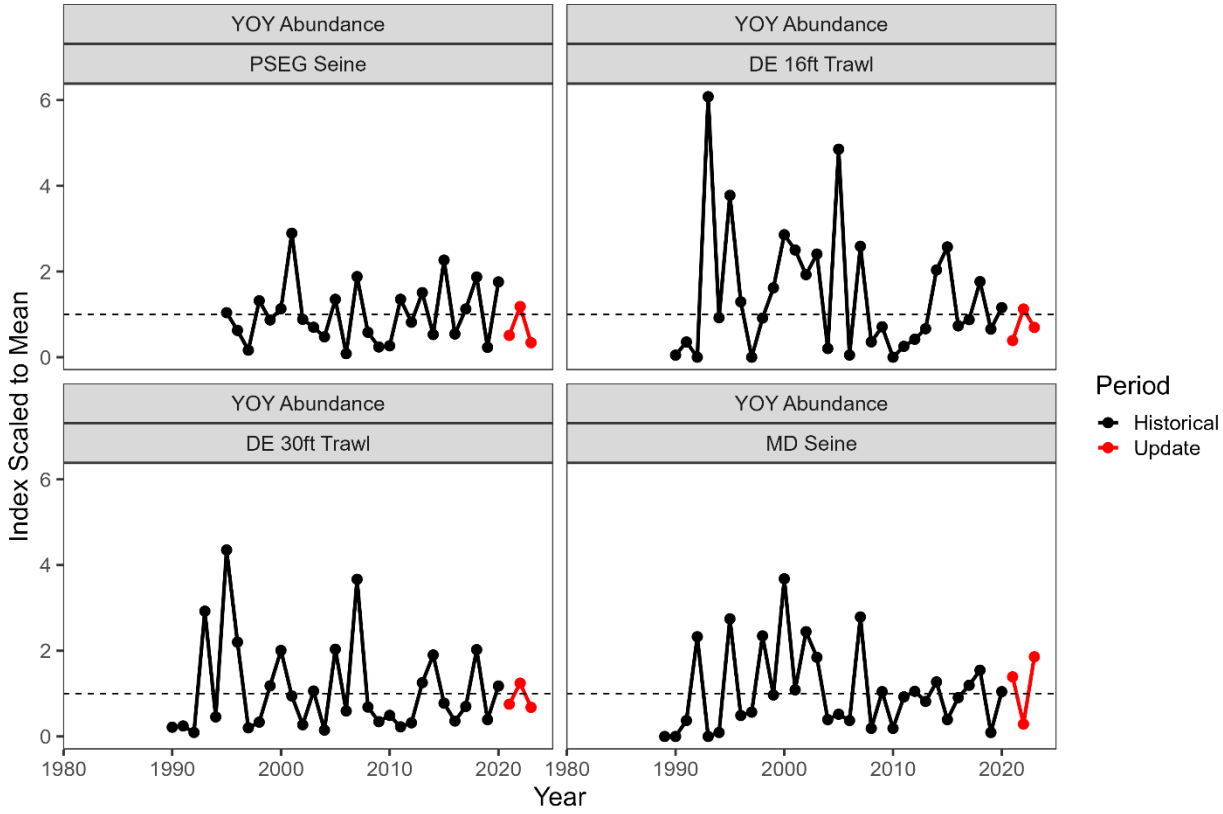

Figure 1. Mid-Atlantic abundance indicators. The dashed line is the time series mean.

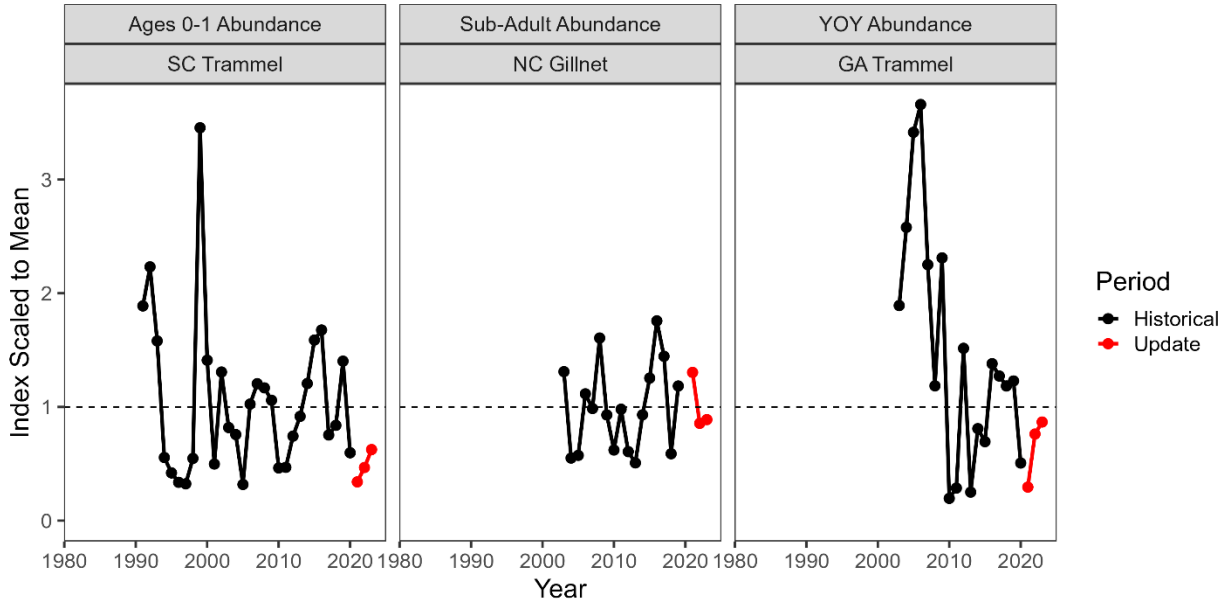

Figure 2. South Atlantic abundance indicators. The dashed line is the time series mean.

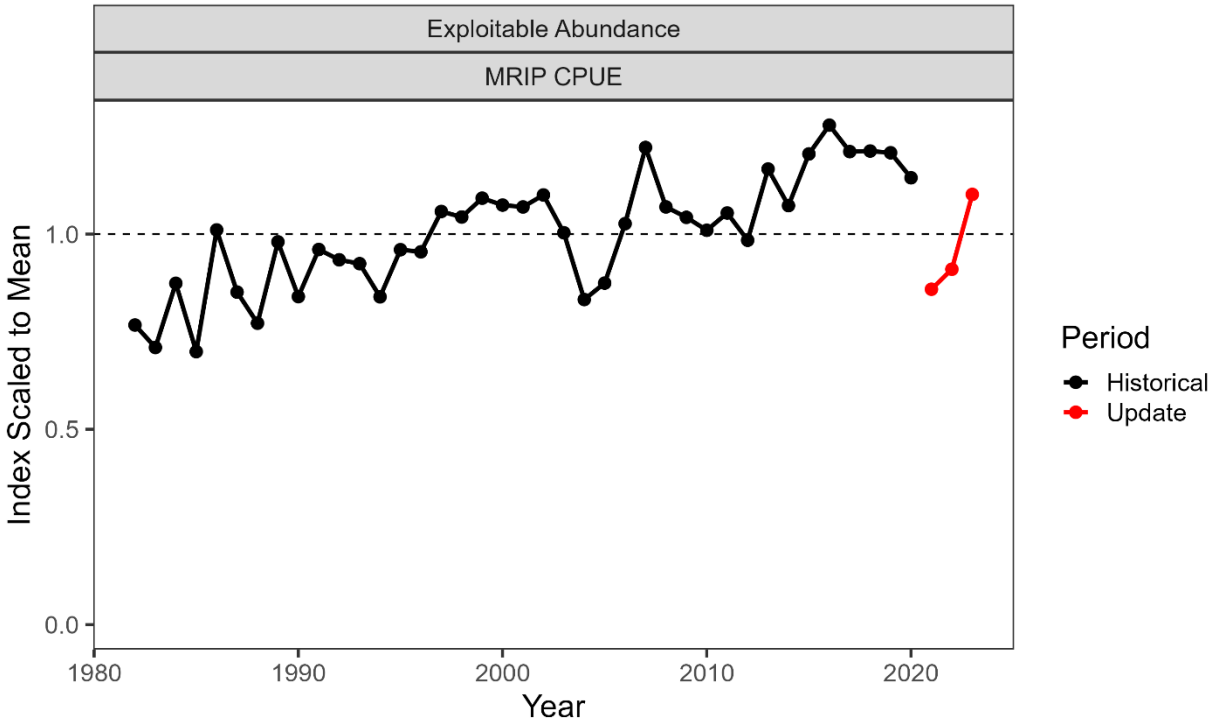

Figure 3. Coastwide abundance indicator. The dashed line is the time series mean.

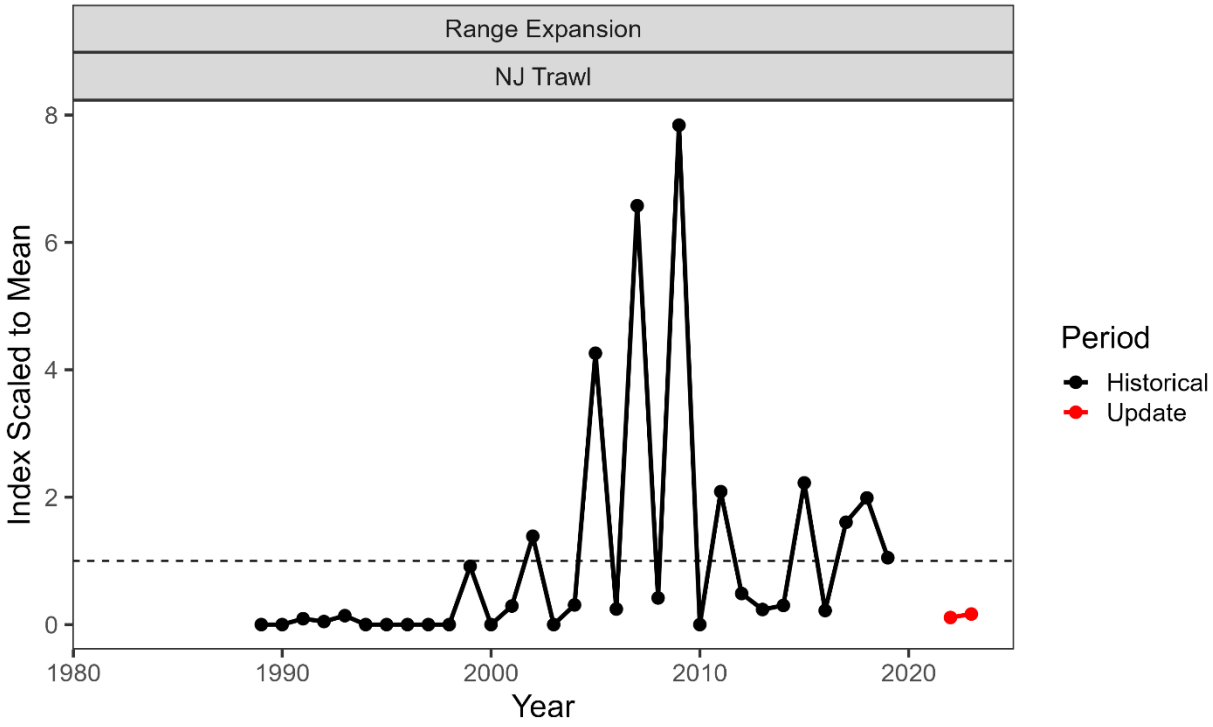

Figure 4. Range expansion indicator. The dashed line is the time series mean.

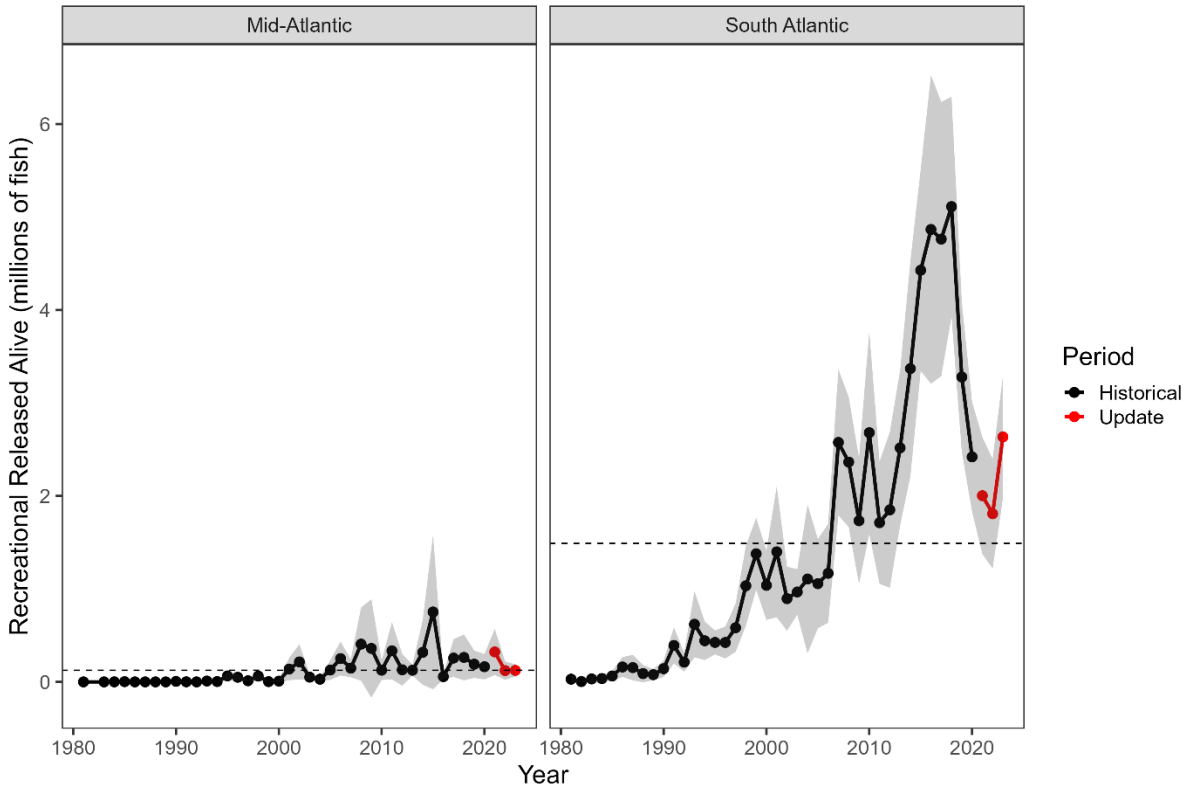

Figure 5. Recreational live release indicators. The dashed line is the time series mean.

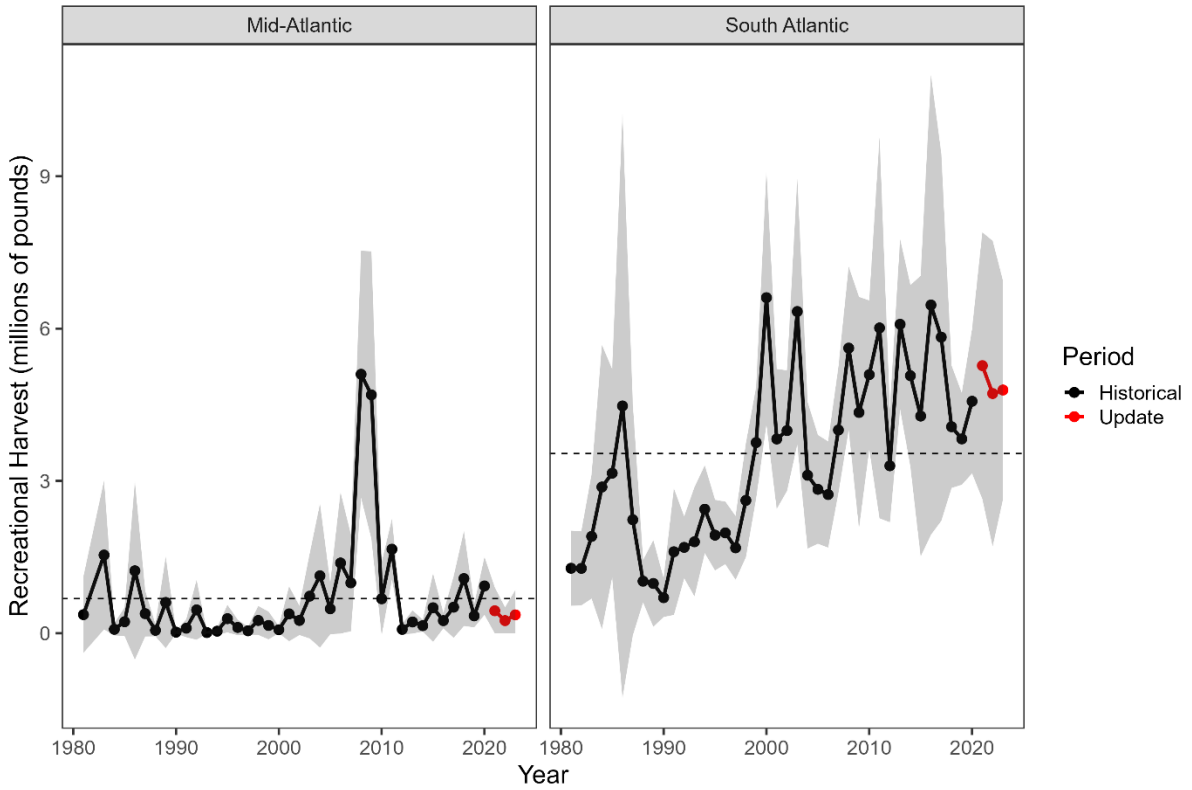

Figure 6. Recreational harvest indicators. The dashed line is the time series mean.

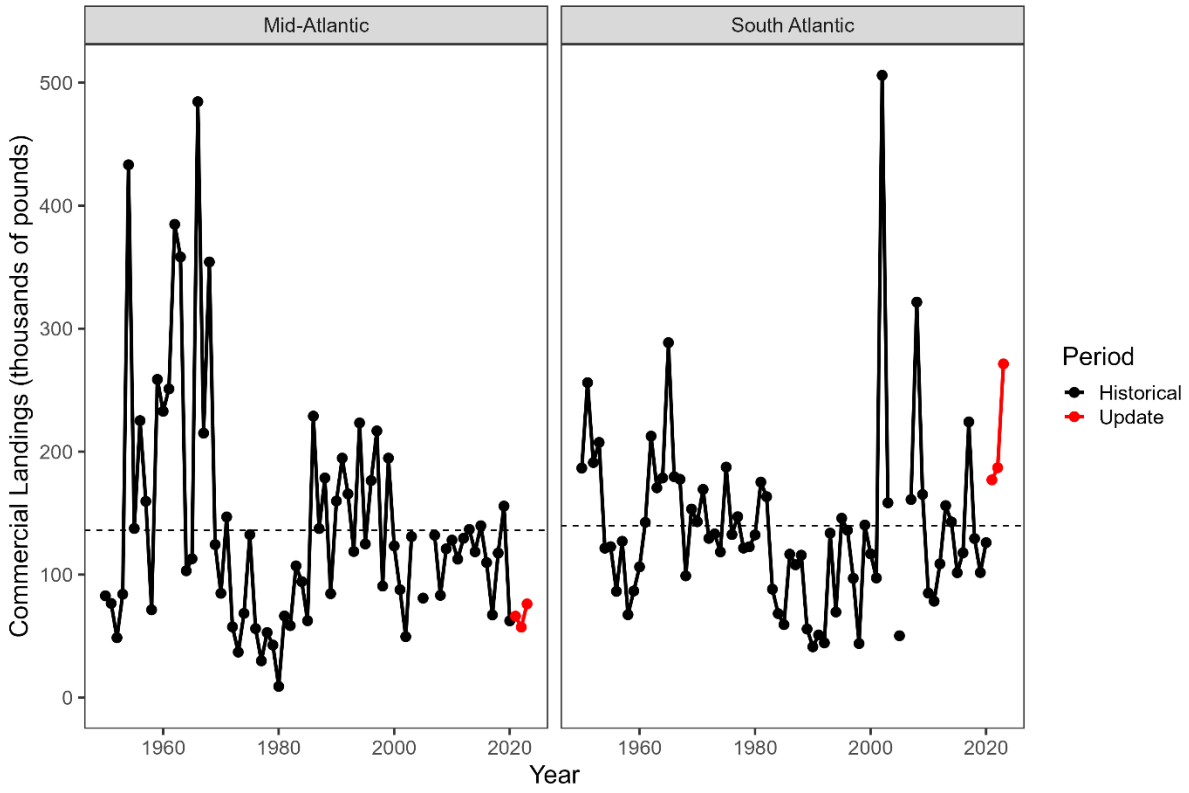

Figure 7. Commercial landings indicators. The dashed line is the time series mean.