

Center for Independent Experts (CIE) Independent Peer Review Report for SEDAR 94 Florida Hogfish: West Florida Shelf and East Florida/Florida Keys

Lisa Chong¹

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1. Quantitative Fisheries Center, Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan, 48823, USA. Email: chonglis@msu.edu

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Executive Summary

A peer review of the SEDAR 94 (Florida Hogfish) was held on July 14-17, 2026, in Charleston, South Carolina. The Review Workshop (RW) included two stocks: i) West Florida Shelf (WFS) and ii) East Florida/Florida Keys (KEYS). Both stocks were assessed using Stock Synthesis (SS3), a flexible age-structured stock assessment modeling platform within NOAA's Fisheries Integrated Toolbox. The assessment models incorporated commercial and recreational removals, fishery-independent indices of abundance, length composition and conditional age-at-length data, and biological information. Model performance was evaluated using an extensive suite of diagnostics and sensitivity analyses.

WFS: The Review Panel (RP) concluded that the WFS Hogfish assessment is scientifically sound, uses the available data appropriately, and provides a suitable basis for management advice. The resulting population estimates were sufficiently reliable and consistent with available data and the known biology of Hogfish. An informative stock-recruitment relationship could not be reliably estimated from the available data; therefore, steepness was fixed at 0.99, effectively representing average recruitment. Spawning Potential Ratio (SPR)-based reference points (SPR30%) were used as the basis for stock status determination. The WFS Hogfish stock was found to be neither overfished nor undergoing overfishing. Recent spawning stock biomass was estimated to be well above the minimum stock size threshold (MSST), and recent fishing mortality was estimated to be below the maximum fishing mortality threshold (MFMT). The methods used were considered appropriate and suitable for management conclusions. Although the RP identified several important sources of uncertainty and areas of further research, it concluded that none were sufficient to alter the acceptance of the assessment or its principal findings. These uncertainties and research needs identified should be considered when interpreting management quantities and planning future assessments, but do not change the RP's conclusions of the current status of the WFS Hogfish stock.

KEYS: A main outcome of the Review Workshop (RW) was the RP's recommendation to replace the Assessment Workshop base model with a revised RW base model (KEYS_RW_Base model), owing to the high uncertainty in the reconstructed landings for the period 1950 – 1980. Based on the KEYS_RW_Base model, the RP concluded that the KEYS Hogfish assessment is scientifically sound, uses the available data appropriately, and provides a suitable basis for management advice. This revised 1986 – 2024 model could not reliably estimate steepness from the available data; therefore, the steepness was fixed at 0.99, effectively representing average recruitment. Spawning Potential Ratio (SPR)-based reference points (SPR30%) were used as the basis for stock status determination. The KEYS Hogfish stock was found to be neither overfished nor undergoing overfishing. However, several model diagnostics (MCMC, parametric bootstrap) and projections corresponding to the revised base model were not available for RP evaluation during the workshop. Consequently, although the RP accepted the deterministic stock status conclusions, it was unable to evaluate their probabilistic robustness for the revised base model at the conclusion of the workshop. An addendum for the KEYS_RW_Base model was made available after the RW, providing the missing model diagnostics and projections. The addendum showed that recent spawning stock biomass was estimated to be well above the minimum stock size threshold (MSST) and recent fishing mortality was estimated to be below the maximum fishing mortality threshold (MFMT). Overall, the RP concluded that the modified KEYS Hogfish assessment provides an appropriate scientific basis for stock status determination and

management consideration. Although the RP identified several important sources of uncertainty and areas of further research, it concluded that none were sufficient to alter the acceptance of the assessment or its principal findings. These uncertainties and research needs identified should be considered in interpreting management quantities and in planning future assessments, but do not change the RP's conclusions regarding the current status of the KEYS Hogfish stock.

Conclusion: The SEDAR 94 assessment was found to represent the best available science. I agree with the conclusions and recommendations made by the broader RP.

Background

NOAA Fisheries is legally mandated under the Magnuson-Stevens Act, Endangered Species Act, and Marine Mammal Protection Act to manage marine resources using the best scientific information available. Independent external peer review is essential to ensure the credibility and quality of the scientific products. Such peer review entails an organized process in which multiple qualified experts evaluate scientific information impartially, objectively, and free of conflicts of interest, and remaining independent from both the development of the science and any agency of constituent positions. This requirement is reinforced by the Office of Management and Budget, which under the Information Quality Act directs federal agencies to peer review highly influential and controversial science before dissemination, specifically produces likely to have a clear and substantial impact on public policy or private sector decisions, using reviewers deemed qualified under the OMB Peer Review Bulletin standards.

The SEDAR 94 Florida Hogfish (*Lachnolaimus maximus*) West Florida Shelf (WFS) and East Florida/Florida Keys (KEYS) assessment took place over a series of three main workshops: the Data Workshop (DW), Assessment Workshop (AW), and Review Workshop (RW). The SEDAR 94 RW was held on July 14-17, 2026, in Charleston, South Carolina. This workshop is part of the Southeast Data, Assessment, and Review (SEDAR) cooperative process for assessments conducted in the Southeast Region. The Review Panel (RP) was chaired by Luiz Barbieri (Chair; SAFMC/GFMC SSC) and included seven other reviewers: Noel Cadigan (CIE reviewer), Challen Hyman (GFMC SSC), Joe Powers (CIE reviewer), Marcel Reichert (SAFMC SSC), Alexei Sharov (SAFMC SSC), Steve Saul (GFMC SSC), and Lisa Chong (CIE reviewer; author of this independent report).

This draft assessment report and all associated background documents were made available to the reviewers two weeks before the RW. At the RW, the Assessment Team presented the conclusions from the DW and AW, details of the stock assessment, stock status evaluation, and deterministic projections. The workshop was well prepared and organized by SEDAR coordinators Julie Neer and Emily Ott. The workshop was also attended by various staff members from the SAFMC and GFMC. This report is my independent review for the CIE and reflects my views, which are consistent with the RP's conclusions.

Description of Reviewer's Role

The role of the reviewer is outlined in the CIE Statement of Work (attached in Appendix 2). This reviewer independently read the DW and AW reports, their appendices, and all supplementary documents before the Review Workshop. This reviewer also attended the RW in Charleston, SC (July 14-17, 2026), provided assessment guidance and recommendations during the workshop, contributed to the RP's summary report, and authored this review report. Several additional sensitivity runs and diagnostic plots were requested during the RW, with a new base model for the KEYS stock established (KEYS_RW_Base model). Finalized base models and additional analyses were documented as an Addendum to the assessment report.

Terms of Reference Findings

1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:

1.a. Are data decisions made by the DW and AW sound and robust?

Overall, the RP concluded that the data decisions made by the DW and AW for WFS and KEYS Hogfish stocks were well-documented, sound, and robust given the available information and data limitations associated with these stocks. Both assessments incorporated several data streams, including commercial and recreational landings, fishery-independent abundance indices, length compositions, conditional age-at-length. The RP found the rationale for major inclusion and exclusion decisions adequately considered and documented. The RP accepted the aggregation of commercial gears in a single fleet for both stocks given the small commercial share of removals and limited, variable sampling among gears. It also accepted the aggregation of the SRHS landings and discards with SRFS hook-and-line estimates. The RP also considers the natural mortality-at-age estimates provided from the DW, noting the higher young age mortality in the WFS relative to KEYS alongside the difference in terminal age (23 vs 16 years).

WFS: The RP accepted the separation of the recreational fleets (spear vs hook-and-line) for the WFS assessment, recognizing that the hook-and-line component has recently become an increasingly important source of recreational removals. However, it noted that recreational composition data are relatively sparse and that it differs from the aggregation approach used for the KEYS and recommended that future assessments continue to evaluate whether the available data adequately support separate recreational fleet parameterizations.

KEYS: The AW base model began in 1950 and relied on reconstructed recreational catches derived from using effort information from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation together with CPUE inferred from recreational data (1982, 1983, 1985). Because these reconstructed removals substantially influenced estimates of historical stock size and stock-recruitment relationship, the RP did not consider them sufficiently reliable for management advice and recommended that the base model instead begin in 1986, when recreational catch information becomes more reliable (KEYS_RW_Base model). The RP accepted the aggregation of the recreational fishery into a single fleet and accepted differences in estimated selectivity among the fishery-independent surveys as biologically and operationally plausible given differences in depth coverage, fishing pressure, gear, availability of fish, and protection from fishing.

I agree with the RP that both models are well configured and defensible, and I concur with the data and configuration decisions the Panel accepted. Personally, I would have liked to see a sensitivity run comparing the separation and combined recreational fleet configurations for the WFS model given that recreational composition data are relatively sparse. A direct comparison would have been informative in confirming that the retained structure does not affect model results. I support the Panel's recommendation to evaluate recreational fleet structure in future assessments.

1.b. Are data uncertainties acknowledged, reported, and within normal or expected levels?

The RP concluded that the major sources of data uncertainty were acknowledged and adequately documented in both assessments and considered these uncertainties generally within expectations given the available information for this species and region. Recreational removals were of concern as the spear landings are relatively uncertain and the harvest and discard estimates had relatively high CVs. Sensitivity analyses using alternative discard mortality rates produced relatively small changes in modeled outputs in both assessments, so this uncertainty did not appear to substantially influence conclusions. The catch and index time series provided limited contrast with respect to the stock-recruitment relationship (i.e., estimate steepness) and informing productivity.

WFS: The RP identified discard mortality for hook-and-line caught Hogfish as another source of uncertainty given their susceptibility to barotrauma even at shower depths. The RP noted that accurate estimation of discard mortality may become increasingly important if hook-and-line discards continue to grow as the fishery continues to develop.

KEYS: The RP considered overall uncertainty in the KEYS assessment relatively high, reflecting limitations across several data streams. The Panel identified the historical recreational catch reconstruction as the most consequential source of uncertainty as it influenced estimated initial stock conditions and the stock-recruitment relationship. Rather than accepting this uncertainty, the Panel recommended excluding this reconstructed period and adopt 1986 as the model starting year. Consequently, while the reconstructed landings provided enough contrast to inform steepness, the shortened time series (1986 – 2024) of the KEYS_RW_Base model no longer supported a reliable estimate of steepness (see ToR 3d).

I agree with the conclusions made by the RP.

1.c. Are input data series reliable and applied properly within the assessment model?

The RP concluded that the input data series for both the WFS and KEYS assessments were appropriately applied within the assessment model and were sufficiently reliable to support the assessment conclusions given the acknowledged uncertainties. The data were used in a manner consistent with standard SS3 practice.

I agree with the conclusions made by the Panel.

2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:

2.a. Are methods scientifically sound and robust?

The RP concluded that SS3 (version 3.30.24) is a scientifically sound and robust framework for both the WFS and KEYS Hogfish stocks. SS3 has been extensively applied and tested and can integrate the mixture of catch, abundance index, length-composition, age, and biological information available for these stocks. The Assessment Team conducted a comprehensive suite of diagnostic tests, including residual diagnostics, retrospective analyses, likelihood profiling, sensitivity analyses, MCMC analyses, parametric bootstrapping, and hindcasting.

I agree with the conclusions made by the RP.

2.b. Are assessment models configured properly and used consistent with standard practices?

The RP concluded that the both the WFS and KEYS_RW_Base models were appropriately configured and consistent with accepted assessment practices. Both assessments made similar pragmatic choices in response to shared data limitations, and the RP accepted each while recommending further research. Steepness was fixed at 0.99 in both models because the available data could not reliably identify a stock-recruitment relationship, effectively allowing average recruitment to describe recruitment dynamics. Super-periods were used for the length composition data to reduce estimation difficulties due to sparse sampling. The Panel accepted this treatment but noted the strengths and weaknesses of super-periods are not sufficiently understood and recommended additional research. A sum-to-zero constraint was applied to recruitment deviations to reduce retrospective patterns and resolve indeterminacy between the scale of the stock-recruitment relationship and the mean recruitment deviations. In both assessments, this constraint disrupted the ADMB MCMC sampling and required a proxy model with the constraint removed for uncertainty.

WFS: The maximum likelihood estimate of the base model generally fell within the interquartile ranges of the proxy model's posterior distributions. The Panel considered the proxy approach as an acceptable workaround but warrants further research.

KEYS: The KEYS assessment clearly illustrated the challenges of estimating steepness. With the model beginning in 1986 and initial depletion freely estimated, steepness and unfished recruitment traded off against one another. Alternative initial condition assumptions produced substantially different steepness estimates (different assumptions about model start year and estimation of initial depletion). No MCMC analysis was conducted for the final KEYS_RW_Base model, but the Panel accepted the proxy as a reasonable workaround but recommended further research. An addendum produced after the RW addressed this: the maximum likelihood estimate of the KEYS_RW_Base model generally fell within the interquartile range of the proxy model's posterior distributions.

I agree with the RP that both models are well-configured and defensible, and the addendum for KEYS is a welcome addition. I strongly support the recommendation for further work on the super-periods (and the platoon configuration) and the proxy MCMC model for both models. My concern I have with the proxy MCMC model is how it reflects the uncertainty of the actual assessment model. Removing the sum-to-zero constraint in the proxy MCMC models changes the statistical properties, permitting variation along the scale vs mean deviation direction that the base model does not allow. There is an open question of whether the proxy's intervals truly represent the assessment model's uncertainty. This is not a reason to doubt the assessments' conclusions but warrants further investigation the Panel recommends.

In each of the model, the composition data weighting was tuned, using Francis reweighting for WFS and the Dirichlet-multinomial for KEYS, while the catch and index likelihood components retained their input specifications and were not part of the data weighting. As a result in both assessments, the length and CAAL composition carried relatively high weight in the total likelihood, and the model fits were driven primarily by size and age structure rather than by the

trends in the fishery-independent indices. For the WFS, the CAAL and length composition components account for nearly all of the total negative log-likelihood (Figure 1), while the survey, discard, and catch components contribute comparatively little. The same pattern holds for the KEYS_RW_Base model (in the addendum). As the relative balance between the composition data and abundance indices influences both the estimated trajectory and its uncertainty, and exploration of this balance would have been informative. However, I recognize that a full exploration would have required substantial additional time. I would recommend that both future assessments examine and document the relative weighting of all data components, including the balance between composition and abundance indices.

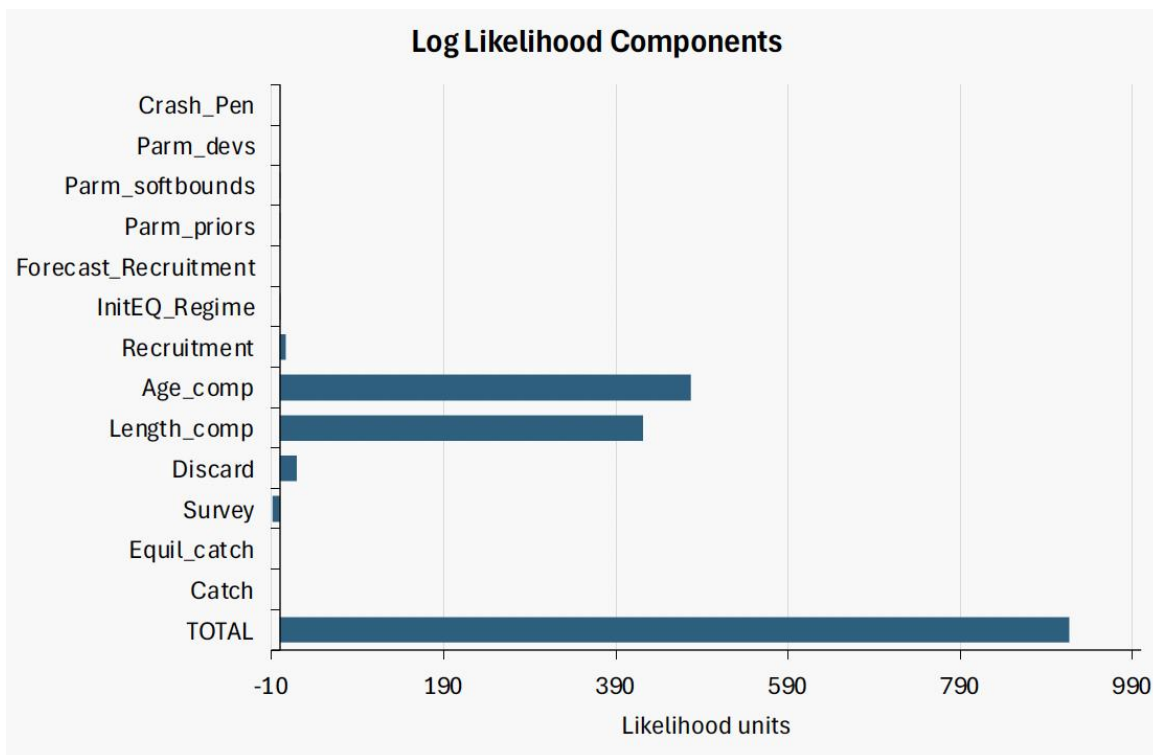


Figure 1. Contribution of individual data components to the total negative log-likelihood for the WFS base model (total = 916.605).

Another potential issue I would like to flag is the data weighting of the composition data in the KEYS model. Composition data was weighted using the Dirichlet-multinomial approach. The CAAL data were left unweighted but were left out as the estimated log-theta parameters converged high values, indicating little likelihood information. This is consistent with standard guidance for this situation. However, a single shared theta was applied for the fishery-independent RVC indices (Florida Keys and Dry Tortugas) whereas every other composition component was given its own parameter. I find this pooling difficult to justify given that the surveys are thought to sample different portions of the population, with the Dry Tortugas relatively representing the unfished or protected component of the stock, and they observe different size distributions. A single shared theta assumes the same relationship between input and effective sample size for both surveys, which is inconsistent with treating them as observing distinct components of the population and different size compositions.

2.c. Are the methods appropriate given the available data?

The RP concluded that the assessment methods were appropriate for the available data for the WFS and KEYS assessments. The age- and size-structured SS3 model accommodated for the length compositions, CAAL observations, abundance indices, catch information, and historical changes in fishery regulations. The RP considered the internal estimation of growth a strength as it accounts for interactions among growth, length-based selectivity, and size truncation in sampled fish. The CAAL information helps address growth model biases associated with length-stratified and other size-selective sampling. The models also used the SS3 growth-platoon feature to represent the effects of the Lee phenomenon; the RP accepted this configuration but recommends further investigation as this feature is not as well understood as other components of SS3. The models assumed equivalent growth rates for males and females, which available residual diagnostics supported for the current assessment, though the RP noted that further investigation of sex-specific growth of Hogfish is warranted.

I agree with the conclusions made by the Panel.

3. Evaluate the assessment findings with respect to the following:

3.a. Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

The RP concluded that population estimates from both models were sufficiently reliable, consistent with the available data and known biology, and appropriate for supporting stock status.

WFS: The model converged with acceptable diagnostics and modest retrospective patterns which were within tolerance for a long-lived species. Notably, the pattern runs in the reassuring direction: past estimates tended to understate biomass and overstate fishing mortality, so added data made status more favorable rather than revealing hidden depletion, and the flat fishery-independent indices support the trajectory.

KEYS: There were caveats with initial conditions, historical reconstruction of catch, and the stock-recruitment relationship. The switch to 1986 model start was itself a reliability fix, keeping the uncertain reconstructed catches from driving historical scale and productivity. Reassuringly, the 1950 and 1986 models produced similar spawning stock biomass and fishing mortality trends, so the recent trajectory is not just an artifact of the reconstruction, though absolute scale and productivity remain more uncertain than desirable.

I agree with the RP that population estimates are useful to support status inferences. For both assessments, the Mohn's rho values are within the range considered acceptable for longer-lived species. However, the retrospective peels are offset from the base across the entire time series rather than only in the terminal years, which is characteristic in overall scale revision. This pattern appears to be associated with instability in the estimated catchability of the fishery-independent surveys. This was explored for the AW KEYS model as a task-list item, though it was not recomputed for the revised based model. In the AW base model, although catchability is

constant through time, it was re-estimated at systematically different values as peels were removed, most notable for the RVC Dry Tortugas index (Figure 2). This shift in constant catchability may rescale the entire biomass series, which may be a plausible explanation for the fanning of the peels across all years. This does not invalidate the assessments as the magnitude of Mohn's rho are within acceptable ranges, but I recommend that future assessments examine the stability and specification of fishery-independent survey catchabilities.

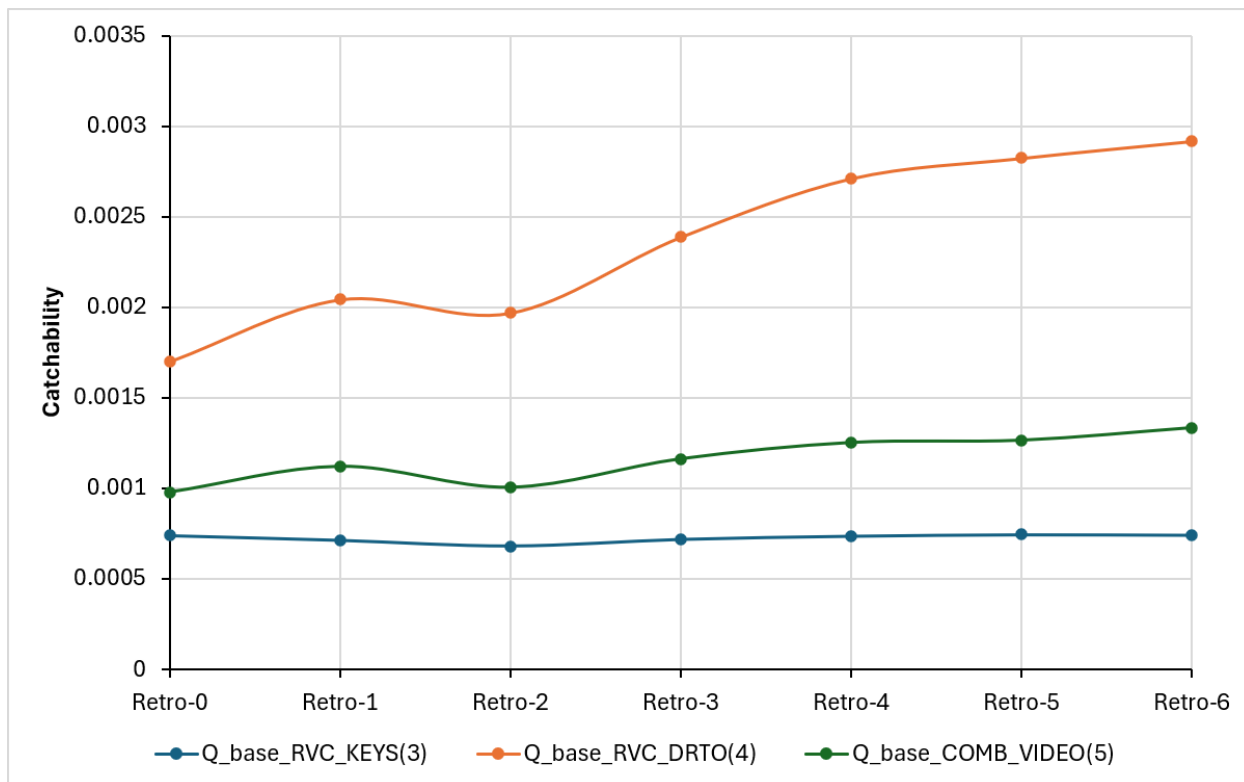


Figure 2. Estimated constant catchability (Q) of the tree fishery-independent indices across retrospective peels (peels 0 – 5) for the AW KEYS base model. The RVC Florida Keys index is in blue, the RVC Dry Tortugas index is in orange, and the combined video index is in blue. This diagnostic for the AW model was conducted during the RW but was not recomputed for the KEYS_RW_Base model.

3.b. Is the stock overfished? What information helps you reach this conclusion?

WFS: The RP agreed with the assessment conclusion that the WFS Hogfish stock is not overfished. Current spawning stock biomass (SSB) sits well above the minimum stock size threshold (MSST) defined by the SPR30% reference point. The MCMC uncertainty analysis puts the entire posterior for the ratio of current SSB to MSST above 1, meaning that the conclusion holds up under uncertainty.

KEYS: The RP agreed with the assessment conclusion that the KEYS Hogfish stock is not overfished, based on the KEYS_RW_Base model and the SPR30% reference point. At the conclusion of the RW, the Panel determined that the revised model was suitable for stock status determination but did not yet have MCMC or parametric bootstrap analyses for the final

configuration, so it could not evaluate the robustness of that determination. The addendum supplied the missing MCMC and parametric bootstrap analyses, allowing the probabilistic check to be completed, which confirmed that the entire posterior for the ratio of current spawning stock biomass to MSST above 1.0, meaning the conclusion holds up under uncertainty.

I agree with the conclusions of the RP and from the Assessment Team for both stocks. The RP determined that the available data did not support reliable estimation of a stock-recruitment relationship for either stock, and so the Assessment Team fixed steepness at 0.99. As MSY-based reference points could not be reliably estimated without a dependable stock-recruitment relationship, the Assessment Team's decision to base the determination on SPR-based reference points is reasonable and appropriate. The overfished determination compares current spawning stock biomass against the MSST ($0.75 \times \text{SSB}_{\text{F30\%SPR}}$). The addendum supplied the MCMC and parametric bootstrap analyses for the KEYS_RW_Base model, and the status of not overfished holds under the SPR30% and SPR40% reference points. This is an acceptable approach for stock status determination. I concur that neither the WFS nor the KEYS Hogfish stock is overfished.

3.c. Is the stock undergoing overfishing? What information helps you reach this conclusion?

WFS: The RP agreed with the assessment conclusion that the WFS Hogfish stock is not undergoing overfishing. Current fishing mortality sits below the FSPR30% reference point. The MCMC uncertainty analysis puts the entire posterior distribution of the fishing mortality status ratio below 1, meaning that the conclusion holds up under uncertainty.

KEYS: The RP agreed with the assessment conclusion that the KEYS Hogfish stock is not undergoing overfishing, based on the KEYS_RW_Base model and FSPR30% reference point. At the conclusion of the RW, the Panel determined that the revised model was suitable for stock status determination but did not yet have MCMC or parametric bootstrap analyses for the final configuration, so it could not evaluate the robustness of that determination. The addendum supplied the missing MCMC and parametric bootstrap analyses, allowing the probabilistic check to be completed, which confirmed that the entire posterior for the fishing mortality status ratio below 1, meaning the conclusion holds up under uncertainty.

I agree with the conclusions of the RP and from the Assessment Team for both stocks. I agree with the conclusions of the RP and from the Assessment Team for both stocks. The RP determined that the available data did not support reliable estimation of a stock-recruitment relationship for either stock, and so the Assessment Team fixed steepness at 0.99. As MSY-based reference points could not be reliably estimated without a dependable stock-recruitment relationship, the Assessment Team's decision to base the determination on SPR-based reference points is reasonable and appropriate. The overfishing determination compares current fishing mortality against the MFMT ($\text{F30\%SPR}$). The addendum supplied the MCMC and parametric bootstrap analyses for the KEYS_RW_Base model, and the status of not overfished holds under the SPR30% and SPR40% reference points. This is an acceptable approach for stock status determination. I concur that neither the WFS nor the KEYS Hogfish stock is undergoing overfishing.

3.d. Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

The RP concluded that the available data did not support reliable estimation of an informative stock-recruitment relationship for either stock. The data carry little information about the shape of the relationship, so steepness was fixed at 0.99, and recruitment was represented through average recruitment and annual deviations. The RP emphasized that this should not be read as evidence that the true biological steepness is 0.99, only that it cannot be reliably estimated. As a reliable stock-recruitment curve was unavailable, the RP supported SPR-based reference points rather than conventional MSY estimates. The RP also noted that Hogfish reproductive biology may itself complicate recruitment dynamics as protogynous hermaphrodites with harem spawning, changes in sex ratio, male abundance, or spawning behavior could weaken the link between conventional spawning biomass and effective reproductive output.

KEYS: The 1950 AW base model appeared able to estimate steepness, but the result was driven by the reconstructed historical catches that the RP judged as unreliable, so the resulting relationship was considered not robust. Models beginning in 1986 hinted that steepness may be below 0.99 (in the likelihood profiles), but the estimates were too sensitive to assumptions about initial conditions and R_0 to provide a stable basis. This carries a management implication that reference points with a lower steepness value could be more conservative than the SPR30% reference point, so the possibility of stronger density dependence than the final base model represents remains an important source of uncertainty.

I agree with the conclusions made by the RP.

3.e. Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

The RP concluded that the SPR-based reference points were appropriate and sufficiently reliable for management use since the data did not support the estimation of an informative stock-recruitment. In both cases, the RP emphasized that using SPR as MSY-proxies does not remove the underlying uncertainty about stock productivity, and managers should account for that uncertainty when deriving management quantities. The uncertainty in recreational removals (especially in spear landings) complicates the inference about the absolute level of fishing pressure the stock can sustain. It is advised that the SSC and Council recognize these uncertainties when interpreting assessment-derived management quantities.

I agree with the RP that the estimates of stock status determination for both stocks are reliable. I would recommend the calculation of probabilistic stock status determinations and statements (i.e., what is the probability that the stock is overfished/undergoing overfishing?) and support risk-based management decisions.

4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:

4.a. Are the methods consistent with accepted practices and available data?

The RP found the projection methods sounds and appropriate for both stocks. Both used the SEFSC Allocation Forecasting framework, an established tool that forecasts from SS3 output and allocates catch among fleets. Projections were deterministic across multiple F and reference point scenarios. Recruitment was set to empirical averages rather than a stock-recruit curve, which the RP accepted because fixed steepness near 1.0 makes recruitment nearly independent of spawning stock biomass.

I agree with the conclusions made by the RP.

4.b. Are the methods appropriate for the assessment model and outputs?

The RP found the projection methods appropriate to both the WFS and KEYS models and their outputs and accepted the results as a suitable basis for management consideration. The projections drew on accepted model estimates, reference points, and recruitment assumptions, and the framework's design for use with SS3 makes it internally consistent with the assessment. The Assessment Team appropriately acknowledged several important caveats and advised that projection results be interpreted with caution.

I agree with the conclusions made by the RP and Assessment Team.

4.c. Are the results informative and robust, and useful to support inferences of probable future conditions?

The RP concluded that the projections were informative and sufficiently useful for evaluating future stock conditions and supporting management advice, while noting that their robustness to alternative biological assumptions could not be fully evaluated. In neither assessment were the projections accompanied by sensitivity analyses for potentially important, fixed inputs (e.g., natural mortality). Such analyses are not standard components of the projection process, and their absence does not invalidate the results, but they would show how projected outcomes depend on key fixed assumptions.

KEYS: Final projections for the KEYS_RW_Base model were not available during the RW, so the Panel's endorsement at the time applied to the projection methodology rather than to results. The addendum provided these results. Short- and long-term deterministic projections indicated that SPR-based target exploitation rates were well above recent levels, so those scenarios produced short-term landings followed by declining SSB toward the target, whereas the F_current scenario continues to rebuild SSB. One structural limitation is that because main recruitment deviations end in 2021 (as opposed to model end of 2024), projected recruitment began in 2022 as a constraint of SS3 that could not be altered.

I agree with the RP's conclusions, particularly the recommendation of including stochastic projections for future assessments. I would add that the ToRs across the Data, Assessment, and Review workshops should be aligned with this so that the projection outputs match what the ToRs ask for.

4.d. Are key uncertainties acknowledged, discussed, and reflected in the projection results?

The RP found that the key projection assumptions were acknowledged, including constant fleet selectivity and allocation, growth, natural mortality, terminal year and future recruitment. The

projections were deterministic and so did not carry parameter uncertainty forward. The RP recommended that the MCMC analyses could be a way to address this, suggesting that future assessments propagate posterior parameter draws through the projections so that probability of future stock conditions can be estimated.

I agree with the RP's conclusions and recommendations. Any of several approaches could propagate uncertainty through the projections: drawing from the posterior via MCMC, drawing from the assessment's asymptotic uncertainty, or exploring plausible future recruitment and fishing states through scenario-based projections.

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

- **Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods**
- **Ensure that the implications of uncertainty in technical conclusions are clearly stated**

The RP concluded that both assessments used an extensive and appropriate suite of methods to evaluate uncertainty, including likelihood profiles, sensitivity analyses, jitter tests, retrospective analyses, asymptotic standard errors, MCMC, ASPM, and parametric bootstrap. In both models, the implications of uncertainty for stock status were considered clearly communicated, particularly the posterior distributions of current spawning stock biomass and fishing mortality relative to their thresholds. The RP noted a common gap, that deterministic projections did not carry parameter uncertainty into future trajectories.

WFS: Sensitivity runs showed the assessment is sensitive to M , with growth, $\ln(R_0)$, and reference points varying substantially, whereas discard mortality had minimal influence. The $\ln(R_0)$ profile showed a single minimum, indicating identifiability, with composition data pulling toward lower R_0 and indices toward higher. MCMC and parametric bootstrap complemented the asymptotic estimates and agreed with the base model on stock status, and many bootstrap replicates parameter bounds, indicating less stability under resampling than the base model alone suggested.

KEYS: The RP determined that the same suite of methods for diagnostics are appropriate, but the MCMC and bootstrap analyses for the revised model were not available at the conclusion of the workshop. The addendum provides the missing analyses and were broadly reassuring. The $\ln(R_0)$ profile was well-behaved, with a clear minimum at base estimates, confirming that stock scale is identifiable. The steepness profile showed that the data favors a value near 0.35, driven by the recruitment and RVC size composition components, while the indices supported higher values, and freely estimated $\ln(R_0)$ and steepness became unstable. This gives a clear justification for fixing steepness, while underscoring that stronger density dependence than the fixed 0.99 steepness value remains a real structural uncertainty. The MCMC proxy and bootstrap were consistent with the base model and support the stock status conclusions.

I agree with the RP that both assessments evaluated uncertainty thoroughly. My reservations concern how uncertainty is captured in both models and how faithfully the proxy MCMC represents the models. The proxy MCMC intervals should be read as an approximation of the base model's uncertainty rather than a direct measure of it (see ToR 2b). This does not change the stock status conclusions, but it does mean that uncertainty may not be fully captured in these diagnostics. The reported uncertainty also does not reflect the sensitivity of scale and productivity to data weighting. As the $\ln(R_0)$ and steepness profiles show in both models, these estimates sit at a balance between composition and index data pulling in opposite directions. For WFS specifically, the sensitivity to natural mortality is a further source of uncertainty. I would encourage future assessments to propagate this structural uncertainty through stochastic projections, so they are carried into the management quantities.

6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

- **Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments**

The RP supported the research recommendations from the DW and AW reports and added their own. The full set of research and monitoring recommendations includes:

- Improve understanding and modeling protogynous hermaphroditic population dynamics: investigate recruitment and reproductive dynamics of harem-forming species, including how social structure and male density affect sex transition, and the potential roles of sperm/male limitation and skip spawning
- Improve recreational spearfishing information: reduce uncertainty in recreational spear landings, which may inadequately sample parts of the fleet, through targeted survey designs
- Evaluate fishery-independent survey coverage and data gaps: assess available indices for geographic coverage, sample size, and age/length information to identify spatial and temporal gaps
- Evaluate alternative assessment and uncertainty methods: compare MCMC, parametric bootstrap, and asymptotic uncertainty estimates; investigate alternative MCMC algorithms; and consider frameworks incorporating random effects, state-space processes, or time-varying fishing mortality
- Evaluate Stock Synthesis implementation choices that are not well understood: examine the consequences of super-periods for sparse composition data, the specification of growth platoons, and removal of the recruitment-deviation sum-to-zero constraint in MCMC proxy models
- Investigate sex-specific growth: evaluate whether sex-specific growth differences are important enough to affect future assessment results

- Evaluate environmental effects on hogfish population dynamics: consider effects of disturbances such as red tides and other harmful algal blooms, cold events, and oil spills on natural mortality, recruitment, movement, and habitat use
- Develop stochastic projections that propagate assessment uncertainty: use the MCMC framework to carry parameter uncertainty into projections

I support the research recommendations from the DW and AW as well as those from the RP. I would like to highlight several recommendations as priority recommendations. First, the need for broad improvements in data quality across fleets and data types, including biological and life-history information, recreational fishery removals, and fishery-independent survey coverage, and to evaluate the associated data gaps. Second, the need to improve understanding and modeling of protogynous hermaphroditic population dynamics.

- **Provide recommendations on possible ways to improve the SEDAR process**
The RP commented that some ToRs need to be revisited, especially the text on best scientific information available and the evaluation of projection results being a task for the SSC rather than a RP. The RP also noted that the bridging analysis was not very informative given the length between assessments and therefore was not evaluated by the RP.

I agree with these conclusions from the RP and would like to add one more recommendation. I would recommend allowing more flexibility in data and modeling configuration decisions between the data, assessment, and review workshops. Some choices made at each workshop appeared to be fixed and could not be revisited or explored at the subsequent workshop (e.g., separation vs combination of the recreational fleets [spear and hook-and-line] in the WFS model, use of super-periods, configuration of platoons). As a result, certain conclusions that rested on those prior decisions were never tested, and by the RW it was too late to evaluate them.

7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.

The RP concluded that the SEDAR 94 WFS and KEYS stock assessments are scientifically sound, uses the available data appropriately, and provides a suitable basis for management advice.

I agree with the conclusions of the RP.

8. Provide suggestions on key improvements in data or modeling approaches that should be considered when scheduling the next assessment.

The RP concluded that the completion of any of the research recommendations provided for ToR 6 is not required before scheduling the next assessment.

I agree with this conclusion made by the RP: none of the recommendations represent deficiencies that would prevent the next assessment from proceeding. As noted under ToR 6, the improvements I would prioritize are broad gains in data quality, particularly recreational removals and fishery-independent coverage, and improved understanding and modeling of protogynous hermaphroditic population dynamics. I would prioritize these two recommendations as they address the limitations with the most direct bearing on stock status determination: the uncertainty in fishing pressure and biomass inputs and the reproductive dynamics that may have prevented reliable estimation of a stock-recruitment relationship. Progress on either would materially improve the reliability of the stock assessment.

9. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.

The report written by the RP completes the task in ToR 9.

Appendix 1

Document #	Title	Authors	Date Submitted
Documents Prepared for the Data Workshop			
SEDAR94-DW-01	Standardized video counts of southeast US Atlantic hogfish (<i>Lachnolaimus maximus</i>) from the Southeast Reef Fish Survey	Nathan Bacheler, Rob Cheshire, and Kyle Shertzer	25 March 2025
SEDAR94-DW-02	Headboat Data for Hogfish in the Southeast U.S. Atlantic and Gulf of America	Robin T. Cheshire and Matthew E. Green	21 May 2025
SEDAR94-DW-03	Florida Keys and East Florida Hogfish Fishery Performance Report March 2024	SAFMC Snapper Grouper Advisory Panel	29 April 2025
SEDAR94-DW-04	Standardized catch rates of Hogfish (<i>Lachnolaimus maximus</i>) from the Southeastern U.S. commercial spear fishery, 1993-2024	Michaela Pawluk and Kevin Thompson	11 July 2025
SEDAR94-DW-05	General Recreational Survey Data for Hogfish in the Gulf of America and South Atlantic	Samantha M. Binion-Rock	11 July 2025
SEDAR94-DW-06	Historical Commercial Fishery Landings of Hogfish in the Southeastern U.S.	Christopher Bradshaw	8 July 2025 Updated: 1 August 2025
SEDAR94-DW-07	Length frequency distributions for Hogfish collected by TIP in the Southeast from 1984 to 2024	Christopher Bradshaw	8 July 2025
SEDAR94-DW-08	Social Dimensions of Hogfish (<i>Lachnolaimus maximus</i>)	David Griffith	8 July 2025
SEDAR94-DW-09	Commercial discard data limitations for Hogfish (<i>Lachnolaimus maximus</i>) in Florida for the Vertical Line and Spearfishing fleet	Kevin Thompson, Sarina Atkinson, Gary Decossas	11 July 2025
SEDAR94-DW-10	A Summary of Florida Hogfish Discard Length Data Collected from At-Sea Observers in For-	Ellie Corbett and Leonardo Eguia	10 July 2025 Updated: 24 July

	Hire Fishery Surveys in Florida 2005-2024		2025
SEDAR94-DW-11	Length and age composition of Florida Hogfish, <i>Lachnolaimus maximus</i> , collected in association with fishery-dependent projects	Maria McGirl, Jessica Carroll, and Bridget Cermak	17 July 2025 Updated: 24 July 2025
SEDAR94-DW-12	Hogfish Discard Mortality and Habitat Ecology on the West Florida Shelf	Robert D. Ellis, B. James Williams, Kerry Flaherty-Walia, and Philip Stevens	18 July 2025
SEDAR94-DW-13	Hogfish Index of Abundance from the Annual FWRI-SEAMAP Trawl Survey along the West Florida Shelf	Brian Klimek and Theodore Switzer	21 July 2025 Updated: 3 September 2025
SEDAR94-DW-14	Young of Year Hogfish Index of Abundance from Seagrass Trawl Surveys of the Florida Big Bend	Brian Klimek and Theodore Switzer	21 July 2025 Updated: 3 September 2025
SEDAR94-DW-15	Standardization of commercial catch per unit effort of Hogfish (<i>Lachnolaimus maximus</i>) from Florida Trip Ticket landings, 1994-2024	Dustin Addis	22 July 2025
SEDAR94-DW-16	Recreational For-Hire Trends in Release Methods and Barotrauma Assessment of Hogfish (<i>Lachnolaimus maximus</i>) using a Fisheries-Dependent At-Sea Observer Program	Leonardo Eguia, Zachary Siders, Debra Murie	18 July 2025 Updated: 31 July 2025 Updated: 2 September 2025
SEDAR94-DW-17	Standardized Catch Rates of Hogfish (<i>Lachnolaimus maximus</i>) from the Marine Recreational Information Program (MRIP) for West Florida and the Keys-East Florida, 1991-2024	Shanae Allen	23 July 2025 Addendum added: 22 August 2025
SEDAR94-DW-18	Hogfish (<i>Lachnolaimus maximus</i>) Lengths Sampled in	Shanae Allen	25 July 2025 Updated: 22

	the Biscayne National Park Creel Survey, 1993-2022 Updated Title: Hogfish (<i>Lachnolaimus maximus</i>) Lengths Sampled in the Biscayne National Park Creel Survey, 1993-2024		August 2025
SEDAR94-DW-19	Indices of abundance for Gulf and Atlantic Hogfish (<i>Lachnolaimus maximus</i>) using data from multiple video surveys	Justin Lewis, Heather M. Christiansen, Sean F. Keenan, Katherine E. Overly, Matthew D. Campbell, Theodore S. Switzer	28 July 2025
SEDAR94-DW-20	Fisherman Feedback Report - Hogfish	Gulf Council Staff	29 July 2025
SEDAR94-DW-21	A ratio-based method for calibrating estimates of total landings (numbers and pounds of fish), and releases (numbers of fish) from MRIP-FCAL to SRFS for Hogfish (<i>Lachnolaimus maximus</i>) in Florida	Chloe Ramsay Updated Authors: Chloe Ramsay and Maria McGirl	31 July 2025 Updated: 17 August 2025
SEDAR94-DW-22	Standardized Reef Visual Census indices for Hogfish, <i>Lachnolaimus maximus</i> , for Southeast Florida (2013 - 2024), the Florida Keys (1997 – 2024), and Dry Tortugas (1999 - 2024)	Robert G. Muller and Halie O’Farrell	10 September 2025
SEDAR94-DW-23	Summary of Southeast For-Hire Integrated Electronic Reporting Program Records for Hogfish Catch in Southeast Region	LAPP/DM Branch, SERO	19 September 2025

SEDAR94-DW-24	Public comments received via the online comment form during the data process		10 October 2025
Documents Prepared for the Assessment Process			
SEDAR94-AP-01	A Unified Reef Visual Census (RVC) and REEF Citizen Science Index	Brice X. Semmens and Dan A. Greenberg	26 March 2026
SEDAR94-AP-02	Weighted Length Compositions for Recreational FL Keys-EFL Hogfish Landings Using MRIP, Biscayne National Park Creel Survey, and Headboat Data	Shanae D. Allen	15 May 2026
Documents Prepared for the Review Workshop			
SEDAR94-RD03	Modeling protogynous hermaphrodite fishes workshop	Gary Shepherd, Kyle Shertzer, Jessica Coakley, Megan Caldwell	
SEDAR94-RD04	Stock assessment of protogynous fish: evaluating measures of spawning biomass used to estimate biological reference points	Elizabeth N. Brooks, Kyle W. Shertzer, Todd Gedamke, and Douglas S. Vaughan	
Final Stock Assessment Reports			
SEDAR94-SAR1	Florida Hogfish	SEDAR 94 Panels	
Reference Documents			
SEDAR94-RD01	Life history through the eyes of a hogfish trophic growth and differential juvenile habitat use from stable isotope analysis	Meaghan E. Faletti, Christopher D. Stallings	

SEDAR94- RD02	Assessing the value of citizen scientist observations in tracking the abundance of marine fishes	Dan A. Greenberg, Christy V. Pattengill-Semmens, Brice X. Semmens
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Appendix 2
Performance Work Statement (PWS)
National Oceanic and Atmospheric Administration (NOAA)
NOAA Fisheries
Center for Independent Experts (CIE) Program
External Independent Peer Review

**SEDAR 94 Florida Hogfish Assessment: West Florida Shelf Stock and East Florida/Florida
Keys Stock**

July 14- 17, 2026

Background

NOAA Fisheries is mandated by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act to conserve, protect, and manage our nation's marine living resources based upon the best scientific information available (BSIA). NOAA Fisheries science products, including scientific advice, are often controversial and may require timely scientific peer reviews that are strictly independent of all outside influences. A formal external process for independent expert reviews of the agency's scientific products and programs ensures their credibility. Therefore, external scientific peer reviews have been and continue to be essential to strengthening scientific quality assurance for fishery conservation and management actions.

Scientific peer review is defined as the organized review process where one or more qualified experts review scientific information to ensure quality and credibility. These expert(s) must conduct their peer review impartially, objectively, and without conflicts of interest. Each reviewer must also be independent from the development of the science, without influence from any position that the agency or constituent groups may have. Furthermore, the Office of Management and Budget (OMB), authorized by the Information Quality Act, requires all federal agencies to conduct peer reviews of highly influential and controversial science before dissemination. Specifically, science products that the agency can reasonably determine that will have, when disseminated, *"a clear and substantial impact on important public policies or private sector decisions."* Additionally, peer reviewers must be deemed qualified based on the OMB Peer Review Bulletin standards¹.

Scope

The **SouthEast Data, Assessment, and Review (SEDAR)** is the cooperative process by which stock assessment projects are conducted in NOAA Fisheries' Southeast Region. SEDAR was initiated to improve planning and coordination of stock assessment activities and to improve the quality and reliability of assessments.

¹ https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2005/m05-03.pdf

SEDAR 94 will be a CIE assessment review conducted for two stocks of Hogfish: the West Florida Shelf Stock and the East Florida/Florida Keys Stock. The review workshop provides an independent peer review of SEDAR stock assessments. The term review is applied broadly, as the review panel may request additional analyses, error corrections and sensitivity runs of the assessment models provided by the assessment panel. There will be two models to be reviewed during the workshop. The review panel is ultimately responsible for ensuring the scientific basis of the assessment through the SEDAR process. The specified format and contents of the individual peer review report are found in **Annex 1**. The Terms of Reference (ToRs) of the peer and review are included in **Annex 2**. The tentative agenda of this virtual panel review and process review meetings is included in **Annex 3**.

Requirements

NOAA Fisheries requires three reviewers to conduct an impartial and independent peer review in accordance with this Performance Work Statement (PWS), OMB Guidelines, and the ToRs below. Modifications to this Performance Work Statement (PWS) and ToRs cannot be made during the peer review, and the Contracting Officer's Representative (COR) and the CIE contractor shall approve any modifications prior to the peer review. All ToRs must be addressed in each reviewer's report.

The reviewers shall have a working knowledge in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the primary task of providing peer-review advice in compliance with the workshop Terms of Reference fisheries stock assessment. Expertise with the Stock Synthesis modeling platform, and the associated model diagnostics would be helpful. Experience with assessments of reef-associated species, particularly those exhibiting complex life histories (e.g., hermaphroditism), and familiarity with evaluating length-and-age composition data, selectivity patterns, and model diagnostics in data-moderate or data-limited contexts is preferred.

The chair, who is in addition to the panel of three reviewers, will not be provided by the CIE. Although the chair will be participating in this review, the chair's participation (e.g., labor and travel) is not covered by this contract.

Tasks for Reviewers

Each CIE reviewer shall complete the following tasks in accordance with the PWS and Schedule of Milestones and Deliverables herein.

Pre-review Background Documents: Two weeks before the peer review, the NOAA Fisheries Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NOAA Fisheries Project Contact will consult with the CIE on where to send documents. The CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance with the PWS scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

Documents to be provided to the CIE reviewers prior to this review include:

S94 Data Workshop Report (<https://sedarweb.org/documents/sedar-94-florida-hogfish-data-workshop-report/>)

S94 Assessment Process Report (to be provided two weeks prior to review)

S94 Working papers and Reference documents (<https://sedarweb.org/assessments/sedar-94-florida-hogfish/>)

Panel Review Meeting: The CIE reviewers shall conduct the independent peer review in accordance with the PWS and ToRs and shall not serve in any other role unless specified herein. The CIE reviewers shall attend and actively participate in a professional and respectful manner as members of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NOAA Fisheries Project Contact is responsible for any meeting arrangements (e.g., conference room reservations, video conferencing logistics, etc.).

Chair Summary Report: The reviewers shall assist the Chair of the meeting with contributions to the summary report.

Contract Deliverables - Independent CIE Peer Review Report: The CIE reviewers shall complete an independent peer review report in accordance with this PWS. Reviewers are not required to reach a consensus. The CIE reviewer shall complete the independent peer review according to required format and content as described in **Annex 1**. The CIE reviewer shall complete the independent peer review addressing each ToR as described in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Foreign National Security Clearance

When reviewers participate during a panel review meeting at a government facility, the NOAA Fisheries Project Contact is responsible for obtaining the Foreign National Security Clearance approval for reviewers who are non-US citizens. For this reason, the reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, and home country) to the Project Contact for the purpose of their security clearance, and this information shall be submitted at least two weeks in advance. For additional information, please see the following link: <https://www.commerce.gov/osy/programs/foreign-access-management>. All CIE reviewers must have a REAL ID-compliant form of identification to access Federally owned or leased facilities. The contractor is required to use all appropriate methods to safeguard Personally Identifiable Information (PII).

Place of Performance

The place of performance shall be the Charleston, SC.

Period of Performance

The CIE reviewers' duties shall not exceed **14** days to complete all required tasks.

Schedule of Milestones and Deliverables

The contractor shall complete the tasks and deliverables in accordance with the following schedule:

Within two weeks of award	Contractor secures participation of the CIE reviewers.
At least two weeks prior to the panel review meeting	Pre-review documents are provided to the reviewers.
July 14- 17, 2026	The reviewers participate and conduct an independent peer review during the panel review meeting.
Approximately 2 weeks later	Contractor receives draft reports
Within 3 weeks of receiving draft reports	Contractor submits final reports to the Government

* The Peer Review Summary Report will not be submitted to, reviewed, or approved by the Contractor.

Applicable Performance Standards

The acceptance of the contract deliverables shall be based on three performance standards: (1) The reports shall be completed in accordance with the required formatting and content in **Annex 1**; (2) The reports shall address each ToR as specified **Annex 2**; and (3) The reports shall be delivered as specified in the schedule of milestones and deliverables.

Travel

All travel expenses shall be reimbursable in accordance with Federal Travel Regulations ([Travel resources | GSA](#)), and all contractor travel must be approved by the COR prior to the actual travel. Any travel conducted prior to the receipt of proper written authorization from the COR will be done at the Contractor's own risk and expense. International travel is authorized for this contract. Travel is not to exceed 17,000.

Confidentiality and Data Privacy

This contract may require that services contractors have access to Privacy Information. Services contractors are responsible for maintaining the confidentiality of all subjects and materials and may be required to sign and adhere to a Non-disclosure Agreement (NDA).

NOAA Fisheries Project Contact:

Roldan Munoz

NOAA Fisheries, Southeast Fisheries Science Center

101 Pivers Island Rd, Beaufort, NC 28516

Roldan.munoz@noaa.gov

Annex 1

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations as specified in the ToR.
2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.
 - a. Reviewer should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.
 - b. Reviewer should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.
 - c. Reviewer should elaborate on any points raised in the Summary Report that they feel might require further clarification.
 - d. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the panel summary report. The CIE independent report shall be an independent peer review of each ToRs and shall not simply repeat the contents of the summary report.
3. The reviewer report shall include the following appendices:
 - Appendix 1: Bibliography of materials provided for review
 - Appendix 2: A copy of the CIE Performance Work Statement
 - Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2
SEDAR 94 Florida Hogfish
Review Workshop Terms of Reference
December 2023

Review Workshop Terms of Reference

1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:
 - a. Are data decisions made by the DW and AW panels sound and robust?
 - b. Are data uncertainties acknowledged, reported, and within normal or expected levels?
 - c. Are input data series reliable and applied properly within the assessment model?
2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:
 - a. Are methods scientifically sound and robust?
 - b. Are assessment models configured properly and consistent with standard practices?
 - c. Are the methods appropriate for the available data?
3. Evaluate the assessment findings and consider the following:
 - a. Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?
 - b. Is the stock overfished? What information helps you reach this conclusion?
 - c. Is the stock undergoing overfishing? What information helps you reach this conclusion?
 - d. Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?
 - e. Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?
4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:
 - a. Are the methods consistent with accepted practices and available data?
 - b. Are the methods appropriate for the assessment model and outputs?
 - c. Are the results informative and robust, and useful to support inferences of probable future conditions?
 - d. Are key uncertainties acknowledged, discussed, and reflected in the projection results?
5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.
 - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods
 - Ensure that the implications of uncertainty in technical conclusions are clearly stated
6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

- Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments
 - Provide recommendations on possible ways to improve the SEDAR process
7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.
 8. Provide suggestions on key improvements in data or modeling approaches that should be considered when scheduling the next assessment.
 9. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.

Annex 3

SEDAR 94 Florida Hogfish: West Florida Shelf and East Florida/Florida Keys

July 14 – 17, 2026

Charleston, South Carolina

Tuesday

8:30 am – 9:00 am	Introductions and Opening Remarks <i>- Agenda Review, TOR, Task Assignments</i>	Coordinator
9:00 am – 12:00 pm	FLK/EFL Assessment Presentations <i>- Assessment Data & Methods</i> <i>- Identify additional analyses, sensitivities, corrections</i>	Analytic Team
12:00 pm – 1:30 pm	Lunch Break	
1:30 pm – 4:30 pm	FLK/EFL Assessment Presentations (continued) <i>- Assessment Data & Methods</i> <i>- Identify additional analyses, sensitivities, corrections</i>	Analytic Team
4:30 pm – 5:30 pm	ToR Review and Daily wrap up	Chair
5:30 pm – 6:00 pm	Public Comment	Chair

Tuesday Goals: FLK/EFL presentations completed, sensitivity and base model discussions begun, projection approaches approved

Wednesday

8:30 am – 12:00 pm	WFS Assessment Presentations <i>- Assessment Data & Methods</i> <i>- Identify additional analyses, sensitivities, corrections</i>	Analytic Team
12:00 pm – 1:30 pm	Lunch Break	
1:30 pm – 4:30 pm	WFS Assessment Presentations (continued) <i>- Assessment Data & Methods</i> <i>- Identify additional analyses, sensitivities, corrections</i>	Chair
4:30 pm – 5:30 pm	ToR Review and Daily wrap up	Chair
5:30 pm - 6:00 pm	Public Comment	Chair

Wednesday Goals: WFS presentations completed, sensitivity and base model discussions begun, projection approaches approved

Thursday

8:30 am – 12:00 pm	Panel Discussion <i>- Assessment Data & Methods</i> <i>- Identify additional analyses, sensitivities, corrections</i>	Chair
12:00 pm – 1:30 pm	Lunch Break	

1:30 pm – 4:30 pm	Panel Discussion/Panel Work Session	Chair
	- <i>Continue deliberations</i>	
	- <i>Review additional analyses</i>	
	- <i>Recommendations and comments</i>	

4:30 pm – 5:30 pm	ToR Review and Daily wrap up	Chair
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5:30 pm - 6:00 pm	Public Comment	Chair
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Thursday Goals: sensitivities and modifications identified, preferred models selected, projection analysis reviewed, Report drafts begun

Friday

8:30 am – 11:30 am	Panel Discussion or Work Session	Chair
	- <i>Final sensitivities reviewed</i>	
	- <i>Projections reviewed</i>	
	- <i>Review Reports</i>	

11:30 am – 12:00 pm	Public Comment
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12:00 pm	ADJOURN
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Friday Goals: Complete assessment work and discussions, final base configurations available. Draft Reports reviewed.

Appendix 3

SEDAR 94

Florida Hogfish: West Florida Shelf and East Florida/Florida Keys Review Workshop Participants

LIST OF PARTICIPANTS

Review Panel

Luiz Barbieri (Chair).....	SAFMC/GFMC SSC
Lisa Chong.....	CIE Reviewer
Noel Cadigan	CIE Reviewer
Challen Hyman	GFMC SSC
Joe Powers	CIE Reviewer
Marcel Renchert.....	SAFMC SSC
Alexei Sharov.....	SAFMC SSC
Steve Saul (via webinar)	GFMC SSC

Analytic Team

Chris Swanson	USF/FWC-FWRI
Dustin Addis	FWC-FWRI
Heather Christiansen	FWC-FWRI

Staff

Julie A Neer	SEDAR
Chip Collier.....	SAFMC Staff
Leonardo Eguia.....	GFMC Staff
Emily Ott.....	SEDAR
Ryan Rindone.....	GFMC Staff
Rachael Silvas	SAFMC Staff

Council Representative

CJ Sweetman.....	Gulf & South Atlantic Council
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Workshop Observers

Chris Bradshaw	FWC-FWRI
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Workshop Observers via Webinar

Shanae Allen	USF/FWC-FWRI
Manuel Coffill-Rivera.....	
Alena Figueroa.....	FWC-FWRI
Sarah Gardiner	GFMC Staff
Bob Hillard.....	Recreational Fisherman
Jennifer Loch	REEF
Danielle Morley	FWC-FWRI
Robert Muller.....	FWC-FWRI
Roldan Muñoz.....	NOAA

Hallie O'Farrell	FWC-FWRI
Tia Offner.....	FWC-FWRI
Jack Olsen	FWC-FWRI
Chloe Ramsay	FWC-FWRI
Ted Switzer	FWC-FWRI