SEDAR 74 Review

SEFSC responses and lessons learned

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GMFMC Reef Fish AP Meeting

4/23/2024

General Overview

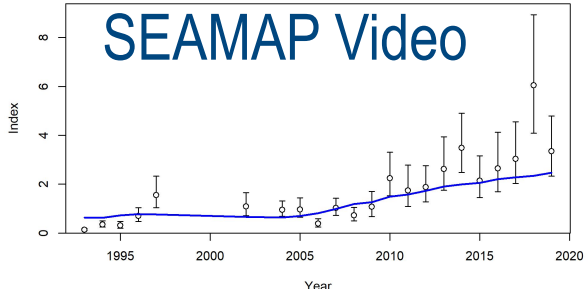
CIE Conclusion:

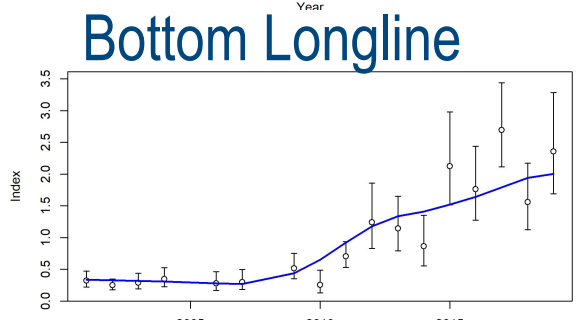
"... the current model configuration proposed by the Team is not ready for further development via the Operational Assessment process without considerable additional work, and likely re-review by outside reviewers."

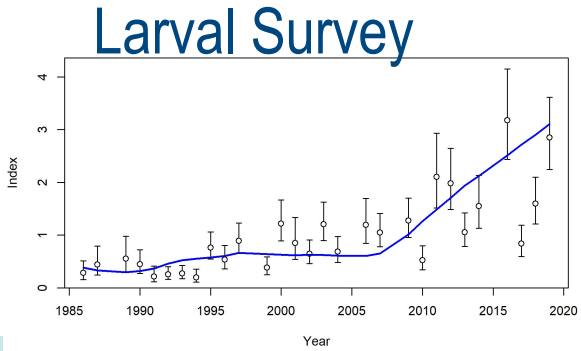
SSC Motion:

"The SEDAR 74 process move forward with a 3-area Gulf red snapper stock assessment, taking into account review panel, including CIE, concerns and criticisms to improve the model where appropriate and possible."

Western Region Indices:







Issues Noted by the Reviewers

Main:

- **Research Track criticisms**
- Treatment of the age and length compositions
- Stock ID conclusions
- The Great Red Snapper Count
- Uncertainty in landings and discards

Additional:

- Treatment of steepness
- Scaling the index CVs and index re-weighting

Research Track Process Recap

- Research track has not realized its original potential:
  - The data providers are impacted more, not less;
  - We cannot look into everything people/we would like to research during a research track;
  - Allowing for the use of preliminary data may cause some delay in addressing data issues;
  - A full assessment process without catch advice is frustrating and resource intensive; and,
  - SEFSC agrees it is difficult to review a model structure with so many inputs and variables that may change.

- Moving to a benchmark-style assessment process will alleviate many of these concerns and constraints.

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Issues with the Age and Length Compositions

CIWE Reviewer criticisms:

- Use of unweighted composition data.
  - Use of unweighted composition data made model evaluation impossible because data would change between model development and the final base model.
- Use of length composition to model directed fleet selectivity.
  - No cohort information from excluding age composition data from directed fleet selectivity modeling offset any benefit derived from the improved fits to discards, landings, and composition data obtained by using length composition.
  - Simply, using length composition data in this way was not beneficial.

Response: Use of Unweighted Length and Age Compositions

- Weighted age compositions, conditional age-at-length, and mean length at age were provided for all directed fleets

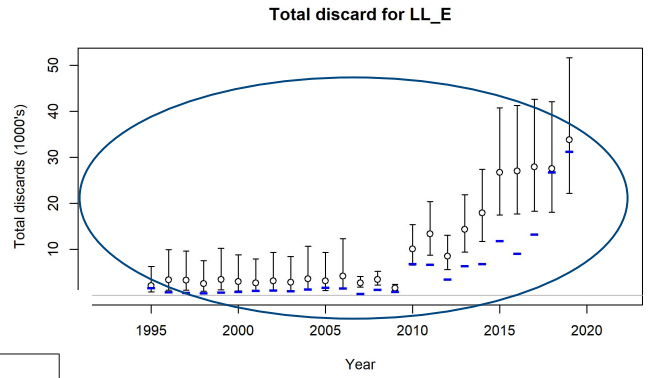
- Fits to weighted age compositions were evaluated and approved by the ADT during assessment webinars.

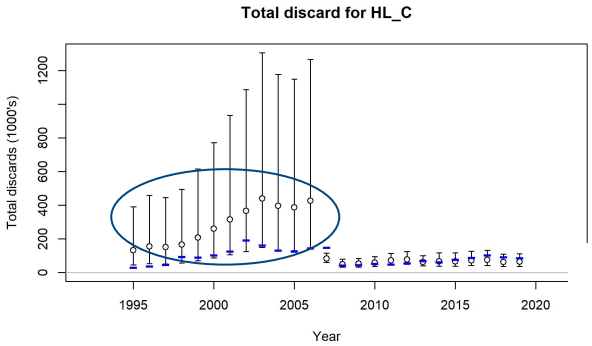
Response to the omission of age compositions

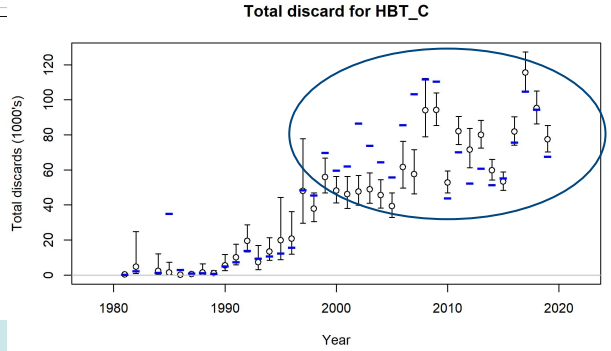
- Model tension apparent when trying to fit age vs. length.
- Age samples not necessarily representative of the stock.
- Information on cohort strength still available through survey age composition data.

Model issues with age-based selectivity for directed fleets

- When using age based selectivity, fits to discards are poor.
- Fits to discards are always more uncertain than landings.
- Not fitting discards was a main criticism of SEDAR 52.

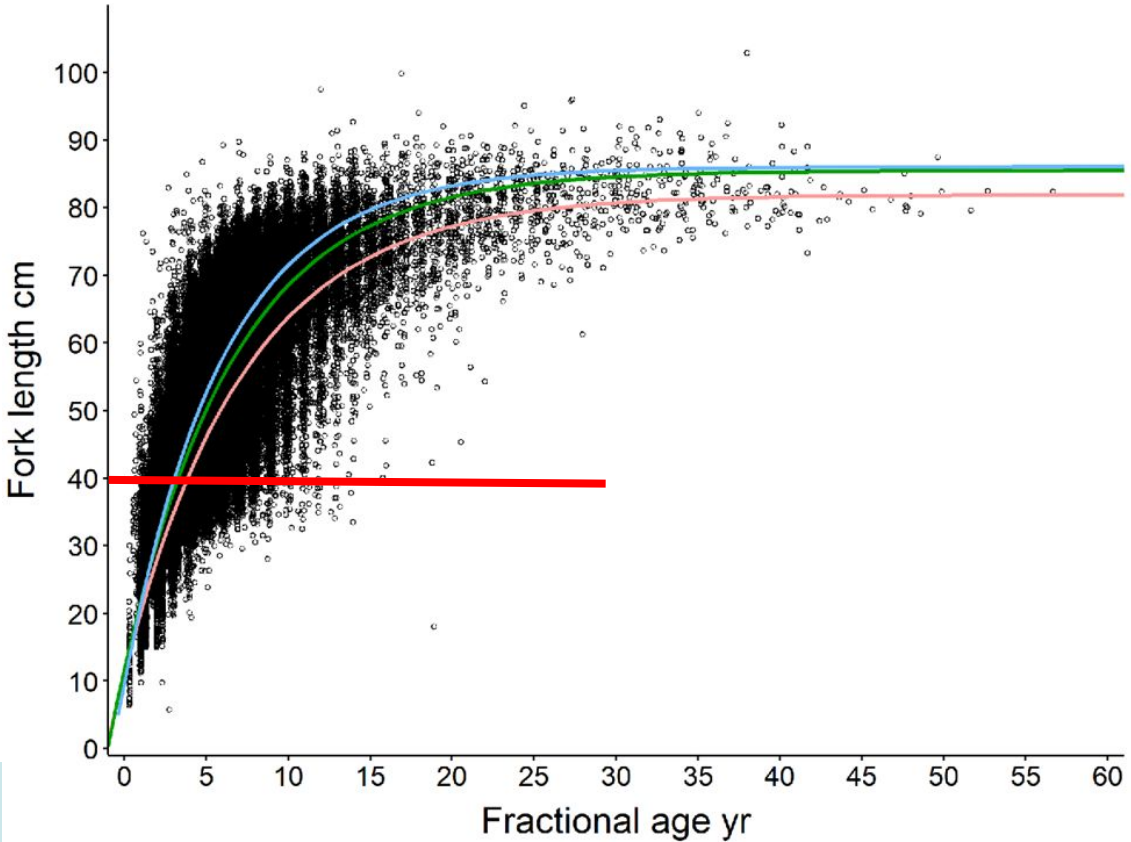






Model issues with age-based selectivity for directed fleets

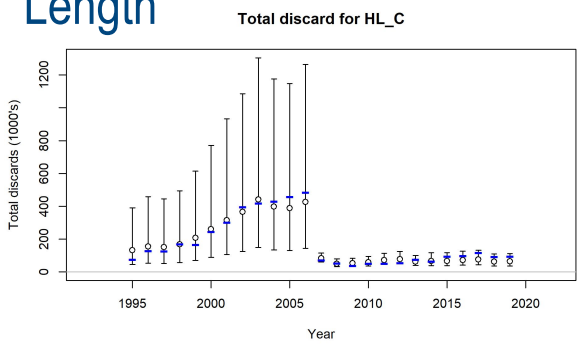
- Retention based on length from regs, so spread of ages in data is wide.
- Ages 0-15 observed below current recreational minimum size (40.64 cm, 16 inch TL).



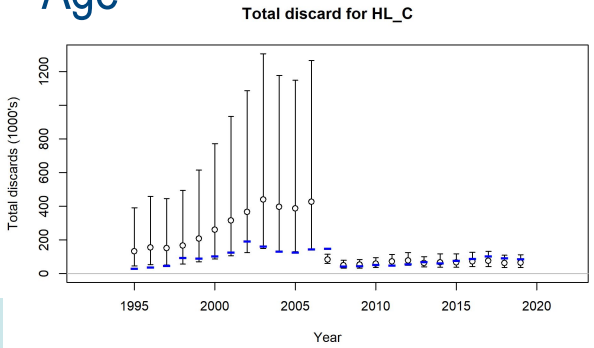
Model issues with age-based selectivity for directed fleets

- Basing both the selectivity and retention processes on length alleviated many of the fit issues.

Length



Age



Commercial Handline ages not always representative of fleet:

- Prior to 2013, process for collecting otoliths:
  - Targeted 100 otoliths per MRIP wave per region
  - Typical to collect 30 otoliths (right and left) from red snapper per interview
  - This resulted in **approximately 3 trips being sampled for all 100 otoliths**

- From 2013 on, sub-sampling was based on individual fish instead of interview number

Commercial Handline ages not always representative of fleet:

- Some potentially biased sampling in the 1990s for directed fleets occurred
- Otolith sampling exceeded processing capacity, resulting in varied sub-sampling approaches, which could introduce bias
- The stratification for this sub-sampling does not match stock ID boundaries
- The issues needed to be worked out prior to the next assessment.

What we plan to do:

- Finish our work on the ageing data
  - Complete descriptions of subsampling and any sampling issues in general
  - Compare the unweighted and weighted age compositions, and length compositions more explicitly.
  - Exploratory data analysis - plots, distributions, and weighting method .

- During the assessment phase, show impact of different assumptions about selectivity, and any changes in fits to compositions.

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Stock ID Issue

CIE: “The data did not support a three area model.” “In particular, the eastern area was quite data poor and many of the parameters had to be borrowed from the central region. “...the Review Panel thought that a return to the two-area model (as a base model) would be more appropriate for now.”

Discussion:

- The eastern data are lacking on their own in certain sectors
  - We mirrored (pooled with) the Central region where needed.

- The stock ID report waffled on support for the three area model. The RT allowed us to attempt a three-area model and highlight strengths and weaknesses of the approach.

- Stock ID issue confounded the review:
  - CIE review for Stock ID? Might or might not have helped.
  - Revisiting stock ID at the Review should not have been an indictment on the whole model building exercise.

Stock ID- what we plan to do:

SEFSC Options:

- Revert to the two area model split at the Mississippi River outflow, as was used in SEDAR 52.
- Use 3-area approach.

SSC Recommendation:

- Continue testing the 3-area model

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The Great Red Snapper Count issues

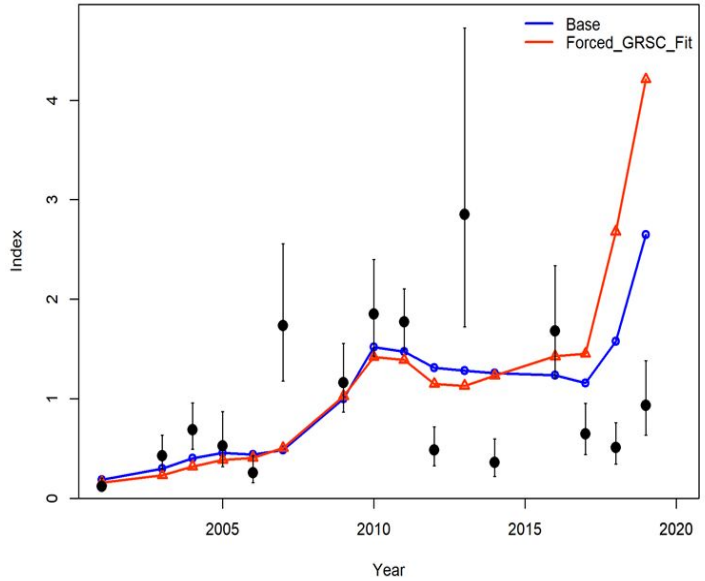
From the reviewers:

"It was premature to include the GRSC estimates in the model as potential biases have not been quantified and composition data were not available."

- GRSC not a true absolute abundance estimate, should not be treated as such.
- More effort needed from separate research team to determine priors for estimating catchability.
- Discussion about whether the GRSC was meant to be used in the assessment.
- CIE: use as ancillary info, even if not fit in model, and use comps somehow

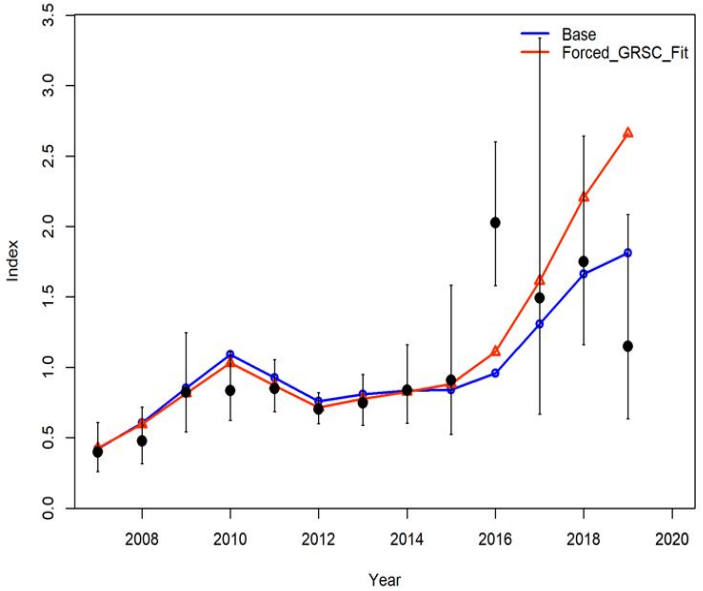
Sensitivities - GRSC Weighting in EGoM

NMFS Bottom Longline



Fits worsened when GRSC fit forced

Commercial Reef Fish



CIE comments about data available from the GRSC:

- There are data for estimating catchability and capturing other sources of variability (e.g., uncertainty in habitat mapping) available from the PIs.
- Biases for methods used can be quantified by a separate research team, as that work requires specialized knowledge.
- Biases would then be used to create priors for the catchability coefficients of each survey method.

What to do next?

- CIE reviewers suggest a separate research team, with GRSC PIs, to explore and quantify biases in the GRSC.
  - Is this possible?

- Length compositions from GRSC be used to inform selectivity estimate not all age-2+
  - We explained the data available did not cover the GOM; requiring assumptions

- Use the GRSC to 'groundtruth' or validate the assessment results.
  - Not yet possible without accurate selectivity or catchability.

- Council motion: Consider GRSC in the TORs for the next assessment.
  - It was considered in multiple ways for SEDAR 74
  - Would need detailed suggestions to do anything different

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Uncertainty in the Landings and Discards issues

- Fitting landings and discards closely, regardless of uncertainty.
  - Their justification: Catch-age models have to know the removals exactly in order to estimate biomass. Otherwise it "Can undermine the basis of these types of models".

- Suggest folding discards into the landings in order to eliminate parameters.

- SEFSC should (and does) have the option to smooth points in discards and landings where anomalies occur.

Fitting landings and discards exactly?

- Removals data are uncertain, and that uncertainty will need to be characterized, especially the recreational landings and discards.
- Including uncertainty in the landings and discards, at least in a preparatory step can help the analysts determine which data may contradict landings trends and why.
  - Would severely complicate management
- Integrated catch-at-age models should be able to incorporate uncertainty in landings and/or discards if the other data are good

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Steepness

- The reviewers disagreed with fixing steepness at 0.99
- “While the stock recruitment relationship may be weak, it is clear that very low stock sizes must produce very low recruitment, and that should preferably be reflected in the model.”
- Direct causes of shifts in stock productivity are currently unclear

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Scaling and/or Re-Weighting the indices

- Tend to scale fishery-dependent indices to the minimum CV in the fishery-independent indices
  - Keeps fishery-dependent indices from dominating trends in the assessment

- Can change scaling of fishery-dependent indices to preserve inter-annual variability
  - Will be a moot point if fishery-dependent indices are dropped as suggested by CIE

How to move forward?

- Use a benchmark-like process (DW, Assessment webinars, and a RW)
  - Suggested topics to revisit:
    - Recreational landings and discard data
      - Agree on approach, so that the catch advice is either in the same units used to monitor, or can be converted easily.
    - Age and length compositions
    - Determine stock ID approach (2- vs 3-area)
    - Evaluate steepness, natural mortality and landings uncertainty through sensitivities
    - Shrimp bycatch (will have a separate CIE review)
    - GRSC - but how?


Thank you!