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SAFMC SSC Catch Level Projections Workgroup Overview

July, 2026

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modified from April 26, 2022 presentation

[SSC Catch Level Projections Workgroup Final Report](#)

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Outline

- Background
 - Statement of work
 - Review of topic and literature
- Recommendations for CFMC SSC
 - General observations
 - Short-term forecasts
 - Uncertainty and observations
 - Assessment report recommendations

Background – Statement of Work

- Justification:
 - SA SSC has recently recommended different recruitment assumptions in catch level projections for different stocks
 - Requested an opportunity to review recent decisions and literature
 - **Develop recommendations on robust recruitment assumptions** for projections used to provide catch level recommendations
- Goal: Develop a set of recommendations for SA SSC consideration when making projection requests used to set catch levels.

Background – Statement of Work

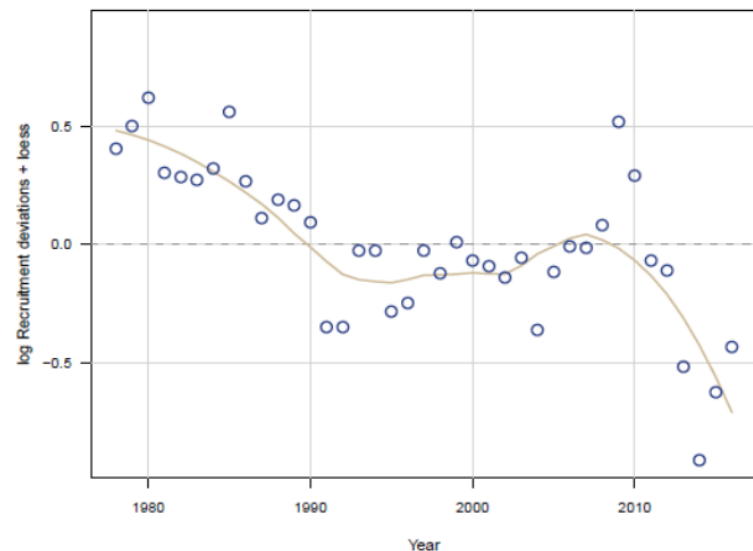
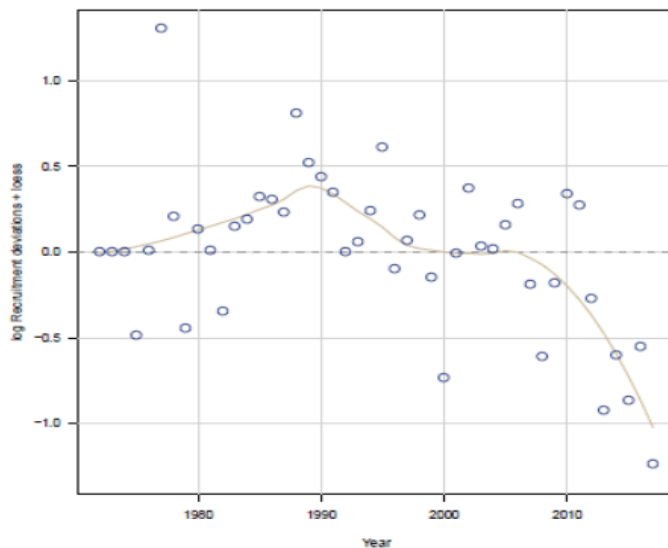
- Tasks:
 1. **Review recent literature** on recruitment assumptions and summarize key findings for the SA SSC
 2. **Summarize recent SA SSC decisions** regarding recruitment assumptions in projections used to set catch level recommendations. Case studies should include, but not be limited to, red grouper, red snapper, red porgy, golden tilefish, gag grouper, black sea bass, and snowy grouper
 3. With the assistance of the SEFSC, **explore the performance alternative recruitment assumptions** and summarize the impact on catch level advice for key example stocks.
 4. **Draft recommendations** for SA SSC consideration.

Background – Review of topic and literature

- Many federally managed South Atlantic stocks have estimates of recruitment during the most recent decade that are well below long-term averages
 - Recruitment overfishing caused by a reduction in spawning stock biomass
 - Changes to key environmental traits as a result of climate change
 - Combination of biotic and abiotic changes that could lead to a regime shift (e.g., **Klaer et al 2015**)
 - Misspecification of the stock assessment model or poor quantity/quality of input data

Background – Review of topic and literature

- Generally, the decisions regarding projections for recruitment in the South Atlantic have not been consistent across species, even with similar trajectories in stock status and estimated recruitment levels



Background – Review of topic and literature

- Other SSCs and Councils
 - Most regions have limited ability to adjust the scientific buffer between OFL and ABC based on environmental conditions
 - SSCs have adjusted ABCs when recruitment deviated from historic patterns as part of the scientific uncertainty
 - No consistent methods to adjust the ABCs or the time period for the new recruitment scenario
 - Typically, SSCs have adjusted the ABC downward associated with decreased recruitment

Background – Review of topic and literature

- Modeling and forecasting recruitment are fundamental to assessing the status of a stock and guiding management recommendations
- However, it is challenging to predict recruitment with the degree of accuracy needed for management purposes
- Approaches to forecast recruitment:
 - Functional stock-recruitment relationships
 - Sampling methods
 - Empirical dynamic modeling
 - Time-series analysis
 - Incorporation of environmental effects

General observations

- Current assumptions about fish population dynamics are based on
 - Populations experience short term fluctuations and long-term shifts
 - Tendency for ecosystem stability (or equilibrium)
 - Attraction point is basis for benchmarks and management targets
- We have seen situations in our stocks where short term (or recent) population dynamics differ from longer term dynamics

General observations

- When it comes to immediate future ABC determination, the more recent dynamics are likely the most relevant
- Long-term dynamics in fish populations tend to cycle around a central tendency
 - Cases of fish stocks reaching very low levels and then recovering
 - Mean condition may be surrounded by broad fluctuations, with the stock rarely settling into the specific central condition, but nonetheless this mean condition seems to exist in the sense of an attracting point to which the fluctuations return
 - Because of this likely condition in ecosystems, long-term forecasts should always consider the complete history of the stock

Short-term forecasts for ABC determination

1. **Short-term forecasts for ABC determination should be limited to 5 years** (post terminal year of the assessment, including interim years before management has taken effect)
 - Assessments should be done more frequently
 - If an analysis finds projections are accurate and performing well for a given species, then lengthening the projection time frame can be considered

Short-term forecasts for ABC determination

2. Short-term Forecasts should use recent mean recruitment

- Recommend default method for short-term forecasts should use recent mean recruitment
 - Van Beveren et al (2021) does not define recent recruitment, thus WG recommends recent mean recruitment be defined for each species on a case by case basis
- 3, 5, and 10 years were explored in Van Beveren paper
- Analysts can recommend a time period based on analyses of the species' data

Uncertainty and observations

- Issues with short-term and long-term forecasts
 - Likely that short-term and long-term forecasts do not agree
 - Short-term dynamics may not be reflective of long-term shifts, changes, or equilibrium tendencies
 - Does not mean that either the rebuilding or short-term forecast is wrong, rather they are both correct but express different types of risks
 - Managers need to be aware of these risks and how their decisions affect the short-term and long-term goals for the fishery, fish stock, and ecosystem
- Uncertainty Assumptions in Forecast Models
 - Given uncertainties, it's imperative to provide managers with an accurate reflection of the unknowns, assumptions, and uncertainties in fish population forecasts
 - Major sources of uncertainty in stock assessment models include recruitment, natural mortality, and the S-R relationship (e.g., steepness)
 - Discards, abundance indices, and ageing accuracy

Assessment report recommendations

- A full description of the recruitment variance assumptions within the model
 - Inclusion of analyses of autocorrelation in recruitment
 - Provide a graph of the distribution of recruitment
- Additional descriptions and sensitivities



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Southeast Data, Assessment, and Review

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South Atlantic Gag

Stock Assessment Report

April 2021

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Questions?

