

### **3. SEFSC INTERIM ANALYSIS STRATEGY**

#### **3.1 Documents**

Attachment 3a. Interim analysis strategy presentation  
Attachment 3b. Interim analysis strategy full report

#### **3.2 Presentation**

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#### **3.3 Overview**

We conducted a management strategy evaluation (MSE) to investigate how management procedures that adjust catch advice between stock assessments performed compared with existing management procedures. We built operating models (OM) for four reef fish species from the US Southeast Atlantic, based on recent stock assessments including Black Sea Bass, Red Porgy, Snowy Grouper, and Vermilion Snapper. These OM contained parameters and data specific to each stock, associated fisheries, and the sampling programs that monitor them. The analysis assumed efficient implementation of management, such that observed catch was equal to total allowable catch (TAC). Our analysis focused on a base scenario intended to most closely characterize the reality of each stock. We also developed multiple alternative scenarios to investigate the sensitivity of the analysis to deviations from the base configuration. A set of management procedures (MP) were applied independently in closed loop simulation for each species and scenario, with many replicate runs. The MP varied in terms of how often stock

assessments were conducted (every 1, 5, or 10 years), and how catch advice (i.e. TAC) was adjusted between stock assessments. Between assessments, TACs were either fixed, adjusted based on projections or adjusted based on a reference index of abundance. Results varied among species and scenarios, but generally showed that healthy stock and fishery status ( $SSB > SSB_{MSY}$  and  $F < F_{MSY}$ ) and comparable levels of total catch could be maintained with stock assessments conducted every 1, 5 or 10 years, whether TACs were fixed, projected, or adjusted based on indices of abundance. But these management procedures vary in terms of average annual variability in yield (AAVY), which was highest when TACs were adjusted based on indices of abundance and lowest when TACs were fixed between assessments.

### 3.4 Public Comment

### 3.5 Action

- Review, discuss, and provide feedback on the interim analysis strategy
- Can interim analysis be a tool to improve management during the interval between assessments? If yes, how should it be implemented?
- Yes, interim analysis (IA) will be a useful tool with several considerations as described below:
  - In addition to the index of abundance, other elements of the survey [size composition (e.g. evidence of truncation?), spatial distribution (e.g. expanding vs contracting), etc.] and fishery [size/age composition, quotas (e.g. are quotas being met? how quickly?)] should be considered when conducting the IA.
  - Specific feedback from Advisory Panels should be considered for use in the IA.
  - IA could be triggered by a value or a trend in an index, rather than a pre-determined time interval.
    - What hurdles might the SSC run across in recommending/adopting new recommendations or actions based on interim analysis?
  - The availability of a reliable abundance index is critical for the application of the IA process; however, a reliable abundance index is not available for all species.
  - How additional indices of abundance and more sources of information (e.g., length frequencies, distribution changes, stakeholder observations) could improve the IA process should be investigated.
  - Stationarity in the operating model assumes no regime or life history changes. How can MSE approaches use non-stationary operating models to compare among IA and normal assessment approaches? This could help identify when regime change is occurring.
  - How do the operating models comport with MSA? (e.g., Is  $P^*$  considered)
  - Consider recruitment projection issues (S-R curve, recent mean, etc.) when determining time between assessments. An empirical index of recruitment would be particularly valuable. Models do use recruitment variability from stock assessment.
- How would the interim analysis strategy integrate with the proposed ABC control rule? What would realistic management procedures look

like. How do TACs actually get set relative to output from IA, particularly when there is a bias?

- Risk level in new ABC-CR recommended by SSC (and ultimately set by Council) could be reconsidered based on results of an IA. SSC would then review the changes to the ABC indicated by IAs and recommend new ABCs.
- SSC would recommend change in TAC (ABC/ACLs) from IA and specify how many years until next review.
  - o 5-year IA interval may be too long based on fishery triggers and species biology.
  - o Consider higher IA/assessment frequency if stock is in a rebuilding plan
  - o IAs will likely be conducted at different intervals (e.g., every 2 to 3 years) depending on realistic workload and management expectations and needs. Using triggers in stock status or fishery landings could be used to initiate an IA (would be great to simulate this).
  - o SERFS trap and video index tracking closely for many species. Since the processing of the video data takes considerably longer (1.5 to 2 yrs) than analyzing trap catches (<1yr), look at trap only data (for species that trap) to expedite data inputs for IA.
  - o In addition to IA results, SSC should look more broadly at fishery and stock performance. For example, did the fishery reach quota in recent years? What is the size distribution of catch in fishery-dependent and fishery-independent samples? Were there trends in recruitment? Any changes in stock or fishery reported by port samplers? SAFE reports (see below) may help with this.
- To what degree can/should interim analysis replace current stock assessments or reduce the frequency of full stock assessments?
- Initial focus should be to reduce frequency of full stock assessments, but not to replace those assessments.
- Preliminary results from MSE simulation studies for some species indicate that projections may be unnecessary if interim analysis become available and reliable.
- Not having any implementation error is major hurdle to SSC endorsement. Implementation error needs to be explored further:
  - o Explore implementation error with regards to inability to control the magnitude of recreational discards/recreational effort.
  - o If IAs are reasonably robust to implementation error, then the time interval between full assessments could be longer.
- Does the SSC have any advice for next steps in studying the effectiveness of interim analysis? (e.g., Is more simulation analysis required? Does this need to be done for more species?)
- Consider retrospective analysis to determine effectiveness of IA approach.
- Explore more thoroughly the consequences of model misspecifications to the IA approach.
- “Torture test” models a bit more with respect to catch (e.g., catch with buffer).

- Attempt to more closely mimic actual management procedures. For example, accounting for the time it takes to implement management measures once a decision has been made to do so.
- The IA frequency could be triggered based on the index (or other key metrics). This might help with prioritization of species in need of IA.
- Exact implementation may differ among species because of substantial variation in performance of IAs (e.g., projections appear to work better for vermilion snapper).
  - o Consider expanding this study to include a few more of the critical SAFMC species and assess performance across a wider range of species. If possible, identify common traits among species that make the IA approach more suitable and successful for some species than others (max age, longevity, specific life-stage).
- A council option does exist to approve changes from IA within a year. However, we recommend simulating a longer lag between terminal data year and management year.