Proposed Allocation Decision Trees:
A Draft Blueprint for Applying Biological, Social, and Economic Considerations in Allocation Decisions

South Atlantic Fishery Management Council

September 2021

Working group includes Dr. Mike Schmidtke, Christina Wiegand, John Hadley, Dr. Scott Crosson, Myra Brouwer, and Dr. Brian Cheuvront

Request of the Council

1) Consider the proposed decision tree approach.
   – Background, introduction to decision tree questions, overview of reviews received so far.

2) Provide general feedback on:
   a) Potential usefulness of the approach.
   b) Are there changes that should be made?
      - Topics
      - Structure
   c) Timing of final review and approval (December 2021 or later meeting?)
      - Consideration of a special meeting?

Introduction

- Increased attention to sector allocation.
  - A report from the GAO recommended that the Councils consider sector allocation needs using:
    - *Trends in catch and landings*
    - *Stock assessment results*
    - *Economic analyses*
    - *Social indicator analyses*
    - *Ecosystem models*
  - Revised method for estimating recreational landings.
    - The “currency” has changed for how landings are accounted for.
- **Goal** is to help the Council develop an approach to addressing allocation decisions that examines applies a consistent method across all species.

Background

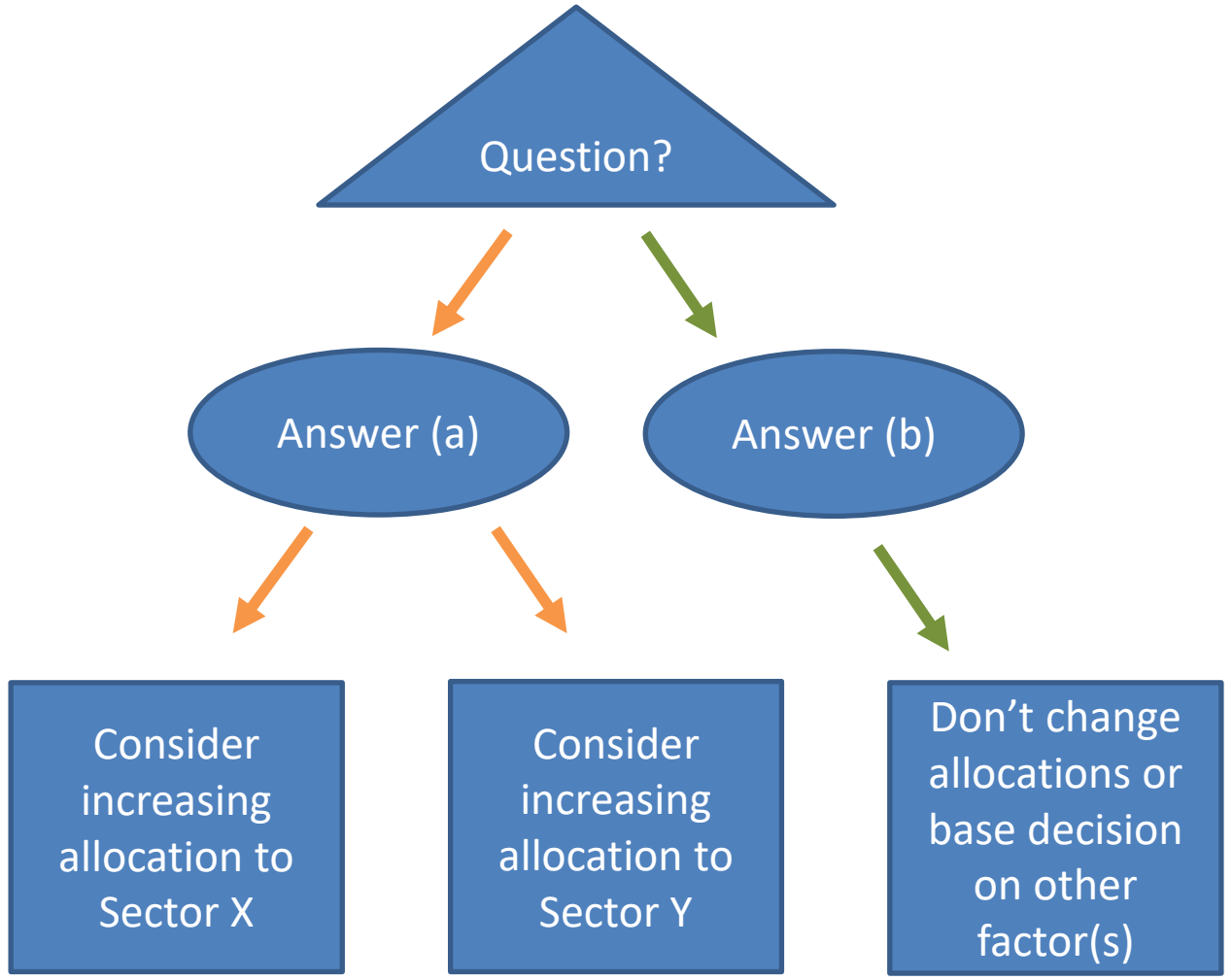
- Landings have been the primary data source used for allocation purposes.
  - The most consistently available data.
  - Available for all species.
- Council is now reconsidering sector allocations without specific time constraints that were present after the 2007 MSA reauthorization.
  - Allows time to develop additional methods.

Recent Council Action

- March 2020 - Council identified criteria they were interested in considering when discussing allocations.
- June 2020 - Council identified criteria for consideration in allocation decisions.
  - *Landings history, discard/bycatch rates, accountability, fairness and equity, market needs and trends, importance to a sector, cultural importance, and informed judgement.*
  - Also approved developing a decision tree approach.
    - Wanted to create an objective and organized approach to allocation decisions.
    - Did not want to be overly prescriptive and wanted to maintain flexibility to address allocations on a species by species basis.

What is the Decision Tree Approach?

- Uses the same question pattern, or "tree" for each species considered.
  - Currently 4 major decision trees being developed.
- As a question is answered, the tree "branches", or directs to the next question to be answered.
- Intended to aid the Council in making decisions such as whether allocations need to be considered in an amendment, initial structuring of allocation alternatives, and help build rationale.



Draft Allocation Decision Trees

- The allocation decision tree categories are slightly modified from the GAO criteria definitions and topics identified by the Council:
  1) Landings and discards
  2) Stock status
  3) Economic factors
  4) Social factors

- Each species would pass through all decision trees.
  - Some decision trees may not provide a relevant outcome for a given species.
  - A question in one decision tree could be applicable to another tree too.

Landings and Discards

- **Landings:** Should future allocations be based on harvests impacted by previous or current allocations (e.g. ACL)?
  - Potential analysis:
    - Landings and quota by sector time series.
    - Quota-induced closures.

- **Discards:** Has discard mortality accounted for a substantial portion of removals for either sector in three of the past five fishing years?
  - Potential analysis:
    - Dead discards as a percentage of annual sector removals.

Stock Status

- **Stock Status:** Has stock status been determined? If available, what is stock status?
  - Potential analysis:
    - SEDAR stock assessments
    - Fishery stock status updates from NOAA.

Economic Factors

- **<u>Economic Importance</u>:** Is the relative economic importance of the species changing?
  - <u>Potential analysis:</u>
    - Gross revenue from a species compared to total gross revenue (commercial).
    - MRIP directed effort for species compared to directed effort for all SAFMC-managed species in the appropriate region as a proxy (recreational).

Economic Factors (Continued)

- **Trends in Demand for the Species**: Are there indications of notable trends in demand for the species?
  - Potential analysis:
    - Trends in ex-vessel price and landings as a proxy (commercial).
    - Trends in MRIP directed effort and landings as a proxy (recreational).
    - Information from Fishery Performance Reports.
- **Trends in Demand for Quota**: Has a sector fully harvested its ACL on a consistent basis?
  - Potential analysis:
    - Historical use of sector ACLs.
    - Projected use of new ACL under the status quo allocation percentage.

Social Factors

- **Fishery Dependance:** Among the top ten communities with the highest total commercial and recreational landings relative to other communities in the region, are most of them engaged in commercial fishing, recreational fishing, or both?
  - Potential analysis:
    - Social indicators, including commercial and recreational fishing engagement, regional quotient, and local quotient.
    - MRIP directed trips.

Social Factors (Continued)

- **<u>Cultural Importance</u>: Does the fishery play a unique role in the history of fishing communities?**
  - <u>Potential analysis</u>:
    - Fishery Performance Reports.
    - Oral histories in NOAA's Voices database.
    - Social vulnerability indicators.
    - Informed judgement.

Topics Initially Considered by Removed from the Decision Tree Approach

- **Bycatch rates, discard rates, and mortalities**
  - Examples: Higher discard rate, mortality by sex/maturity stage, greater juvenile or female mortality, potential for protogyny, one sector more directly fishing on spawning aggregations.

  - Rationale for non-inclusion:
    - Difficult to address through allocation changes.
    - Likely better addressed through fisheries management measures other than allocations.

Topics Initially Considered by Removed from the Decision Tree Approach (Continued)

- **Changing distribution of stock due to climate change or other factors.**
  - Rationale for non-inclusion: Potentially important consideration in analysis of allocation decisions but not an informative measure to use in initial decisions of whether to or how to reallocate.
    - Intent of the Decision Tree approach is to aid the Council in signaling the need for reallocation.
      - Retrospective data used within decision tree not informative of need for reallocation due to shifting range or stock distribution.
    - Other than commercial allocations of King and Spanish Mackerel, the Council does not currently implement notable regional or location-based allocations.

Working through the Decision Tree

1) Council staff will gather appropriate information.
   - Will be presented in a Shiny app, similar to the fishery overviews that have been presented at recent Council meetings.

2) Staff will develop preliminary responses and move the Council through the decision tree.
   - Results will be compiled in a decision tool.

3) Council members will be able to clarify the outcomes of each decision point and asked to address any subjective outcomes.

Working with the results

- Possible that not all decision trees are going to have input every time for every species.

- Not likely that all decision tree "nodes" will point to the same sector allocation recommendation.
  - Consider a single rank order to the four decision trees?
    - Weight outcome of each major topic ahead of time
  - Go with the preponderance of the decision tree recommendations?
    - Majority rules
  - Assign no rank or order?
    - Initial staff recommendation to maintain flexibility.

Review and Feedback

- Initial allocation decision tree tool reviewed by:
  - The SEP (April 2021)
  - The SSC (April 2021)
  - Staff from NOAA SERO and the SEFSC (July 2021)
  - AP Chairs, Vice Chairs, and other members (August 2021)
    - Snapper Grouper, Mackerel Cobia, and Dolphin Wahoo AP members.
- <u>The good:</u>
  - Generally positive feedback on the initiative to develop a systematic approach to collecting relevant data for addressing allocation decisions.
  - Appreciation of multi-disciplinary approach.
  - Range of information provided was appropriate given the need for a relatively quick turnaround time.

Review and Feedback (Continued)

- <u>Issues identified (the not-so-good):</u>

1. Concern over single species approach that will affect multi-species fisheries.
   – Brought up by all reviewer groups.

2. Climate change should be included in the decision tree process.
   – Particularly stressed by AP members.

3. Uncertainty in some of the data being used in the analyses.
   – Particularly discard and MRIP data.

4. Tool may not be applicable to all species or some “branches” may provide misleading results.
   – Particularly for species with highly constrained harvest levels (e.g. red snapper).

Timeline for the Development of the Decision Tree Approach

TOR	TASK	DEADLINE
ONE	Draft questions developed for landings history, stock assessment results, and biological/ecosystem decision trees.	Complete (Winter/ Spring 2021)
	Draft questions developed for economic and social decision trees.	Complete (Winter/ Spring 2021)
	Draft order and branching of landings history, stock assessment results, and biological/ecosystem decision trees determined.	Complete (Winter/ Spring 2021)
	Draft order and branching of economic and social decision trees determined.	Complete (Winter/ Spring 2021)
	Descriptions of each decision tree (question reasoning, branching logic).	Complete (Winter/ Spring 2021)
	Council Update at the March 2021 meeting.	Complete (March 2021)
	Draft Blueprint including decision tree descriptions and details on how they can be used when developing allocation alternatives and decisions.	Complete (Spring 2021)
TWO	Draft Blueprint reviewed by the SSC and SEP.	Complete (April 2021)
	Draft Blueprint sent to SERO and SEFSC for review.	Complete (July 2021)
	Draft Blueprint reviewed by Council AP members.	Complete (August 2021)
THREE	Draft Blueprint questions provided to the Council.	September 2021
FOUR	Final (?) Allocation Decision Tree Blueprint and demonstration	December 2021
FIVE	Potential additional review of Allocation Decision Tree Blueprint (if needed)	March 2022

?

Next Steps

1) Incorporate Council input from September meeting and revise decision trees as appropriate.

2) Further integrate advisor comments and address concerns.

3) Develop “final” list of decision tree questions for the Council’s approval and provide an example likely via the imaginary and infamous shadow shark.

Discussion Questions and Direction to Staff

1. **Process:** Do you feel that the use of a decision tree method as outlined would be useful for the Council to systematically and consistently examine initial allocation decisions?

   i) Please note that any final allocation decisions will have the advantage of more detailed biological, economic, and social analyses once staff has had a chance to develop such information.

2. **Content:** Keeping in mind the need to focus on readily available data and completion of the decision tree in a relatively short timeframe (several weeks to a few months), do you feel that the general topics covered are adequate? Are there topics that should be added or removed?

   i) Should **climate change** be added to the list of questions for setting allocations?

3. **Timing:** How does the Committee want to proceed with development of the decision tree tool?

   i) Final approval is scheduled for the December 2021 meeting. Is this still the preferred timing?
   ii) Other options could include consideration of a special meeting to fully review the tool and/or an additional review at March 2022 meeting.