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

For review by the South Atlantic Fishery Management Council
September 2021

Objectives of this meeting

1) Review the draft decision tree approach.
2) Review the draft decision tree questions and criteria.
3) Provide direction to staff on how to proceed with development of the allocation decision tree.

Introduction

In March 2020, the South Atlantic Fishery Management Council (Council) identified criteria to consider when discussing allocations that included: *landings history, expected/known discard rate, accountability of a sector, fairness, equity, market needs, importance of a species to a sector, cultural importance, and the possibility of removing sector allocations*. At the end of March 2020, the Government Accountability Office (GAO) released a report on its review of fishery sector allocations in the South Atlantic and Gulf of Mexico.[1] The GAO recommended similar criteria when considering sector allocation needs: *trends in catch and landings, stock assessment results, economic analyses, social indicator analyses, and ecosystem models.*

Since the last reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in 2007, which required establishing annual catch limits (ACLs) and prompted establishment of sector allocations for managed species, landings have been the primary data source used for allocation purposes in the South Atlantic region since they have been the most consistently available data and can be obtained for all species. However, the Council has acknowledged that other biological or ecosystem data sources, as well as input from economics and the social sciences, are also important to inform sector allocation decisions.

While neither the MSA nor the National Standard Guidelines require allocations, they are an important management tool that is available to the Nation's fishery management councils. The Council has chosen to establish allocations for the majority of its managed species for which there are recreational and commercial landings. In most cases, the Council has not used data other than landings because other types of data are at times lacking for the South Atlantic region or there has not been a consistent method to apply other criteria, such as social and economic factors. Currently, the Council is reconsidering sector allocations in a systematic manner without specific time constraints that were present after the MSA reauthorization, which allows for consideration of additional methods. Also, the Council has set an allocation review trigger policy[2] and will continue receiving multiple stock assessments that warrant a review of sector

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[1] The GAO report is available at https://www.gao.gov/products/gao-20-216.
[2] The Council's Allocation Review Trigger Policy at
https://safmc.net/download/AllocationReviewTriggerPolicy071619.pdf

allocations when revising the acceptable biological catch levels and resulting ACLs, making the development of a systematic approach to addressing allocations desirable.

The Comprehensive ACL Amendment (2012) created sector allocations for most species that did not already have them using landings from 1986 through 2008. The formula used a long-term "historical" time series and a more "recent" trend. Sector allocations were determined using fifty percent of the average landings from 1986 through 2008 ("historical" trend) and fifty percent of average landings from 2006 through 2008 ("recent" trend). The same amendment also put sector ACLs and accountability measures (AMs) in place. In-season harvest closures were implemented to keep landings from exceeding ACLs. Prior to 2012, in-season closures were uncommon. Since closures disrupt how the fishery would otherwise operate, and closures might occur for one sector and not the other, applying the same allocation formula to more recent years (particularly after 2012) may not reflect each sector's full harvest capacity or use when not restricted by an ACL. Hence, modifying sector allocations by using landings from years *after* AMs were implemented, particularly those used for short-term trends, could introduce a management-induced constraining effect that should be considered when developing landings-based allocations. Nonetheless, trends in catch and landings remain a valuable source of information to help determine future modifications to sector allocations.

The Decision Tree Approach

Making sector allocation decisions is a difficult and complicated process. To help incorporate other sources of information, in addition to landings, the Council is exploring the use of a Decision Tree Approach to determine salient issues when discussing sector allocations and develop an organized approach to allocation decisions. At the September 2020 meeting, the Council endorsed the concept of the Decision Tree Approach and directed staff to work on developing the approach with input from its advisors. The Council expressed concerns over establishing an approach that would be overly prescriptive and wanted to maintain flexibility in allocation decisions on a species-by-species basis. As such, the approach design seeks to be informative in a methodical and consistent manner without being prescriptive.

A Decision Tree Approach is a systematic methodology that uses the same question pattern, or tree, for each species considered. As a question is answered, the tree "branches," or directs to the next question until all the relevant questions are answered, and a course of action is recommended for that species (**Figure 1**). By narrowing the focus, the Council can determine the most important factors to consider based on available data. The following items outline the approach:

1. The decision trees are slightly modified from the five criteria recommended by the GAO. There are four decision tree categories based on:
    o Landings and discards
    o Stock status
    o Economic factors
    o Social factors
2. Each species would "pass through" all decision trees.
3. Some decision trees may not provide a relevant outcome for a given species.
4. A question in one decision tree could be applicable to another tree.

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The first of the four recommended criteria, landings history, is what the Council has primarily relied upon. This information is available for species by sectors and can be applied consistently. Depending on how the decision questions are worded, the landings decision tree could provide insight into whether the current allocations are working or not. For example, a decision tree could recommend the Council explore whether one sector could benefit from increased allocation without harming the ability of the other sector to continue to land fish.

The main intent of the decision tree process is to allow the Council to work through the decision tree process when review of allocations has been triggered by the Council's allocation policy or near the beginning of a potential FMP amendment. This process is meant 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.
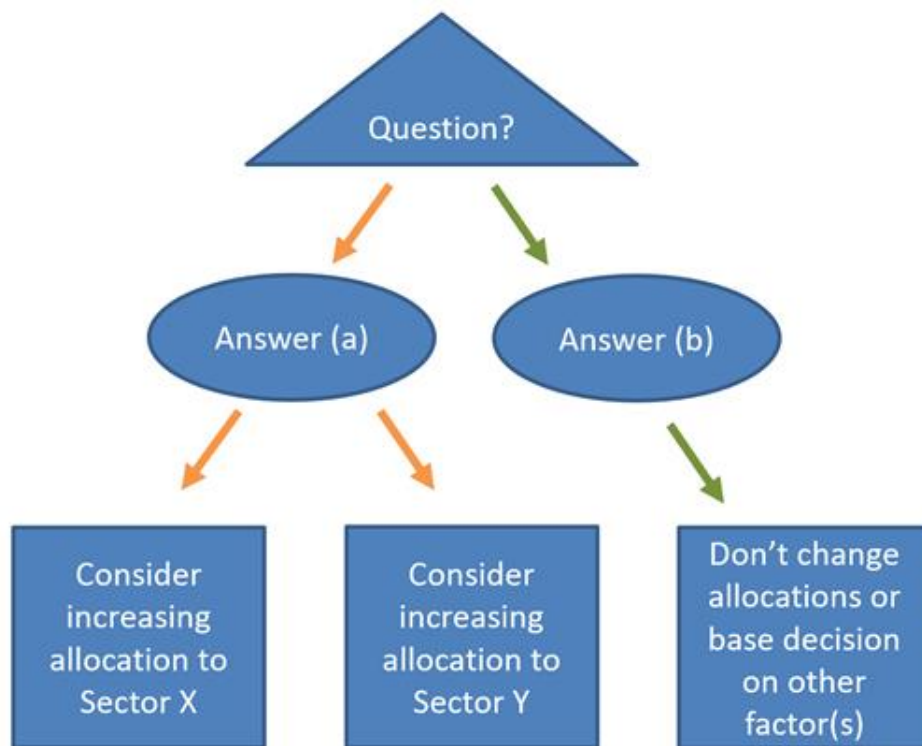

Figure 1. Conceptual example of a decision tree.

Decision Tree Questions
Topic: Landings and Discards

Landings: Should future allocations be based on harvests impacted by previous or current quotas (e.g. ACL)?

Answers:

1. No. *Consider allocations developed using harvests from a historical time period without quotas that limit annual harvest or other factors addressed in other decision trees.*
2. Yes. **Have both, only one, or neither sector met or exceeded the ACLs or experienced closures due to the ACLs being projected to be met or being exceeded in any of the past five fishing years?**
   a. Both sectors. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*
   b. One sector. *Consider reallocation of no more than the difference between the maximum annual harvest in the last five years and the ACL from the underharvesting sector. Consider a minimum threshold for the difference to avoid reallocating insignificant portions of the ACL.*
   c. Neither. *Current fisheries have not been limited by the ACLs. Consider recent proportions of total landings in allocations. Consider whether sector allocations are necessary for fair and equitable management of this fishery. If one sector has recently shown significant growth, consider this trend in setting future allocations.*

Potential analysis: Landings and quota by sector time series, in addition to record of any quota-induced closures and when those closures occurred within the fishing year.

Discards: Has discard mortality accounted for a more substantial portion of removals for either sector in three of the past five fishing years?

1. Yes. *Consider not increasing the allocation for a sector with a substantial amount of discard mortality.*
2. No. *Neither sector is substantially impacted by discard mortality. Consider allocation advice provided by the other decision trees.*

Potential analysis: Dead discards as a percentage of annual sector removals.

Topic: Stock Status
Stock Status: Has stock status been determined?

Answers:

1. Yes. **What is the stock status? Consider advice from all applicable statuses.**
   a. Overfished. *Prioritize reallocation towards a sector if that could increase biomass (via increased survivorship, particularly of juveniles and adult females).*
   b. Overfishing. *Prioritize reallocation towards a sector if that could decrease dead discards. Also consider measures beyond allocation to end overfishing.*

c. Not Overfished/Not Overfishing. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*

2. No; stock status is unknown. **Is there an adequate index of abundance showing population trends?**
   a. Yes. **Is the population growing, stable, or decreasing?**
      i. Stable or Growing. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*
      ii. Decreasing. *Prioritize reallocation towards a sector if that could increase biomass (via increased survivorship, particularly of juveniles and adult females) or decrease dead discards.*
   b. No. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*

Potential analysis: SEDAR stock assessments and fishery stock status updates from NOAA.

Topic: Economic Factors

Economic Importance: Is the relative economic importance of the species changing?

Answers:
1. Yes. **Is it becoming more economically important?**
   a. Becoming more important to one sector. *Prioritize reallocation towards the sector for which the species has a higher economic importance.*
   b. Becoming more important to both sectors. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*
2. No. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*

Potential data analysis: Logbook information to determine commercial importance through a comparison of gross revenue from a species to total gross revenue. Compare directed effort for species to directed effort for all SAFMC-managed species in the appropriate region as a proxy for recreational importance.

Trends in Demand for the Species: Are there indications of notable trends in demand for the species?

Answers:
1. Yes. **What is the trend by sector?**
   a. Demand is increasing in both sectors. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*
   b. Demand is increasing for one sector and not the other. *Prioritize reallocation towards sector that is exhibiting increasing demand.*
2. No. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*

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Potential analysis: Use the following as proxies for demand. Trends in ex-vessel price and landings for the commercial sector. Trends in directed effort and landings for the recreational sector. Also information may be available from Fishery Performance Reports.

Trends in Demand for Quota: Has a sector fully harvested its ACL on a consistent basis?

Answers:
   1. Yes, only one sector. *Prioritize reallocation towards the sector that would likely benefit from additional ACL.*
   2. Yes, both sectors. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*
   3. No. *Consider maintaining current allocations or basing changes to allocations on other factors addressed in other decision trees.*

Potential analysis: Consider historical use of sector ACLs. Also consider projected use of new ACL under the status quo allocation percentage, particularly if the methodology for estimating recreational landings has recently changed. If one sector is underharvesting its sector ACL while the other sector is fully utilizing its sector ACL, then reconsidering allocations that would lead to better utilization of the total ACL could make one sector better off while not restricting harvest within the other sector and could lead to increased net economic benefits.

Topic: Social Factors

Fishery Dependence: 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? *(Communities are considered highly engaged if they are above the one standard deviation threshold).*

Answers:

   1. Most are highly engaged in commercial fishing.
        a. **Are the identified fishing communities dependent on commercial fishing opportunities for this species (above the median local quotient)?**
             i. Yes. *Consider prioritizing commercial fishing opportunities.*
             ii. No. *Review fishing opportunities for associated species and consider whether adjustments to focus species allocations are necessary.*
   2. Most are highly engaged in recreational fishing.
        a. **Are the identified fishing communities dependent on recreational fishing opportunities for this species (above the median number of directed trips)?**
             i. Yes. *Consider prioritizing recreational fishing opportunities.*
             ii. No. *Review fishing opportunities for associated species and consider whether adjustments to focus species allocations are necessary.*
   3. Equally engaged in commercial and recreational fishing. *Consider removing sector allocations or allocating equally between the sectors.*

Potential analysis: Social indicators, including commercial and recreational fishing engagement, regional quotient, and local quotient, MRIP directed trips.

Cultural Importance: Do fishing activities play an important role in the history of fishing communities?

Answers:
1. Yes. **Does the species play a unique role in community cultural tradition?**
   a. Yes. **Have changes in the regulatory environment affected the role this species plays in communities?**
      i. Yes. *Consider allocations that mirror the historical real or de facto allocations and/or current values in the fishery.*
      ii. No. *Consider allocations that prioritize biological/ecosystem or economic needs.*
   b. No. *Review fishing opportunities for associated species and consider whether adjustments to focus species allocations are necessary.*
2. No. *Consider allocations that reflect the current state of the fishery or removing sector allocations.*

Potential analysis: Summary of information provided in fishery performance reports and oral histories found in NOAA's Voices database, where available, social vulnerability indicators, and informed judgement.

Topics Initially Considered but Removed from the Decision Tree Approach

The following biologic, fishing behavior, and ecosystem considerations were initially explored for use in the decision tree approach. While important considerations in the management of fish stocks or the analysis of allocation decisions, they do not tend to lend themselves well to the method for various reasons.

- 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 or may be more directly addressed through fisheries management measures other than allocations.

- Changing distribution of stock due to climate change or other factors.
  - Examples: Shifting migration patterns or range.
  - Rationale for non-inclusion: Potentially an important consideration in analysis of allocation decisions but not an informative measure to use in initial allocation decisions before the Council has developed allocation alternatives for a species. The intent of the Decision Tree approach is to aid the Council in signaling the need for reallocation when first addressing the topic for a species. Retrospective data, which

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makes up the majority of the information presented, may not be informative in providing a signal for the need to reallocate. Additionally, other than regional commercial allocations of king and Spanish mackerel, the Council does not currently implement notable regional or location-based allocations.

Working through the Decision Tree Questions

To aid in working through the series of decision tree questions, Council staff will gather appropriate information, as available, towards the beginning of an amendment. Examples of such information is listed under "potential analysis" for each respective topic. This information will be presented to the Council using Shiny apps[3] in a fishery overview. Since most questions are not subjective, assuming the appropriate data are available, the outcomes should be available for the Council to review immediately. To help compile the outcomes, an online allocation tool will be available. A draft version of this tool can be viewed at:

https://safmc-shinyapps.shinyapps.io/AllocDecTrees/

Staff will develop preliminary responses and assist the Council through the decision tree questions and resulting recommendations ahead of initial allocation decisions. Council members will be able to clarify the outcomes of each decision point, asked to address any subjective outcomes, and will review the comprehensive results through the online tool.

Working with Decision Tree Results

With multiple and varying decision tree "branches" or "nodes," there could be many different combinations of results. The most straightforward result would be that all the decision trees would give the Council the same sector allocation advice.

It is possible that not all decision trees are going to have meaningful input every time for every species. This could be due to lack of relevant data readily available to inform answers to the questions, or the answers to the questions may not add relevant information to make a decision about sector allocations for a given species. For example, there may not be relevant social information available to make a sector allocation recommendation from that decision tree.

The most plausible outcome is that not all of the decision trees will point to the same sector allocation recommendation. The Council is then left with how to resolve the differences between or within the decision trees. There are three recommendations that could help the Council make a final decision on its course of action:
1. Prior to applying the decision tree method to any species, rank order to each question in the decision trees based on various characteristics such as confidence in the data, overall importance to the success of the fishery, etc.
2. Consider the preponderance of the decision tree recommendations. If several decision trees make a recommendation and the majority of them point towards one solution while the others point to a different solution, the Council should follow the recommendation of the majority.

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[3] https://shiny.rstudio.com/

3. Do not apply a ranking or preponderance of recommendations. The outcomes of the decision tree can be used to help the Council develop a range of alternatives if the Council decides that examining allocations is desired.

If the overall recommendation from the various decision trees is still not clear, the prior rank ordering of the decision trees would be used to make the final decision. The recommendations of the decision tree with the highest ranking that gave a viable solution are the ones that would be followed. On the other hand, assigning a ranking or deferring to a preponderance of recommendations would reduce the Council's flexibility. As such, it is initially proposed that there is no commitment to a ranked order or preponderance of outcomes when deciding the course of action to take from the decision tree outcomes.

Review of the Decision Tree Approach

The Council asked staff[4] to develop the decision tree approach and work with advisors from the Socio-Economic Panel (SEP), Scientific and Statistical Committee (SSC), Advisory Panels (APs), NOAA Southeast Regional Office, and NOAA Southeast Fisheries Science Center to help modify and calibrate the methodology. Relevant portions of the summary reports from the SEP, SSC, and AP discussions of the approach are provided in **Appendixes 1** through **3**. This input has been or will be incorporated into the allocation decision tree tool as appropriate. Reviewers have also identified some key potential challenges to this approach. Given the timing of this input, the identified issues have not yet been fully addressed. A summary of overall feedback as well as the potential issues is as follows:

Overall:
- 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.

Potential issues:
- Concern over single species approach that will affect multi-species fisheries.
  - Brought up by all reviewer groups.
- Climate change should be included in the decision tree process.
  - Particularly stressed by AP members.
- Uncertainty in some of the data being used in the analyses.
  - Particularly discard and MRIP data.
- Approach 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).

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[4] Working group made up of Dr. Mike Schmidtke (SAFMC), Christina Wiegand (SAFMC), John Hadley (SAFMC), Dr. Scott Crosson (SEFSC), Myra Brouwer (SAFMC), and Dr. Brian Cheuvront (formerly SAFMC).

Timeline for the Development of the Decision Tree Approach

Based on previous review and discussion of allocation approaches, the Council is planning to implement a fully developed decision tree methodology by their December 2021 meeting (**Table 1**).

Table 1. Timeline for development of the decision tree approach to allocations.

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

Discussion Questions and Council Action

The Council is asked to review the draft decision tree topics and questions, initial feedback from advisors and reviewers, and provide guidance on how to proceed with the allocation decision tree approach and tool. The following questions that focus on the process, content, and timing will guide staff on how to proceed with development of the tool:

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?

   a) 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?

   a) 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?

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

Appendix 1. Summary report of SEP recommendations

The Socio-Economic Panel (SEP) met on April 13, 2021 via webinar. Among the agenda topics was a review of the Allocation Decision Tree Blueprint. The SEP discussed the decision tree, focusing particularly on the economic and social components, and provided the following comments and guidance:

Discussion Questions:

1.   Economic
   a. Keeping in mind the need to focus on readily available data and completion of the decision tree in a relatively short time (several weeks to a few months), does the SEP feel that the set of questions presented covering economic topics is adequate?

   The set of questions presented covering economic topics seems adequate given the need to focus on readily available data to complete a decision tree in a relatively short time.

   b. Are there additional economic-related questions or topics that should be covered in this portion of the decision tree approach? Are there questions that should be removed?

   The questions included are appropriate given data availability and time constraints.

   c. Does the SEP feel that the outline potential data analyses are adequate? Are there other readily available analyses or data sources that should be examined?

   The data analysis steps outlined are rather briefly described but seem to be designed to gather appropriate and available data and analyze the data in a manner that can provide beneficial information. Adequacy of analyses will require nuance; for example, using landings and dockside value to measure demand will involve considering the role and trends in other species targeted by the sector.

   d. Are the resulting recommendations from the economic decision trees appropriate? Will they help guide allocation decisions without being too prescriptive?

   The prescriptiveness of the allocation decision tree is decided by how it is used by the Council. That said, the allocation decision tree outlined is not overly prescriptive and can provide the Council the opportunity to consider other species-specific information not covered by the decision tree in making allocation decisions.

   Additional economic comments on allocation trees:

   Staff mentioned that, for a given fish species, if it is possible to re-allocate ACL share to one sector without harming the other sector (a "Pareto improvement"), then the re-allocation should be made (all else equal). This same idea can be extended to "trading" ACL shares *across species*, and it might make *both* sectors better off. Consider the

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answer to this question for all species pairs A and B: "If the recreational sector gives some of its ACL share of species A to the commercial sector, and in exchange the commercial sector gives some of its ACL share of species B to the recreational sector, are *both* sectors made better off?" This can be true when the recreational sector values species B more highly than species A, and at the same time the commercial sector values species A more highly than species B. The same idea might apply *across states* (or other geographic regions) when ACL is allocated across states. "If the state X gives some of its ACL share of species A to the state Y, and in exchange state Y gives some of its ACL share of species B to state X, are *both* states made better off?"

The discussion in the points above referred to trades that would make both sectors or states better off *economically*, but, the same idea could be applied to trades that make two fish species better off *biologically*. For example, suppose there was a "trade" that transferred ACL share in species A from recreational sector to the commercial sector, and in exchange transferred ACL share in species B from the commercial sector to the recreational sector. Suppose, after this trade, that both sector were about as well off *economically* as they were before the trade, but suppose that one or both fish species are better off *biologically*, then this is a trade that should happen. For example, suppose that the recreational and commercial sectors each get about the same economic value from each species A fish landed, but the recreational sector has more dead discards. Then, transfer some share from recreational sector to commercial sector. This helps the biology of species A. Now, in compensation, some share of species B is transferred from commercial sector to recreational sector, an amount of share so that both the recreational sector and the commercial sector are as well off economically as they were before the trade, but the biology of species A was helped by the trade. So, net gain to species A biologically with little net impact economically on either recreational sector or commercial sector.

2.   Social
   a. Are there additional sociocultural-related questions or topics that should be covered in this portion of the decision tree approach? Are there questions that should be removed?

   The sociocultural decision tree questions included seem appropriate given time and data constraints associated with the allocation decision process.

   b. Does the SEP feel that the outlined data analyses are adequate? Are there other readily available analyses or data sources that should be examined?

   The data analyses outlined is of appropriate scope given the data and time limitations associated with the decision tree process.

   c. Given the need to complete any decision tree related analysis in a short amount of time, what is the best way to summarize and present available qualitative data?

The data seems to lend itself to summary reports with the data quantified where possible (for instance, presentations of local quotients and number of directed trips).

d. Should the vulnerability social indicators be incorporated into the social decision trees?

    No.

e. Are the resulting recommendations from the social decision trees appropriate? Are they clear enough to guide allocation decisions without being too prescriptive?

    The allocation decision tree outlined is not overly prescriptive and can provide the Council the opportunity to consider additional information not covered by the decision in making informed allocation decisions.

f. Should questions listed in the decision trees be posed to Advisory Panels when conducting Fishery Performance Reports?

    This question is best decided by Council staff that are more familiar with the APs and the development of Fishery Performance Reports. If the data could be gathered in a manner that did not impede the AP in other duties the additional information gathered seems valuable; however, such input should not be overweighted due to the small size of APs and the potential for AP representatives personal experiences not to be indicative of the broader fishery/stakeholder groups they represent on specific issues.

    Additional social comments on allocation trees:
    In addition to community's *dependence* on fishing, and whether fishing plays an important role in the community's history/culture, might also want to consider whether there is some *unique* social/cultural/historical aspect of a fishing community *relative to other fishing communities*. (e.g., maybe the Gullah culture?)

    Other social questions to consider:
    What are the dimensions of social/cultural/historical *uniqueness*? What would be a good measure for each dimension of uniqueness? (speculation: answers to these questions might be found in the sociology/history/historical preservation literature, rather than in the economics/biology/fish management literature)

3. Overall
    a. Given the overlap of some information that falls across multiple topics, such as landings or importance of a fishery to a given sector, does the SEP suggest the continued use of a "siloed approach" where the decision tree questions remain organized by subject (Social, Economic, Landings, and Stock Status) or should a more mixed approach be used where appropriate crossing multiple topics in one branch of the decision tree? For example, the overarching topic of Landings could be addressed using biologic, social, and economic questions.

The SEP preferred a 'siloed approach'. While the data used and topics overlap, they are used differently for each decision tree and evaluate different criteria.

b. Does the SEP feel that the use of a decision tree method as outlined would be useful for the Council to systematically and objectively examine allocations?

   The decision tree process outlined would be useful for the Council to systematically and objectively examine allocations. The decision trees created are not overly prescriptive and will provide the Council with basic inputs for making allocation decisions with the ability to gather and consider any additional decision specific information not included in the trees. That said, the process and trees should be routinely (every few years) assessed to determine if each tree is still relevant, if the data collected is the best available, and if new data analysis techniques might be better suited to the task.

c. It is likely that the outcomes of working through the decision tree will vary by topic.
   i. To provide the Council more conclusive guidance, should some topics be weighted more heavily than others? If so, which ones should be prioritized?
   ii. Would it be better to not provide a weighting to the topics and rely on a "majority rules" approach where each topic has equal ranking and the Council should consider allocation decisions based on net outcome of the topics. For example, if three of the five topics point towards additional allocation to the sector, the Council would be encouraged to prioritize additional ACL to that sector.

   The question of weighting is hard to answer in a general sense and is likely to change with each decision based on the particulars of the fishery being analyzed and the data available. If, for example, social decision tree data is not available for an allocation decision providing a pre-determined weight would cause issues in the decision process. Based on the decision specific nature of the data, the Council should determine weights on a case-by-case basis.

Appendix 2. Summary report of SSC recommendations

The Scientific and Statistical Committee (SSC) met on April 27-29, 2021 and May 3, 2021 via webinar. Among the agenda topics was a review of the Allocation Decision Tree Blueprint. The SSC discussed the decision tree, focusing particularly on the landings, discards, and stock status components, and provided the following comments and guidance:

- The SSC made the following recommendations:
    o Consider adding releases, as appropriate, for some species.
    o Consider the potential social and biological net gain of reallocation among sectors for two different species or geographic locations (see SEP report for details).
    o Consider tournaments and festivals in development of the tree because they represent potentially significant socioeconomic and cultural dimensions not otherwise captured.
    o Change the name to a "decision matrix" (as opposed to decision tree) given the decision-making process is not linear and there are multiple parallel aspects to consider.
    o Consider a traffic light approach similar to that used for Spot and Atlantic Croaker by the ASMFC.
    o Consider consulting the SSC if the use of indices is needed. Many of these data sources are informative, but should be interpreted with appropriate ancillary information and caveats.
    o Keep in mind that the magnitude of landings can be impacted by factors other than management decisions.
    o Order of questions does not matter.
    o Weighting tree components is unnecessary.
    o Additional analyses will need to be conducted during development of an amendment, but this tree is designed to see if allocation is needed.
    o In general, please keep in mind that changes in the management regime, sector allocations in particular, will change fishing mortality and selectivity for each sector, potentially changing projections used to set fishing level recommendations significantly.

Appendix 3. Summary report of AP recommendations

Chairs, Vice Chairs, and other members of the Snapper Grouper, Mackerel Cobia, and Dolphin Wahoo Advisory Panels (APs) met on August 17, 2021 via webinar to review the Allocation Decision Tree Blueprint. The AP members discussed the draft decision tree in its entirety and provided the following comments and guidance:

Landings, Discards, and Stock Status Questions

- It is possible to go back in time and see the effects of decreased access on commercial landings. Management measures have significantly affected the commercial sector's ability to land fish while the recreational sector has been essentially open access over the same time period.
  - Historically, there have been a lot of management measures aimed at ending overcapitalization of the commercial industry.
  - In addition to limited access permits, the commercial sector has been negatively affected by low catch limits, low market prices and in-season closures.

- In commercial fisheries that are limited access you have a known commodity of fishermen which allows you to allocate based on socioeconomic concerns. However, open access fisheries like Spanish mackerel are expanding up and down the coast due to climate change. It will be important to consider how each fishery and sector is set up.

- The switch to MRIP-FES shows that the recreational industry has played an important role in harvest of south Atlantic species and there needs to be more of an effort to limit recreational harvest in a similar manner to how commercial harvest has been limited historically.

- There needs to be a better understanding of the size of the recreational sector. There is reliable information on the for-hire sector, but there is no information on the number of private recreational fishermen participating in federal fisheries.
  - The number of private recreational fishermen fishing offshore (in federal waters) is likely to vary significantly between states.
  - There have been substantial changes in recreational fishing effort in the last few years. Demand is increasing and everyone deserves the opportunity to fish for a given species.
  - Recreational catch has not been well monitored historically, and now MRIP-FES has affected past estimates. It may not be ideal to base allocations off of controversial data streams.

- The discard mortality threshold used in the decision tree should vary based on the species being considered. While a 50% dead discard rate may be appropriate for red snapper, it is too high of a threshold for the majority of managed species.
  - It can be challenging to get an understanding of recreational discards because of frequent management changes (for example, size limits).
  - It will be important to consider the type of gear being used when discussing discard mortality and allocations. Efficient methods of fishing result in little to no bycatch.

- Fisheries should be managed to MSY not to a certain discard level otherwise they may become just discard fisheries.

- When discussing allocations, it will be important to focus on the percentage allocation as opposed to the poundage a given sector is allocated. The percentage is what ultimately matters as new assessments are conducted and stock status changes into the future.
    - Stock status changes will necessitate reconsideration of allocations, which means that the Council is going to be considering allocations often.

- Commercial fishermen need a baseline amount of quota to keep the fishery profitable, especially as the recreational industry continues to grow. It would not be so hard to lose percentage allocation if a minimum poundage was guaranteed.
    - Additionally, any allocation needs to ensure there is enough quota to supply the non-boating consumers.

- Recreational fishermen need a certain number of fish to make it worth going out on a trip. A small percentage allocation may result in a low poundage which would have other ramifications for the sector (more restrictive seasons and bag limits, for example).

Economic Questions

- MRIP does not accurately reflect demand, especially for low encounter species. It will be challenging to know if there is a shift in to or from a species if demand is not accurately tracked.
    - Just because there is high demand does not mean fishermen need to be increasing their effort. This is especially true for stocks that cannot handle increased effort from either sector.
    - The trend for both sectors is increasing demand (from consumers, private recreational anglers, and charter boat industry).

- Accountability is important – if the recreational sector had limits on participation like the commercial sector, management measures would not need to be so strict.

- We will have more information coming from the for-hire sector with mandatory reporting in place.
    - Having better data doesn't always give a solution to the problem.

- Reallocating unused quota from one sector to another is a no-brainer, but it may be hard to say one sector needs the resource more than the other because everyone needs access to the fishery.
    - Currently both sectors often have access to very little quota. The commercial sector can't grow, and it is continually being reduced by regulations. It is also possible that the private recreational sector is overcapitalized.

- There needs to be an understanding of what it means to be a private recreational angler. There may be no economic impact on a private angler aside from monetary savings from not

purchasing for a fish market, but there are other things important to private recreational anglers.

  o It will be important to consider the economic effects of retailers, hotels, boat builders, etc. However, it can be hard to determine if the economic effects from fishing are actually be felt by the local community or by larger corporations.

  o There needs to be a discussion regarding the universe of stakeholders that matter for allocations (just anglers? associated businesses? consumers?).

Social Questions

- Using the fishery performance reports (FPRs) prepared by advisory panels in the decision trees is a good use of the information.

  o Information from fishermen that have knowledge of historical fisheries may also be helpful. For example, the citizen science project FISHstory is a great source of past information on the charter industry.

- Waterfront gentrification in south Atlantic coastal communities is a big challenge for commercial fishing businesses. Fishermen are being kicked out of historic fishing communities because they can't afford to continue living in coastal areas.

  o This is having an effect on future participation in the industry. Young kids no longer start out working on deck and work their way up to owning their own boat.

  o Gentrification is also having an impact on the charter industry. It is becoming more expensive to get into the industry.

  o There is no dockage available for commercial fishermen and dockage that is available for for-hire boats has become expensive.

    ▪ The commercial fleet has become more mobile as a result of gentrification.

  o Recreational fishing is becoming increasingly important in coastal areas due to gentrification; however commercial fishing was historically important.

- The influx of the people moving to the coastal southeast region is driving changes in the fishery just as much as changes to individual species regulations.

- There needs to be an effort made to help fishermen make a living in any possible way so that both the commercial and recreational sectors can exist.

- It will be important to consider how the allocation decision tool could be used to address new and emerging fisheries or gear types (for example, increasing effort the commercial and recreational dive component of the snapper grouper fishery) given the limited data that would be available.

Comments on the Overall Approach

- In general, the decision trees are going to be beneficial as a way to bring together all the information that should be considered when discussing allocations.

  o Allocations are going to be controversial no matter what approach is utilized.

- There is concern that this approach is moving too quickly, without the Council having a good idea of actual catch levels.
  - Recent stock assessment don't always accurately account for variables such as climate change and increasing or decreasing access to a fishery.

- Ultimately, the devil is in the details and success of the decision tree tool will depend on exactly how this tool is utilized.

Climate Change

- Climate change is an important factor that is not included in any of the decision trees.
  - Species are expanding and/or migrating northward and there is little information on who is fishing and how fishermen are jumping into different fisheries.
  - There is limited information on climate change, which may make it challenging to incorporate into allocation decisions.
  - It can be challenging to tease out whether or not increased landings are the result of the species being more available due to climate change or rather a result of increasing effort.

- Consider including a climate change decision tree for species where the Council has management jurisdiction over the affected range (dolphin wahoo and coastal migratory pelagics). Also consider including those snapper grouper species that are beginning to be caught father north.

Other Factors to Consider

- The impact of increasing prices on consumer and restaurant access. While fishermen like high prices, there is a breaking point. When the price of local seafood gets too high, consumers will turn to imported seafood from fisheries that are not well managed.

- There should be a decision tree result that recommends a common pool of quota which both sectors could draw from as needed.

- It is important to ensure enough fish are left in the water to support typical predator/prey interaction.

- Reallocation of one species will likely result in additional indirect effects on cooccurring species.

- It will be important to understand the history of management and how certain regulations have affected a given sector's ability capacity to catch fish. Consider providing a history of management at the beginning of the allocation review.