



Mid-Atlantic Fishery Management Council

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MEMORANDUM

Date: March 25, 2024
To: SSC Sub-Group for review of the Recreational Measures Setting Process Framework/Addenda
From: Julia Beaty, staff
Subject: Background on the Recreational Measures Setting Process Framework/Addenda

Summary

The Scientific and Statistical Committee (SSC) is tasked with reviewing several aspects of the [Recreational Measures Setting Process Framework/Addenda](#). The SSC will complete this review during their July 23-25, 2024 meeting. This document summarizes background information, Terms of Reference (TORs) for the review, management alternatives and other topics currently under consideration, planned and ongoing analyses, and the anticipated timeline for completion of the Framework/Addenda.

Background

Summer flounder, scup, black sea bass, and bluefish are jointly managed by the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission). The Council and Commission have faced several challenges when setting recreational bag, size, and season limits (also referred to as recreational measures) for these species. Key challenges have included uncertainty and variability in the recreational fishery data provided by the Marine Recreational Information Program (MRIP), the need to frequently change measures based on MRIP data, and the perception that measures are not reflective of stock status. In addition, management measures have not always had their intended effect on overall harvest.

During 2020 - 2022, the Council and Commission developed the [Harvest Control Rule Framework/Addenda](#) to consider modifications to the process for setting recreational measures for all four species. The goal of this action was to ensure that recreational measures aim to prevent overfishing, are reflective of stock status, appropriately account for uncertainty in the recreational data, take into consideration angler preferences, and provide an appropriate level of stability and predictability in changes from year to year. Through this action, the Council and Commission adopted a new process for setting recreational measures referred to as the Percent Change Approach (described in more detail starting on page 5). The Percent Change Approach was first used to set the 2023 recreational measures for scup and black sea bass. It was first used

for summer flounder when setting the 2024 recreational measures.¹ It will not be used for bluefish while that stock is in a rebuilding plan.

The Council and the Commission's Policy Board agreed that the Percent Change Approach should sunset by the end of 2025 with the goal of implementing an improved long-term process for setting measures, starting with the 2026 measures. The Council and the Policy Board agreed that in addition to the Percent Change Approach, two other alternatives considered through the previous framework/addenda should be further developed to determine if they should be used as the longer-term management approach. A new management action referred to as the [Recreational Measures Setting Process Framework/Addenda](#) is being developed to consider the process for setting recreational measures for 2026 and beyond. The alternatives and other topics currently under consideration are described in more detail starting on page 4.

Role of the SSC

The SSC will work with the Fishery Management Action Team/Plan Development Team (FMAT/PDT)² to review several aspects of the Recreational Measures Setting Process Framework/Addenda. TORs for the SSC's review are listed below.

The SSC provided input on the Harvest Control Rule Framework/Addenda in 2022.³ Some TORs for this new review address similar topics as those discussed by the SSC in 2022. The SSC has been asked to revisit these topics and address additional questions as the Recreational Measures Setting Process Framework/Addenda is a new management action with a modified range of alternatives and additional supporting analysis.

The input of the SSC will be used in several ways. It will be used by the FMAT/PDT to refine the alternatives as appropriate. It will be made available prior to public hearings to help inform public comments. It will be considered by the FMAT/PDT and the Advisory Panel when those groups discuss recommendations to the Council and Policy Board for preferred alternatives. It will also be considered by the Council and Policy Board when they take final action and select the process for setting recreational measures in 2026 and beyond.

To ensure the subsequent deadlines for completion of the framework/addenda can be met (see page 14), the SSC must complete this review during their July 23-25, 2024 meeting. A sub-group of the SSC has been formed and will begin their review and discussions as soon as possible. To ensure timely review and opportunities to revise the analyses and alternatives, the SSC sub-group

¹ The Council and Commission intended to use the Percent Change Approach to set the 2023 recreational summer flounder measures. However, supporting analysis from the Recreation Demand Model (RDM) showed conflicting results (see page 12 for a description of the RDM). The Council and Board therefore agreed to leave recreational summer flounder measures unchanged in 2023. The underlying cause of the conflicting results (i.e., different years of catch per trip data) has since been addressed based on the recommendations of the Monitoring and Technical Committees. Similar issues with conflicting results are not expected in the future.

² The FMAT/PDT is a group of Council, Commission, NOAA Fisheries, and state agency staff tasked with further developing and analyzing the alternatives under consideration through the framework/addenda. FMAT/PDT members have expertise in state and federal fisheries management, stock assessments, recreational fisheries economics, legal requirements, and other technical expertise. A list of FMAT/PDT members is available at <https://www.mafmc.org/fmat>.

³ Background materials, a meeting summary, and the final SSC report from the 2022 review are available at <https://www.mafmc.org/ssc-meetings/2022/may10-11>.

may provide a preliminary response to some TORs, as appropriate, prior to a full SSC review in July 2024.

SSC Terms of Reference

- 1) Provide feedback on the potential effects the management alternatives (including the no action alternative) might have on future ABC recommendations and scientific uncertainty considerations.
 - a) Provide an evaluation of the potential biological impacts on the stocks and potential quota impacts to the commercial sector.
- 2) Compare and provide a relative ranking of all alternatives in terms of their potential to: 1) provide stability in recreational management measures, 2) appropriately respond to changes in stock status, and 3) prevent overfishing. Comment on other socioeconomic considerations (e.g., angler welfare) if possible based on available information. Describe tradeoffs in these considerations inherent in each alternative. These considerations can be ranked separately; they need not be combined into one ranking system. The SSC should not select an overall preferred alternative.
- 3) Are the fishery and stock status indicators and associated threshold values (e.g., the categories of biomass and fishing mortality) under each alternative reasonably defined for determining when a change in recreational management measures is needed?
- 4) Review the approaches for defining fishing mortality (F) targets for recreational measures and use of fishing mortality indicators for determining when measures should change.
 - a) Review and provide feedback on the analyses to support these approaches. Are the methods sound and applied appropriately for potential application in management?
 - b) Evaluate the scientific and biological appropriateness and identify any uncertainties of partitioning stock-wide F reference points and F projections into sector-specific reference points and projections for use in management.
 - c) Comment on whether the potential recreational F-based approaches could allow recreational measures to more appropriately respond to changes in stock status compared to setting measures based on a harvest target (e.g., the Recreational Harvest Limit or a harvest target set based on the current implementation of the Percent Change Approach).
- 5) Address the following for the Management Strategy Evaluation (MSE) conclusions, if applicable:
 - a) Given the limited scope of this analysis, what are the most important results, conclusions, and caveats in the MSE report for the Council and the Commission's Policy Board to consider when selecting a preferred alternative?
 - b) Given the MSE is specific to summer flounder, are there other factors and/or areas of uncertainty to consider for scup, black sea bass, and bluefish?
- 6) If appropriate, provide recommendations for additional work that could be completed by the FMAT/PDT or the MSE team prior to public hearings. Any additional analysis should help the public understand the alternatives and their impacts and should help the Council

and Policy Board select their preferred alternative(s). It must not result in the identification of new alternatives outside the range of alternatives approved for public hearings.

Alternatives Under Consideration

Four primary management alternatives are currently under consideration through the Recreational Measures Setting Process Framework/Addenda. These alternatives are described in more detail in the following sections. They are expected to be further refined and modified before a final range of alternatives is approved for public hearings. The Council and Policy Board may also consider other alternatives beyond those listed below prior to finalizing a document for public hearings. The SSC sub-group will be informed of any changes in the range of alternatives to help inform their review.

Once public hearings take place, the range of alternatives cannot be modified. However, alternatives that are within the range of previously approved alternatives may be adopted. After public hearings, consideration of new alternatives that are outside the existing range of alternatives would require an additional round of public hearings. This would pose challenges for completing the framework/addenda prior to the sunset of the Percent Change Approach at the end of 2025.

Stocks Under a Rebuilding Plan

It should be noted that none of the alternatives currently under consideration would change the requirements for stocks under a rebuilding plan. Under all alternatives, stocks under an approved rebuilding plan would be subject to the measures of that plan. None of the alternatives would replace rebuilding plan measures. The rebuilding plan may require a different process than the alternatives described below. In some instances, measures implemented through the alternatives below may be used as temporary measures until a rebuilding plan is implemented, which can take up to two years after the stock is declared overfished.

No Action Alternative

If the Council and Commission take no action through the Recreational Measures Setting Process Framework/Addenda, the Percent Change Approach will sunset at the end of 2025 and the process for setting recreational measures, starting with 2026 measures, would revert back to the requirements of the Fishery Management Plans (FMPs) prior to implementation of the Harvest Control Rule Framework/Addenda. Specifically, measures would be set with the primary goal of allowing harvest to meet but not exceed the recreational harvest limit (RHL).⁴ Specific methodologies for achieving this goal are not codified in the FMP. The Monitoring and Technical Committees can provide advice on the preferred methods for setting measures to achieve this goal for each specifications cycle. The Recreation Demand Model, described in more detail on page 12, could be used under this or any other alternative. Unlike the other alternatives under consideration, measures would be set for one year at a time under the No Action Alternative.

⁴ Additional details on how state measures would be set under the Commission process are outlined in the Addendum XXXII for summer flounder and black sea bass (available at <http://www.asmfc.org/species/summer-flounder> and <http://www.asmfc.org/species/black-sea-bass>), Addendum XI for scup (available at <http://www.asmfc.org/species/scup>), and Amendment 1 for bluefish (available at <http://www.asmfc.org/species/bluefish>).

By aiming to allow harvest to meet but not exceed the RHL, recreational measures would contribute to the goal of preventing overfishing. This is because the RHL is derived from the overfishing limit, accounting for the commercial/recreational allocations required by the FMP and expected recreational dead discards in the upcoming year(s). The RHL can also be adjusted to account for management uncertainty.

As previously stated, concerns with the previous process, including uncertainty and variability in the MRIP data, the need to frequently change measures, and the perception that measures were not reflective of stock status led to initiation of the Harvest Control Rule Framework/Addenda and the Recreational Measures Setting Process Framework/Addenda. Therefore, although the No Action Alternative has a straightforward method for demonstrating that overfishing will be prevented, it may not address these challenges unless other improvements to the process can be made while staying within the previously defined confines of the FMPs.

Percent Change Approach

The Recreational Measures Setting Process Framework/Addenda will consider if the Percent Change Approach should be maintained beyond the December 31, 2025 sunset date. The Percent Change Approach will not automatically rollover. Management action would be required to either extend the sunset period or establish this as a long-term approach without a sunset.

Under the Percent Change Approach as currently implemented, measures must aim to achieve a specified percent change in harvest compared to the expectation of harvest in the upcoming two years under current measures. The target level of harvest that measures must aim to achieve can differ from the RHL and is defined based on the following two factors:

- 1) A confidence interval (CI) around an estimate of expected harvest in the upcoming two years under current measures compared to the average RHL for the upcoming two years and
- 2) Spawning stock biomass compared to the target level, as defined by the most recent stock assessment.

The resulting percent change in harvest that measures should aim to achieve is summarized in Table 1.

The Percent Change Approach is intended to allow recreational measures to remain unchanged across two years, aligned with the timing of updated management track stock assessments, which are expected to be available every other year for all four species.

Table 1: Process for determining appropriate percent change in expected harvest when developing measures under the Percent Change Approach as currently implemented.

<i>Column 1</i> Future RHL vs Estimated Harvest	<i>Column 2</i> Biomass compared to target level (SSB/SSB _{MSY})	<i>Column 3</i> Change in Harvest
Future 2-year average RHL is greater than the upper bound of the harvest estimate CI (harvest expected to be lower than the RHL)	Very high (greater than 150% of target)	Liberalization percent equal to difference between harvest estimate and 2-year avg. RHL, not to exceed 40%
	High (at least the target, but no higher than 150% of target)	Liberalization percent equal to difference between harvest estimate and 2-year avg. RHL, not to exceed 20%
	Low (below target stock size)	Liberalization: 10%
Future 2-year average RHL is within harvest estimate CI (harvest expected to be close to the RHL)	Very high (greater than 150% of target)	Liberalization: 10%
	High (at least the target, but no higher than 150% of target)	No liberalization or reduction: 0%
	Low (below target stock size)	Reduction: 10%
Future 2-year average RHL is less than the lower bound of the harvest estimate CI (harvest is expected to exceed the RHL)	Very high (greater than 150% of target)	Reduction: 10%
	High (at least the target, but no higher than 150% of target)	Reduction percent equal to difference between harvest estimate and 2-year avg. RHL, not to exceed 20%
	Low (below target stock size)	Reduction percent equal to difference between harvest estimate and 2-year avg. RHL, not to exceed 40%

In adopting the Percent Change Approach for use in setting measures for 2023-2025, the Council and the Policy Board agreed it was an improvement over the previous process because measures are set for two years at a time, additional consideration is given to biomass level, and the uncertainty in harvest estimates is considered. However, some Council and Policy Board members expressed concerns that the Percent Change Approach would not always proactively prevent overfishing. In addition, the SSC expressed concern that the information used to define the three biomass categories is already incorporated into the RHL, resulting in double counting of this information, which could result in measures that are too liberal or too restrictive. Other Council and Policy Board members expressed concerns that the Percent Change Approach is too similar to the previous requirement to allow harvest to meet but not exceed the RHL; therefore, many of the same challenges would remain.

For all these reasons, the Council and Policy Board agreed that the Percent Change Approach should be used starting with the 2023 fishing year but should sunset no later than the end of 2025. Through this new management action, the Council and Policy Board will consider if it is appropriate to continue using the Percent Change Approach beyond 2025 either as currently implemented or modified.

The FMAT/PDT is considering potential modifications to the Percent Change Approach, including re-evaluation of the 10%, 20%, and 40% thresholds, re-evaluation of the three biomass categories, and consideration of recent recreational fishing mortality rates in place of recreational harvest. These potential modifications will be discussed in more detail with the SSC sub-group.

Biological Reference Point Approach

An alternative referred to as the Biological Reference Point Approach was developed through the Harvest Control Rule Framework/Addenda and will be further developed through the Recreational Measures Setting Process Framework/Addenda. This alternative has been modified by the Council and Policy Board based on the FMAT/PDT's recommendations and is expected to be further modified prior to finalization of a range of alternatives for public hearings. The current configuration of this alternative is described below.

Under this alternative, the most recent levels of biomass and fishing mortality would define seven management measure bins, as illustrated in Table 2. Movement from one bin to another would require a change in management measures. If a stock remains in the same bin for two specifications cycles based on updated biomass and fishing mortality information, then the measures may remain unchanged, or slightly more liberal or slightly more restrictive measures may be implemented based on consideration of biomass trend, recent recruitment, and whether or not recent RHLs have been exceeded. The original intent was that Bin 1 would have the most liberal set of measures and Bin 7 would have the most restrictive set of measures; however, further consideration is needed to define how measures would be set. The FMAT/PDT will discuss this in the coming months and the SSC sub-group will be informed of their progress.

To define the bins shown in Table 2, fishing mortality would be defined as either overfishing (F greater than F_{MSY}) or not overfishing (F equal to or below F_{MSY}). Biomass would be divided into four categories: very high (at least 150% of the target level), high (at least the target level, but below 150% of the target level), low (below the target level, but at least 50% of the target level), and overfished (below 50% of the target level). Biomass trend would be grouped into two categories: 1) stable or increasing (where stable refers to an average change of $\pm 4\%$ over the most recent three years of available data and increasing refers to an increase of at least 4% over the most recent three years), or 2) decreasing (a decrease of at least 4% on average in the most recent three years of available data). Recruitment would be defined as either high (i.e., the most recent three-year average is equal to or greater than the median value from the time series used to inform ABC projections) or low (i.e., the most recent three-year average is below the median value from the time series used to inform ABC projections). Recent harvest would be defined as either exceeding or not exceeding the RHL based on the most recent two-year average.

When biomass is less than 50% of the target level, the stock is overfished and a rebuilding plan must be implemented. Bin 7 would include restrictive measures which may be used until a rebuilding plan is implemented, which can take up to two years after the stock is declared overfished. Once the rebuilding plan is implemented, measures would be developed in accordance with the rebuilding plan and this alternative would not be used to set measures until the stock is no longer in a rebuilding plan.

As previously considered through the Harvest Control Rule Framework/Addenda, measures for Bins 1-7 would aim to achieve a target level of harvest, catch, or fishing mortality, as specified by the Council and Policy Board. Although placement in Bins 1-7 would be based on a combination of biomass and fishing mortality, the measures associated with each bin could be defined based on six categories of biomass and the target level of harvest, catch, or fishing

mortality deemed appropriate for that biomass level. Table 3 lists example biomass categories considered during development of the previous action. This will be further discussed by the FMAT/PDT and may be modified.

Under this alternative, measures would be adjusted in sync with the setting of catch and landings limits in response to updated assessment information. It is anticipated that updated stock assessments will be available for all four species every other year. Measures may be modified in interim years if new data suggest a major change in the expected impacts of those measures on the stock or the fishery.

This was not selected as a preferred alternative through the previous management action due to its complexity. In addition, some Council and Policy Board members, as well as some Advisory Panel members, and many public comments expressed concern that without additional analysis, it was challenging to predict how the resulting measures under this alternative would compare to other alternatives. Additional considerations and analysis through the new framework/addenda may help address some of these concerns.

Table 2: Summary of the Biological Reference Point Approach illustrating bins of measures associated with different combinations of stock conditions. B↑ indicates stable or increasing biomass, B↓ indicates decreasing biomass, R↑ indicates high recruitment, and R↓ indicates low recruitment. Initial, liberal, and restrictive refers to the measures that would be used for each bin. Further discussion is needed by the FMAT/PDT to define how measures would be set.

Biomass Compared to Target Level	Overfishing is Not Occurring	Overfishing is Occurring
Very High At least 150% of the target level	R↑ R↓ B↑ liberal B↓ initial	R↑ R↓ Recent harvest limits not exceeded B↑ initial B↓ restrictive
		Recent harvest limits exceeded B↑ restrictive B↓ restrictive
High At least the target, but below 150% of the target level	R↑ R↓ B↑ liberal B↓ initial	R↑ R↓ Recent harvest limits not exceeded B↑ initial B↓ restrictive
		Recent harvest limits exceeded B↑ restrictive B↓ restrictive
Low Below the target level, but at least 50% of the target level	R↑ R↓ B↑ initial B↓ restrictive	R↑ R↓ Recent harvest limits not exceeded B↑ initial B↓ restrictive
		Recent harvest limits exceeded B↑ restrictive B↓ restrictive
Overfished Less than 50% of the target level	Most restrictive/rebuilding plan	

Table 3: Example biomass levels for defining the default measures under each bin for the Biological Reference Point Approach.

Bin	SSB/SSB_{MSY}
1	200%
2	140%
3	75%
4	100%
5	75%
6	60%
7	25%

Biomass Based Matrix

An alternative referred to as the Biomass Based Matrix Approach was developed through the previous action and will be further considered through the Recreational Measures Setting Process Framework/Addenda. This alternative has been modified by the Council and Policy Board based on the FMAT/PDT's recommendations and may be further refined in the future. The current configuration of this alternative is described below.

This alternative would define six management measure bins based on biomass compared to the target level and recent trends in biomass. Both biomass compared to the target level and biomass trend would be defined the same way as described in the previous section for the Biological Reference Point Approach.

As previously considered through the Harvest Control Rule Framework/Addenda, measures for Bins 1-6 would aim to achieve a target level of harvest, catch, or fishing mortality, as specified by the Council and Policy Board. The measures associated with each bin could be defined based on six categories of biomass and the target level of harvest, catch, or fishing mortality deemed appropriate for that biomass level. Table 5 lists example biomass categories considered during development of the Harvest Control Rule Framework/Addenda. This will be further discussed by the FMAT/PDT and may be modified.

Under this alternative, measures would be adjusted in sync with the setting of catch and landings limits in response to updated assessment information. It is anticipated that updated stock assessments will be available for all four species every other year. Measures may be modified in interim years if new data suggest a major change in the expected impacts of those measures on the stock or the fishery.

This was not selected as a preferred alternative through the previous action. Some Council and Policy Board members, as well as some Advisory Panel members, and many public comments expressed concern that without additional analysis, it was challenging to predict how the resulting measures under this alternative would compare to other alternatives. Additional considerations and analysis through the new framework/addenda may help address some of these concerns.

Table 4: Summary of Biomass Based Matrix Approach.

Biomass Level	Biomass Trend		
	Increasing	Stable	Decreasing
Very High At least 150% of the target level	Bin 1 (most liberal measures)		
High At least the target, but below 150% of the target level	Bin 1	Bin 2	
Low Below the target, but at least 50% of the target level	Bin 3	Bin 4	
Overfished Less than 50% of the target level	Bin 5	Bin 6 (most restrictive measures)	

Table 5: Example biomass levels for defining the measures under each bin for the Biomass Based Matrix Approach.

Bin	SSB/SSB _{MSY}
1	150%
2	100%
3	75%
4	60%
5	40%
6	20%

Other Topics to be Considered Through the Framework/Addenda

At the direction of the Council and Policy Board, the following additional topics will also be considered through this management action. These are not management alternatives; rather, they are topics that will be considered in the context of the management alternatives listed in the previous section.

- **Target metric for setting measures** – The previous framework/addenda considered if recreational measures in state and federal waters should collectively aim to achieve a target level of harvest (e.g., based on the RHL), recreational dead catch (e.g., based on the recreational annual catch limit), or fishing mortality. This will be further considered through the Recreational Measures Setting Process Framework/Addenda.
- **Starting point for measures** – Many recreational stakeholders have expressed frustration that the current measures do not appear to be aligned with stock status. The Council and Policy Board agreed that further consideration should be given to the starting point for measures under all alternatives.
- **Management uncertainty** – The Council and Policy Board agreed that further consideration should be given to the implications of the alternatives for management uncertainty buffers as currently defined in the Fishery Management Plan.
- **Use of the Summer Flounder Management Strategy Evaluation (MSE) model** – The previously developed [Summer Flounder MSE model](#) will be used to analyze several aspects of this management action, as time allows. For example, it may be used to evaluate the performance of potential indicator thresholds which define the boundaries between management measure bins, the management response to crossing those

thresholds, and measures assigned to each management response. Given time constraints, simplifying assumptions will need to be made and realistic example measures are not expected to be generated. Additional information will be provided by the MSE modelers during upcoming SSC sub-group and full SSC meetings.

- **Impacts on the commercial sector** – Although this action will only consider the process for setting recreational measures, the Council and Policy Board agreed to further evaluate potential indirect impacts to the commercial sector. This action will not consider any changes to commercial management and it will not consider transferring quota between the commercial and recreational sectors.
- **Other topics** – This action may consider other topics, as appropriate. For example, this could include potential revisions to the accountability measures and considerations related to conservation equivalency.

Recreational Accountability Measures

The Magnuson-Stevens Fishery Conservation and Management Act requires Council FMPs to contain ACLs and “measures to ensure accountability.” The National Standards Guidelines state that AMs “are management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur. AMs should address and minimize both the frequency and magnitude of overages and correct the problems that caused the overage in as short a time as possible.” (50 CFR 600.310 (g)).

Proactive AMs include adjustments to the management measures for the upcoming fishing year, if necessary, to prevent the relevant target from being exceeded. The FMPs also currently include reactive AMs, including paybacks of ACL overages or adjustments to measures depending on stock status and the magnitude of the overage, as described below.

For determining if a reactive AM has been triggered, ACL overages for the recreational summer flounder, scup, and black sea bass fisheries are evaluated by comparing the most recent 3-year average recreational ACL against the most recent 3-year average of recreational dead catch (i.e., landings and dead discards). The Bluefish FMP requires a comparison of recreational dead catch to the ACL for the single most recent year. If the relevant comparison shows that dead catch exceeded the ACL, then the appropriate AM varies based on stock status. The text below describes the reactive AMs for summer flounder, scup, and black sea bass. The bluefish AMs differ slightly due to the use of a single-year comparison and the potential for transfers between the recreational and commercial fisheries, which is not allowed under the Summer Flounder, Scup, and Black Sea Bass FMP.

1. If the stock is overfished ($B < \frac{1}{2} B_{MSY}$), under a rebuilding plan, or the stock status is unknown: The exact amount, in pounds by which the most recent 3-year average recreational ACL has been exceeded will be deducted in the following fishing year, or as soon as possible once catch data are available. This payback may be evenly spread over two years if doing so allows for use of identical recreational management measures across the upcoming two years.
2. If biomass is above the threshold, but below the target ($\frac{1}{2} B_{MSY} < B < B_{MSY}$), and the stock is not under a rebuilding plan:
 - a. If only the recreational ACL has been exceeded, then adjustments to the recreational management measures, taking into account the performance of the measures and conditions that precipitated the overage, will be made in the

following fishing year, or as soon as possible thereafter, once catch data are available, as a single-year adjustment.

- b. If the most recent estimate of total fishing mortality exceeds F_{MSY} (or the proxy), then an adjustment to the recreational ACT will be made as soon as possible as a payback that will be scaled based on stock biomass. The calculation for the payback amount in this case is: (3-year average overage amount) * $(B_{MSY}-B)^{1/2}$ B_{MSY} . This payback may be evenly spread over two years if doing so allows for use of identical recreational management measures across the upcoming two years. If an estimate of total fishing mortality is not available for the most recent complete year of catch data, then a comparison of total catch relative to the ABC will be used.
3. If biomass is above the target ($B > B_{MSY}$): Adjustments to the recreational management measures, taking into account the performance of the measures and conditions that precipitated the overage, will be made in the following fishing year, or as soon as possible thereafter, once catch data are available, as a single-year adjustment.

The FMAT/PDT will further discuss AMs under each of the management alternatives considered through the Recreational Measures Setting Process Framework/Addenda. Further discussion is needed to more fully consider what, if any, changes to the AMs may be appropriate to consider through this management action.

Given the timing of MRIP data availability, the regulations do not allow for in-season closure of the recreational fishery if harvest or catch exceeds the target value. The Recreational Measures Setting Process Framework/Addenda will not consider changes to the recreational in-season closure authority as none of the alternatives would change the timing of availability of data to inform in-season closures.

Recreation Demand Model

The Recreation Demand Model (RDM) developed by the Northeast Fisheries Science Center (NEFSC) has been used to inform the recreational measures for summer flounder, scup, and black sea bass, starting with the 2023 measures. It is anticipated that this model will continue to be used for these three species in the future. This model is not available for bluefish. The SSC is not tasked with reviewing the RDM and the RDM is not required under any of the alternatives in the Recreational Measures Setting Process Framework/Addenda. However, an understanding of the capabilities of the RDM may provide useful context for the SSC to consider when developing responses to the TORs. The RDM is also used within MSE modeling framework and supports some of the ongoing analyses to support this management action.

The RDM is used to predict the effect of proposed recreational measures on angler satisfaction, fishing effort, and recreational harvest and discards of summer flounder, scup, and black sea bass. The RDM represents a major improvement over prior methods for setting recreational measures in that it accounts for angler responses to alternative management measures (i.e., shifts in effort) and the projected length distribution of the fish stocks. These factors were not explicitly considered under the previous methods, which relied largely on MRIP data and the expert judgment of the Monitoring and Technical Committees. The RDM is based on peer-reviewed models for other species (Carr-Harris and Steinback 2020, Holzer and McConnell 2017, Lee et al. 2017) and was reviewed by the SSC in September 2021. Several improvements have been made since the SSC review. The Monitoring and Technical Committees have also discussed the

RDM multiple times over the past few years and additional improvements have been made based on their feedback.

The RDM consists of two main components: a discrete choice model of fishing decisions and a fishery simulation model. The discrete choice model is used to predict the probability that an angler would choose to take a fishing trip based on the expected catch and cost of that trip. This component of the model is based on random utility theory, in which it is assumed that a decision maker, when faced with a decision between a discrete number of alternatives, will choose the alternative that maximizes their utility. The utility provided by each alternative varies and can depend on characteristics of the alternative (e.g., trip costs, how many of each species can be kept vs. discarded), characteristics of the decision maker (e.g., age, gender, income, education, fishing avidity), and unobserved characteristics of both the alternative and the decision maker. The RDM models the relationship between the observable characteristics of the alternative/decision maker and utility. From this relationship the model can compute the probability that, given a choice between not fishing and taking a fishing trip with outcomes that are based on fishery data and proposed management measures, an angler will choose to fish. These individual decisions in aggregate constitute the total demand for recreational fishing and directly impact the estimated number of fish removed from the stock.

Data for the discrete choice model come from a 2022 mail and web-based survey of anglers from Maine through Virginia. This survey was sent to 6,000 saltwater fishing license holders. 2,317 completed surveys were returned, representing a 38.7% response rate. The survey collected demographic and fishing-related information, as well as angler choice data from a “discrete choice experiment”. A sample of this survey is available at https://www.mafmc.org/s/survey-sample_version12.pdf.

The second major component of the RDM is a fishery simulation model, which calculates changes in angler fishing effort (demand), harvest, discards, and angler welfare under alternative management measures relative to a baseline year. It uses results from the discrete choice model described above combined with recent historical and projected fishery data to predict trip-level outcomes. The model incorporates projected numbers-at-age from the stock assessments to allow projected changes in the size distribution of the stock to influence the size of fish anglers are expected to encounter in the upcoming year. The simulation is repeated 100 times to account for statistical uncertainty in the input data, including the MRIP data and the projected numbers-at-age from the assessments. Output of the simulations includes harvest and discards in numbers of fish and weight, number of expected trips, and angler welfare at the state level, as well as percent changes in harvest weight relative to a status-quo scenario where next year’s regulations are held constant at current year values. Outputs used in management to date include the median value of the distribution of model outcomes from the 100 simulations, and confidence intervals based on the percentiles of this distribution to capture uncertainty in the model input data. Results are provided at the state and fishing-mode level and can be aggregated to higher levels (e.g., state, region, or coastwide).

An important step in developing the simulation model is generating estimates of recreational catch-at-length and catch-per-trip in the upcoming year. For example, when setting 2024 measures, the most recent complete year of input data was 2022. Therefore, the data used to generate baseline estimates of 2024 catch-at-length came from 2022 MRIP and state volunteer angler survey data. These baseline estimates were subsequently adjusted to account for the projected 2024 size distribution of the stock. Based on the advice of the Monitoring and Technical Committees, 2024 catch-per-trip by state/wave/mode was computed using the most

recent two years of MRIP data (i.e., 2022 and preliminary 2023 data for waves 1-4; 2021 and 2022 for waves 5-6) with data from each year weighted equally. This method is intended to capture variation in the MRIP data across years while reflecting recent conditions and avoiding too much emphasis on years heavily impacted by COVID-19 (e.g., a three year average would have included 2020, which the Monitoring and Technical Committees did not support). The Monitoring and Technical Committees may revisit these data decisions in the future and recommend alternative approaches when setting measures for future years. Nonetheless, the data used to generate estimates of both recreational catch-at-length and catch-per-trip in 2024 represent the Monitoring and Technical Committees’ most informed beliefs about future fishing conditions.

A cloud-based decision support tool was developed by the NEFSC to allow Monitoring and Technical Committee members to run the RDM when developing proposals for state/regional measures for 2024. Given funding limitations, this tool was only made available to Monitoring and Technical Committee members for a defined period of time. It is expected to be available again in late 2024/early 2025 for discussions regarding 2025 recreational measures.

Framework/Addenda Timeline

The following table summarizes the draft timeline for development and implementation of the Recreational Measures Setting Process Framework/Addenda. Dates beyond March 2024 are subject to change.

May 2023	<ul style="list-style-type: none"> • FMAT/PDT formed.
June - July 2023	<ul style="list-style-type: none"> • FMAT/PDT meetings.
August 2023	<ul style="list-style-type: none"> • Council and Policy Board meeting to review progress and discuss next steps. • Council member/Commissioner work group formed.
September - November 2023	<ul style="list-style-type: none"> • FMAT/PDT and Council member/Commissioner work group meeting. • AP meeting to review progress and provide input. • Scientific and Statistical Committee (SSC) meeting to review progress. • MSE team begins work.
December 2023	<ul style="list-style-type: none"> • Council and Policy Board meeting to review progress and discuss next steps.
January - July 2024	<ul style="list-style-type: none"> • FMAT/PDT and Council/Commissioner work group meetings to continue development and analysis of alternatives and develop draft document for public hearings. • Continued MSE work. • Formation and meetings of SSC sub-group to review several aspects of the framework/addenda.
July 2024	<ul style="list-style-type: none"> • Final report on MSE work provided to FMAT/PDT and SSC. • SSC meeting to review draft sub-group report and finalize report from full SSC.
August 2024	<ul style="list-style-type: none"> • Council and Policy Board meeting to review progress and discuss next steps.
August-September 2024	<ul style="list-style-type: none"> • FMAT/PDT meeting(s) to develop recommendations for the final range of alternatives.

	<ul style="list-style-type: none"> • AP meeting to review draft range of alternatives and provide input to Council and Policy Board.
October 2024	<ul style="list-style-type: none"> • Council and Policy Board meeting to approve final range of alternatives and approve draft document for public hearings through Commission process.
December 2024 – February 2025	<ul style="list-style-type: none"> • Public hearings through Commission process.
March 2025	<ul style="list-style-type: none"> • FMAT/PDT and AP meetings to review public comments and provide input to Council and Policy Board prior to final action.
April 2025	<ul style="list-style-type: none"> • Council and Policy Board meeting for final action.
April-December 2025	<ul style="list-style-type: none"> • Development, review, and revisions of framework/addenda documents. • Federal rulemaking. • Monitoring and Technical Committees use new process to set 2026 recreational measures.
Late 2025 or early 2026	<ul style="list-style-type: none"> • Effective date of implemented changes.

References

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