



Mid-Atlantic Fishery Management Council
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Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: December 1, 2022
To: Chris Moore, Executive Director
From: Kiley Dancy, Julia Beaty, and Hannah Hart, Staff
Subject: Overview of Percent Change Approach and Recreational Harvest Estimation Models for Development of 2023 Recreational Summer Flounder, Scup, and Black Sea Bass Measures

On Tuesday, December 13, the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission's (Commission) Summer Flounder, Scup, and Black Sea Bass Board (Board) will recommend 2023 recreational management measures for all three species. Prior to the agenda items addressing 2023 recreational measures for each species, staff will provide an overview of the Percent Change Approach adopted under the Recreational Harvest Control Rule Framework/Addenda. This process must be followed for setting 2023 recreational measures for these three species. In addition, staff will summarize two newly available recreational harvest estimation models which can inform the measures setting process. These topics are summarized below.

Percent Change Approach

In June 2022, the Council and the Commission's Interstate Fishery Management Program Policy Board (Policy Board) approved a new process for setting recreational bag, size, and season limits (i.e., recreational measures) called the Percent Change Approach. They agreed to use this approach for summer flounder, scup, and black sea bass starting with 2023 measures.¹ Under this approach, measures in the upcoming year(s) will aim to achieve a specified percent change in harvest compared to expected harvest under the current measures. Unlike the previous process, the appropriate percent change in harvest will no longer be primarily based on a comparison of expected harvest under status quo measures to the recreational harvest limit (RHL). Instead, the appropriate percent change will be defined by the following two factors:

- 1) Comparison of a confidence interval (CI) around an estimate of expected harvest in the upcoming year(s) under status quo measures to the average RHL for the upcoming two years and
- 2) Biomass compared to the target level, as defined by the most recent stock assessment.

¹ The Council and Policy Board intend for the Percent Change Approach to also apply to bluefish once that stock is no longer under a rebuilding plan. They also agreed, for all stocks, that this approach should be used through 2025 with the goal implementing a new process for setting recreational measures for 2026 and beyond.

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

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

<i>Column 1</i> Future RHL vs Harvest Estimate	<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 level, 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 the 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 level, but no higher than 150% of target)	No liberalization or reduction: 0%
	Low (below the 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 level, 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 the target stock size)	Reduction percent equal to difference between harvest estimate and 2-year avg. RHL, not to exceed 40%

This process 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. However, **measures will be set on a one-year cycle for 2023 given that 2023 is an interim year for the management track assessments.** It is anticipated that this process will be used for a two-year cycle starting with 2024-2025.

For 2023, the Monitoring Committee (MC) has followed the steps below in determining their recommendations for the appropriate percent change in harvest and the associated measures. Details can be found in the briefing tabs for each species and in the MC meeting summary from November 15, 2022.

1. **For each species, what is expected 2023 harvest under 2022 measures, including a confidence interval around that estimate?** To generate these estimates, the MC considered results from the newly available fishery models (see section below), including a median estimate of harvest and confidence intervals around this estimate. For each species, the MC identified which of the two models they felt was most appropriate for each species for 2023 and applied an 80% confidence interval.
2. **How do the harvest estimate CIs generated through step 1 compare to the 2023 RHL for each species?**² This defines the appropriate cell in Table 1, Column 1.
3. Based on the step above and the appropriate biomass category in Table 1, Column 2 for each species (based on 2021 management track assessment results), the MC **determined the necessary percent change in harvest that 2023 measures should aim to achieve.** This is defined by the relevant cell in Table 1, Column 3. As described in the summary of the November 15, 2022 MC meeting,³ the MC recommended a modification for scup due to the triggering of an accountability measures.
4. Considering the outcome of step #3, the **MC recommended specific recreational measures** for each species.

State waters measures will be developed in early 2023 by states working with the Technical Committee, considering feedback received at state-hosted public hearings, with review and consideration for approval by the Board.

Accountability Measures under the Percent Change Approach

The Recreational Harvest Control Rule Framework/Addenda made minor changes to the recreational accountability measures (AMs). The revised AMs are described below.

Recreational AMs are triggered for these three species when the most recent 3-year average of recreational dead catch (i.e., landings and dead discards) exceeds the most recent 3-year average recreational annual catch limit (ACL). The appropriate response varies based on the criteria listed below.

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 year's 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:

² The 2024 RHL will not be determined until 2023 after the results of the 2023 management track assessments are available for all three species. Therefore, although the Percent Change Approach indicates that the upcoming two-year average RHL will be used, only the 2023 RHL will be used in this first year of implementation.

³ To be posted to <https://www.mafmc.org/briefing/december-2022> once it is available.

- If only the recreational ACL has been exceeded, then adjustments to the recreational management measures (bag, size, and seasonal limits) would be made in the following year, or as soon as possible once catch data are available. These adjustments would take into account the performance of the measures and the conditions that precipitated the overage.
 - 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: (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 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 (bag, size, and seasonal limits) will be made for the following year, or as soon as possible once catch data are available. These adjustments would take into account the performance of the measures and the conditions that precipitated the overage.

As described in more detail in the species-specific briefing materials for the December 2022 Council/Board meeting,⁴ AMs have been triggered for scup and black sea bass, but not for summer flounder. As described below, given that scup and black sea bass are currently above their target biomass levels, the AMs require adjustments to the recreational management measures, but they do not specify how those adjustments should be made.

On October 20, 2022, the NMFS Greater Atlantic Regional Fisheries Office Regional Administrator sent a letter to the Council (see attachment) stating that given actions taken by the Council and Commission over the past year, including revisions to the commercial/recreational allocation, restrictions to the recreational scup and black sea bass measures in 2022, and final action on the Recreational Harvest Control Rule Framework/Addenda, no additional action, beyond changes which may be required through the Percent Change Approach, is needed to address the triggering of an AM for scup or black sea bass.

Overview of New Recreational Fishery Models

The Council and Commission have supported development of two statistical models to predict the impacts of recreational bag, size, and season limits on recreational harvest and discards of summer flounder, scup, and black sea bass.

The Recreational Demand Model (**RDM**) accounts for the impacts of regulations, year class strength, population size, and angler preferences on harvest and discards. Year class strength and population size are based on stock assessment projections. Angler preferences are based on a survey of anglers from Maine through Virginia. This model also accounts for the interaction of summer flounder, scup, and black sea bass fishing regulations on angler behavior. Additional information about this model can be found in this overview document: <https://www.mafmc.org/s/fluke-RDM-overview-final-report.pdf>. Since the October 2022 MC meeting, this model was updated to account for inflation in trip costs and to incorporate more recent length-weight data for black sea bass.

⁴ Available at <https://www.mafmc.org/briefing/december-2022>

The Recreational Fleet Dynamics Model (**RFDM**) uses a shape constrained additive model to predict harvest and discards based on management measures. Covariates in the models to predict harvest include year, state, minimum size, open season, bag limit, a lagged recruitment variable (for summer flounder and black sea bass), spawning stock biomass (for scup), and the RHL (for summer flounder and black sea bass). Mode (i.e., for-hire vs. private/rental and shore modes) is also included as a variable for scup only. Inclusion of some covariates varied across species based on best model fit and the best judgement of the modelers. An R Shiny App⁵ is being developed for this model to allow the MC to modify management measures and view the resulting predicted harvest and discards. Additional information about this model can found in this overview document:

https://www.mafmc.org/s/RFDM_CompleteModel_WriteUps_Oct2022_FinalDraftclean.pdf.

Since the October 2022 MC meeting, this model was updated to add 2021 data. The average weight per harvested fish was also updated based on 2021 average weights.

Both models allow for consideration of varying management measures at the state and wave level. Both models were reviewed by the Council's Scientific and Statistical Committee in September 2021⁶ and have been improved since that time based on their recommendations. Neither model is required under the Percent Change Approach; however, both models are an improvement over past methods of predicting future harvest. The MC reviewed both models and provided recommendations for which model to use for each species for setting 2023 management measures, as described in the summary of the November 15, 2022 MC meeting.⁷

⁵ An R Shiny app is an interactive web-based app that can be easily accessed and used by others, in this case to explore sets of measures on a state or coastwide scale and display outputs of each scenario.

⁶ The final report from the SSC review is available at https://www.mafmc.org/s/05_Rec-Model-Peer-Review-Reports.pdf.

⁷ To be posted to <https://www.mafmc.org/briefing/december-2022> once it is available.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL MARINE FISHERIES SERVICE
 GREATER ATLANTIC REGIONAL FISHERIES OFFICE
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October 20, 2022

Dr. Christopher Moore
 Executive Director
 Mid-Atlantic Fishery Management Council
 800 North State Street, Suite 201
 Dover, DE 1990

Dear Chris:

We recently completed the 2020 and 2021 summer flounder, scup, and black sea bass year-end catch accounting, and the final report is attached to this letter. Summary tables are provided below (Tables 1 and 2).

In 2020, there were no overages of the acceptable biological catches (ABC) or overfishing limits (OFL) for summer flounder and scup. Black sea bass catch exceeded the ABC, but not the OFL. There were no overages of the commercial annual catch limits (ACL) or quotas in 2020. The performance of the recreational fisheries was variable and is discussed further below.

Table 1: Fishing year 2020 summer flounder, scup, and black sea bass catch, OFLs and ABCs (amounts presented in metric tons (mt)).

Stock	Total Catch	OFL	Difference	ABC	Difference
Summer Flounder	11,234	14,034	-22%	11,354	-1%
Scup	14,735	18,674	-24%	16,227	-10%
Black Sea Bass	8,112	8,795	-8%	6,835	17%

In 2021, there were no overages of the ABCs or OFLs for summer flounder and scup. Black sea bass catch exceeded the ABC and the OFL. There were no overages of the commercial ACLs or quotas in 2021.

Table 2: Fishing year 2021 summer flounder, scup, and black sea bass catch, OFLs, and ABCs (amounts presented in metric tons (mt)).

Stock	Total Catch	OFL	Difference	ABC	Difference
Summer Flounder	9,646	14,367	-39%	12,297	-24%
Scup	15,512	16,012	-3%	15,791	-2%
Black Sea Bass	9,868	8,021	21%	7,916	22%

Black Sea Bass Overage

In 2021, the black sea bass OFL was 8,021 mt, and total catch was 9,871 mt, corresponding to a 21-percent overage. Although the catch exceeded the OFL, we do not yet have the information required to determine if overfishing was occurring. The status determination criteria for black sea bass make use of the annual fishing mortality rate (F) relative to a maximum fishing mortality rate (MFMT) to determine if overfishing has occurred. The 2022 data update from



the Center did not include estimates of fishing mortality. A research track and management track assessment for black sea bass will be available in 2023. The current status update did indicate that the relative abundance of black sea bass, derived from the Northeast Fisheries Science Center spring bottom trawl survey, has steadily increased since 2015. Age composition data also show above average 2015, 2016, and 2019 cohorts. When the updated stock assessments are available, we will determine if any additional action is required.

Recreational Annual Catch Limit Evaluation

To assess whether accountability measures were triggered for the recreational summer flounder, scup, and black sea bass fisheries, the three-year average recreational catch is compared to the three-year average recreational ACL. This comparison is provided in Tables 3, 4, and 5. We also note whether numbers were generated from the Coastal Household Telephone Survey (CHTS) or Fishing Effort Survey (FES).

Due to data gaps in 2020 and 2021, we were unable to perform the typical evaluation and estimation of recreational discards. To generate discard estimates, an ad hoc approach was used that applies the mean weight of a discarded fish from 2019 to the number of dead discards.

Table 3: Summer Flounder Three-Year Average Recreational Catch vs. ACL (2019-2021), in mt

Fishing Year	Landings	Discards	Total Catch	ACL	MRIP
2019	3,538	1,379	4,917	5,218	FES
2020	4,565	1,448	6,013	5,218	FES
2021	3,091	922	4,083	5,662	FES
		Average	5,004	5,366	

Table 4: Scup Three-Year Average Recreational Catch vs. ACL (2019-2021), in mt

Fishing Year	Landings	Discards	Total Catch	ACL	MRIP
2019	2,454	188 ¹	2,642	3,633	CHTS
2020	5,858	521	6,379	3,570	FES
2021	7,539	616	8,155	3,474	FES
		Average	5,725	3,559	

Table 5: Black Sea Bass Three-Year Average Recreational Catch vs. ACL (2019-2021), in mt

Fishing Year	Landings	Discards	Total	ACL	MRIP
2019	1,569	227	1,796	2,083	CHTS
2020	4,103	1,569	5,672	3,668	FES
2021	5,428	1,903	7,330	3,596	FES
		Average	4,933	3,116	

¹ The 2019 scup recreational discard estimate has been revised. The estimate in the January 15, 2021, GARFO to MAFMC letter was incorrect because it was based on the FES. The estimate should have been based on the CHTS because the 2019 ACL was based on an assessment that did not include the MRIP data update. This revised discard estimate is based on the CHTS. This correction does not change the fact that the recreational harvest, in 2019, was less than the recreational ACL.

Recreational catch of scup and black sea bass exceeded their respective ACLs, triggering the accountability measure. When biomass is above the target, as it is for both scup and black sea bass, the accountability measure does not require a pound-for-pound payback, or specific percent reduction. The accountability measure requires that 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. Knowing that recreational overages were likely, the Council and Board took proactive action and implemented reductions to recreational measures in 2022 for both scup and black sea bass. The Council and Board also adopted revised commercial and recreational allocations and a new approach to setting recreational management measures, with a continued commitment to improving the management of the recreational fisheries. Given all of the steps the Council and Board have recently taken, we have determined that no additional action is required to address the overages.

If you have any questions on the report, please contact Emily Keiley at (978) 281-9116.

Sincerely,



Michael Pentony
Regional Administrator

cc: Dr. Jon Hare, Science and Research Director, Northeast Fisheries Science Center

Enclosure