



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Striped Bass Management Board

FROM: Atlantic Striped Bass Technical Committee and Stock Assessment Subcommittee

DATE: April 17, 2023

SUBJECT: Rebuilding Projections with 2022 Preliminary Data and Ocean Commercial Quota Utilization Scenarios

The Striped Bass Technical Committee (TC) and Stock Assessment Subcommittee (SAS) met via webinar on March 14 and March 30, 2023 to develop updated stock rebuilding projections as tasked by the Striped Bass Management Board. Before developing the projections, the TC-SAS reviewed a correction to the rebuilding probabilities in the 2022 Stock Assessment Update Report.

Correction to Short-Term Projections and Probabilities in 2022 Stock Assessment Update

The 2022 Atlantic Striped Bass Stock Assessment Update (terminal year 2021) was reviewed by the Board in November 2022. The assessment includes short-term projections estimating the probability of female spawning stock biomass (SSB) reaching the SSB threshold and SSB target (rebuilt) under three constant fishing mortality (F) scenarios. The projections and probabilities are summarized in Table 10 and Figure 18 of the assessment report.

After the assessment report was completed, the assessment team identified an issue with the calculated error around those projections. When the assessment report was developed, the projections inadvertently used standard error, instead of coefficient of variation (CV), in the error calculations. This resulted in larger error than should have been shown around the SSB projections. The projections were later corrected using CV in the error calculations. The corrected projections have a smaller error around the projected SSB, which results in updated probabilities. This update did not affect the median SSB projection, only the error around the projection and associated probabilities.

The TC-SAS reviewed this correction on March 14, 2023, and the 2022 Stock Assessment Update Report will be updated to reflect the correction. The updated Table 10 from the Assessment Report is enclosed as an Appendix to this memo showing the change.

New Rebuilding Projections

In November 2022 and January 2023, the Board tasked the TC-SAS with two items:

- Task 1: Evaluate whether 2022 removals remained at a level associated with the 2021 fishing mortality rate.

- Task 2: Conduct stock projections to determine how specific ocean commercial quota utilization scenarios would impact the stock rebuilding timeline.

The Board requested projections in time for the May 2023 Board meeting, and requested the projections include 2022 preliminary removals data. The TC-SAS developed the following suite of projections to address both Board tasks.

Data Inputs for New Projections

Projections were conducted using the 2022 stock assessment model configuration, including using the low recruitment assumption. Age-1 recruitment was estimated using the 2021 Maryland YOY index to predict 2022 recruitment, and using the 2022 Maryland YOY index to predict 2023 recruitment for the quota utilization scenarios. The low-recruitment assumption was used for all other years.

Preliminary 2022 removals were compiled in number of fish. Preliminary 2022 commercial landings were provided by each state. It is important to note that commercial landing estimates will likely be updated as states complete final harvest accounting in the coming months. Commercial discards for 2022 were estimated by applying the 2021 discard-to-landings ratios for each region to the preliminary 2022 commercial landings. For recreational removals, preliminary 2022 MRIP data were used for recreational harvest and release mortality (9% of recreational live releases). Final MRIP data are expected to be published in late April 2023.

Preliminary MRIP data for 2022 indicate a 91% increase in recreational harvest and 3% increase in recreational live releases, relative to 2021. This results in an overall 40% increase in recreational removals, with a preliminary estimate of 6.2 million fish in 2022 relative to 4.4 million fish in 2021.

Total preliminary removals from both sectors was estimated to be about 6.9 million fish in 2022, a 33% increase from 5.2 million fish in 2021. These removal estimates will be updated in August 2023 as part of the FMP Review Report for the 2022 Fishing Year based on state compliance reports, but the TC does not expect significant changes from these preliminary numbers.

For the ocean quota utilization scenarios, the projections assume there would be additional commercial harvest starting in 2023 to reflect using all, or most of, the ocean commercial quota. To estimate commercial harvest for 2023 under Scenario 2 (full ocean quota used), any unused 2022 ocean quota was converted from pounds to number of fish and added to the total removals. For states with active commercial fisheries, unused 2022 quota was converted to number of fish using state-specific average commercial fish weight. For states with inactive commercial fisheries (ME, NH, CT, NJ, and NC), unused quota was converted to number of fish using the coastwide ocean average commercial fish weight (15.3 pounds). For Scenario 3 (full ocean quota used except NJ), New Jersey's quota in number of fish was subtracted from that additional harvest. Scenario 3 reflects the fact that New Jersey's commercial quota is currently unavailable for quota transfers because it has been re-allocated to the recreational fishery.

Projection Scenarios and Assumptions

The TC-SAS focused on three scenarios with constant F projections through 2029. Scenario 1 is based on preliminary 2022 removals only. Scenarios 2 and 3 have different assumptions for 2023-2029 by accounting for the ocean commercial quota utilization scenarios requested by the Board and by using a constant removals assumption between years 2022 and 2023 instead of a constant F assumption as in scenario 1. The TC-SAS decided to apply these quota utilization scenarios starting in projection year 2023 because 2023 is the first year that quota transfers could potentially be permitted.

For 2023-2029 projection years, all three scenarios assume a constant three-year average F . The TC-SAS emphasized that striped bass catch and F rates vary from year-to-year, even under the same regulations. Using a three-year average acknowledges that variability. The estimated F rate for 2022 (scenario 1) or the estimated F rate for 2023 + additional quota utilization (scenarios 2 and 3) were averaged with F rates from 2019 and 2021. 2020 was not included due to COVID-19 uncertainty. The 3-year average F was very close to the $F_{\text{prelim2022}}$, and projections with constant $F_{\text{prelim2022}}$ were explored as a sensitivity run.

Scenario 1 uses preliminary 2022 removals (6.9 million fish) to estimate F in 2022. For 2023-2029 projections, $F_{\text{prelim2022}}$ is averaged with F_{2019} and F_{2021} .

Scenario 2 uses preliminary 2022 removals data to estimate F in 2022. Starting in 2023, F is adjusted to account for harvesting the full ocean quota each year; active fisheries use all their quota and inactive fisheries transfer all their quota via commercial quota transfers. $F_{2023+\text{fullquota}}$ is calculated assuming preliminary 2022 removals plus an additional commercial harvest (~41,500 fish) are removed from the 2023 population. For 2023-2029 projections, $F_{2023+\text{fullquota}}$ is averaged with F_{2019} and F_{2021} . Because the landed NJ commercial quota is counted both in the “full commercial quota” and in the re-allocation of the commercial quota to the recreational fishery, those fish are double-counted for this scenario.

Scenario 3 uses preliminary 2022 removals data to estimate F in 2022. Starting in 2023, F is adjusted to account for harvesting the full ocean quota each year except for New Jersey’s quota; active fisheries use all their quota and inactive commercial fisheries, except NJ, transfer all their quota via commercial quota transfers. $F_{2023+\text{fullquotaminusNJ}}$ is calculated assuming preliminary 2022 removals plus additional commercial harvest (~27,400 fish) are removed from the 2023 population. For 2023-2029 projections, $F_{2023+\text{fullquotaminusNJ}}$ is averaged with F_{2019} and F_{2021} .

Projection Results

For all scenarios, projected F rates were between the current F target of 0.17 and F threshold of 0.20. These projected F rates are higher than F_{2021} of 0.14. If F stays between the target and the threshold from 2023-2029, the probability of rebuilding the stock to SSB target by 2029 decreases substantially compared to the rebuilding probability associated with F_{2021} . The 3-year average F was very close to the $F_{\text{prelim2022}}$ and the projection results using $F_{\text{prelim2022}}$ as a sensitivity run were not substantially different from the results presented here.

Table 1 summarizes the projected F rates for each scenario and the associated rebuilding probability of reaching the SSB target by 2029. The table also includes the 2022 Stock Assessment Update projection based on F_{2021} for comparison.

Table 1.

Description	Scenario	Year	Projected F	Pr SSB > target in 2029	Pr SSB > thresh-old in 2029
2021 Fishing Mortality from 2022 Stock Assessment Update	-	2022-2029	F in 2021	97.5 %	99.9 %
2022 Preliminary Removals	1	2022	F in 2022	15 %	94 %
		2023-2029	Average F (2019,2021, 2022)		
2022 Preliminary Removals + Full Ocean Quota in 2023	2	2022	F in 2022	11 %	91 %
		2023-2029	Average F (2019,2021, 2023+fullquota)		
2022 Preliminary Removals + Full Ocean Quota minus NJ in 2023	3	2022	F in 2022	11 %	91 %
		2023-2029	Average F (2019,2021, 2023+fullquota minusNJ)		

Figure 1 shows the SSB projection and the probability curves for reaching the SSB threshold and SSB target for each scenario. For comparison, Figure 1 also shows the SSB projection and probability curves associated with constant F_{2021} from the 2022 Stock Assessment Update.

Discussion of 2022 Removals

Increased recreational removals in 2022 are driving the increased F rates and lower rebuilding probabilities in all scenarios. The projections indicate SSB will increase over time before stalling between the target and threshold. Since the estimated $F_{\text{prelim2022}}$ (and all other projected fishing mortalities) is between the F target and threshold, it is expected that SSB will also remain between the SSB target and threshold, without fully rebuilding to the SSB target level. Because the F reference points are calculated to achieve the SSB reference points in the long-term, SSB will reach its target over the long-term only if F is at (or below) its target. In order to meet the SSB target by 2029 (i.e., a short-term timeline), F would need to be below its target, as demonstrated by the high rebuilding probabilities associated with F_{2021} , which was below F target.

While the projections indicate a low probability of rebuilding to the *target* by 2029 under these higher F rates, the probability of reaching the SSB threshold in 2029 (no longer overfished) is above 90% for all scenarios. The TC-SAS noted that angler effort and behavior continue to be an

important factor and source of uncertainty. As the stock recovers and strong year classes become available to the recreational fishery, effort may increase, contributing to both increased harvest and live releases.

The outcome of projections is dependent on which constant F or catch level is assumed (as well as assumptions about recruitment and selectivity). The TC-SAS emphasized that projections assuming a constant F or constant catch are not necessarily representative of future years since striped bass catch and F vary from year-to-year. These new projections based on 2022 removals represent a higher catch outlook, while the projections based on 2021 removals represent a lower catch outlook (Figure 2). If future catch and F are somewhere in the middle, the rebuilding probability may also fall between the low 15% associated with 2022 removals and the high 97% associated with 2021 removals. The ocean quota utilization scenarios overlap almost completely with the 2022 removals scenario, indicating the additional quota utilization has a minimal impact on the projections compared to the increase in total removals from 2021 to 2022 (Figure 2). For the first years of the projections, the three new scenarios overlap significantly with the 2021-based projection, but diverge further in later years, where we have less confidence in our assumptions about F and recruitment (Figure 2).

Discussion of Quota Utilization Scenarios

The 2023-2029 projected F for the ocean quota utilization scenarios 2-3 is based on a worst-case scenario and is only about 2% higher than the projected F for the 2022 removals scenario 1. This slight increase in F results in a slightly lower (-4%) probability of rebuilding by 2029. However, this slight difference results from the assumptions used to generate the projected fishing mortality rates more than the addition of the ocean quota utilization. In scenario 1, an average F (2019,2021,2022) was applied to all remaining projection years (2023-2029), while in scenarios 2-3, an average F (2019,2021,2023) was applied to all remaining years (2023-2029). Consequently, both population dynamics between 2022 and 2023 and increased quota utilization are responsible for the differences between scenario 1 and 2-3.

The projections indicate that the impact of additional quota utilization on F and rebuilding probability is negligible. The maximum quota utilization scenario 2 only adds 41,500 extra fish to removals, which is less than 1% of total removals. The addition or subtraction at a scale of tens of thousands of fish relative to the total removals scale of several million has negligible impacts on overall F , as also demonstrated by the negligible difference between scenarios 2 and 3 (difference of 14,000 fish).

Discussion on Interim Projections

The TC-SAS discussed the benefits and challenges of conducting stock projections between stock assessments. In this case, the benefit of these interim projections is a timely update to the Board considering the significant increase in recreational catch in 2022 following two low catch years, which also included COVID-19 uncertainty. In addition, 2022 aligned with the emergence of the strong 2015-year class in the ocean fishery, which likely contributed to the large change between 2021 and 2022. The TC noted these projections are not the same as a full

stock assessment update where the model would be re-run to include the 2022 catch-at-age and index data to produce estimates of F and SSB in 2022 to determine stock status.

The TC-SAS noted that conducting annual stock projections would not be particularly useful given interannual variability in removals under constant regulations, and the life history of striped bass (long-lived, slow to mature, etc.). Instead, the TC-SAS talked about the potential benefits of aligning projections and assessments with planned management changes.

If the Board is considering management changes, the TC-SAS recommends the Board be as specific as possible with the types of measures they would consider and their intent (e.g., reduce removals to a particular F rate or rebuilding probability, protect year classes, etc.).

TC-SAS Members in Attendance on March 14 and 30

Nicole Lengyel Costa (TC Chair, RI), Mike Celestino (SAS Chair, NJ), Michael Brown (ME), Kevin Sullivan (NH), Gary Nelson (MA), Kurt Gottschall (CT), Caitlin Craig (NY), Brendan Harrison (NJ), Tyler Grabowski (PA), Margaret Conroy (DE), Alexei Sharov (MD), Luke Lyon (DC), Ingrid Braun (PRFC), Brooke Lowman (VA), Joshua McGilly (VA), Charlton Godwin (NC), Steve Minkinen (USFWS), John Sweka (USFWS), Tony Wood (NOAA)

Board Members and Public in Attendance on March 14 and 30

Chris Batsavage, David Borden, Emerson Hasbrouck, Max Appelman, David Sikorski, Mike Wilberg, Rob Latour, Adena Schonfeld, Samara Nehemiah, Alan Bianchi, Jessica Best, Evan Dintman, Glen Fernandes, Tony Friedrich, Peter Himchak, Jesse Hornstein, Nichola Meserve, Chris Moore, Marisa Ponte, Will Poston, Cody Rubner, Patrick Rudman, Antonia Santegata, Ross Squire, David Stormer, Taylor Vavra, Mike Waine, Esther Wang, Charles Witek, Steve Witthuhn, Michael Woods

ASMFC Staff: Katie Drew, Emilie Franke

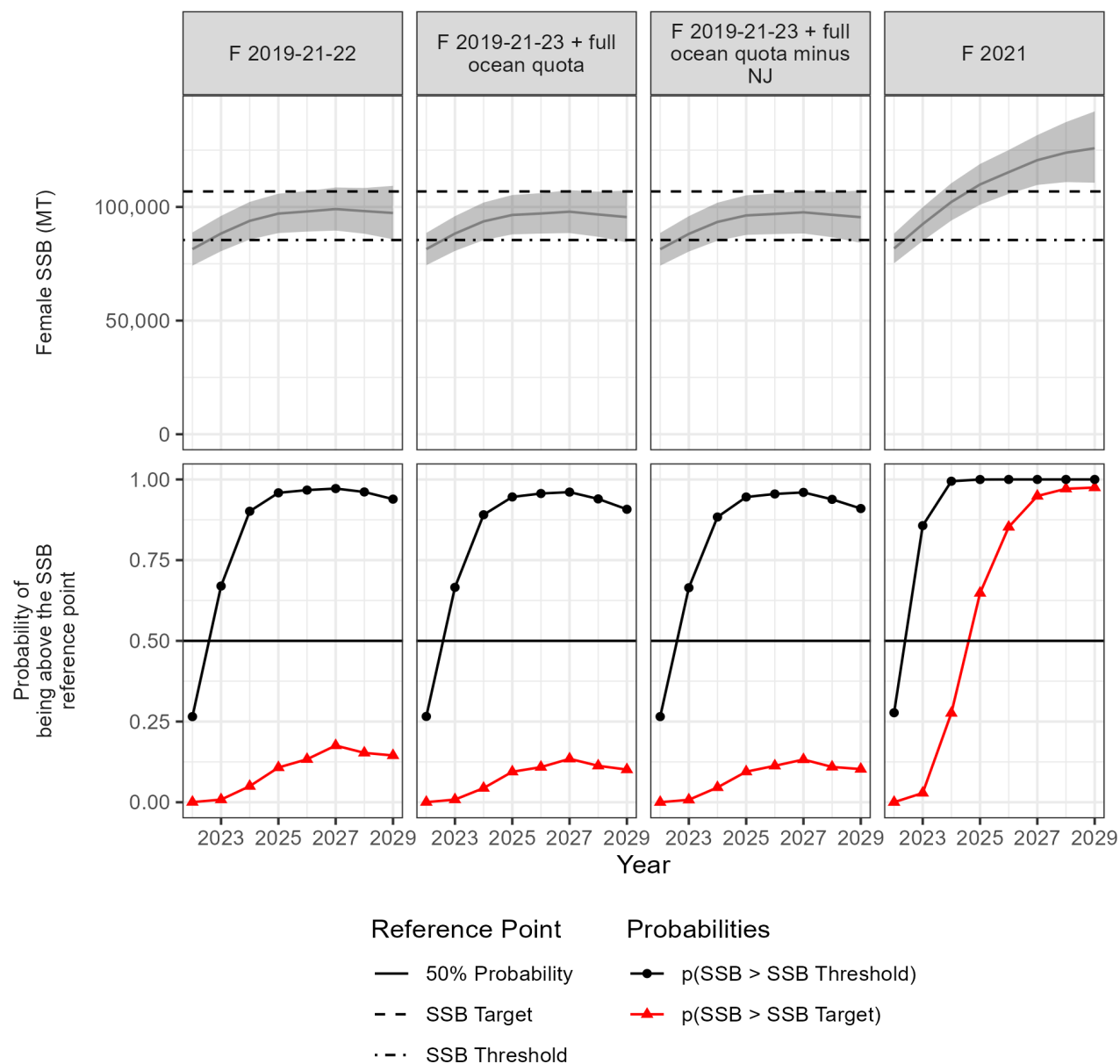


Figure 1. Projected female SSB with 95% confidence intervals (top row) and the probability of SSB being above the SSB reference point (bottom row) for the three new projection scenarios and for the original F_{2021} projection scenario from the 2022 assessment update.

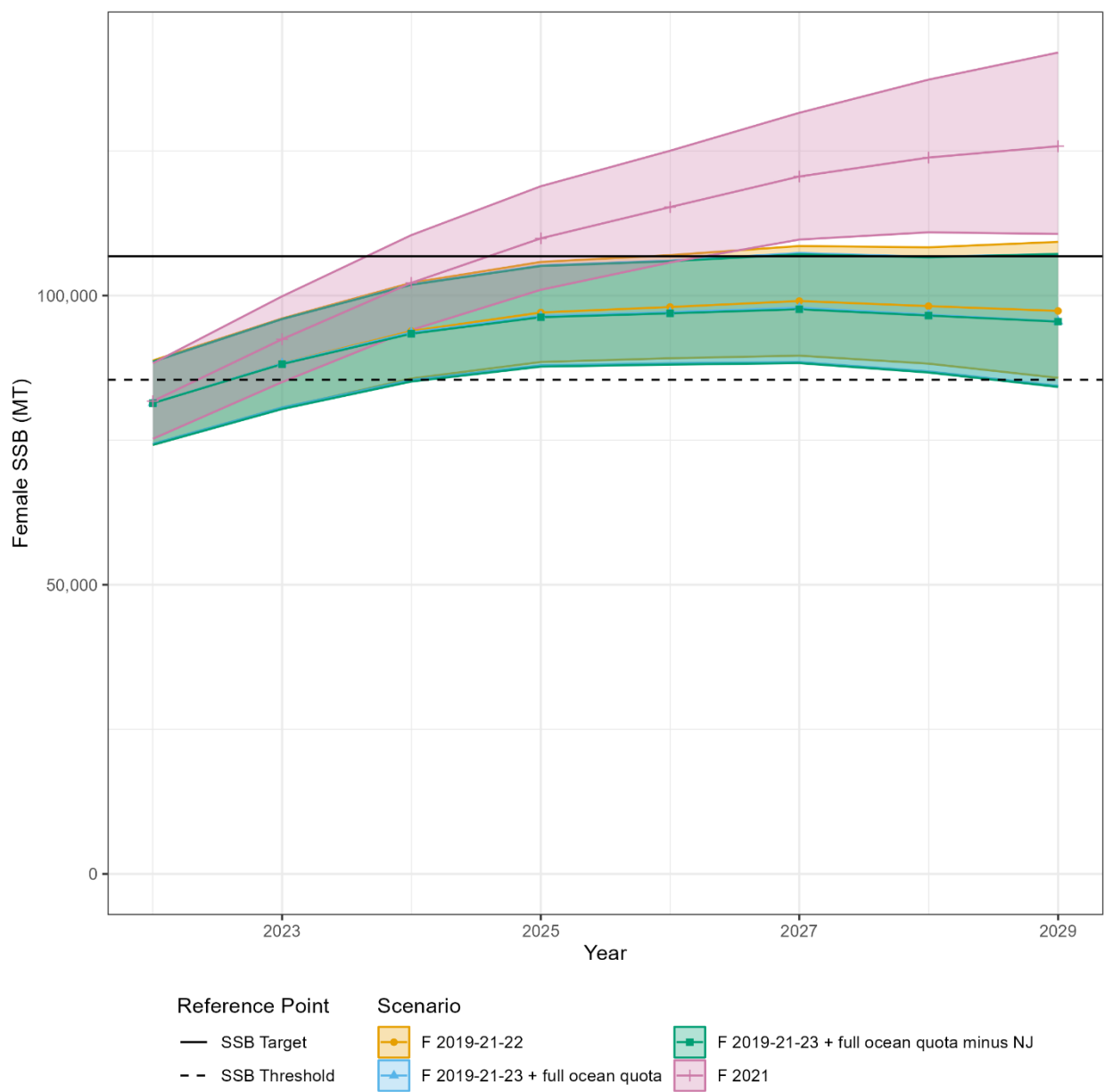


Figure 2. Projected female SSB with 95% confidence intervals for the three new scenarios (yellow, blue, green) and the original F_{2021} projection scenario from the 2022 assessment update (pink).

Appendix. Correction to 2022 Stock Assessment Update Report

Table 10, Figure 18, and associated text in the 2022 Stock Assessment Update Report will be updated to reflect the correction.

Table 10 Corrected. Probability of SSB being at or above the SSB threshold or target under different constant F scenarios. Bolded final row indicates 2029, the rebuilding deadline. Shaded green columns are the corrected probabilities compared to the originally reported values in grey text.

Year	Probability SSB \geq SSB threshold under current F		Probability SSB \geq SSB target under current F		Probability SSB \geq SSB threshold under F target		Probability SSB \geq SSB target under F target		Probability SSB \geq SSB threshold under F threshold		Probability SSB \geq SSB target under F threshold	
2021	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2022	34.4%	27.9%	0.4%	0.0%	34.5%	27.4%	0.4%	0.0%	34.5%	27.4%	0.4%	0.0%
2023	70.2%	86.1%	14.9%	2.8%	61.9%	76.5%	13.1%	1.3%	53.2%	61.2%	11.6%	0.5%
2024	86.0%	99.3%	39.0%	27.6%	74.1%	95.3%	29.2%	10.0%	61.8%	80.7%	23.2%	2.2%
2025	91.8%	99.9%	56.1%	64.7%	79.3%	99.1%	40.3%	25.1%	64.3%	87.7%	28.6%	4.7%
2026	94.1%	99.9%	65.7%	85.1%	81.4%	99.6%	45.5%	36.7%	63.4%	88.3%	30.3%	5.3%
2027	95.7%	99.9%	72.7%	94.8%	82.8%	99.8%	49.9%	49.0%	63.4%	87.3%	31.9%	5.9%
2028	96.4%	99.9%	76.6%	97.2%	82.8%	99.8%	52.0%	53.4%	61.7%	83.5%	31.6%	5.7%
2029	96.7%	99.9%	78.6%	97.5%	82.4%	99.6%	52.5%	53.9%	59.4%	76.9%	30.5%	5.4%

Corrected values in green



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Atlantic Striped Bass Technical Committee and Plan Development Team Meeting Summary

Webinar
June 5, 2023

Technical Committee Members: Nicole Lengyel Costa (Chair, RI), Tyler Grabowski (Vice Chair, PA), Michael Brown (ME), Kevin Sullivan (NH), Gary Nelson (MA), Kurt Gottschall (CT), Caitlin Craig (NY), Brendan Harrison (NJ), Margaret Conroy (DE), Alexei Sharov (MD), Luke Lyon (DC), Ingrid Braun (PRFC), Josh McGilly (VA), Charlton Godwin (NC), Jeremy McCargo (NC), Steve Minkinen (USFWS)

Plan Development Team Members: Nichola Meserve (MA), Nicole Lengyel Costa (RI), Caitlin Craig (NY), Brendan Harrison (NJ), Jordan Zimmerman (DE), Angela Giuliano (MD), Emilie Franke (ASMFC)

ASMFC Staff: Katie Drew, Emilie Franke, Toni Kerns

Public: Dennis Abbott (NH Board Proxy), Max Appelman (NOAA Board Member), Alan Bianchi (NCDMF), Mike Celestino (NJDEP-SAS Chair), Tony Friedrich, Jaclyn Higgins, Jesse Hornstein (NYDEC), Ray Kane (MA Board Member), Brooke Lowman (VMRC-SAS member), Shanna Madsen (VMRC), Will Poston, Charles Witek

Meeting Overview

The Atlantic Striped Bass Technical Committee (TC) and Draft Addendum II Plan Development Team (PDT) met via webinar on June 5, 2023 to discuss tasks supporting the 2023 Emergency Action and development of Draft Addendum II, which considers 2024 management options.

The TC and PDT will meet jointly again on June 28 via webinar to continue addressing these tasks. In the interim, the PDT will also meet on June 15 via webinar to continue work on Draft Addendum II.

The estimated 2023 removals, projected 2023 and 2024 reductions, and projections discussed in this summary are initial results. **The results will be updated prior to the June 28th TC-PDT call to reflect the following TC input and discussion.**

Estimating 2023 Removals Accounting for Emergency Action

Striped Bass Management Board Motion Approved May 2, 2023

Move that the Striped Bass Board, by emergency action as outlined in the Commission's ISFMP Charter, implement a 31" maximum size to all existing recreational fishery regulations where a higher (or no) maximum size applies, excluding the Chesapeake Bay trophy fisheries. All other

recreational size limits, possession limits, seasons, gear restrictions, and spawning protections remain in place. Jurisdictions are required to implement compliant measures as soon as possible and no later than July 2, 2023.

TC Task for Emergency Action

The TC discussed methods to estimate 2023 removals accounting for the emergency 31" maximum size limit implementation. An estimate of 2023 removals is needed to project what level of 2024 removals would achieve the fishing mortality target for Draft Addendum II development.

As a starting point for discussion, ASMFC staff conducted initial calculations using 2018-2019 data to simulate effects of a strong year-class moving from age-7 to age-8 in the fishery (i.e., using the 2011-year class in 2018-2019 as a proxy for the 2015 year-class in 2022-2023). The TC discussed this past strong year-class estimation method (Method #1), and also recommended an additional method to estimate removals based on projections of the 2023 population (Method #2).

Method #1: Past Strong Year-Class Estimation

Method #1 estimates 2023 removals using 2018-2019 data to simulate fish availability and recreational catch when a strong year class (2011-year class as proxy) moves from age-7 to age-8 in the fishery, just as the 2015s are moving from age 7-8 from 2022-2023. This approach used the same assumptions and methods as were used to develop options for Addendum VI to Amendment 6.

2022 and 2023 recreational size limits were applied to 2018 and 2019 data, respectively, to simulate what recreational removals would have been under those measures. It was assumed the 2023 emergency 31" maximum size limit measures were effective starting in Wave 3 for the ocean region, and Wave 4 for the Chesapeake Bay in order to avoid counting large fish harvested during the Chesapeake Bay trophy season, which are exempt from the 31" maximum size limit.

As a strong year class moves from age-7 to age-8, this method estimated a 50% decrease in ocean recreational harvest and a 25% decrease in Chesapeake Bay recreational harvest occurring during Waves 3-6 and Waves 4-6, respectively, under the 31" maximum size limit. This method estimates an 8% decrease in ocean live releases and 4% decrease in Chesapeake Bay live releases for the same time period under the 31" maximum size limit.

To estimate 2023 removals, those percent reductions were applied to 2022 Waves 3-6 ocean recreational removals and Waves 4-6 Chesapeake Bay recreational removals. Recreational removals during the earlier waves and total commercial removals were assumed to be the same as 2022. Overall, the preliminary estimate is a 29% reduction in 2023 total removals relative to 2022 due to the emergency 31" maximum size limit.

TC Discussion on Method #1

The TC noted this method and assumptions are reasonable to estimate 2023 removals. The benefit is this is an empirical approach based on past observed data. One noted assumption is this method assumes any change in effort from 2018 to 2019 would also occur from 2022 to 2023. The TC noted the unpredictability of effort from year-to-year, so making any new or different assumptions about effort would be difficult. Similarly, TC members noted it would be difficult to make any new or different assumptions about how live releases might change with a narrower slot. For previous reduction calculations, the TC has assumed a 1:1 change in harvest and releases; in this case, any 31-35" fish that would have been harvested (prior 100% chance of dying) would be a new release (9% change of dying). No additional assumptions were made regarding potential increased fishing effort and live releases to find a fish within the slot.

A TC member requested staff consider applying the emergency 31" maximum size limit to at least part of the Chesapeake Bay Wave 3 recreational removals. The trophy fishery only occurs during two weeks of that wave, and the emergency 31" maximum size limit was effective for the other Chesapeake Bay recreational fisheries for the remainder of the wave. Staff will examine the length frequencies from that wave to consider this change, but did note the difficulty of separating out the trophy fish harvest, which are unaffected by the emergency action. Overall, this requested calculation change would likely have a very small impact on the results.

The TC discussed why live releases were estimated to decrease under the 31" maximum size limit. Last year in 2022, when the strong 2015 year-class was age-7, part of that abundant year class was above 28", and so available in the slot. But part of that abundant year class was still below 28" and therefore sub-legal. So it is possible that many 2022 releases were releases of under-size fish. In 2023, when the strong 2015 year-class is age-8, most of that abundant year class is above 28", and so directly within the 28-35" slot. So even if there are increased releases of fish over 31" due to the emergency action, there may be fewer sub-legal fish caught/released. Figure 1 shows the size distribution of age-7 fish vs. age-8 fish (i.e., the predicted size distribution of the 2015 year-class in 2022 vs. 2023) relative to the Addendum VI ocean slot and the emergency action maximum size limit. It was noted that in the ocean in 2019, live releases decreased while harvest increased relative to 2018 as the strong 2011 year-class moved from age-7 to age-8.

Recommendation to Add Method #2: Projection-Based Estimation

In addition to Method #1, the TC requested a second estimation of 2023 removals using a projection-based method (Method #2). Method #2 will use the stock assessment model to project 2023 numbers-at-age and apply growth curves to estimate numbers-at-size in 2023. The change in size distribution and number of fish available from 2022 to 2023 will then be used to estimate how removals would change. Effort is assumed constant. Staff noted one challenge is determining what selectivity to use for the projection. Staff and TC members will work on completing Method #2 for review by the TC and PDT later this month.

The TC will then compare the estimated 2023 removals observation-based Method #1 to the projection-based Method #2. If the estimates are vastly different, the TC will determine which method to move forward with, or if the results should be averaged in some way. If the estimates result in different reduction calculations for 2024 measures in Draft Addendum II, the PDT requested clear guidance from the TC on what reduction level to achieve.

Draft Addendum II Guidance for 2024 Management Options

Striped Bass Management Board Approved Motion May 2, 2023

Move to initiate an Addendum to implement commercial and recreational measures for the ocean and Chesapeake Bay fisheries in 2024 that in aggregate are projected to achieve F -target from the 2022 stock assessment update ($F = 0.17$). Potential measures for the ocean recreational fishery should include modifications to the Addendum VI standard slot limit of 28-35" with harvest season closures as a secondary non-preferred option. Potential measures for Chesapeake Bay recreational fisheries, as well as ocean and Bay commercial fisheries should include maximum size limits. The addendum will include an option for a provision enabling the Board to respond via Board action to the results of the upcoming stock assessment updates (e.g., currently scheduled for 2024, 2026) if the stock is not projected to rebuild by 2029 with a probability greater than or equal to 50%.

Note: For measures beyond 2024, the Board noted their intent to consider the results of the upcoming 2024 stock assessment update to inform subsequent management action.

TC Task for Draft Addendum II

The TC will conduct projections to determine the level of removals (and resulting percent reduction from 2022) to achieve F target in 2024, as is the Board's intent with Draft Addendum II. After a percent reduction is determined, the PDT will develop management options to meet the reduction in 2024 relative to 2022 removals. The TC will provide guidance on option calculation methods and assumptions.

Projections to Achieve F -target in 2024

Projections are conducted using the 2022 stock assessment model configuration. To project the starting 2023 and 2024 populations, age-1 recruitment was estimated using the Maryland juvenile abundance index, and estimates of 2022 and 2023 removals were used.

Incorporating the Method #1 estimate of 2023 removals (described above), initial projections indicate 2024 removals would need to be 5.7 million fish to achieve F -target in 2024. This is a 16% reduction from 2022 levels. Projections will be re-run incorporating the Method #2 estimate of 2023 removals for comparison.

To estimate the probability of rebuilding to the spawning stock biomass target, projections were initially run using a constant catch assumption for 2024-2029 as a starting point for discussion. However, the TC recommended using a constant F assumption for 2024-2029. TC members noted the constant F assumption is more appropriate than a constant catch

assumption because catch would not remain constant if fewer fish are available to the fishery. Constant F takes into account removals in relation to fish availability. Projections will be re-run using a constant F assumption. Finally, TC members noted that neither a constant catch nor constant F projection is entirely reliable given changes in effort, fish availability, etc. that result in varying recreational removals from year-to-year.

TC Discussion on Draft Addendum II Options

For ocean recreational fishery options to modify the slot limit, the TC discussed effort assumptions and concerns about release mortality. TC members reiterated the difficulty of making any new or different assumptions about the scale of live releases since changes in effort and angler behavior are difficult to predict. TC members also noted that changing the harvestable size limit does not address recreational release mortality, which is still a large portion of fishing mortality. TC members noted the Board needs to consider addressing overall effort, including the catch-and-release fishery, in the management program. It was also noted that if seasons are considered, a consistent season will be difficult to implement since the timing of fish availability varies by state.

For both ocean and Chesapeake Bay recreational fishery options, TC members posed questions about long-term management strategy, and whether the goal should continue to be protecting specific year classes over time (e.g., 2015s and 2018s) or to focus on achieving the required level of overall removals without consideration of year-class strength. The 2024 stock assessment could be an opportunity for this more in-depth discussion on management approaches and the use of slot limits in the future.

For all recreational fishery options, TC members recommended conducting the option analysis using length frequencies from 2020, when the strong 2011 year-class was age-9, to provide comparable fish availability to 2024 when the 2015 year-class will be age-9, as well as to continue to explore the projection-based Method #2 for comparison. Using 2022 length frequencies could also be explored as a comparison.

For commercial fishery options for maximum size limits, TC members noted the loss of future reproductive capacity resulting from harvesting more smaller fish under a maximum size limit. The TC was also concerned about the potential to increase the overall number of fish killed due to increased discarding of oversize fish and the smaller average size of fish in the harvest combined with a weight-based quota. The TC noted quotas could be adjusted for the change in size limits using spawner-per-recruit/yield-per-recruit analysis that has been used for previous commercial size limit changes.

Next Steps

- Estimates of 2023 removals will be calculated using the projection-based Method #2, and will be refined as needed using Method #1. The two estimates will be compared.
- Projections will be re-run using Method #1 2023 estimate, Method #2 2023 estimate, and a constant F assumption for 2024-2029.

- The PDT will meet June 15 to continue developing 2024 management options.
- The TC-PDT will meet jointly on June 28 to re-visit these topics and option calculations.

Figure

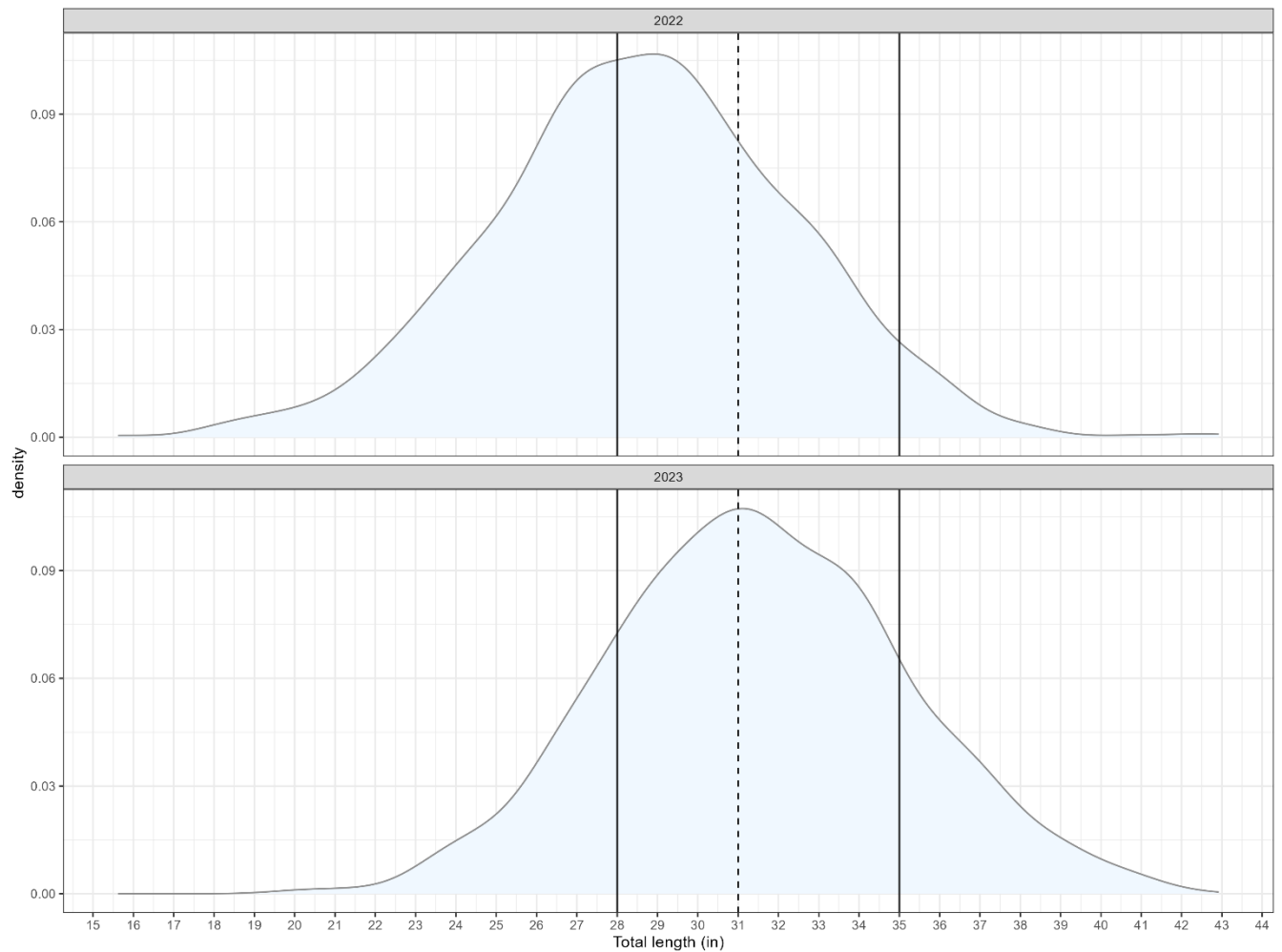


Figure 1. Size distribution of age-7 fish vs. age-8 fish (i.e., the predicted size distribution of the 2015 year-class in 2022 vs. 2023). Note that this figure is not scaled by abundance, so it does not show the decrease in abundance of this year-class as it moves from 2022 to 2023, but it does show the high proportion of the 2015 year-class that was just below the size limit in 2022, and the lower proportion that will be undersize in 2023.