



Mid-Atlantic Fishery Management Council

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MEMORANDUM

Date: March 28, 2022
To: Michael P. Luisi, Chairman, MAFMC
From: Paul J. Rago, Ph.D., Chair, MAFMC Scientific and Statistical Committee (SSC)
Subject: Report of the March 2022 SSC Meeting

The SSC met via webinar from 15th-16th March 2022, addressing the following topics:

- Review and Potential Change to 2022 *Illex* ABC specifications
- Golden Tilefish update and review of 2023 ABC
- Blueline Tilefish update and review of 2023 ABC
- Atlantic Mackerel 2023-2024 Rebuilding ABC Specifications
- Overview of Council Action: Request for review of Harvest Control Rule
- Ecosystem Science and Application
- Receive update from Economics Working Group on 2021 and future activities

See Attachment 1 for the meeting's agenda.

All SSC members were able to participate for all or part of the meeting (Attachment 2). Other participants included Council members, Council staff, NEFSC and GARFO staff, and representatives of industry, stakeholder groups, and the general public. Council staff provided outstanding technical support throughout the process. The SSC benefited from preparations prior to the meeting; presentations and supporting documents were relevant and high quality. Jason Didden consulted with the NEFSC and SSC on an ongoing basis to improve the information necessary for both the *Illex* squid and Atlantic Mackerel discussions. Kiersten Curti, NEFSC, provided timely responses on rebuilding alternatives for Atlantic Mackerel rebuilding projections. A special thanks to Brandon Muffley who guided the SSC's work before, during, and after the meeting.

Within the SSC, Thomas Miller's guidance on *Illex* discussions and David Secor's contributions for Atlantic Mackerel were both substantial. Their intensity and scholarship are greatly appreciated. I thank Sarah Gaichas and Geret DePiper for their excellent meeting notes and members of the SSC and Council staff for their comments on an earlier draft of this report.

All documents referenced in this report can be accessed via the SSC's meeting website <https://www.mafmc.org/ssc-meetings/2022/march15-16>. This report uses many acronyms: a comprehensive guide is listed in Attachment 3.

I convened the meeting and made an opening statement regarding my role as a contractor to the Council for the purpose of providing technical support to the Council on *Illex* ABC analyses. Details of my analyses are provided below. To avoid any appearance of conflict of interest, Dr. Michael Wilberg (SSC vice chair) chaired this portion of the meeting and Dr. Thomas Miller led discussions on the Terms of Reference. I also clarified the scope of my contractual support from the Council, noting in particular that my participation in the NRCC's *Illex* Research Track Assessment Working Group was not supported by either the Council or any other entity.

***Illex* Squid**

Rago Presentation

The presentation focused on evaluation of alternative catch limits of 24,000 to 60,000 mt for 2022. The methodology built upon the methods used in 2021 and included some advances developed within the Research Track Assessment. Analyses were based on commercial catch data and NEFSC fall bottom trawl surveys data from 1997 to 2021. Survey data were not available for 2017 and 2020, and catch data for 2021 are considered preliminary. Alternative catch limits were evaluated with respect to their implications for percentage escapement and the ratio of fishing mortality to natural mortality over all years. Percentage escapement is the ratio of fished to the unfished stock size at the end of the fishing season. The numerator is based on the predicted residual stock size given an initial stock size and an alternative catch limit. The denominator is based on same initial stock size but decremented only by natural mortality. In addition to the observed catch and survey values, the computation relies on three parameters: catchability (i.e., probability of capture per tow), availability (i.e., fraction of stock in the sampling domain), and the instantaneous natural mortality rate.

The revised methodology more fully considered the uncertainty in the catchability, availability and natural mortality parameters. Ranges of these parameters were refined by comparisons with values in the scientific literature or via analyses prepared in support of the Research Track Working Group by John Manderson, Brooke Lowman and Anna Mercer. Estimates of availability were improved via spatial analyses of seasonal bottom trawl surveys conducted in the shelf waters of the US and Canada. Notably, these estimates do not consider the availability of unsampled but possibly extensive offshore populations. Estimates of catchability were improved by comparisons with calibration experiments and expert judgement of fishermen. Finally, estimates of a range of natural mortality rates were based on comparisons with values used in the scientific literature.

Effects of uncertainty in the parameters were evaluated by assuming that each parameter had a uniform distribution with lower and upper bounds as described above. The joint effect of these three sources of uncertainty on escapement was evaluated by integrating over the entire

parameter space using a numerically intensive method. Additional details on the parameterization and methodology may be found in the report by Rago (2022) to the Mid-Atlantic Fishery Management Council.

Biological reference points for *Illex* squid have not been developed, but the effects of alternative catch limits were compared to several candidate thresholds that have been applied to manage squid stocks elsewhere and have been suggested for forage species. Target escapement rates of 40% and 50% have been used for other squid species. A ratio of fishing mortality F to natural mortality M equal to $2/3$ has been considered for forage species. For the purposes of the analyses considered by the SSC, escapement estimates below 50% and F/M ratios greater than $2/3$ were considered as evidence of overfishing. Numerical methods were used to compute the average probability of falling below 50% escapement and above $F/M=2/3$ for each alternative catch limit. The average was estimated by computing these probabilities for each available year between 1997 and 2021 ($n=23$).

Based on the actual catches (1997-2021) the estimated probabilities of falling below 50% escapement were below 13%. The maximum historical probability of exceeding $F/M=2/3$ was less than 21%. Hence the historical catches are unlikely to have resulted in overfishing during this period. Consideration of hypothetical alternative catches reveal similarly low probabilities of creating overfishing over most years. If future years were similar to the poor years 1999, 2001 or 2013, alternative quotas greater than 28,000, 48,000 and 55,000 mt, respectively would have led to escapement levels below 50%. Such exceptions are useful for quota recommendations if the probability of a poor future year is known. Otherwise, analyses based on consideration of all historical years is likely to give a more accurate forecast of risk in an “average” future year. Statistical theory can advise on the consequences of alternative catches but choices related to appropriate risk are matters of policy, not science.

The Council’s Risk Policy can be applied to the evaluation of alternative catch levels if the ratio of current stock sizes to B_{msy} was known. Since this ratio is also not known, any evaluation of risk must be based on assumed values for B/B_{msy} . If the current stock size exceeds B_{msy} (target biomass) then catch limits up to 60,000 mt would not exceed a 28% probability of overfishing. If the population is actually about one half B_{msy} (threshold biomass), then the Council Risk Policy limits the probability of overfishing to 20%. Under this hypothesis, the highest quota consistent with the policy is 47,000 mt. Continuing this logic and considering the F/M threshold of $2/3$, the highest acceptable catch limit is 40,000 mt.

Ongoing research efforts to link oceanographic conditions to historic and future stock conditions may improve both forecasting stock size and estimating risk of overfishing.

Following Rago’s presentation, Mike Wilberg noted that the Research Track Assessment (RTA) peer review was completed the week before the SSC meeting. The findings of that meeting and the reports from CIE reviewers have not been summarized, and were not available for consideration by the SSC.

Following the presentation, a number of questions were raised by the SSC.

The catchability q , availability v , and natural mortality M parameters are assumed to be independent but in fact, could be correlated. Covariance among parameters would alter the estimated probabilities but the magnitude and direction of changes are not known. Additional work on the potential consequences of oceanographic processes on the joint distribution of q , v , and M was recommended. The SSC further noted that the estimated range of availability does not account for the fraction of the population offshore. Under this circumstance, the likelihood of overfishing would be lower than reported in the Rago report. Similarly, a 50% escapement policy was chosen for evaluation of alternative quotas. If the more commonly used reference point of 40% escapement level had been used, the risks would have been lower for each of the alternative catch levels. Unfortunately, existing databases of worldwide fishery stock assessment results have few case studies for squid or other comparably short-lived species. Within the Mid-Atlantic region, it was noted that $F/M=2/3$ has been proposed for Butterfish, but neither the Research Track nor the SSC had endorsed such an approach.

The SSC had several questions about the range of values used for catchability. It was noted that the Bigelow to Albatross conversion (i.e., divide Bigelow catches by 1.4) suggest the Albatross efficiency could not exceed 0.7. Broadscale comparisons of day vs night differences in catch rates further suggested reductions in catchability. Questions regarding the nature of autocorrelation considered in availability analyses were addressed by John Manderson. He provided additional details on the underlying models used by himself and colleagues and noted that Rago had selected more conservative ranges (i.e., those more likely to give higher biomass estimates and therefore give higher estimates of fishing mortality). Another SSC member suggested further refinement of the escapement model parameterization to include alternative statistical distributions (instead of Uniform).

Several SSC members noted the difficulties of having the RTA and SSC meetings in adjacent weeks. Having a longer span would allow for more complete consideration of the RTA findings. For 2022, Council staff advised that this was desirable and that the SSC would be considering the results of a Management Track Assessment for *Illex* at a meeting later in the year. Catch recommendations for 2023 would be considered at that time.

Didden Staff Memo

Jason Didden, Council staff, provided an overview of the 2021 fishery, trends in prices and comments from fishery Advisory Panel. Catches in 2021 were the highest ever during the period of the US-only fishery. Price and demand are the primary drivers of the commercial fishery. The US fishery is small relative to other squid fisheries so prices are largely dependent on international markets. Recent MSC certification of the US *Illex* fishery is viewed as a positive development. Harvesters reported major within-year changes in *Illex* availability to US fishing areas. Such changes are consistent with patterns deduced from mathematical models and investigations of oceanographic processes. Harvesters also commented on the utility of a more extended fishing season to derive a better understanding of the population throughout the year. Harvesters also appreciated participation in discussions about oceanographic factors.

The RTA's conclusions regarding the 2023 fishing year and beyond are not yet known. In view of the dynamic aspects of the fisheries, the Council recommended reconsideration of the SSC's recommendation for 33,000 mt in 2022. In May 2021, the SSC agreed with the staff recommendation of 33,000 mt but expressed concerns that a full range of alternatives had not been evaluated. The report from Rago, commissioned by the Council, was intended to build upon the 2021 analyses. In view of the additional scope for increase suggested by these analyses, the staff recommended an increase of 10% from 2021 to a total of 36,300 mt for 2022. The current risk policy allows for such increases when an OFL does not exist.

The SSC inquired about seasonal patterns of within year fisheries landings and potential influences of COVID 19. In contrast to longfin squid, *Illex* were less affected by restaurant closures. Lisa Hendrickson, NEFSC provided additional context about the spatial pattern of the fishery noting similar patterns in stat area distributions and specific areas within stat areas. As noted earlier, the recommendations from the Research Track Assessment are not yet known nor are the consequences for the MTA later in 2022. The SSC will consider catch recommendations for 2023 at a meeting later in 2022.

Public Comment

Public commenters noted the use of escapement targets in squid fisheries around the world. MSC now recommends the use of escapement targets in their most recent guidance documents. Fisheries operating under such targets have generally been stable. Another commenter requested a 20% increase from the previous ABC to 39,600. He noted the economic and social importance of this fishery particularly during this period when other pelagic fishing opportunities are declining. This proposal was supported by other who further emphasized the small area of fishing relative to the total stock area, the exclusion of *Illex* in offshore areas and the short season length. Others cited observations from research vessels from tows deeper than 2500 m. Finally, it was noted that ex-vessel value alone is an insufficient measure of economic value.

Illex ABC recommendations for 2022

Following these presentations and general discussion, the SSC addressed the Terms of Reference (italics) for *Illex* Squid. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For *Illex* squid, the SSC will provide a written report that identifies the following for the 2022 fishing year:

- 1) *Review the current 2022 Illex acceptable biological catch (ABC) of 33,000 MT and determine if an ABC adjustment is warranted. If so, please specify an adjusted 2022 Illex ABC and provide any rationale and justification for the adjustment;*

The SSC notes that *Illex* squid continues to be a data poor species.

The SSC received a detailed report from Dr. Paul Rago, who recused himself from discussion of ABC specification. The report included an enhanced, numerical analysis of possible scenarios related to available biomass, the impact of the fishery, and the vulnerability of squid to surveys. This represented extensions to the framework that he had previously presented to the SSC and that provided the basis for the existing ABC determination.

The SSC recognized Rago's presentation included a substantially more comprehensive evaluation of the underlying dynamics of the population and the fishery. The principal conclusions from the Rago presentation accepted by the SSC were:

- Escapement has been relatively high over the last 10 years, suggesting a relatively small impact of the fishery on the component of the stock that is exploited.
- Assumptions regarding parameters that were inputs to the analyses thought were thought to lead to minimum likely estimates.
- Distributions of the joint estimate of F:M suggests that exploitation rate in the fishery is likely low.
- By comparison to empirical escapement reference points used to manage squid fisheries elsewhere globally, the current ABC levels are associated with low risks of exceeding those escapement standards.
- The analyses do not consider any autocorrelation in the dynamics of the squid population that could be caused by stock-recruitment dynamics or by environmental drivers.

The SSC believes that an ABC of 33,000 MT for 2022 is no longer warranted. Instead, the SSC recommends an ABC for 2022 of 40,000 MT based on the following lines of evidence

- It is consistent with discussions of the SSC last year that noted a desire to increase the ABC, but felt it was constrained from so doing because of the lack of a more complete exploration of the implications catch on the squid population. Dr. Rago's enhanced numerical analysis provides such information.
- It represents an approximately 20% increase in the ABC above the 2021 determination, consistent with the incremental approach the SSC has adopted previously.
- Based on an evaluation of a prolonged time series, it is consistent with
 - a low chance of falling below the escapement level of 40% that has been used in the management of other squid fisheries (slide 38, $p=0.065$), and
 - a moderate risk of exceeding a ratio of $F:M=2/3$ (slide 40, $p=0.2$)Both a 40% escapement level and an $F:M=2/3$ have been suggested as candidate reference points.
- The SSC believes this level of ABC will lead to a low risk of overfishing.
- The SSC did not feel comfortable increasing the ABC beyond this level because we continue to lack a clear link between escapement, F:M and the risk of overfishing and thus cannot yet directly apply the Council's risk policy.

2) *The most significant sources of scientific uncertainty associated with determination of the ABC;*

The SSC noted the following ongoing sources of uncertainty for this ABC determination

- The lack of a peer-reviewed OFL introduces substantial uncertainty for the foundation of ABC determination. As an alternative, the SSC is relying on data poor approaches and reference points used to manage other squid fisheries and used to promote sustainability of exploited forage species.

- Continued uncertainty over the fraction, and the interannual variability, of the squid population that is subject to exploitation. This likely leads to estimates that are likely lower bound estimates of the impact of the fishery on the squid population.
- The lack of understanding of stock- recruitment processes in squid complicates development of biological reference points.
- The lack of understanding of the coherence of squid availability on the shelf with environmental drivers of distribution complicate understanding of whether sequences of good or bad years are likely to occur, which would bias understanding of stock status when using data poor approaches.
- Levels of escapement that afford protection against overfishing are poorly understood analytically and empirically.
- Estimates of q , v , and M are uncertain and estimates are assumed to be uncorrelated, whereas there are easily conceived processes that could introduce correlations among these key parameters.

3) *The materials considered by the SSC in reaching its recommendations;*

The SSC considered:

- A detailed presentation and report, “Evaluation of Alternative Catch Limits for *Illex* in 2022” from Paul Rago.
- ToRs for the research track assessment.
- Maps of the spatial distribution of the squid fisheries for 2019 and 2020 from Lisa Hendrickson
- Fishery advisory performance report for 2022 and fishery information document from Jason Didden
- *Illex* ABC-Staff Recommendation memo from Jason Didden

4) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

The SSC believes these recommendations meet National Standard guidelines for best available scientific information available.

Golden Tilefish

José Montañez, Council staff, started the discussion on Golden Tilefish ABCs for 2023 began with a review of the fishery performance data for 2021. The stock is not overfished and not experiencing overfishing in 2020 based on the results of a 2021 Management Track Assessment. A data update for 2021 was not provided by the NEFSC but the SSC looks forward to an update in 2023 and the results of a Research Track Assessment in 2024. Harvesters reported an overall increase in CPUE and a broad size distribution, including smaller fish. These improvements are consistent with the changes predicted by the stock assessment. The current quota of 891 mt is part of a 3-year quota for 2022-2024. Actual landings have been slightly below the quotas. Prices were up slightly in 2021 compared to 2020.

In view of the positive signs from the fishery, and the absence of any negative indicators of stock status, the SSC concluded that no adjustments to the quota for 2023 are warranted. The SSC recommends continuation of the previously specified ABC. The SSC also reiterated its ongoing concerns about reductions in biological port sampling for Golden Tilefish.

Blueline Tilefish

Jason Didden reported that commercial landings were down in 2021 but prices were increasing. The trip limit in 2021 dropped from 500 to 300 fish when the stock reached 70% of the quota. The change is designed to reduce targeted trips and the large buffer (30%) reflects the high variability of the catch estimates. Mandatory reporting of recreational private boat harvests has been very low thus far. Blueline tilefish are rare in the MRIP angler intercepts and catches estimates generally have low precision. An operational assessment in collaboration with the Southeast Fisheries Science Center is anticipated in 2024.

Council staff recommended no changes to the existing ABC of 100,520 lb and the SSC concurred with this recommendation.

Atlantic Mackerel

Landings and prices were down in 2021 but similar to recent years. Demand remains strong but US production is a small fraction of worldwide trade.

Following the July 2021 meeting of the SSC and its report, the Council passed a motion in requesting additional guidance from the SSC on rebuilding options for Atlantic Mackerel. Five distinct options were specified to achieve within a 10-year period. The options are distinguished by varying assumptions about recruitment, the desired probability of rebuilding within the 10-year period, and specification of risk for each proposed catch trajectory. The need for reconsideration of rebuilding options arose when the 2021 MTA revealed that rebuilding was lagging behind earlier projections. The Council requested that the options would align with the Council's Risk Policy and the SSC's derivation of a 150% CV for the OFL. Jason Didden, MAFMC presented the options specified by the Council and Kiersten Curti, NEFSC, provided details on each rebuilding option.

Mackerel recruitment has been low in recent years and various assessments have debated the underlying causes. Environmental conditions may be resulting in low recruitment. Alternatively low recruitment may be due to reduced spawning stock biomass. If stock size is low due to long-term environmental conditions, then severe reductions in ABC are required to achieve rebuilding. Alternatively, if stock size is responsible, then increases in recruitment could occur in response to lower rates of fishing. The feedback effect would accelerate recovery beyond that possible if recruitment is assumed to be stationary about a reduced recent average. The stock-dependent recruitment hypothesis was considered in 4 of the 5 rebuilding options (Table 1 below).

The stock recruitment relationship assumes that larger recruitments are more likely when the stock is high than when it is low. The SSB_{msy} for mackerel is estimated as 181,090 mt and F_{msy}=0.22. This hypothesis is formalized as a step function in which the distribution of possible recruitment has a smaller range (2009 onward) and lower average when the stock biomass is below the threshold (0.5 SSB_{msy}). The converse (larger range (1975 onward) and higher mean recruitment) is true when the stock biomass is above the threshold (0.5 SSB_{msy}). The basis for this type of stock recruitment relationship and examples may be found in Brodziak et al. 2001.

Rebuilding scenarios were evaluated using a stochastic projection model based on 2000 bootstrap estimates of the terminal year population sizes from the stock assessment model. Owing to the varying starting conditions and random effects of time varying recruitment, the population trajectories under the rebuilding scenarios result in a broad distribution of values. Measures of central tendency (i.e., median) were used to describe the expected rebuild times, the probability of rebuilding by 2032 and the expected catch trajectories. It was noted that not all of the realizations would successfully rebuild, even under the most aggressive reductions in fishing mortality.

Suggestions from the SSC included alternative ways of capturing the patterns associated with each realization and illustration that rebuilding may fail even with very long rebuilding periods. The distribution of SSB for each year would be useful to characterize because it is expected to be skewed with heavy tail of high rebuild probabilities. The SSC also suggested further investigation into potential environmental drivers for recent low recruitment. It was further noted that rebuilding would be monitored via Management Track Assessments every two years. Adjustments to the rebuilding strategy are expected. The SSC emphasized the deliberative nature of discussions about the stock recruitment relationship and rebuilding strategies. These discussions included extensive consultations among NEFSC and SSC as well as the DFO Canada and other assessment partners.

Following these presentations and general discussion, the SSC addressed the Terms of Reference (*italics*) for Atlantic Mackerel. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Atlantic Mackerel, the SSC will provide a written statement that identifies the following for the 2023 – 2024 fishing years:

- 1) *Provide acceptable biological catch (ABC) recommendations, in weight, for the Council's rebuilding alternatives. The rebuilding alternatives include either P* based calculations or a target probability of rebuilding (e.g., 50% or 60%) specified by the Council. The alternatives use one of the two recruitment assumptions previously recommended by the SSC – the most recent recruits (2009 onwards) or a two-phase approach that only*

incorporates the longer time series (1975 onwards) once biomass is over half of the rebuilding target. The SSC also previously recommended a 150% CV for the P based calculations.*

This table summarizes the alternatives specified by the Council and gives the calculated 2023, 2024, and total rebuilding plan (2023-2032) ABC estimates. Note that an OFL CV probability of 150% applies to alternatives 2 and 5. The SSC recommends Alternative is 2: Split standard P* (see ToR 2).

Table 1. Atlantic Mackerel Rebuilding Options Summary

Rebuilding Alternative Name	Rebuilding Risk Policy	Recruitment	Probability Rebuild by 2032	F (2023/2024 if multiple)	Rebuilt by (median)	2023 median Catch/ABC (mt)	2024 median Catch/ABC (mt)	Rebuild Plan median catch/ABC 2023-2032 (mt)
1. 2009+ Rebuild	50% chance of rebuilding by 2032	2009+	56.6%	0.01	June 2031	703	865	12,866
2. Split standard P*	Use basic P* as rebuilding plan.	Split at 1/2 Bmsy	51.5%	0.07/0.08	June 2031	4,539	6,207	171,291
3. Split 60% rebuild	60% chance of rebuilding by 2032	Split at 1/2 Bmsy	60.5%	0.12	June 2031	8,094	9,274	144,147
4. Split 50% rebuild	50% chance of	Split at 1/2 Bmsy	53.4%	0.14	June 2032	9,371	10,591	157,821

	rebuilding by 2032							
5. Split 50% rebuild with P* deduction	Use rebuild F from split 50% chance of rebuild and then deduct per P* as if rebuild F was overfishing F	Split at 1/2 Bmsy	62.3%	0.04/0.05	June 2029	2,976	4,168	134,022

2) *Provide any guidance regarding the relative risks associated with the different rebuilding alternatives and identify the most significant sources of scientific uncertainty associated with rebuilding;*

The SSC reviewed all alternatives and recommends the P* approach with the maximum fishing mortality threshold (MFMT) equal to the Fmsy proxy (Alternative 2). This alternative, (1) fulfills rebuilding plan requirements; (2) is the most responsive to new information on changes in stock status; (3) produces the highest rebuilding plan 10-year catch yield); (4) is fully consistent with the Council’s P* risk policy; and (5) would avoid “break points” in catch limit advice, which would reduce year-to-year changes in the ABC.

Risks and scientific uncertainties pertain to the two classes of alternatives: Alternative 1, which considers projections on the basis of only recent recruitment (2009+) and the remainder (Alternatives 2-5) that use the recent recruitment period under the condition of $SSB < 0.5 SSB_{MSY}$, and use the entire recruitment series (1975+) when $SSB \geq 0.5 SSB_{MSY}$ (Alternatives 2-5).

Alternative 1

Risks:

- ABC/Catch levels are quite low indicating risk of a depleted industry and foregone catch once SSB recovers.
- At low to nil catch levels, fishery-dependent data will become unavailable to support stock assessment.
- High discard potential if recruitment recovers under low catch

Scientific Uncertainties:

- Predictions of which recruitment regime exists is highly uncertain owing to lack of understanding on how recruitment is controlled (i.e., role of SSB, the environment, and the food web).
- Recreational catch/unreported removals may exceed low ABCs under this Alternative; knowledge about catch will needs to become more precise at low ABCs.

- Uncertainty accumulates with length of projections.

Alternatives 2-5

Risks:

- Stock may not recover without the low F specified in Alternative 1.
- The SSB trigger implies a sudden change in recruitment state, which is not supported by current understanding of what drives recruitment
- The two recruitment stanza approach applies uses an SSB trigger for which there is limited analytical support (SSC Chairman's September 22, 2021 Report to MAFMC)
- An immediate shift towards a higher recruitment regime is assumed at $SSB \geq 0.5 SSB_{MSY}$, whereas an unknown lag may occur between increased SSB and recruitment.
- Because a stock-recruitment relationship is unknown for this stock, it is uncertain whether SSB changes will be driven by increased recruitment or vice versa. This approach implies a S-R relationship, which may be arbitrary given that it has not been parameterized in the assessment
- The approach of shifting recruitment regimes can have unexpected effects later on with respect to stock rebuilding. The threshold is sensitive to the timing of a pulse of strong recruitment and may not reflect longer-term SSB rebuilding.
- Approaches rely on a SSB-based boost to recruitment that has not been observed recently (since 2007).
- The lack of strong precedence of this approach (but see Brodziak et al. 2001) conveys risk in predicting its performance in rebuilding.

Scientific Uncertainties:

- We do not know the form of the underlying stock-recruitment relationship.
- Knowledge about catch will need to become more precise at low ABCs.
- The trigger SSB for using one or the other recruitment series is deterministic, without consideration of error.
- Uncertainty in small amplitude changes in SSB
- Uncertainty in long projections

3) *Provide any data and/or assessment considerations for the 2023 Atlantic Mackerel management track assessment;*

Management Track Assessment

- The Atlantic mackerel egg surveys and related ichthyoplankton processing and data analysis are fundamental in assessment and projections of rebuilding.
- Phase plots are instructive in evaluating linked changes between recruitment, SSB, and F.
- The US recreational sector is less represented in length data in the assessment than commercial sectors. Should evaluate recreational fishery data quality and assessment sensitivity

Considerations for future assessments

- Shoreside sampling needs to be improved (multispecies issue)
 - Cost per length is now higher so sampling reduced since FY 2020
 - Allocation also based on catch amount—but should have minimum sample size for assessments
- Further evaluate is needed on how error in the egg survey propagates to error in the spawning stock biomass index to better interpret small amplitude <50% changes in SSB.

4) *The materials considered by the SSC in reaching its recommendations;*

- Staff memo: 2023-2024 Atlantic Mackerel rebuilding recommendations and considerations
- NEFSC rebuilding projection tables:
 - Mackerel 10 Year Rebuilding Projections (Excel)
 - Mackerel P* Projections (Excel)
 - Figure – Mackerel SSB Rebuilding Projections
 - Figure – Mackerel Catch Rebuilding Projections
- 2022 Mackerel, Squid, Butterfish Advisory Panel Fishery Performance Report
- 2022 Atlantic Mackerel Fishery Information Document
- July 2021 SSC Meeting Report
- September 2021 SSC Meeting Report
- Brodziak, JKT, WJ Overholtz, and PJ Rago, 2001. Does spawning stock affect recruitment of New England groundfish? Canadian Journal of Fisheries and Aquatic Science 58:306-318

5) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

Agreed. The SSC believes these recommendations meet National Standard guidelines for best available scientific information available.

Council Action: Harvest Control Rule

Julia Beaty, Council staff, opened this session with a succinct overview of the Harvest Control Rule (HCR) under consideration by the Council. The HCR amendment is a complex set of measures designed to regulate recreational harvest of summer flounder, scup, black sea bass, and bluefish. The overall objective is to prevent overfishing by employing controls that account for stock status and its uncertainty. To the extent possible the measures are to be governed by angler preferences and a desire for stability of measures across jurisdictions and over time.

Five different alternatives have been proposed. All of them rely on regular updates of stock status but the algorithms that trigger changes in regulations differ. The basic features of the alternatives are described below:

- Status Quo—measures designed to prevent harvests from exceeding annual harvest limits.
- Percent Change—compares expected harvest to future harvest limits, and current stock size to target level.
- Fishery Score—attributes of stock and fishery (relative biomass, recruitment, fishing mortality and expected harvest) are scored, weighted, and summed to create an aggregate score. Four score intervals are defined and sets of recreational measures are defined within each bin.
- Biological Reference Point—current stock biomass and fishing mortality rates are used to define eight possible bins related to whether overfishing is occurring or not, and four levels of stock size relative to B_{msy} . Within each of these eight bins, measure are further governed by trends in biomass, recruitment and recent harvests compared to their limits. The magnitudes of admissible changes are not defined but are categorized as “liberal”, “default”, “restrictive”, “restrictive and re-evaluate”, and “rebuilding”.
- Biomass Matrix—similar to the Biological Reference Point measure but relies on current stock biomass and trends in biomass to create six possible sets of regulatory measures. Four levels of stock size and three levels of biomass trend (increasing, stable, decreasing) are defined. The six bins can span more than one level of biomass trend.

The HCR amendment is motivated by real and perceived uncertainties in the MRIP estimates of catch and perceptions that recent regulations are inconsistent with true stock size, rendering them ineffective. To address these concerns the HCR is a set of alternative algorithms that define a basis for adjusting regulations in response to changes in stock condition. The specific measures (e.g., bag limits, size limits, or seasons) are not defined. Such measures are to be defined during the specifications process by the appropriate technical groups familiar with the fisheries and jurisdictions.

The Council’s request to the SSC is stated below:

Request that the SSC provide a qualitative evaluation, in time for final action at the June 2022 Council/Policy Board meeting, regarding the potential effect of each of the five primary alternatives in the Harvest Control Rule Addendum/Framework on the SSC’s assessment and application of risk and uncertainty in determining ABCs. The intent is to provide the Council and Policy Board with information to consider the tradeoffs among the different alternatives with respect to the relative risk of overfishing, increasing uncertainty, fishery stability, and the likelihood of reaching/remaining at B_{msy} for each approach at different biomass levels (e.g., for $\frac{1}{2} B_{msy} < B < B_{msy}$, the relative risk among alternatives is (highest to lowest) $E > C > B > A > D$).

Julia’s presentation and the motion from Council generated extensive discussion within the SSC. The SSC appreciated the breadth of the options and the efforts to link recreational measures to stock status. The SSC inquired about the processes that led to these alternatives and the selection of various bins and thresholds. Discrete, rather than continuous responses to changes in relative

abundance or fishing mortality, could have important feedback effects for population dynamics. Some members expressed concerns that the implications of these control rules have not been evaluated to date. Several ongoing projects, such as the summer flounder MSE project, may be useful for a more comprehensive evaluation.

It was noted that the current process for setting the RHL relies on results from the most recent stock assessment and their relevant projection models. Hence further adjustments for biomass or fishing mortality within a given regulatory option could be viewed as double counting for such factors. To varying degrees, the recreational fisheries for all of the species in the HCR coexist with commercial fisheries. Concerns were raised that this linkage should be explored within the HCR, particularly because recreational overages may create overfishing for the stock as a whole.

As part of a more general discussion the SSC noted that management measures do not always have their intended effects. In theory the HCR will be more successful in addressing the uncertainty of such measure and responding appropriately as situations warrant. Such responsiveness may conflict with the underlying desirability of stable regulations over time.

Several SSC members expressed concerns that fully worked examples had not been provided. Julia explained that specific measures were excluded because it would detract from discussions about the principles underlying each alternative. Council staff are not anticipating conducting simulation studies to compare the efficacy of each alternative for each species. To facilitate such studies, stock assessments might consider using recreational and commercial “fleets” separately. This would allow for more direct estimation of the force of mortality imposed by anglers and commercial harvesters.

Economic and social concerns include angler responses to alternative measures. Angler discontent with current regulations is high in the Mid-Atlantic; this introduces additional uncertainty into the selection of options. MRIP is designed to capture broad trends at an annual time step over multi-state regions. Partitioning such data into smaller domains decreases the precision of estimates. Low precision and potential bias are likely to continue unless recreational data collection efforts are increased.

Prior to the SSC meeting a request to participate in a working group was sent to the Committee. Six members volunteered to participate (Tom Miller, Cynthia Jones, Alexei Sharov, Lee Anderson, Brian Rothschild, and Paul Rago). Tom Miller will chair the group. Several meetings will be held prior to the May 10-11, 2022 meeting of the SSC. The SSC will craft a formal response at that meeting for delivery to the Council at its June 7-9 meeting.

As part of its charge from the Council, the SSC will address two broad themes. First, it will consider how approaches to slow down the rates of change in RHL will affect the uncertainty measures used by the SSC. What are the possible feedback effects of this uncertainty? Second, each of the five options will be considered to identify those least likely to increase uncertainty. In view of the short time available for the review, consensus, rather than analytical approaches will be used.

Ecosystem Science and Application

State of the Ecosystem and EAFM Risk Assessment

Sarah Gaichas presented the NEFSC's State of the Ecosystem report that included over 60 contributors. The iterative process of presentation, suggestions and refinement continues to be appreciated by the SSC. In recent years the SOE report has focused more directly on information relevant to the Council's decision-making process. Wherever possible, links to the underlying methodology and data are provided. The report for 2022 retains the structure from 2021 with a three-page graphical report card, risk summary and synthesis theme. The remainder of the report reviews performance relative to management objectives and risks. Due to changes in the data processing for commercial catch data, some recent catch data for 2020 have not been included.

Recreational seafood and commercial seafood both show long term declines but these declines are not necessarily due to stock status declines. Only two stocks, Atlantic Mackerel and Bluefish are overfished and only one stock (Atlantic Mackerel) is subject to overfishing. Climate risk of particular concern for Surfclam & Ocean Quahog. Recreational effort increased but fleet diversity decreased. The range in opportunities might be important to consider, as contraction of party/charter and shift towards shoreside angling continues.

In the bottom trawl surveys the expected number of species does not appear to be changing over time. Owing to the discontinuity in survey (FSV Albatross vs. R/V Bigelow) methods, the current time series is insufficient to detect statistical differences.

New indicators were introduced in 2022 for Community & Social Vulnerability. Highly engaged and reliant communities are generally less vulnerable to Environmental Justice impacts. Recreational communities tend to be less vulnerable to Environmental Justice issues.

Climate risks appear to be increasing with notable increases in bottom temperature, the frequency of heat waves from August through fall, and changes in seasonality metrics. The Mid-Atlantic Cold Pool is both warming and becoming smaller. Ocean acidification is expanding and more warm core rings from the Gulf Stream are intruding on slope water. Some progress has been made linking these changes to *Illex* abundance.

Ecosystem changes include dominance of smaller zooplankton species, reductions in the energy content of herring and reductions in fish condition factor. Predator biomass remains high with continuing increases in gray seals and relatively high levels of abundance for Highly Migratory Species. The number and extent of proposed offshore wind energy areas continues to increase.

The SSC expressed appreciation for the comprehensive and synthetic report, the open processes for further investigation of the underlying data and methodologies, and the responsiveness of the team to suggestions for improvement.

The SSC inquired about the use of trend lines and the possibility that the methodology might not be sensitive to local trends. It was noted that several models were evaluated for each time series to select trends based on an AIC value.

Several members asked for details on the Environmental Justice metrics and the underlying indicators. Lisa Colburn, NEFSC, was lead on this section.

<https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities>

Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Environmental Justice also includes measures of the demographic composition of the communities, languages, unemployment, poverty and incarceration rates.

Update on SSC Ecosystem Work Group

Sarah Gaichas reported on the work of the Ecosystem Working Group. Several meetings were held and the following key objectives have been identified:

1. Expanding and clarifying the ecosystem portion of the SSC OFL CV determination process (short term objective)

A flow chart outline has been developed to facilitate consideration of ecosystem drivers in stock assessments. If the ecosystem driver has been incorporated into the assessment model or stock projections there is no need to account for these factors outside the model.

Otherwise the OFL might be adjusted in response to such omissions. The direction of adjustments might be known but the magnitude would likely be a function of expert judgement. Additional work on this is underway using John Wiedenmann's MSE model in collaboration with Mike Wilberg. Summer flounder and Atlantic mackerel are currently the focal species.

2. Developing prototype processes to provide multispecies and system level scientific advice appropriate for Council decision making, in particular where there are multispecies and multi-fleet tradeoffs linking directly to economic and social outcomes (long term objective)

The NEFSC has secured funding for additional analytical support. Results may allow for direct incorporation of uncertainty into the OFL CV criteria rubric used by the SSC. Such modeling has the potential for deriving ecosystem level reference points.

3. Collaborating with SSC species leads, stock assessment leads, and relevant working groups in developing the stock-specific Ecosystem and Socio-economic Profiles (ESP) process to specify stock-specific Ecosystem ToRs that are impactful and can be integrated into assessments (moderate-term objective)

This effort will continue on ongoing engagement of SSC members with stock assessment working groups as part of the RTA. In particular, further work with Bluefish RTA in 2023 is

expected. It was noted that a more structured process, beginning with a conceptual model, will increase the odds of success.

The SSC appreciated the progress of the Ecosystem Working Group. It was noted that the timing of information flows is critical in the stock assessment process owing to the tight interdependencies among data and model components and the incompressible management timelines. The SSC expressed interest in receiving information from the Working Group in advance of the stock assessment results. For example, early information on the results of the Research Track Assessments for *Illlex* and Butterfish would be helpful in advance of receiving the results of the Management Track Assessments for these species in July. If the current schedule does not allow for such changes, then an additional meeting of the SSC in 2022 may be warranted.

Economic Work Group

Geret DePiper provided an overview of the Economic Work Group activities in 2021 through early 2022. Activities were primarily focused on assisting the Council's Research Steering Committee (RSC) on the feasibility of re-starting the Research Set Aside (RSA) program in the Mid-Atlantic region. The RSA could allow for targeted research on topics relevant to sound management of MAFMC species. The group met regularly throughout the past year and supported the RSC by contributing substantively to four day-long workshops. These included: 1) identification of research topics, 2) application of economic theory for various funding options, 3) enforcement and tradeoff issues, and 4) development of a decision tree for creating a comprehensive RSA process. Draft goals of the revised RSA include:

- 1) Quality peer-reviewed research that maximizes benefits to public and Council by enhancing understanding of its managed resources.
- 2) Ensure monitoring, accountability and enforcement of RSA quota
- 3) Generate resources to fund projects aligned with Council priorities
- 4) Foster collaboration and trust among science, industry and Council.

Overall, the workshops were viewed as highly successful, a view affirmed by the RSC Chair Michelle Duval and members of the public. The Economics Work Group added value to the RSA process and established a strong partnership with the Council. Future requests for assistance from the Economics Work Group are expected. In the meantime, the work group will continue to support the Summer Flounder MSE project, the EAFM risk assessment and terms of reference for stock assessments and other reviews. The overall capacity of the SSC to address economic issues is ultimately limited. Concerns were expressed that substantive involvement in fewer issues is preferred to the converse.

Other Business

- The Scientific Coordination Subcommittee will be hosting a meeting of the Fishery Management Council's Scientific and Statistical Committees August 15th-17th in Sitka, Alaska. Sarah Gaichas will be presenting a keynote address. Up to three members of the SSC will participate in the meeting. The focus of the meeting will be inclusion of ecosystem information in stock assessments.
- There will be no changes to the species and topic leads for the SSC. See Council webpage for details.
https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/6234d93b8ea4466be3d67345/1647630651288/2022+SSC+Species_Topic+Leads+Table.pdf
- For purposes of economic stability and regulatory stability, the Council often prefers multi-year specifications for ABCs. These approaches can be problematic with respect to the Council's risk policy, if the population is trending downward from a high level. A small group will be convened to address approaches for averaging ABCs. The SSC will be seeking clarification from Council regarding objectives for multi-year specifications.
- The May 10-11 meeting of the SSC will be a hybrid meeting in Baltimore.

Attachment 1



Mid-Atlantic Fishery Management Council Scientific and Statistical Committee Meeting

March 15 – 16, 2022 via Webinar

Webinar Information

(Note: same information for both days)

Link: [March 15-16, 2022 SSC Meeting](#)

Call-in Number: 1-415-655-0001

Access Code: q59Uk4AE5qA

AGENDA

Tuesday, March 15, 2022

- 9:30 Welcome/Overview of meeting agenda (P. Rago)
- 9:35 Review and potential change to 2022 *Illex* ABC specifications
- Review updated *Illex* quota work products (P. Rago)
 - Review of staff memo 2022 ABC recommendation (J. Didden)
- 11:00 Break
- 11:15 Continue review of 2022 *Illex* ABC specifications
- SSC 2022 *Illex* ABC recommendations (T. Miller)
- 12:30 Lunch
- 1:30 Golden Tilefish data and fishery update; review of previously recommended 2023 ABC (J. Montañez)
- 2:15 Blueline Tilefish data and fishery update: review of previously recommended 2023 ABC (J. Didden)
- 3:00 Break
- 3:15 Atlantic Mackerel 2023 – 2024 Rebuilding ABC Specifications

- Review of Council rebuilding alternatives and stock projections using SSC guidance (J. Didden and K. Curti)
- SSC 2023 – 2024 ABC recommendations (D. Secor)

5:30 Adjourn

Wednesday, March 16, 2022

8:30 Overview of Council Action: Recreational Harvest Control Rule (J. Beaty)

- Council motion on SSC input and guidance
- Discussion on process and approach to address Council motion (e.g., formation of work group)

10:15 Break

10:30 Ecosystem Science and Application (S. Gaichas)

- NEFSC 2022 Mid-Atlantic State of the Ecosystem Report
- 2022 update of Council's EAFM Risk Assessment
- SSC Ecosystem Work Group – update on work group work plan and progress
- Ecosystem and socio-economic work for 2022 Bluefish Research Track assessment

12:30 Lunch

1:00 Report from SSC Economic Work Group

- Update on engagement with the Council on the RSA redevelopment project
- Potential area(s) for future engagement

1:45 Other Business

- 2022 Scientific Coordination Subcommittee meeting
- Species/topic lead assignments
- ABC averaging approach

2:30 Adjourn

Note: agenda topic times are approximate and subject to change

Attachment 2

MAFMC Scientific and Statistical Committee

March 15-16, 2022

Meeting Attendance via Webinar

Name

Affiliation

SSC Members in Attendance:

Paul Rago (SSC Chairman)	NOAA Fisheries (retired)
Tom Miller	University of Maryland – CBL
Ed Houde	University of Maryland – CBL (emeritus)
Dave Secor (March 15 th only)	University of Maryland – CBL
John Boreman	NOAA Fisheries (retired)
Lee Anderson	University of Delaware (emeritus)
Jorge Holzer	University of Maryland
Yan Jiao	Virginia Tech University
Rob Latour	Virginia Institute of Marine Science
Brian Rothschild	Univ. of Massachusetts-Dartmouth (emeritus)
Olaf Jensen	U. of Wisconsin-Madison
Sarah Gaichas	NOAA Fisheries NEFSC
Wendy Gabriel	NOAA Fisheries (retired)
Mike Wilberg (Vice-Chairman)	University of Maryland – CBL
Cynthia Jones	Old Dominion University
Gavin Fay	U. Massachusetts-Dartmouth
Alexei Sharov	Maryland Dept. of Natural Resources
Geret DePiper	NOAA Fisheries NEFSC
Mike Frisk	Stony Brook University
Mark Holliday	NOAA Fisheries (retired)

Others in attendance (only includes presenters and members of public who spoke):

Kiersten Curti (March 15 th only)	NEFSC
Jason Didden	MAFMC staff
Brandon Muffley	MAFMC staff
Julia Beaty	MAFMC staff
Jeff Kaelin	Lund's Fisheries
José Montañez	MAFMC staff
Paul Nitschke (March 15 th only)	NEFSC
Lisa Hendrickson (March 15 th only)	NEFSC
John Manderson (March 15 th only)	Open Ocean Research
Greg DiDomenico	Lund's Fisheries
Meghan Lapp	Seafreeze Ltd.
Eric Reid	Fisheries Consultant
Emerson Hasbrouck (March 16 th only)	Cornell Cooperative Extension
Mike Waine (March 16 th only)	American Sportfishing Association
Michelle Duval	MAFMC
Abby Tyrell (March 16 th only)	NEFSC
Kim Hyde (March 16 th only)	NEFSC

Attachment 3. Glossary

ABC—Acceptable Biological Catch
AIC—Akaike’s Information Criterion
Bmsy—Biomass at maximum sustainable yield
CV—Coefficient of Variation
DFO—Department of Fisheries and Oceans, Canada
ESP—Ecosystem and Socio-economic Profiles
EAFM—Ecosystem Approach to Fisheries Management
F—Instantaneous rate of fishing mortality
FSV—Fishery Survey Vessel
GARFO—Greater Atlantic Region Fisheries Office
HCR—Harvest Control Rule
M—Instantaneous rate of natural mortality
MRIP—Marine Recreational Information Program
MTA—Management Track Assessment
MSC—Marine Stewardship Council
MSE—Management Strategy Evaluation
OFL—Overfishing Limit
P*—Probability of overfishing
q—catchability coefficient parameter
RHL—Recreational Harvest Limit
RSA—Research Set Aside
RSC—Research Steering Committee
RTA—Research Track Assessment
R/V—Research Vessel
SSBmsy—Spawning stock biomass at maximum sustainable yield
SSC—Scientific and Statistical Committee
v—availability parameter



Ecosystem and Ocean Planning Committee & Advisory Panel Meeting

February 24, 2022

Webinar Meeting Summary

The Mid-Atlantic Fishery Management Council's (Council) Ecosystem and Ocean Planning (EOP) Committee and Advisory Panel (AP) met on Thursday, February 24, 2022 from 1:00 p.m. to 2:30 p.m. The purpose of the meeting was for the EOP Committee and AP to provide feedback and input on a research project the Council is collaborating on with a research team from Rutgers University. The project is developing forecast models to predict short-term (1-10 years) climate-induced distribution changes for four economically important Mid and South Atlantic managed species (summer flounder, spiny dogfish, *Illex* squid, and gray triggerfish). A forecast model for summer flounder has been developed and the Committee and AP provided feedback on the model outputs and their potential utility and offered input on future project direction and next steps.

EOP Committee Attendees: K. Wilke (Committee Chair), A. Nowalsky (Committee Vice-Chair), J. Cimino, M. Duval, P. Geer, K. Kuhn, S. Lenox, T. Schlichter, S. Winslow, D. Stormer, M. Luisi (Council Chair), J. Hermsen, W. Townsend (Council Vice-Chair)

EOP Advisory Panel Attendees: W. Goldsmith, F. Hogan, S. Rubow, Z. Greenberg, J. Weis, M. Lapp, E. Bochenek, C. LoBue, M. Heard Snow, P. Himchak, F. Akers, J. Kaelin, P. Simon, P. deFur, J. Firestone, M. Binsted, J. Hancher, B. Brady

Other Attendees: M. Pinsky, A. Fredston, C. Collier, E. Knight, S. Close, G. DiDomenico, J. Byrd, K. Dancy, B. Muffley, K. Almeida, J. Beaty

Overview of project presentations:

Staff started the off the presentation with a review of the biological, science, and management challenges created due to shifting stock distributions. It also addressed the Council's interest and engagement in the current research project and the potential areas of application of the research project outcomes. Existing stock distribution models offer forecasts that are typically 60-100 years in the future and the Council has utilized this information in a strategic way, i.e., incorporation and policy recommendations in the Ecosystem Approach to Fisheries Management (EAFM) guidance document. The types of models being developed in this project may allow the Council to consider changes in stock distributions in both a strategic and a more tactical and responsive way within the management decision process.

Dr. Alexa Fredston, Rutgers University, then introduced "dynamic range models" that are designed to mechanistically forecast range shifts over short time scales while accounting for

transient dynamics in populations. The team at Rutgers is fitting these models to data on each of the four focus species from 1972-2006, and running “retrospective forecasts” of the subsequent decade (2007-2016) to evaluate the model performance. Some of the features of these models include spatial structure, age structure, and a number of user options such as choosing which process (movement, mortality, or recruitment) is temperature-dependent. Preliminary results suggest that the temperature-dependent recruitment model has skill at forecasting summer flounder range dynamics. Future steps include running these models for the other species and “competing” the best models against more traditional species distribution modeling methods.

Questions and feedback on project from Committee and AP:

Following the presentations, the meeting was opened up for Committee and AP questions and feedback regarding the modeling framework and initial outputs for summer flounder. In general, the group was supportive of the modeling approach and work done to date, but also had a number of questions and raised a variety of areas for additional consideration by the project team. Below is a bulletized summary of some of the broader feedback offered by the Committee and AP (this is not comprehensive list of all discussion):

- Habitat, in addition to temperature, is also changing and has implications for recruitment, productivity and distribution shifts, particularly for an estuarine dependent species like summer flounder, and is not considered in current model.
 - The project team did note that the modeling framework is quite flexible and habitat variables could be added, but the goal of this project is to develop short-term forecasts with a “simplified” model that includes stock dynamics, temperature and fishing as the primary drivers. If the results of the project show these initial factors are not sufficient for short-term forecasts, future model development may need to look to these other forces (i.e., habitat) and see if performance improves.
- Since the model is considering stock dynamics across the range of a species, there was interest in the ability to evaluate these dynamics and different spatial scales (i.e., are stock dynamics and distributions different off North Carolina than off Massachusetts, for example).
 - The project team noted this is a strength of the current model and spatial structure used to evaluate the data.
- The group recommended the project team consider other potential sources of data beyond the NEFSC trawl survey. For example, the use of industry and/or study fleet information and other fishery independent surveys (e.g., Rutgers larval survey). It was also noted that there is an opportunity to gain some additional insight and information from the upcoming *Illlex* research track assessment peer review later in March.
 - The project team noted that *Illlex* model development has yet to begin and would certainly be interested in the information from the peer review.
- The group commented on some of the differences found between forecast model and the observed data for summer flounder and the considerations for evaluating inter-annual variability versus overall 1-10 year prediction trend of the population centroid. It was also questioned how the centroid signal could be influenced by variability in the timing of the seasonal migration due to the inter-annual variability in temperature (e.g., stocks staying further north longer because of warmer water). The group supported the model outputs that provide not only the point estimates from the forecast model but also the associated

uncertainty associated with the estimate and if the observed data falls within the estimate bounds.

- The project team noted the forecast model does a pretty good job at predicting the observed inter-annual variability in the population centroid, except for the last year of the prediction, which is the most uncertain model estimate. Need to consider the trade-offs associated with specifying a model to appropriately capture the inter-annual variability but also need to pick-up the correct long-term (10 year) trend in the signal as well.

Additional webinars/meetings with the project team and the EOP Committee and AP will be held in the future as the other three species-specific models are developed and the project begins to wrap-up. Staff will also keep the Council apprised of any project updates and developments.



Research Set-Aside (RSA) Workshop Meeting 4 – Summary Recommendations

Wednesday, February 16, 2022

Compiled by
Brandon Muffley and Andrew Loftus

SUMMARY OUTCOMES

Research Set-Aside Workshop
Workshop 4 (Summary Recommendations)
Wednesday, February 16, 2022

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Appendix V. Presentation: Draft Goals of RSA Program

Appendix VI. Presentation: Topic #1 - Who is Involved in the RSA Program?

Appendix VII. Presentation: Topic #2 - How Would You Allocate/Divide RSA Quota?

Appendix VIII. Presentation: Topic #3 - What does an RSA trip look like?

Appendix IX. Workshop 4 Registrants

SUMMARY OUTCOMES

Research Set-Aside Workshop Workshop Meeting 4 (Summary Recommendations)

Workshop Goal: The goal of Workshop Meeting 4 is to review the recommendations from the first three workshops and provide input for consideration by the Council’s Research Steering Committee (RSC) regarding recommendations for RSA program redevelopment.

Next steps after this workshop

Dr. Michelle Duval (RSC Chair)

(Full presentation is included in Appendix II)

- April 27th – RSC meeting to review all input and develop guidance and final recommendations for Council consideration.
- June 7–9 – Council meeting to review RSC recommendations and make a decision on whether to redevelop the RSA program.
- Depending on decision from Council:
 - If the decision is “no,” there will be no further (immediate) work on redevelopment.
 - If the decision is “yes,” begin to develop appropriate management action document (i.e., framework or amendment).
 - Depending upon action and included components, it would likely be 1+ years to complete.
 - Will need to coordinate/work with the Atlantic States Marine Fisheries Commission and state agency staff/enforcement on program details and specifics.

Role of the Scientific and Statistical Committee (SSC) Economic Work Group

Presentation by Dr. Geret DePiper (Chair, SSC Economic Work Group)

(NOTE: Full presentation is included in Appendix III and key points of the question & answer dialogue are captured in the appropriate summary section of the discussions below.)

Key Points

- Economic Work Group was established by the Council specifically to provide input into the economic impact of issues before the Council.
- Collaborative and iterative process with the Council structure.
- RSA program inherently has a number of economic implications.
- A series of white papers has been developed for each of the previous RSA Workshops (Workshops 1-3).
- Supporting material for today’s workshop focus on how the program design impacts the ability to achieve RSA goals:
 - Who participates.
 - How quota is allocated.
 - What RSA trips look like.

Workshop 1-3 Recap/brief overview of issues from the previous program

Presentation by Andrew Loftus (workshop facilitator)
(NOTE: Full presentation is included in Appendix IV)

Key Points

- **Workshop 1 (Research)**
 - Identify how research goals will be prioritized, projects will be screened, and results will inform management/be communicated to the Council and stakeholders.
- **Workshop 2 (Funding)**
 - Discuss how the program will be administered (federal grant program), discuss funding mechanism, and indicate that projects should be tied to management/assessment needs.
- **Workshop 3 (Enforcement)**
 - Identify potential program modifications that could prevent reoccurrence of previous enforcement issues.
- **Workshop 4 (Recommendations)**
 - Review the recommendations from the first three meetings (synthesized by the RSC) and provide input for RSC consideration regarding recommendations for RSA program redevelopment.

Workshop Goal Discussions

Draft Goals of RSA Program

Brandon Muffley (MAFMC staff)
(NOTE: Full presentation is included in Appendix V).

Summary

- Based on feedback and input from workshop #1 - #3, identified a list of nearly 20 different potential objectives.
 - RSC took that list and created four draft goals and associated objectives.
- Developed a decision tree to identify different RSA program components and consider how they may support the goals and objectives identified.
- Prioritized and refined the draft Goals and Objectives
 - Identified linkages across goals and implications for working through decision tree.
 - Consider trade-offs associated with different decision tree options in achieving specified goals.
- Goals and Objectives provide the overall framework for a possibly revised program; while alternatives/questions in the decision tree specify the structure and details of program in support of goals.

Listed in Priority Order. **Blue capitalized lettering** indicates language added during the discussion.

Goal 1. Produce quality, **APPROPRIATELY** peer-reviewed research that maximizes benefits to the Council, **MANAGEMENT PARTNERS, AND THE** public and enhances the Council’s understanding of its managed resources (Research)

1. Support more applied management-focused research activities.
2. Higher priority on proposed RSA projects whose results would likely have immediate application to species management.
3. Discourage commitments to longer-term monitoring projects.
4. Ensure all data collected (funding and research) through the RSA program is open access.

Goal 1 Discussion

- It is implied that states are included in the RSA program. For jointly managed species, should add language “management partners.”
- Does all research need to be peer reviewed?
 - Should be scientifically valid but not necessarily a full independent peer review process.
 - The intent of “peer review” is to set a high bar, not necessarily an outside peer review such as for publication.
 - There is a peer review by NOAA as part of the RSA process.
 - Conclusion: Peer reviewed does not mean published.
- “Open access” for data is a lofty goal but may be difficult to implement.
 - “Confidential data” may not be able to be open access.
 - All objectives are subject to laws etc. so this would apply to open access and confidential data.
- For objective #2, suggestion to replace the word “immediate” with “timely” noting that research does take time and as does the QA/QC and peer review and key is having the information available when its needed.

Goal 2: Ensure effective monitoring, accountability, and enforcement of RSA quota (Enforcement and Administration)

<u>Original Order</u>	<u>Revised Order</u>	Goal #2 Objective
1	4	Minimize law and admin (agency and researcher) burdens.
2	6	Improve STATES’ ability to revoke RSA fishing privileges.
3	5	Provide support for admin and law activities.
4	1	Apply enhanced, adaptive, and consistent enforcement standards and controls.
5	3	Increase state-federal science, enforcement, and administration collaboration and cooperation.
6	2	Ensure compliance with the reporting and use of the RSA quota.

Goal 2 Discussion

- Move #4 (“Apply...”) and #5 “Ensure....” Should be moved up if this is prioritized.
- “Improve ability to revoke RSA fishing privileges” is not needed for the Federal level but is really applicable to the state level enforcement (perhaps add “state” into bullet 2).
- Suggested order for prioritization is 4, 6, 5, 1, 3, 2, agreed upon with no objection.

Goal 3: Generate resources to fund research projects that align with the priorities of the Council (Funding)

1. Maximize revenues from RSA quota.
2. Provide equitable opportunity to fund research across all Council-managed species.
3. Increase scientific and industry partnerships.
4. Evaluate fairness in fishing community access to RSA quota.

Goal 3 Discussion

- Does #2 mean using money from a species of value to support research on other species?
Response: Yes, including this objective would indicate a willingness to use funds generated from one species to support research for another species. By including this objective, this would also answer, by default, questions raised in the decision tree document (see Topic 2, Questions 2A and 2B)
- “Maximizing revenues” depends on how it is defined. “Maximize” doesn’t necessarily mean getting the highest gross return, but a high net return; minimizing administrative and law enforcement costs might maximize the net revenue of a program.

Goal 4: Foster collaboration and trust between scientific and fishing communities and the general public

1. Ensure all data collected (funding and research) through the RSA program is open access. [Move to #2]
2. Ensure an open, accountable, and transparent process through all steps (funding and research) of the RSA program. [Move to #1]
3. Increase scientific and industry partnerships.
4. Evaluate fairness in fishing community access to RSA quota.

Goal 4 Discussion

- A suggestion was made to combine Goal 1 and 4. However, others thought that they should remain separate, particularly to keep an emphasis on fostering fair collaboration with the fishing community. The point was made that quota taken away from fishermen for RSA should be used to provide science that benefits everyone, not just improve relationships with those participating in the RSA program.
- Objective #2 should be moved to the top.
- Need to be cautious about the expectations set by some of these objectives; certain aspects are confidential by law and cannot be “open.”

Public questions/comments on Goals

- Input was offered that Goal 4 should be prioritized as the first one; trust should be the foundation, and participation of the fishing community is necessary for the RSA program. Following discussion, the Panel consensus was to leave the Goals prioritized as is.

Specific Topic Discussions

- **Red/Orange text** indicates the options recommended by the RSC.
- **Green lettering** is text added following the January RSC meeting.
- **Blue lettering** indicates language added during the discussion during this meeting.

Topic #1 - Who is involved in the RSA program?

Dr. Mark Holliday (SSC Economic Work Group)

(NOTE: Full presentation is included in Appendix VI)

Topic 1 Summary

- Accept that trade-offs are a natural consequence of decision making.
- Clearly document rationale for decisions.

Topic #1 - Who is involved in the RSA program	
Top Tier/Highest Priority Questions	
1A. Allow commercial sector participation only	
1B. Allow commercial and for-hire sector participation (no private recreational fishermen)	
1Bi. Phase-in participation by one sector	
1C. Allocation of quota across sectors or keep separate	
2A. Fixed percentage of ABC for each fishery (i.e., different percentages for each fishery)	
2B. Fixed percentage of ABC across all fisheries	
2C. Fixed number of pounds for each fishery	
3A. Allow participation only by federally-permitted vessels	
3B. Allow participation by federally-permitted and state-permitted vessels	
3Bi. Phase-in participation by permitted (state) vessels	
3Bii. Appropriate/standardized reporting for all vessels	
3C. Do not allow participation by vessel owners that are also dealers unless dealer has a physical address for place of business	
4. Allow states to opt out of shoreside participation in an RSA program (e.g., providing required state exemption permits, etc.)	
5A. Cap the number of vessels that can participate within each state	
5Ai. Cap by sector (depending on alternatives 1A-1C)	
6A. Require Allow observers/state staff onboard all RSA compensation fishing trips	
6B. Require Allow all vessels to be equipped with VMS or AIS	

Topic 1 Discussion Summary

Option Set 1 (1A-1C)

- General support for keeping the RSA program open to both Commercial and For-Hire fishermen. Both sectors are important for generating specific science and if there is discontent from sectors that are excluded it is likely to erode long-term support for the program.
- Some comments that allocation of the RSA quota should be determined by the Council and that setting a standard for separate allocations as part of the RSA plan would complicate implementation and monitoring.
- Details will need to be fleshed out further by the RSC.

Option Set 2 (2A-2C)

- From an implementation standpoint, dealing with “fixed poundage” rather than a percentage is much easier.
- Requiring a percentage of ABC from each fishery may be problematic in the long-term. The value of a specific fish changes over time and species that don’t generate sufficient revenue would not result in bids for harvest.
- The Council would have the option to not allocate RSA quota for species with little value.

Option Set 3 (3A-3C)

- Both federal and state-permitted vessels should be subject to the same reporting requirements.
- Support for sub-options associated with 3B (those in green).

Option Set 4

- There is a legal gray area for a state to opt out of allowing federally-permitted vessels to participate in federally-approved activities.
- “Opt in” might be a better option than opt out. Providing states flexibility to limit the sectors that can participate may help alleviate administrative burden and encourage states to opt in.
- Federal regulations and permits are helpful for enforcement; some states do not have the capability to enforce some issues with the existing state-issued permit infrastructure.

Option Set 5 (5A-5Ai)

- No recommendation; this should be a state decision.
- Current limitation of 50 federally-permitted vessels per RSA supported project.

Option Set 6 (6A-6B)

- Changing “require” to “allow” would make these requirements a moot point.
- Law enforcement needs to weigh in on this.
- Some discussion that “allow” applied to observers but that “require” pertained to VMS or AIS. These are two very different electronic systems and further discussion needs to occur.
- Overall support for some type of electronic monitoring and the RSC needs to consider/discuss this further.

Topic #2: How would you allocate/divide the RSA quota?

Dr. Geret DePiper (SSC Economic Work Group)

(NOTE: Full presentation is included in Appendix VII)

Topic 2 Summary

Topic #2 - How would you allocate/divide RSA quota	
Top Tier/Highest Priority Questions	
1A. RSA applies to all fisheries/species	1B. RSA only for select fisheries/species
2A. Allow specific percentage of projected revenue from species quota sale to be used for research on other species	2B. All revenue from species quota sale can only be used for research related to that species
3A. Funding mechanism should include ability to use both bilateral agreements and third party auctions	3B. Funding mechanism should include the use of only bilateral agreements or third party auctions (only one)
3A-Bi. Conduct periodic review of funding mechanism(s) to determine approach supports or undermines project or program objectives	
Secondary Tier Priority Questions	
4A. Single species quota lots only	4Ai. Allow specific percentage of revenue from species quota sale to be used for other species research
	4Aii. All revenue from species quota sale can only be used for that species
4B. Bundled and single species quota lots	
5A. Support short-term projects only (2-3 years max)	5B. Support short- and long-term projects (i.e., monitoring)
6A. Proposals need to identify scientific need and how results will reduce uncertainty	6B. Proposals need to identify how results will address a timely/relevant management issue
6C. Proposals need to include a detailed data sharing/management plan	

Topic 2 Discussion Summary

Option Set 1 (1A-1B)

- Agreed that the language for these options should be revised to clarify that it refers to FMPs and species and not fishing sectors (e.g., private recreational fisherman are not a component of the RSA program).
- The Council would have the option to allocate or not any specific species.

Option Set 2 (2A-2B)

- Consensus that funds generated by RSA could be used to support research for any managed species (MAFMC and any other management entity, e.g., ASMFC or NEFMC). This requires additional discussion by the RSC.

Option Set 3

- The Council doesn't have the ability to tell a PI how to monetize a quota but Council could offer guidance or recommendations. This option allows for both bilateral and third party (i.e., auction) agreements.
- 3A and 3Ai —if/when conducting future reviews of the RSA funding mechanism(s), need to include mortality as part of this review to ensure we are minimizing/not

increasing mortality associated with harvest of RSA quota and mortality associated with RSA related research.

Topic #3 - What does an RSA trip look like?

Dr. Lee Anderson (SSC Economic Work Group)

(NOTE: Full presentation is included in Appendix VIII)

Topic 3 Summary

Topic #3 - What does an RSA trip look like
Top Tier/Highest Priority Questions
1A. Compensation harvest completely decoupled from funded research (i.e. vessels harvesting RSA quota are not vessels conducting research) 1B. Compensation harvest decoupled from research activity, but vessels harvesting RSA quota also participate in research trips 1C. Where feasible, compensation harvest is coupled with research activity
2A. Require RSA harvest OF A SPECIFIC SPECIES to occur on separate trips from non-RSA harvest OF THAT SAME SPECIES 2B. Allow both RSA and non-RSA harvest on the same trip
3A. Limit RSA offloads to specific ports in each state 3Ai. Limit RSA sales to specific dealers in each state 3Ai(1). Limit RSA sales to only federally permitted dealers 3B. Require all RSA quota to be offloaded at the same port from pre-trip notification
4. Limit RSA offloads to specific hours (e.g., 6am-8pm)
5A. Require all participating vessels to submit a pre-trip notification 24hrs in advance to declare intent to harvest RSA quota that includes port and anticipated day/time of landing. 5B. Require all vessels to report port of landing, amount of RSA quota onboard, and complete an electronic trip report at least six hours prior to landing
6A. Allow RSA trips to land quota after the regular season closes 6B. Allow RSA trips to increase trip limits during the regular season 6C. Allow RSA trips flexibility in both the timing and landings throughout the year
Secondary Tier of Priority Questions
7A. Unlimited transfer/leasing of RSA quota between vessels 7B. Do not allow transfer/leasing of RSA quota except under catastrophic circumstances. 7C. Allow for one or limited number of transfers/leases of RSA quota between vessels

Topic 3 Discussion Summary

Option Set 1 (1A-1C)

- It is very rare where harvesting activities are integrated into the research activities (option 1C) but the group supports for keeping this option since there is concern for increasing mortality by allowing harvest under the RSA program and the mortality associated with the research.

Option Set 2 (2A-2B)

- Having dedicated trips will likely improve enforceability and administration of the program.
- However, this may increase discards and complicate trips for fishermen.
- “Landing flexibility” allows vessels to possess another state’s quota in other states along the coast and was not in place when the previous RSA program was in place which may complicate this option.
- Summary: RSA trips/harvest and non-RSA trips/harvest *for the same species* could not occur on the same trip but harvesting of other species where RSA quota is not used would be allowed. All harvest of a species under a declared RSA trip (e.g., summer flounder) would count against the RSA quota, regardless if under/over the state designated trip limit.
- RSC needs to discuss how to address remnant RSA quota that is not sufficient to justify a separate trip.

Option Set 3 (3A-3B)

- This requirement is feasible and the intent of the program currently.

Option Set 4

- No discussion (RSC indicated this is a state issue and they should identify offload timing requirements based on fishery needs and enforcement capabilities)

Option Set 5 (5A-5B)

- No objection but some thought that both 5A and 5B should both be required for an enforceable program. However, there was considerable concern about requiring an electronic trip report 6 hours before landing since some trips in the Mid-Atlantic are not even 6 hours long.
- eVTRs require reporting (completion of the VTR) before they enter port. Any pre-landing reporting will aid enforcement.
- RSC needs to discuss the 6 hour pre-landing reporting requirement (5B).

Option Set 6 (6A-6C)

- This must be interpreted in the context of all of the other requirements specified earlier.
- This allows flexibility (e.g., after season closure and higher trip limits).

Option Set 7 (7A-7C)

- Not discussed (second tier questions)

Public questions/comment

- Topic 3, Option 2A – maybe one compromise is to specify by species; require harvest of RSA
- What happens if a vessel has a small amount of RSA quota left over? This needs to be addressed.

Wrapping it all up: Summary of Consensus Decisions

Andrew Loftus (workshop facilitator)

- The RSC needs to assemble a summary table comparing elements of the former RSA program to that proposed through this workshop process, particularly addressing the issues that were identified when the old program was discontinued.
- Goals 1-4 were agreed to with the current priority order. Some reordering of objectives under specific goals and some word tweaking were recommended but not major changes.

Topic Areas

- Recommendations made by the RSC were generally agreed to with some clarification and tweaking.
- More discussion is needed on monitoring – electronic and state-observer and the different components of VMS and AIS.
- Possibly provide a state opt-in option (rather than opt out) regarding participation in the RSA program.
- Need to consider a state’s ability (or lack of) for regulating a state-permitted vessel participating in a federally approved RSA program; some states lack the authority.
- Include a recommendation “Where feasible, compensation harvest is coupled with research activity.”
- Need further refinement of Topic 3, 2A. “Require RSA harvest to occur on separate trips from non-RSA harvest” and the nuances to this in consideration of the impacts on increasing discard of fish. Make sure that it refers to specific RSA species quota.
- General agreement on the need for tight pre-trip notification of an RSA trip (and species) as well as pre-landing notification, although the 6 hour requirement may need to be nuanced.
- At a future meeting, the RSC will be considering all of these discussions and some second tier questions that were not addressed in this workshop before making a recommendation to the Council.

Appendix I. Workshop 4 Agenda



Research Set-Aside Workshop Workshop Meeting 4

Wednesday, February 16, 2022
9:00 a.m. – 4:00 p.m. EST

Webinar Link: [RSA Redevelopment Workshop #4](#)

Meeting Number (Access code): 2338 185 4153; Password: 6WQi2whHrX7

Meeting Page: <https://www.mafmc.org/council-events/rsa-workshop-4>

Purpose

The Mid-Atlantic Fishery Management Council and its Research Steering Committee (RSC) are hosting a Research Set-Aside (RSA) Workshop to help the RSC develop a recommendation to the Council with public input on whether and how to redevelop the Mid-Atlantic RSA program. *The goal of Workshop Meeting 4 is to review the recommendations from the first three meetings and provide input for RSC consideration regarding recommendations for RSA program redevelopment.* For additional background information and details on the other workshops, please visit: <https://www.mafmc.org/workshop/rsa>.

Briefing Materials

- 2021 RSA Workshop Final Reports: [Workshop #1](#), [Workshop #2](#), and [Workshop #3](#)
- [RSC Meeting Summary from January 18, 2022](#)
- RSA Decision Tree Tables (posted on the workshop meeting page)
- SSC Economic Work Group Memo: Decision Tree Cost/Benefit and Trade-off Considerations (posted on the workshop meeting page)

Supplemental Materials

- [2014 Program Issues Memo](#)
- [2019 New England Fishery Management Council RSA Program Review](#) (focus on Sections 4 and 6)
- [Comprehensive Historical Program Documentation](#)

Agenda

- 9:00 a.m. – 10:00 a.m.**
- Welcome** - Research Steering Committee and Council Chairs
 - Ground Rules & Review of Workshop Structure** - Andrew Loftus (Facilitator)
 - Next steps after this workshop** - Michelle Duval, RSC Chair
 - Role of the SSC Economic Work Group** - Geret DePiper, Economic Work Group Chair
 - Workshop 1-3 Recap/brief overview of issues from the previous program** - Andrew Loftus
- 10:00 a.m. – 10:15 a.m.**
- Overview of RSC process since last workshop** – Brandon Muffley
 - **Public questions/comment**
- 10:20 a.m. – 10:30 a.m.**
- Break**
- 10:30 a.m. – 11:30 a.m.**
- Draft Goals of RSA Program** – seek comments on goals for an RSA Program - Brandon Muffley
 - **Facilitated Discussion**
 - **Public questions/comment**
 - **Panel Consensus**
- 11:30 a.m. – 12:30 p.m.**
- Topic 1 – Who is involved in the RSA program?** – Mark Holliday, Economic Work Group
 - **Review and comments on draft RSC decisions**
 - **Facilitated Discussion**
 - **Public questions/comment**
 - **Panel Consensus**
- 12:30 p.m. – 1:00 p.m.**
- Lunch**
- 1:00 p.m. – 2:00 p.m.**
- Topic 2 – How would you allocate/divide the RSA quota?** – Geret DePiper, Economic Work Group
 - **Review and comments on draft RSC decisions**
 - **Facilitated Discussion**
 - **Public questions/comment**
 - **Panel Consensus**
- 2:00 p.m. – 3:00 p.m.**
- Topic 3 – What does an RSA trip look like?** – Lee Anderson, Economic Work Group
 - **Review and comments on draft RSC decisions**
 - **Facilitated Discussion**
 - **Public questions/comment**
 - **Panel Consensus**

3:00 p.m. – 3:15 p.m.	Break
3:15 p.m. – 3:45 p.m.	Wrapping it all up: Summary of Consensus Decisions - Andrew Loftus <ul style="list-style-type: none">• Public Comment
3:45 p.m. – 4:00 p.m.	Next Steps - Michelle Duval
4:00 p.m.	Adjourn

Note: agenda topic times are approximate and subject to change

Presentations are not included here for space considerations but can be found in the final report posted to the Workshop #4 meeting page at: <https://www.mafmc.org/council-events/rsa-workshop-4>

Appendix II. Presentation: Process and Timeline for Possible RSA Redevelopment

Appendix III. Presentation: Economic Work Group Overview

Appendix IV. Presentation: Synopsis of RSA Workshop Outcomes

Appendix V. Presentation: Draft Goals of RSA Program

Appendix VI. Presentation: Topic #1 - Who is Involved in the RSA Program?

Appendix VII. Presentation: Topic #2 - How Would You Allocate/Divide RSA Quota?

Appendix VIII. Presentation: Topic #3 - What does an RSA trip look like?

Appendix IX. Workshop 4 Registrants

First Name	Last Name	Affiliation
Panelists		
John	Almeida	NOAA General Counsel
Lee	Anderson	MAFMC Scientific and Statistical Committee (Econ WG)
Chris	Batsavage	MAFMC Research Steering Committee
Bob	Beal	Atlantic States Marine Fisheries Commission
Eleanor	Bochenek	NFI-SMC, Retired Rutgers University
James	Cassin	NOAA Office of Law Enforcement
Laura	Deighan	NMFS GARFO
Geret	DePiper	MAFMC Scientific and Statistical Committee (Econ WG)
Michelle	Duval	MAFMC Research Steering Committee
Pat	Geer	MAFMC Research Steering Committee
Emily	Gilbert	NMFS GARFO
Laura	Hansen	NMFS GARFO
Emerson	Hasbrouck	Cornell University
Dewey	Hemilright	Council Member (Law Enforcement Committee)
Mark	Holliday	MAFMC Scientific and Statistical Committee (Econ WG)
Shannah	Jaburek	NMFS GARFO
Yan	Jiao	MAFMC Scientific and Statistical Committee (Econ WG)
Michael	Lanning	NMFS GARFO
Scott	Lenox	Council Member (Law Enforcement Committee)
Andrew	Loftus	Facilitator
Mike	Luisi	Maryland Dept. of Natural Resources/MAFMC Chair
Brandon	Muffley	MAFMC Staff
Adam	Nowalsky	MAFMC Research Steering Committee
Eric	Powell	Successful applicant/SCMFIS
Paul	Rago	MAFMC Scientific and Statistical Committee (Econ WG)
Sean	Reilly	NYSDEC Police
Paul	Risi	MAFMC Research Steering Committee
Mary	Sabo	MAFMC staff
Ryan	Silva	NOAA Fisheries/MAFMC Research Steering Committee
Todd	Smith	NOAA Office of Law Enforcement
Jason	Snellbaker	NJ Marine Enforcement Unit/ASMFC LEC
Wes	Townsend	MAFMC Vice Chair
Kate	Wilke	MAFMC Research Steering Committee
General Public and Other Participants		
Katie	Almeida	The Town Dock
Sam	Asci	New England Fishery Management Council staff

Dave	Bethoney	Commercial Fisheries Research Foundation
Bonnie	Brady	Long Island Commercial Fishing Association
Jay	Hermsen	NMFS GARFO
Tara	McClintock	Cornell University Cooperative Extension-Marine Program
Nichola	Meserve	MA Division of Marine Fisheries
Mike	Plaia	AP member - MAFMC, NEFMC, ASMFC
Brad	Schondelmeir	MA Division of Marine Fisheries
Sarah	Turner	NMFS GARFO
Mike	Waine	American Sportfishing Association
Scott	Curatolo-Wageman	Cornell Cooperative Extension