Black Sea Bass
Commercial State Allocation Amendment

Public Hearing Document

October 2020

Prepared by
The Mid-Atlantic Fishery Management Council (Council) and
The Atlantic States Marine Fisheries Commission (Commission)

The management alternatives described in this document are identical to those included in the Atlantic States Marine Fisheries Commission's Draft Addendum XXXIII.

For more information about this action, visit: https://www.mafmc.org/actions/bsb-commercial-allocation.

Public Comment Process and Proposed Timeline

Black sea bass are jointly managed by the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission). In October 2019, the Commission's Summer Flounder, Scup, and Black Sea Bass Management Board (Board) initiated development of Draft Addendum XXXIII to the Interstate Fishery Management Plan (FMP) for Summer Flounder, Scup, and Black Sea Bass. In December 2019, the Council initiated a complementary amendment. This amendment/addendum considers modifications to the black sea bass commercial state allocations and also considers adding the state specific commercial allocations to the Council's FMP. This document presents background on black sea bass commercial management and a range of management alternatives for public consideration and comment. The addendum process and expected timeline are below.

Timeframe	Action
2019 through Summer 2020	Draft range of alternatives developed
August 2020	Council and Board approve final range of management alternatives
October - November 2020	Public comment period
December 2020 (anticipated)	Final action (selection of preferred alternatives)
Early through mid 2020	Federal rulemaking (depending on preferred alternatives selected)

You are encouraged to submit comments on this action at any time during the public comment period. **The final date comments will be accepted is November 13, 2020 at 11:59 p.m.** Comments may be submitted at any of the hearings listed on the next page, by mail, email, fax, or through an online comment form. If you have any questions or would like to submit comments, please use the contact information below. **All comments will be made available to both the Commission and Council for consideration; duplicate comments do not need to be submitted to both bodies.**

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Online: https://www.mafmc.org/comments/bsb-allocation

Webinar Dates and Instructions

Due to the COVID-19 pandemic, all hearings will be conducted via webinar, with designated hearings for individual states and regions. You are encouraged to participate in the hearing for your state or region; however, all hearings are open to all individuals. Please note that in order to comment during the hearings you will need to use GoToWebinar. If you call in without using GoToWebinar, you will be in listen only mode and will not be able to provide input. Webinar dates, registration links, and call-in information are provided on the next page.

State/Region	Date and Time
Virginia	Thursday, 10/8/2020 6-8 pm
North Carolina	Tuesday, 10/13/2020 6-8 pm
Delaware and Maryland	Wednesday, 10/14/2020 6-8 pm
Connecticut and New York	Thursday, 10/15/2020 6-8 pm
New Jersey	Tuesday, 10/27/2020 6-8 pm
Rhode Island	Wednesday, 10/28/2020 6-8 pm
Massachusetts	Thursday, 10/29/2020 6-8 pm

You can access GoToWebinar through your computer, tablet, or smartphone. To download the software, click here or search for "GoToWebinar" in the app store on your smart phone or tablet. We recommend you register for the hearing well in advance. GoToWebinar will provide you with a link to test your device's compatibility with the webinar. If you find your device is not compatible, please contact the Commission at info@asmfc.org (subject line: GoToWebinar help) and Commission staff will try to get you connected. We also strongly encourage participants to **use the computer voice over internet (VoIP)** so you can ask questions and provide input at the hearing. Those joining by phone only will be limited to listening to the presentation and will not be able to provide input. In those cases, you can send your comments to staff via email, mail, or fax at any time during the public comment period.

To register for a public hearing please click here: Public Hearing Registration

As part of the registration process, you must select the date and time of the hearing you wish to attend (see table above).

To attend the webinar in listen only mode, you may dial this number: 562.247.8422; Access Code: 412-241-258. Please note that those joining by phone only will be limited to listening to the presentation and will not be able to speak. In those cases, you can send your comments to staff via email, mail, or fax at any time during the public comment period.

Tips for Providing Public Comment

We value your input. To be most effective, we request that your comment include specific details as to why you support or oppose a particular proposed management option. Specifically, please address the following:

- Which proposed options/sub-options do you support, and which options/sub-options do you oppose?
- Why do you support or oppose the option(s)?
- Is there any additional information you think should be considered?

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1.0 Introduction

This amendment and the Commission's corresponding Draft Addendum XXXIII propose alternative approaches for allocating the coastwide black sea bass commercial quota among the states[1]. This amendment/addendum has the following two goals:

- To consider adjusting the current commercial black sea bass allocations using current distribution and abundance of black sea bass as one of several adjustment factors to achieve more balanced access to the resource. These adjustment factors will be identified as the development process moves forward.
- To consider whether the state allocations should continue to be managed only under the Commission's FMP or whether they should be managed under both the Commission and Council FMPs[2].

The management unit for black sea bass in US waters is the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border. The black sea bass fisheries are managed cooperatively by the states through the Commission in state waters (0-3 miles), and through the Mid-Atlantic Fishery Management Council (Council) and NOAA Fisheries in federal waters (3-200 miles).

The Council and Commission are both responsible for implementing the annual coastwide commercial quota. Currently, only the Commission is responsible for managing the state by state allocation of the coastwide quota. The current state quota allocations were established in 2003 through Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP, and extended indefinitely through Addendum XIX (2007).

2.0 Overview

2.1 Statement of Problem

State allocations of the commercial black sea bass quota were originally implemented in 2003 as part of joint Amendment 13, loosely based on historical landings from 1980-2001. The state shares in Amendment 13 allocated 67% of the coast-wide commercial quota among the states of New Jersey through North Carolina (North of Cape Hatteras) and 33% among the states of New York through Maine. These state commercial allocations have never been modified.

Over the last decade, the distribution of the black sea bass stock has changed, abundance and biomass have increased significantly, and there have been corresponding changes in fishing effort and behavior. According to the most recent black sea bass stock assessment, which modeled fish north and south of Hudson Canyon separately, the majority of the stock occurred in the southern region prior to the mid-2000s (NEFSC 2019). Since then the biomass in the northern region has grown considerably. Although the amount of biomass in the southern region has not declined in recent years, the northern region currently accounts for the majority of

[1] The Council and Commission are also developing a separate joint amendment to consider modifications to the allocations of total allowable catch or landings between the commercial and recreational sectors for summer flounder, scup, and black sea bass. A change to the commercial/recreational black sea bass allocation could impact the amount of quota available to the states, but would not impact the percentage allocations among the states. Information on commercial/recreational allocation amendment can be found at http://www.mafmc.org/actions/sfsbsb-allocation-amendment.

[2] In this document it is noted that the Council and Board could choose between proposed management options to modify the black sea bass state commercial allocations. If it is decided that the state allocations should not be added to the Council's FMP, then only the Board would select the management program.

spawning stock biomass (Figure 1). This shift in black sea biomass distribution has also been supported by peer reviewed scientific research (e.g., Bell et al., 2015).

In some cases, expansion of the black sea bass stock into areas with historically minimal fishing effort has created significant disparities between state allocations and current abundance and resource availability. The most noteworthy example is Connecticut, which has experienced significant increases in black sea bass abundance and fishery availability in Long Island Sound in recent years but is only allocated 1% of the coastwide commercial quota. As previously stated, this allocation was based loosely on landings from 1980-2001.

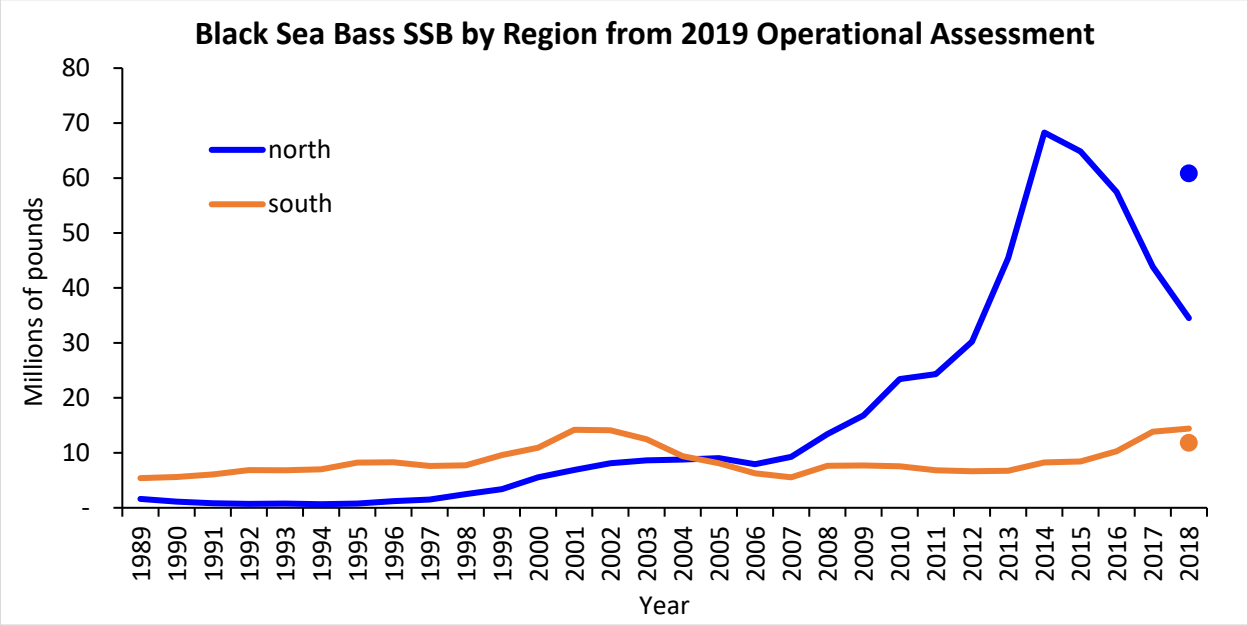

Figure 1. Black sea bass spawning stock biomass by region from the 2019 Operational Assessment Update. Open marks represent retro-adjusted values (used to set catch limits). Source: Personal communication with Northeast Fishery Science Center.

2.2 Background

The joint Council/Commission management program for black sea bass began in 1996. The corresponding FMPs established an annual process of developing commercial quotas, recreational harvest limits, and recreational and commercial management measures, as well as a series of permitting and reporting requirements. Initially, the annual coastwide commercial quota was divided into four quarters: January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31.

Under the quarterly quota allocation system, the fishery was subjected to lengthy closures and some significant quota overages. Fishery closures occurring as a result of quotas being fully utilized or exceeded resulted in increased discards of legal sized black sea bass in mixed species fisheries for the remainder of the closure period. Significant financial hardship on the part of the fishing industry also resulted from a decrease in market demand caused by a fluctuating supply. To address these issues, a series of emergency rules were used in 2001 to establish initial possession limits, triggers, and adjusted possession limits. While these measures helped reduce the length of fishery closures, the frequent regulatory changes confused fishermen and added significant administrative burden. The Commission's Addendum VI (2002) provided a

mechanism for setting initial possession limits, triggers, and adjusted possession limits during the annual specification setting process without the need for further emergency rules.

The quarterly quota system was replaced with an annual quota system under joint Amendment 13, approved by the Council and Commission in May 2002. The Amendment implemented a federal coastwide commercial quota, and a state-by-state allocation system for 2003 and 2004 to be managed by the Commission. This system was adopted to reduce fishery closures, achieve more equitable distribution of quota to fishermen, and allow the states to manage their commercial quota for the greatest benefit of the industry in their state.

At the time of final action on Amendment 13, the Council expressed a desire that the state allocations be managed at both the state and federal levels and contained in both the Council and Commission's FMPs. However, the NOAA Fisheries Regional Administrator at the time said a state quota system at the federal level could not be monitored effectively with the then current monitoring methods due to the anticipated low allocations in some states. As a result, the Council approved a federal annual coastwide quota, acknowledging that this would facilitate the use of state allocations through the Commission's FMP. Many of the concerns with monitoring state quotas at the federal level have subsequently been resolved with changes to how commercial landings are reported.

The state-specific shares adopted through Amendment 13 include the following: Maine and New Hampshire 0.5%, Connecticut 1%, Delaware 5%, New York 7%, Rhode Island, North Carolina and Maryland 11%, Massachusetts 13%, New Jersey and Virginia 20% (Table 1).

The individual state shares management program was continued in 2005 and 2006 through the Commission's Addendum XII (2004). Addendum XIX, approved in 2007, extended the state shares of the commercial black sea bass quota indefinitely. No further changes have been made to the black sea bass commercial state shares. Addenda XII and XIX (2004 and 2007, respectively) allowed for the transfer of black sea bass commercial quota among states, and Addendum XX (2009) established the process for state to state quota transfers. Under the management program established through these Commission Addenda, states have the responsibility of managing their quota to provide the greatest benefit to their commercial black sea bass industry. The ability to transfer or combine quota further increased the flexibility of the system to respond to annual variations in fishing practices or landings patterns.

In response to some states' concerns about changing resource availability and associated fishery impacts, the Board formed a Commercial Black Sea Bass Working Group in August 2018 to identify management issues related to changes in stock distribution and abundance, and propose potential management strategies for Board consideration. In February 2019, the Board reviewed the Working Group report. The key issue identified by the Working Group was that the state commercial allocations implemented in 2003 do not reflect the current distribution of the resource, which has expanded significantly north of Hudson Canyon. The Board then requested that a Plan Development Team (PDT) perform additional analyses and further develop proposed management options related to the issue of state commercial allocations. After reviewing the PDT report, in October 2019 the Board initiated Draft Addendum XXXIII to consider changes to the black sea bass commercial state allocations. In December 2019, the Council initiated a complementary amendment. The full range of management alternatives considered through this addendum and amendment are described in the next section of this document.

Table 1. State shares of Black Sea Bass as allocated by Addendum XIX to Amendment 13.

State	Percent of Coastwide Quota
Maine	0.5 %
New Hampshire	0.5 %
Massachusetts	13 %
Rhode Island	11 %
Connecticut	1 %
New York	7 %
New Jersey	20 %
Delaware	5 %
Maryland	11 %
Virginia	20 %
North Carolina	11 %

3.0 Proposed Management Program

The Council and Board are seeking public comment on each of the alternatives included in this amendment and draft addendum. A flowchart of all management alternatives for modifying the commercial state allocations is found in Appendix 1. Note that the alternatives listed in Section 3.2 would result in changes to the Council's FMP and the federal regulations, but not the Commission's FMP.

3.1 Management Alternatives for Commercial State Allocations

A. Status quo (current commercial state allocations)

This alternative would maintain the current state allocation percentages (Table 1).

B. Increase Connecticut allocation to 5%

Note: This alternative is proposed for consideration before, or in addition to any of the following allocation alternatives. It could also be selected as a standalone alternative if no other changes are desired. If this alternative is selected, the base allocations under any other alternative would be equal to the % new allocations shown in Table 2.

This alternative would increase Connecticut's 1% allocation of the coastal quota to 5%. Connecticut has experienced a substantial increase in abundance of black sea bass in state waters over the last seven years (Figure 2), though the state's 1% allocation has remained unchanged. This alternative attempts to reduce the disparity between the abundance of black sea bass in Connecticut waters and Connecticut's quota allocation by increasing Connecticut's allocation to 5%, using the following approach:

1) Hold New York and Delaware allocations constant. New York has experienced a similar increase in black sea bass abundance in state waters; therefore, a reduction to the New York allocation is not proposed. Delaware's current allocation is 5%. This alternative does not seek to make Connecticut's percent allocation larger than any other state.

2) Move half of Maine and New Hampshire quotas to Connecticut. Since 2012, neither Maine nor New Hampshire have reported commercial black sea bass landings, and neither state currently has declared an interest in the fishery.

3) Move some allocation from Massachusetts, Rhode Island, New Jersey, Maryland, Virginia, and North Carolina to Connecticut. The amount moved from each state would be proportional to that state's current percent allocation.

Table 2. Proposed changes in state allocations.

State	Current % Allocation	Change in % Allocation	New % Allocation
ME	0.5%	-0.25%	0.25%
NH	0.5%	-0.25%	0.25%
MA	13.0%	-0.53%	12.47%
RI	11.0%	-0.45%	10.55%
CT	1.0%	4.00%	5.00%
NY	7.0%	0.00%	7.00%
NJ	20.0%	-0.81%	19.19%
DE	5.0%	0.00%	5.00%
MD	11.0%	-0.45%	10.55%
VA	20.0%	-0.81%	19.19%
NC	11.0%	-0.45%	10.55%

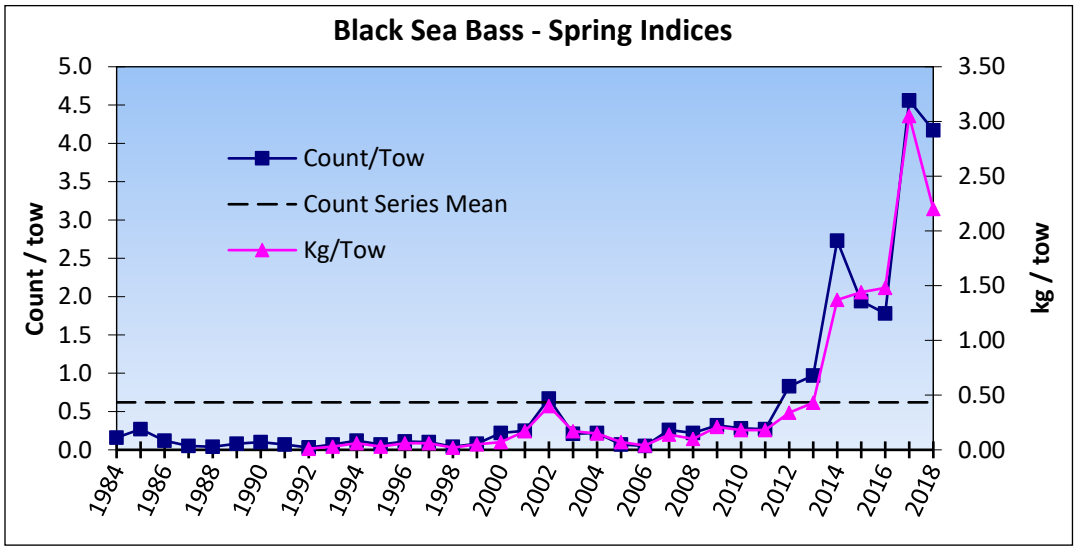

Figure 2. Connecticut Long Island Sound Trawl Survey Spring Black Sea Bass Index

C. Dynamic Adjustments to Regional Allocations

The Dynamic Adjustments to Regional Allocations approach (DARA approach) is a formulaic method that aims to balance fishery stability and responsiveness to the changing distribution of the stock. State allocations would be gradually adjusted based on regional shifts in biomass distribution. Stock distribution (defined as proportion of exploitable biomass by assessment sub-area) would be derived from updated stock

assessments or surveys[3]. This approach recognizes traditional involvement and investment in the development of the fishery and addresses the changing distribution of the stock and the resulting effects within the fishery.

There are two phases to the DARA approach. The first is the transition phase, during which the initial allocations (either the current allocations, or allocations modified through alternative B) are gradually adjusted to allocations partially based on distribution of the stock. During this phase, the state allocations become less dependent on the initial allocations and more dependent on regional stock distribution.

After the transition phase is complete, the relative importance of the initial allocations and current stock distribution in determining the allocations would be fixed, but allocations would continue to be adjusted when updated stock distribution information becomes available. The DARA approach proposes use of the 2019 operational stock assessment results (NEFSC, 2019) and additional stock assessments thereafter to determine the values for regional stock distribution[4]. Taking into account the initial allocations and regional stock distribution, the two components are integrated to produce dynamic regional allocation shares, which are then subdivided into state-specific allocations. The formulas for calculating regional and state shares can be found in Appendix 2.

As described below, there are various sub-alternatives to set the scale and pace of the change in allocations. Appendix 2 includes a complete description of the method and examples of the DARA approach applied retrospectively to recent years. If this alternative is selected, a regional configuration would also need to be selected under alternative set G.

Sub-alternatives for Dynamic Adjustments to Regional Allocations approach

The DARA approach affords considerable flexibility, with regard to both the initial configuration and application of the allocation formula over time. The overall approach can be modified in various ways to achieve different results. Below are descriptions and proposed sub-alternatives for each adjustable component of the approach. Note that the sub-alternatives for each component represent the minimum and maximum bounds on the range of alternatives; the Council and Board could select an alternative configuration within this range.

1. Final relative importance of initial allocations versus resource distribution

The sub-alternatives below determine the final relative importance of the initial allocations compared to stock distribution at the end of the transition phase. Before the transition begins (year 0), the allocations are 100% based on the initial allocations, and 0% based on stock distribution. The weights assigned to initial allocations and stock distribution must always sum to 100%; therefore, if the final weight of the initial allocations is 10%, the final weight of the resource distribution factor is 90%. As the final

[3] This option is modeled after the Transboundary Management Guidance Committee (TMGC) approach, which was developed and used for the management of Georges Bank resources shared by the United States and Canada (TMGC, 2002).

[4] The Council and Board may specify alternative information (e.g. NEFSC Trawl Survey) to be used in the case that future assessments cannot provide information on regional stock distribution.

weight of the distribution factor increases, the weight of the initial allocations decreases, and the regional allocations resulting from the DARA approach become more dependent on the spatial distribution of black sea bass biomass, and less dependent on the initial allocations.

- **Sub-alternative C1-A:** Under this alternative, at the end of the transition phase allocations are based 90% on stock distribution and 10% on the initial allocations.
- **Sub-alternative C1-B:** Under this alternative, at the end of the transition phase allocations are based 50% on stock distribution and 50% on the initial allocations.

2. Change in relative weights of each factor per adjustment

The transition to allocations based partially on historical allocations and partially on resource distribution would occur through incremental adjustments to the relative importance of each factor. These sub-alternatives would determine how much the relative weights of the initial allocations and stock distribution factors would change with each adjustment. Larger adjustments could potentially result in a faster transition away from the initial allocations (see above). Smaller adjustments would likely result in a slower transition. Adjustments to the relative weights of each factor also have the potential to impact the regional allocations during the transition; smaller changes to the weights would likely produce smaller changes in the regional allocations during each adjustment.

- **Sub-alternative C2-A:** Under this alternative, the relative weights of each factor (initial allocations and stock distribution) would change by 5% per adjustment. For example, in the first adjustment, the respective weights assigned to the initial allocations and stock distribution would change from 100%/0% to 95%/5%. This would result in a slower transition to the final weighting scheme, and a slower change in the allocations compared to sub-alternative C2-B.
- **Sub-alternative C2-B:** Under this alternative, the relative weights of each factor (initial allocations and stock distribution) would change by 20% per adjustment. For example, in the first adjustment, the respective weights assigned to the initial allocations and stock distribution would change from 100%/0% to 80%/20%. This would result in a faster transition to the final weighting scheme and a faster change in the allocations compared to sub-alternative C2-A.

3. Frequency of weight adjustments

These sub-alternatives determine how often the weights assigned to each factor (initial allocations and stock distribution) would be adjusted during the transition phase. More frequent adjustments to the weights would result in a faster transition to the final weighting scheme. Note that each time an adjustment is made to the weights, it would likely result in a change to the allocations, even if the distribution information remains unchanged.

- **Sub-alternative C3-A:** Under this alternative, adjustments to the weights assigned to the initial allocations and stock distribution would occur every year. This would result in a faster transition from the initial weights to the final weights. It could also result in yearly changes in the allocations, even if stock distribution information remains unchanged.

- **Sub-alternative C3-B:** Under this alternative, adjustments to the weights assigned to the initial allocations and stock distribution would occur every other year. This would result in a slower transition from the initial weights to the final weights. It could also result in changes to the allocations every other year, even if stock distribution information remains unchanged.

4. Regional allocation adjustment cap

These sub-alternatives would establish a cap for the maximum percent by which the regional allocations could change at one time. A lower percentage cap would result in smaller incremental changes to the allocations, and could increase the total duration of the transition phase.

- **Sub-alternative C4-A:** This alternative would cap the change in regional allocations at a maximum of 3% per adjustment.
- **Sub-alternative C4-C:** This alternative would cap the change in regional allocations at a maximum of 10% per adjustment.
- **Sub-alternative C4-D:** Under this alternative there would be no cap to the change in regional allocations per adjustment. This means the regional allocations would change according to the formula based only on changes in the weights assigned to the initial allocations and stock distribution and any changes in resource distribution values.

D. Trigger approach

Using a trigger-based approach, a minimum level of coastwide quota would be established as a trigger for a change in allocations to the states. If the coastwide quota in a given year were higher than the established quota trigger value, then the coastwide quota would be distributed to the states in two steps: 1) the amount of coastwide quota up to and including the trigger would be distributed to the states according to "base allocations" (dependent on alternative B and sub-alternative set D4); and 2) the amount of quota in excess of the established trigger amount, hereafter referred to as the surplus quota, would be distributed using a different allocation scheme. This method somewhat reduces fishery disruption or instability by allowing changes to state allocations only when the coastwide quota exceeds a predetermined amount.

Trigger approach sub-alternatives

Below are all sets of sub-alternatives for configuration of the trigger approach. The first set of sub-alternatives relates to the established trigger value (sub-alternatives D1-A and D1-B). The second set relates to how surplus quota above the trigger would be distributed among the states (sub-alternatives D2-A, and D2-B). The third and fourth sub-alternative sets are only applicable if alternative D2-B is selected, and would establish how surplus quota would be distributed within a region, and whether base allocations would remain the same each year or change over time. Examples of several trigger approach configurations are provided in examples 1-6 in Appendix 3.

1. Trigger value

Note that the Council and Board could select an alternative value within the range of sub-alternatives below.

- **Sub-alternative D1-A: Trigger value of 3 million pounds**

  A 3 million pound trigger represents approximately the average coastwide commercial quota from 2003 through 2018, excluding years in which specifications were set using a constant catch approach (Figure 3).

- **Sub-alternative D1-B: Trigger value of 4.5 million pounds**

  A 4.5 million pound trigger was selected by the Council and Board as the maximum trigger level for consideration under this approach. It is greater than all quotas implemented prior to 2020 (i.e., maximum quota of 4.12 million pounds in 2017), but lower than the 2020 quota of 5.58 million pounds (Figure 3).

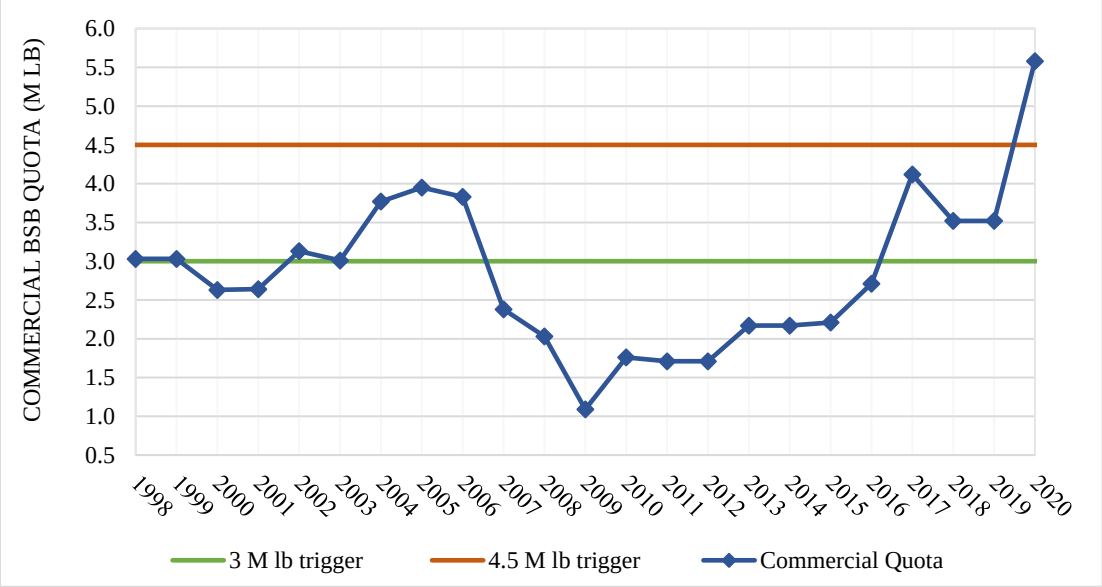

Figure 3. Black sea bass commercial quotas over time compared to 3 million, 4 million and 4.5 million pound triggers.

2. Distribution of surplus quota

- **Sub-alternative D2-A: Even distribution of surplus quota**

  If the coastwide quota in a given year is higher than the trigger, then the surplus quota would be distributed equally to the states of Massachusetts through North Carolina. Maine and New Hampshire would each receive 1% of the surplus, based on their historically low participation in the fishery. Should the annual coastwide quota be less than or equal to the established quota trigger, allocation percentages would default to the base allocations.

- **Sub-alternative D2-B: Distribution of surplus quota based on regional biomass from stock assessment**

  This sub-alternative attempts to address the goal statement of this action by incorporating the regional biomass distribution. If the coastwide quota in a given year were higher than the trigger, then the surplus quota would first be allocated to each region based on regional biomass proportions from the stock assessment, and then the regional quotas would be distributed to the states within each region. A method for distributing quota to states within each region would be specified by selecting sub-alternative D3-A or D3-B. If this alternative is selected, a regional configuration would also need to be selected under alternative set G.

3. Distribution of regional surplus quota to states within a region (*only applicable if sub-alternative D2-B is selected*)

- **Sub-alternative D3-A: Even distribution of regional surplus quota**

  Regional surplus quota would be distributed to the states within each region equally. Maine and New Hampshire would each receive 1% of the northern region surplus quota. Examples of this allocation approach are provided in Appendix 3 (examples 3 and 5).

- **Sub-alternative D3-B: Proportional distribution of regional surplus quota**

  Regional surplus quota would be distributed to the states within each region in proportion to their initial allocations (see sub-alternative set D4). Maine and New Hampshire would each receive 1% of the northern region surplus quota.

4. Allowing base allocations to change over time (*only applicable if sub-alternative D2-B is selected*).

- **Sub-alternative D4-A: Static base allocations**

  Under, this sub-alternative, the quota up to and including the trigger amount would be allocated based on the initial base allocations every year (status quo, or the modified allocations proposed in alternative B). Examples of this allocation approach are provided in Appendix 3 (examples 1-3).

- **Sub-alternative D4-B: Dynamic base allocations**

  Under this alternative, the quota up to and including the trigger amount would be allocated according to the previous year's final state allocations. This sub-alternative has the potential to change allocations more quickly than sub-alternative D4-A. Examples of this allocation approach are provided in Appendix 3 (examples 4-6).

E. Trigger approach with increase to Connecticut and New York allocations first

This alternative proposes a 3 million pound trigger (see previous section). Annually, the coastwide quota up to and including 3 million pounds would be distributed based on the initial allocations (Table 1). Surplus quota above 3 million pounds would first be used to increase Connecticut's allocation to 5% of the overall quota, and then to increase New York's allocation to 9% of the overall quota. Any remaining additional quota would be

split between the regions according to the proportion of biomass in each region based on the most recent stock assessment information, and then allocated among the states within each region in proportion to the initial allocations. Examples of this alternative are provided in Appendix 3 (examples 7 and 7-B). If this alternative is selected, a regional configuration would also need to be selected under alternative set G.

F. Percentage of coastwide quota distributed based on initial allocations

This approach would allocate a fixed percentage of the annual coastwide quota using the initial allocations regardless of the coastwide quota level. Fluctuations in annual quota values would result in similar fluctuations in the number of pounds allocated using the initial allocations (equal to the status quo allocations, or the modified allocations proposed under alternative B). For example, if the established percentage of quota to be distributed using the initial allocations is 50%, 2 million pounds of a 4 million pound coastwide quota would be distributed using the initial allocations. Unlike the trigger approach, this approach would still allow a portion of the quota to be allocated using a distribution other than the initial allocations even under lower coastwide quotas. The sub-alternatives below establish how the remaining quota would be allocated to the states.

Percentage approach sub-alternatives

Below are all sets of sub-alternatives for configuration of the percentage approach. Examples of several percentage approach configurations are provided in Appendix 3 (examples 8-12).

1. Percentage of quota to be allocated using initial allocations

Note that the Council and Board could select an alternative value within the range of sub-alternatives below.

- **Sub-alternative F1-A: 25%**

  Under this sub-alternative, 25% of the annual coastwide quota would be allocated to the states using the initial allocations. Therefore, 75% of the coastwide quota would be allocated to the states according to the sub-alternatives selected in the following sets.

- **Sub-alternative F1-B: 75%**

  Under this sub-alternative, 75% of the annual coastwide quota would be allocated to the states using the initial allocations. Therefore, 25% of the coastwide quota would be allocated to the states according to the sub-alternatives selected in the following sets.

2. Distribution of remaining quota

- **Sub-alternative F2-A: Even distribution of remaining quota**

  Remaining quota would be distributed equally to the states of Massachusetts through North Carolina. Maine and New Hampshire would each receive 1% of the remaining quota, based on their historically low participation in the fishery.

- **Sub-alternative F2-B: Distribution of remaining quota based on regional biomass from stock assessment**

  Remaining quota would first be allocated to each region based on regional biomass proportions from the stock assessment, then regional quotas would be distributed to the states within each region. A method for distributing quota to states within each region would be specified by selecting sub-alternative F3-A or F3-B. If this alternative is selected, a regional configuration would also need to be selected under alternative set G.

3. Distribution of regional quota to states within a region

(*Only applicable if sub-alternative F2-B is selected*)

- **Sub-alternative F3-A: Even distribution of regional quota**

  Remaining quota would be distributed to the states within each region equally, except Maine and New Hampshire would each receive 1% of the northern region quota.

- **Sub-alternative F3-B: Proportional distribution of regional quota**

  Remaining quota would be distributed to the states within each region in proportion to their initial allocations, except Maine and New Hampshire would each receive 1% of the northern region quota.

G. Regional configuration alternatives

Alternatives C through F consider changing the current state allocations to incorporate regional distribution information from the stock assessment. In order to apply a regional component to the allocations, it is necessary to establish a regional configuration. The following sub-alternatives establish which states would be grouped together as regions for the purposes of allocating a combined regional quota which would then be distributed to the states in each region. Though neither state has declared an interest in the fishery, Maine and New Hampshire are included in the northern region and their allocations would be determined according to the allocation approach selected above.

- **Sub-alternative G1:** This alternative would establish two regions: 1) ME-NY, and 2) NJ-NC. These regions generally align with those used for the assessment, which used Hudson Canyon as the dividing line based on several pieces of evidence that stock dynamics have an important break in this area.

- **Sub-alternative G2:** This alternative would establish three regions: 1) ME-NY; 2) NJ; and 3) DE-NC. This alternative attempts to address the unique position of New Jersey as the state straddles the border between the northern and southern spatial sub-units defined in the stock assessment (Figure 4) by treating it as a separate region. Under this alternative, New Jersey's initial 20% allocation is treated as follows: 10% is considered to come from the northern region, and 10% from the southern region. As the regional allocations change, NJ's "northern" 10% of the coastwide quota would change according to the proportion of biomass in northern region and the "southern" 10% would change according to the proportion of biomass in the southern region. New Jersey's total allocation would

be the sum of the northern and southern components of its allocation. This is consistent with the spatial distribution of black sea bass landings in recent years, which is roughly an even split between north and south of Hudson Canyon (see Table 3 and Figure 5).

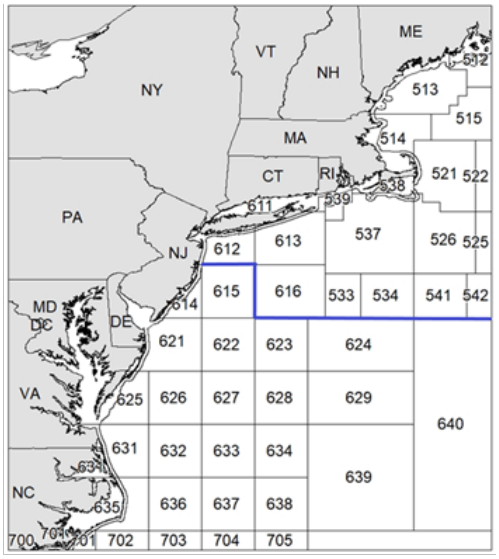

Figure 4. NOAA Fisheries statistical areas showing the dividing line between the northern and southern regions as defined in the black sea bass stock assessment.

Table 3. Proportion of black sea bass commercial harvest landed in New Jersey from northern and southern region statistical areas. Only landings associated with valid northeast region statistical area codes were included in the calculations. Data were provided by the ACCSP. Landings by area were estimated by applying VTR proportions of landings by area to dealer data.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	**Average 2010-2019**	**Average 2010-2014**	**Average 2015-2019**
% North	38%	28%	47%	46%	54%	78%	65%	74%	58%	57%	**54%**	**43%**	**66%**
% South	62%	72%	53%	54%	46%	22%	35%	26%	42%	43%	**46%**	**57%**	**34%**

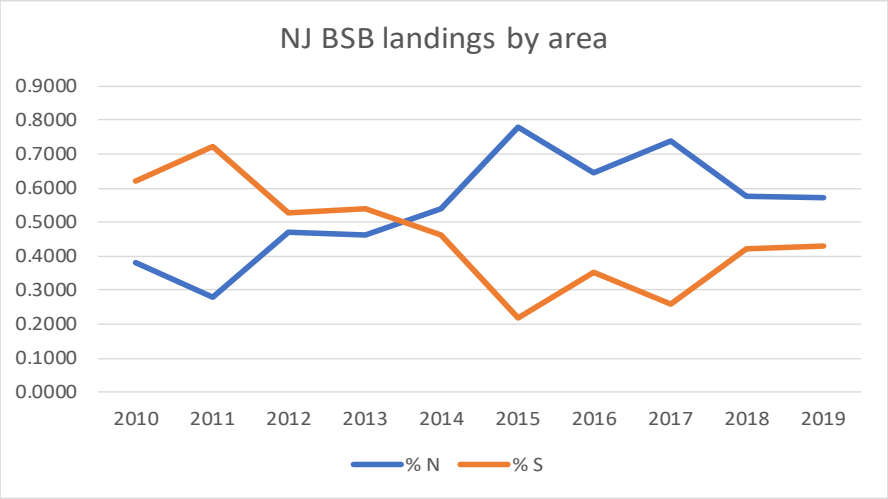

Figure 5. Proportion of black sea bass commercial harvest landed in New Jersey from northern and southern region statistical areas by year.

3.2 Management Alternatives for Changes to Federal Regulations

This amendment will also consider 1) whether the state allocations should be added to the Council's FMP or if they should remain only in the Commission's FMP, 2) if added to the Council's FMP, should changes be made to the regulations regarding paybacks of state quota overages, and 3) whether to modify regulations regarding federal in-season closures. The following alternatives relate to Council management and the federal regulations.

3.2.1 Alternatives for adding state commercial allocations to the Council FMP

A. Status quo (no action): Commercial state allocations included only in the Commission's FMP

Under this alternative, the black sea bass commercial state allocations would remain only in the Commission's FMP. Changes to these allocations would not require a joint action with the Council.

B. Commercial state allocations for black sea bass included in both Commission and Council FMPs

Under this alternative, the state allocations would be added to the Council's FMP. Future changes to the allocations would be considered through a joint action between the Commission and Council.

Including the state allocations in both FMPs would require NOAA Fisheries to monitor landings at the state level. Transfers of quota between states would continue to be allowed, but would be managed by NOAA Fisheries, rather than the Commission. It should be noted there are differences between the two bodies in how transfers are conducted. The Commission allows transfers to occur at any time up to 45 days after the last day of the fishing season. Commission transfers are not limited. While NOAA Fisheries allows for late season quota transfers for other species, they are limited to unforeseeable late season events. Generally, the deadline for a state to submit routine transfer requests is the close of business on December 16. While the Commission allows transfers at the end or after the fishing season to help states balance quota overages,

NOAA Fisheries would likely not allow for such transfers unless the overage was unforeseen in the last two weeks of the fishery. The burden of proof would then be on the state to justify the transfer. Lastly, the Commission is able to approve and finalize transfers within a day or two of receiving the request, while quota transfers through NOAA Fisheries may take several weeks to be finalized.

If this alternative is selected, the following sub-alternatives could modify the Council's FMP to establish how overages of state quotas are handled.

- **Sub-alternative B1: Paybacks only if coastwide quota is exceeded**. Under this alternative, states would only pay back overages of their allocations if the entire coastwide quota is exceeded. This is the current process for state-level quota overages under the Commission's FMP (Addendum XX). No other changes to the current commercial accountability measure regulations would be made.
- **Sub-alternative B2: States always pay back overages**. Under this alternative, the exact amount in pounds by which a state exceeds its allocation would be deducted from their allocation in a following year, regardless of if the coastwide quota was exceeded or not. All other aspects of the commercial accountability measures would remain unchanged.

3.2.2 Alternatives for federal in-season closures

The Council and Board are considering three alternatives related to in-season federal closures. The current regulations for in-season closures require the entire commercial fishery to close in-season for all federally permitted vessels and dealers, regardless of state, once the coastwide quota is projected to be landed. This has not occurred to date; however, concerns have been expressed about the potential for overages in some states to impact all states through in-season closures.

The following alternatives specify when the commercial fishery would close in-season for all federal permit holders coastwide. Under all alternatives below, individual states would close in-season if their allocations are reached prior to the end of the year, as is currently required under the Commission's FMP.

A. Status quo (no action): coastwide federal in-season closure when landings are projected to exceed the coastwide quota

Under this alternative, the entire commercial fishery would close in-season for all federally permitted vessels and dealers, regardless of state, once the coastwide quota is projected to be landed, as is currently required under the Council's FMP.

B. Coastwide federal in-season closure when landings are projected to exceed the commercial quota plus a buffer of up to 5%

Under this alternative, the entire commercial fishery would close in-season for all federally permitted vessels and dealers, regardless of state once landings exceed the coastwide quota plus an additional buffer of up to 5%. The Council and Board would agree to the appropriate buffer for the upcoming year through the specifications process. The intent behind allowing an additional buffer is to help minimize negative economic impacts of coastwide closures on states that have not fully harvested their allocations.

This is not expected to create an incentive for quota overages as states would still be required to close when their state-specific quotas are reached and states would still be required to pay back quota overages (see sub-alternative set above).

C. Coastwide federal in-season closure when the commercial ACL is projected to be exceeded.

Under this alternative, the entire commercial fishery would close in-season for all federally permitted vessels and dealers, regardless of state, once the coastwide commercial ACL is projected to be landed, as opposed to when the quota is projected to be landed under the current regulations. Discards in weight cannot be monitored in-season using current discard estimation methods. Therefore, in practice, this alternative would require GARFO to make assumptions about discards in the current year.

4.0 Status of the Stock

The most recent stock status information comes from the 2019 operational stock assessment, which was peer-reviewed in August 2019 and approved for management use in October 2019 (NEFSC 2019). The assessment indicated that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2018, the terminal year of data used in the assessment.

The operational stock assessment updated the Age Structured Assessment Program (ASAP) models used in the 2016 benchmark stock assessment with commercial and recreational catch data, research survey and fishery-dependent indices of abundance, and analyses of those data through 2018[5]. For modeling purposes, the stock was partitioned into two sub-units divided approximately at Hudson Canyon to account for spatial differences in abundance and size at age. The sub-units are not considered separate stocks. Although the stock was assessed by sub-unit, the combined results were used to develop reference points, determine stock status, and recommend fishery specifications.

Spawning stock biomass (SSB), which includes both mature male and female biomass, averaged around 8 million pounds during the late 1980s and early 1990s and then steadily increased from 1997 to 2002 when it reached 22.2 million pounds. From 2007 to 2014, SSB dramatically increased, reaching a peak in 2014 at 76.5 million pounds. Since 2014 SSB has trended back down. After adjusting for retrospective error in the model, SSB in the terminal year (2018) was estimated at 73.6 million pounds, approximately 2.4 times the target SSB reference point (SSB_{MSY} proxy= SSB40% = 31.1 million pounds) (Figure 6). This means that the stock was not overfished in 2018. The (similarly adjusted) fishing mortality rate (F) in 2018 was 0.42, about 91% of the fishing mortality threshold reference point (F_{MSY} proxy= F40%) of 0.46. This means that overfishing was not occurring in 2018. Except for 2017, F has been below the F_{MSY} proxy for the last five years. Average recruitment of black sea bass from 1989 to 2018 was 36 million fish at age 1. The 2011 year class was estimated to be the largest in the time series at 144.7 million fish and the 2015 year class was the second largest at 79.2 million fish. Recruitment of

[5] In July 2018, the Marine Recreational Information Program (MRIP) replaced the existing estimates of recreational catch with a calibrated 1981-2017 time series which accounts for new survey methods that were fully implemented in 2018. The new calibrated recreational estimates are significantly higher than previous estimates, especially in later years of the time series. These revised data were incorporated into the 2019 operational stock assessment. This change was one of multiple factors which impacted the understanding of overall biomass levels.

the 2017 year class as age 1 in 2018 was estimated at 16.0 million, well below the time series average.

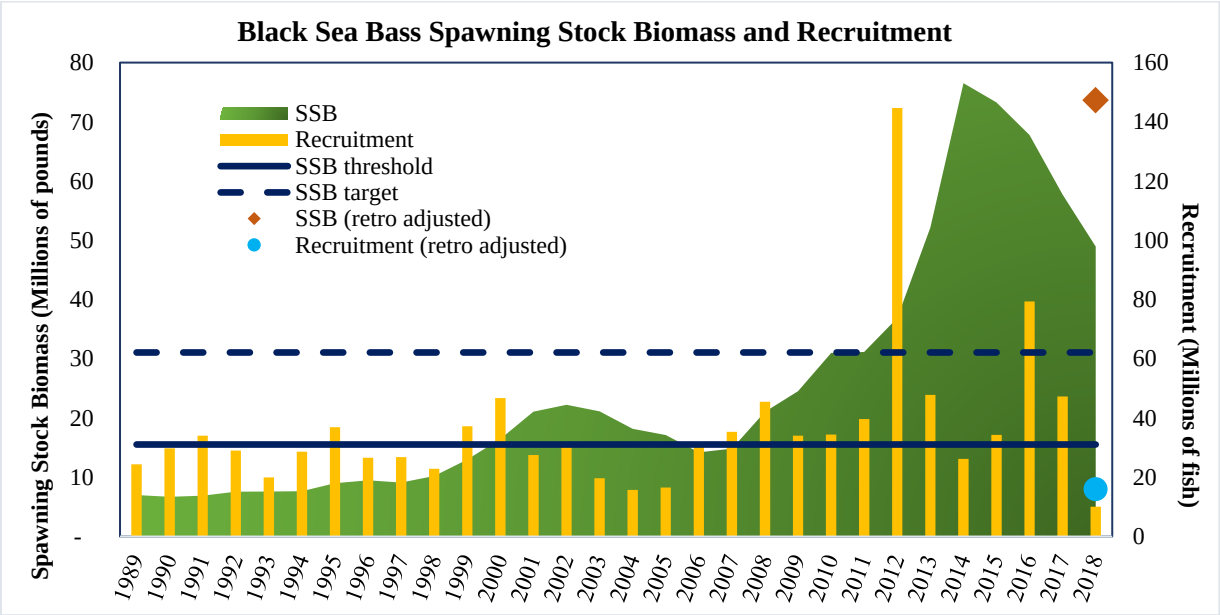

Figure 6. Black sea bass spawning stock biomass and recruitment. Source: 2019 Operational Assessment Prepublication Report, Northeast Fishery Science Center.

5.0 Status of the Fishery

The following information is based on commercial fishery dealer data (landings), the most recent stock assessment (discards), federal vessel trip reports (gear types and area of catch), and input from a small sample of fishermen and dealers. Input was provided by 6 individuals who primarily identify as fishermen and 4 individuals who represent two commercial fish dealers. Collectively, these 10 individuals are from 5 states and use three different gear types (i.e., bottom otter trawl, pot/trap, and hand line). Their input is not intended to be a representative sample of the commercial black sea bass fishery as a whole, but was solicited to provide context to trends shown in the data and document relevant information not captured in the available data.

As previously stated, commercial landings have been constrained by a coastwide commercial quota since 1998, and state allocations were introduced in 2003. From 1998 to 2019, coastwide landings have closely followed quotas, ranging from a low of 1.16 million pounds in 2009 to a high of 3.98 million pounds in 2017. State landings have also closely followed quotas since they were implemented in 2003. A process for interstate quota transfers was established in 2009, but until 2017 states were constrained by low quotas and thus there were few opportunities for inter-state transfers. More interstate transfers have occurred under higher quotas in recent years. For example, in the last three years, Massachusetts through New Jersey have all received quota transfers from other states to prevent or mitigate overages of their state quotas.

Since the coastwide quota was implemented in 1998, on average commercial discards have constituted 17% of total commercial removals. Over the last five years of the time series (2014-2018) discards were generally higher, averaging 33% of total commercial removals. Discards in recent years have likely been influenced by high availability coupled with quota and minimum fish size limitations.

The average price per pound paid to fishermen by dealers for black sea bass (adjusted to 2019 values based on the Gross Domestic Product Price Deflator) appears to show an inverse relationship with landings in New Jersey through North Carolina during 2010-2019 (i.e., price generally decreased with increases in landings, p=0.002). There did not appear to be a strong relationship between price and landings in Maine through New York during 2010-2019 (p=0.498, Figure 7).

Some fishermen and dealers said temporary price drops can occur at both local and regional levels due to increases in the coastwide quota, state-specific seasonal openings, or individual trawl trips with high landings, all of which can be interrelated. They note that these sudden price drops are often temporary and the price usually rises again. This is evident in the coastwide relationship between average price per pound and the coastwide quota, which increased by 52% mid-year in 2017 and then decreased by 15% from 2017 to 2018. The average coastwide price per pound dropped from $3.92 in 2016 to $3.49 in 2017, but increased to $3.82 in 2018 (all prices are adjusted to 2019 values based on the Gross Domestic Product Price Deflator).

Input from fishermen and federal vessel trip report data from 2009-2019 suggest that in years with higher quotas, bottom trawl gear accounted for a greater proportion and pots/traps accounted for a smaller proportion of total commercial landings compared to years with lower quotas. For example, the lowest quotas during 2010-2019 occurred in 2010-2012. During those years, bottom trawl gear accounted for around 39-41% of total commercial black sea bass landings (depending on the year) and pots/traps accounted for about 33-36%. In comparison, the highest quotas occurred in 2016-2019, during which around 52-61% of total commercial black sea bass landings could be attributed to bottom trawl gear and around 21-26% to pot/trap gear. Some fishermen have said trawlers are better able to take advantage of increases in quota as they can land higher volumes than vessels using pot/trap gear. This can be especially beneficial when the price of black sea bass drops (usually temporarily) in response to sudden increases of fish on the market.

According to commercial dealer data for 2010-2019, the average coastwide ex-vessel price per pound for black sea bass caught with bottom trawl gear was $3.90 (adjusted to 2019 values), 6% greater than the average price for black sea bass caught with pots/traps ($3.70). However, some fishermen report that they can get higher prices for black sea bass caught with pots/traps as they can market their fish as fresher and better quality than trawl-caught fish. Pot/trap and hook and line commercial fishermen in some states also sell black sea bass to live markets, which offer even higher prices. Some fishermen and dealers say size has a greater impact on price than gear, though the two are interrelated as fishermen using bottom trawl gear tend to land larger black sea bass than those using pots/traps.

The states have taken different approaches to managing their commercial black sea bass fisheries. Delaware, Maryland, and Virginia use Individual Transferable Quota (ITQ) systems, while other states utilize different combinations of quota periods, closed seasons, and initial or adjustable trip and possession limits to prevent quota overages[6]. For some states like Connecticut, quota availability and resulting management measures are highly dependent on quota transfers from other states. Some fishermen and dealers say they take these differences in state management measures into account when deciding when to fish, where to sell fish, and what price to offer for fish. For example, the price offered by local dealers may be higher when

[6] Additional information on state quota management systems can be made available upon request.

neighboring states are closed. Alternatively, some fishermen and dealers in comparatively low allocation states say they generally do not make business decisions based on black sea bass. Due to the low allocations in some states, black sea bass provides supplemental income for these fishermen and dealers, but they are not a primary target species. For these reasons, the economic impacts of changes to state quotas can vary in part based on how states adjust their management measures in response to quota changes. For example, an increase in the possession limit could have different impacts than an extension of the open season. ITQ fishermen may be impacted differently than non-ITQ fishermen, and impacts may vary between gear types.

From 2010-2017, the commercial black sea bass landings from Maine through North Carolina which were caught in the northern region (as defined in the stock assessment, corresponding to approximately Hudson Canyon and north) increased steadily, with the greatest increases occurring during 2015-2017. After 2017, the proportion caught in the northern region declined, but remained much higher than the proportion from the southern region. During 2010-2019, the amount of commercial black sea bass landings caught in the southern region did not vary greatly (Figure 8).

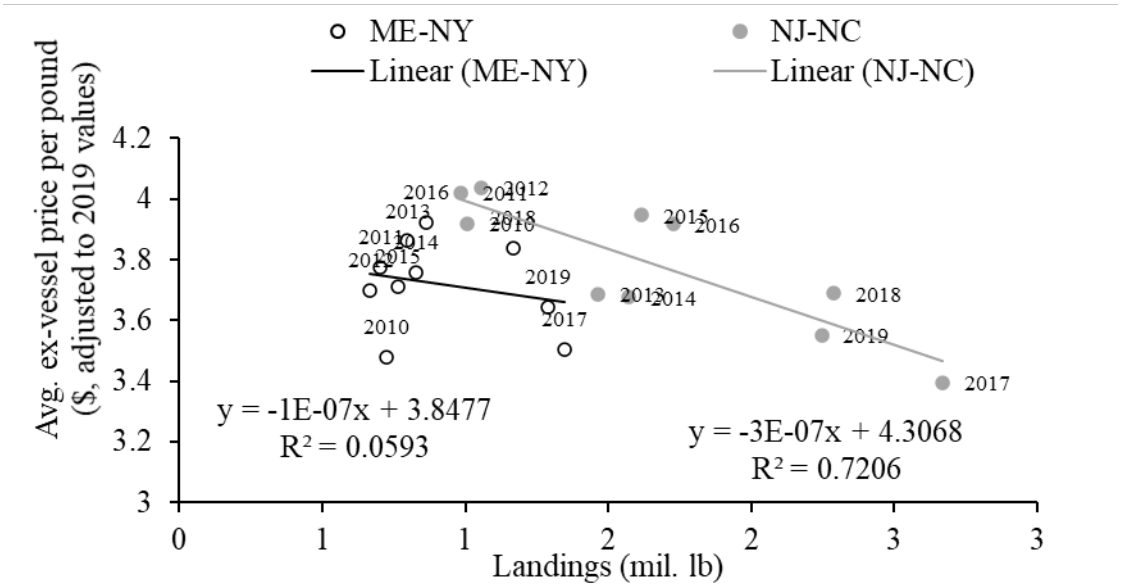

Figure 7. Average annual ex-vessel price per pound for black sea bass compared to annual black sea bass commercial landings by region (ME-NY and NJ-NC), 2010-2019, with associated linear relationship. Prices are adjusted to 2019 values based on the Gross Domestic Product Price Deflator. Data source: dealer data (CFDERS, provided by the

NOAA Fisheries Greater Atlantic Regional Fisheries Office Analysis and Program Support Division).

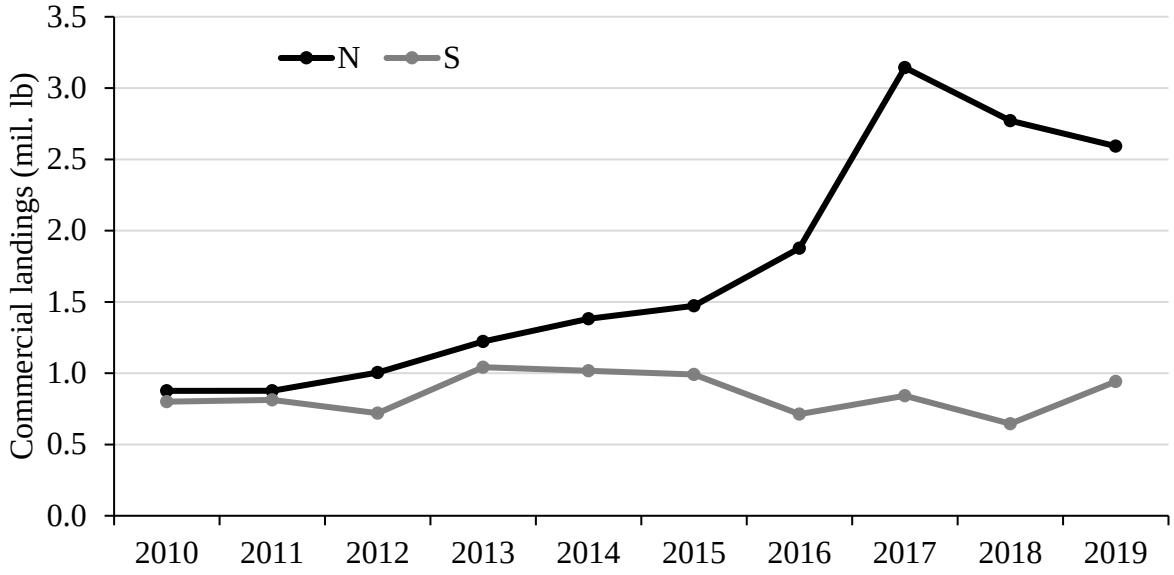

Figure 8. Total commercial black sea bass landings, 2010-2019, Maine through North Carolina, by region of catch location (North or South). Region is assigned based on statistical area of catch using the delineation defined in the stock assessment. Landings with an unknown statistical area were assigned to region based on the state of landing. Data source: dealer AA tables provided by the Northeast Fisheries Science Center

6.0 Literature Cited

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MAFMC. 2003. Amendment 13 to the Fishery Management Plan for Black Sea Bass. Available at: http://www.mafmc.org/sf-s-bsb

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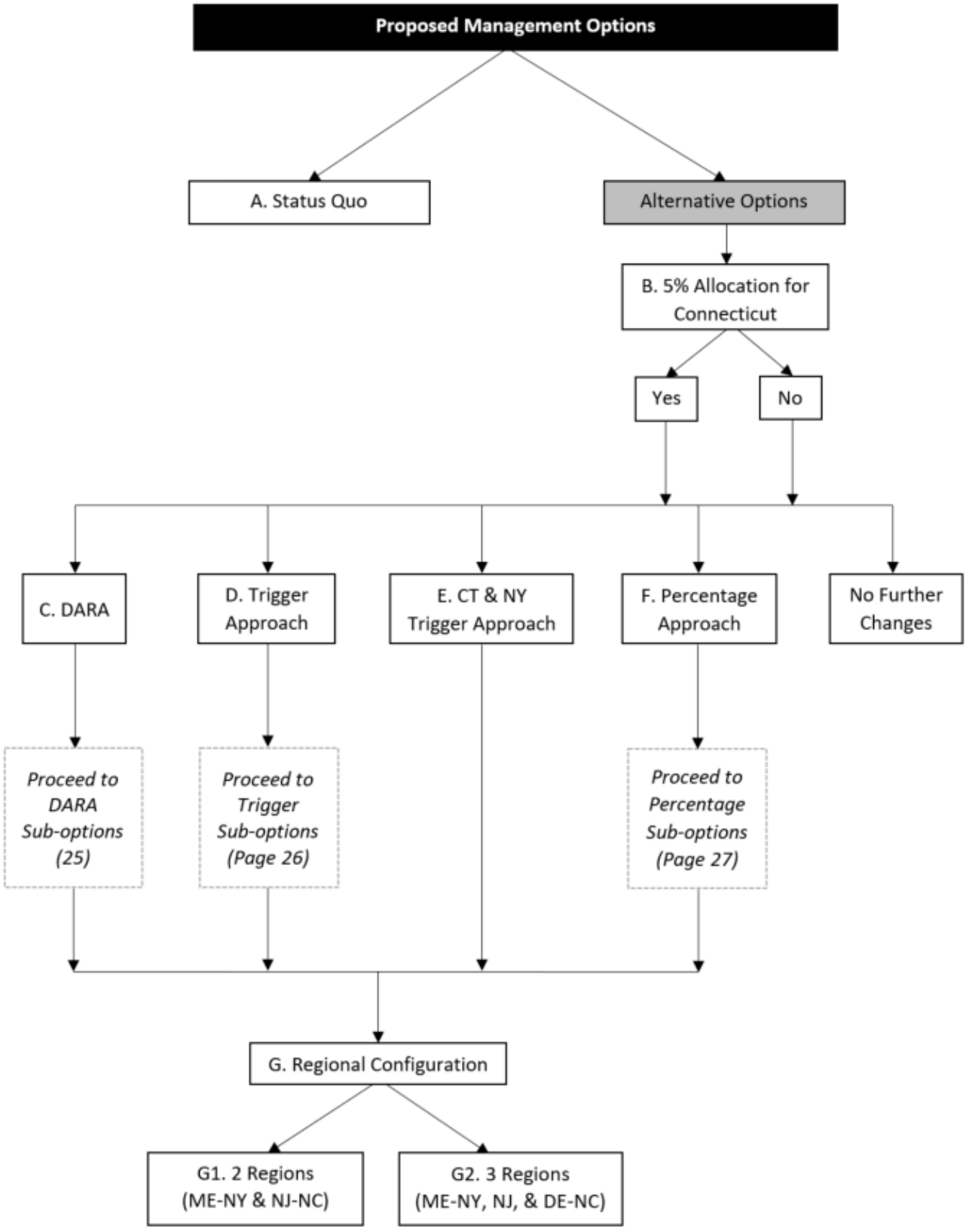
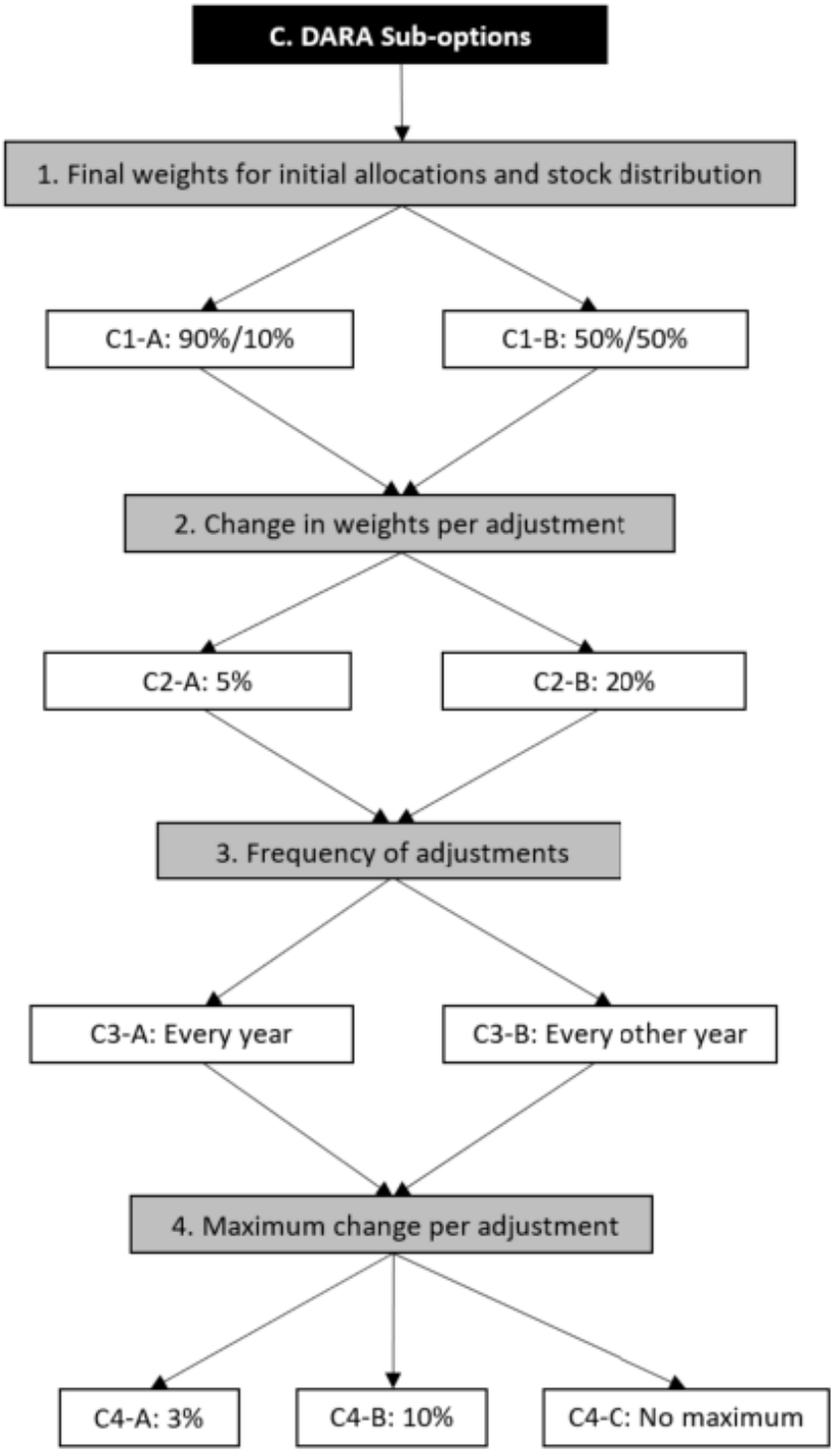
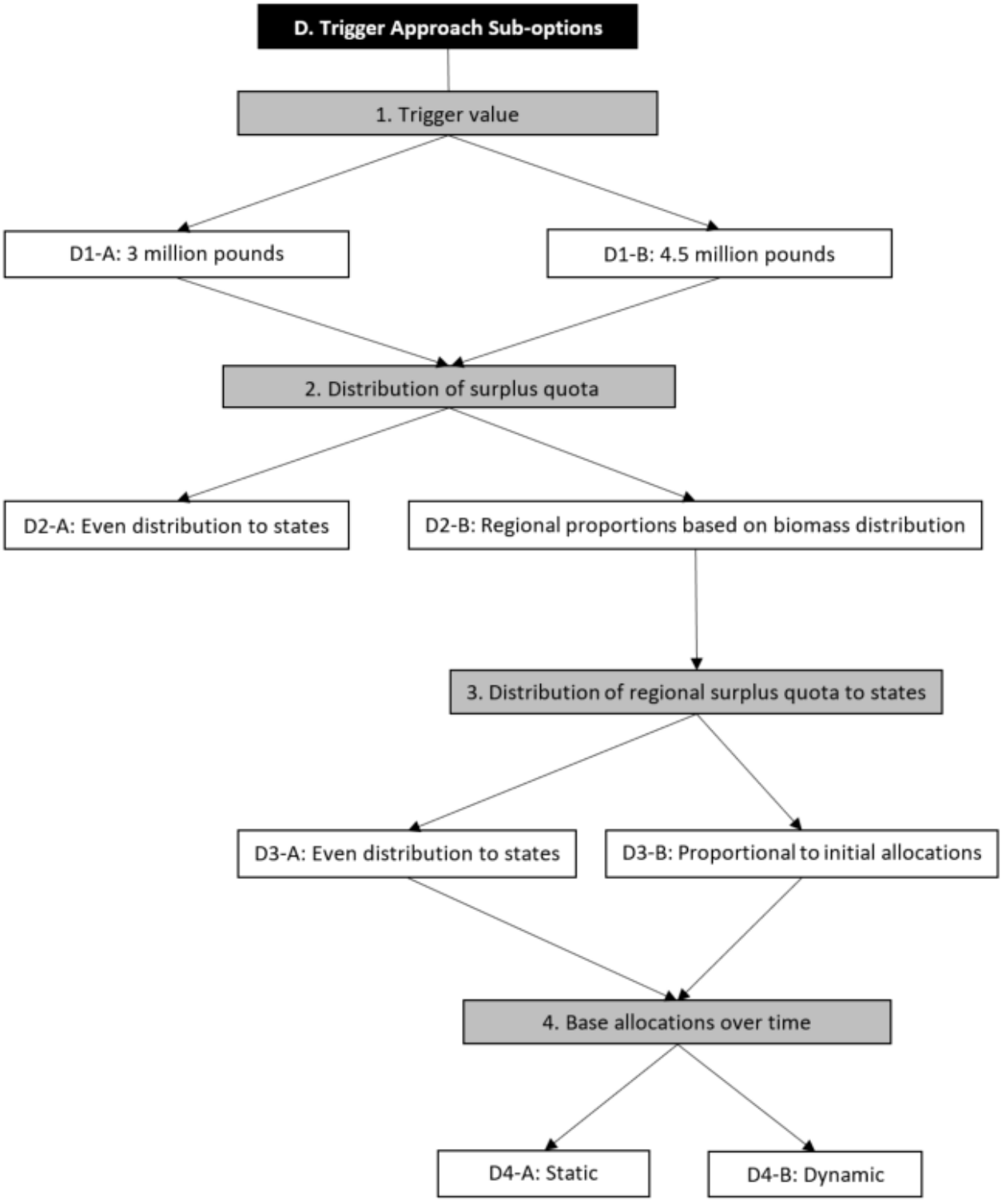
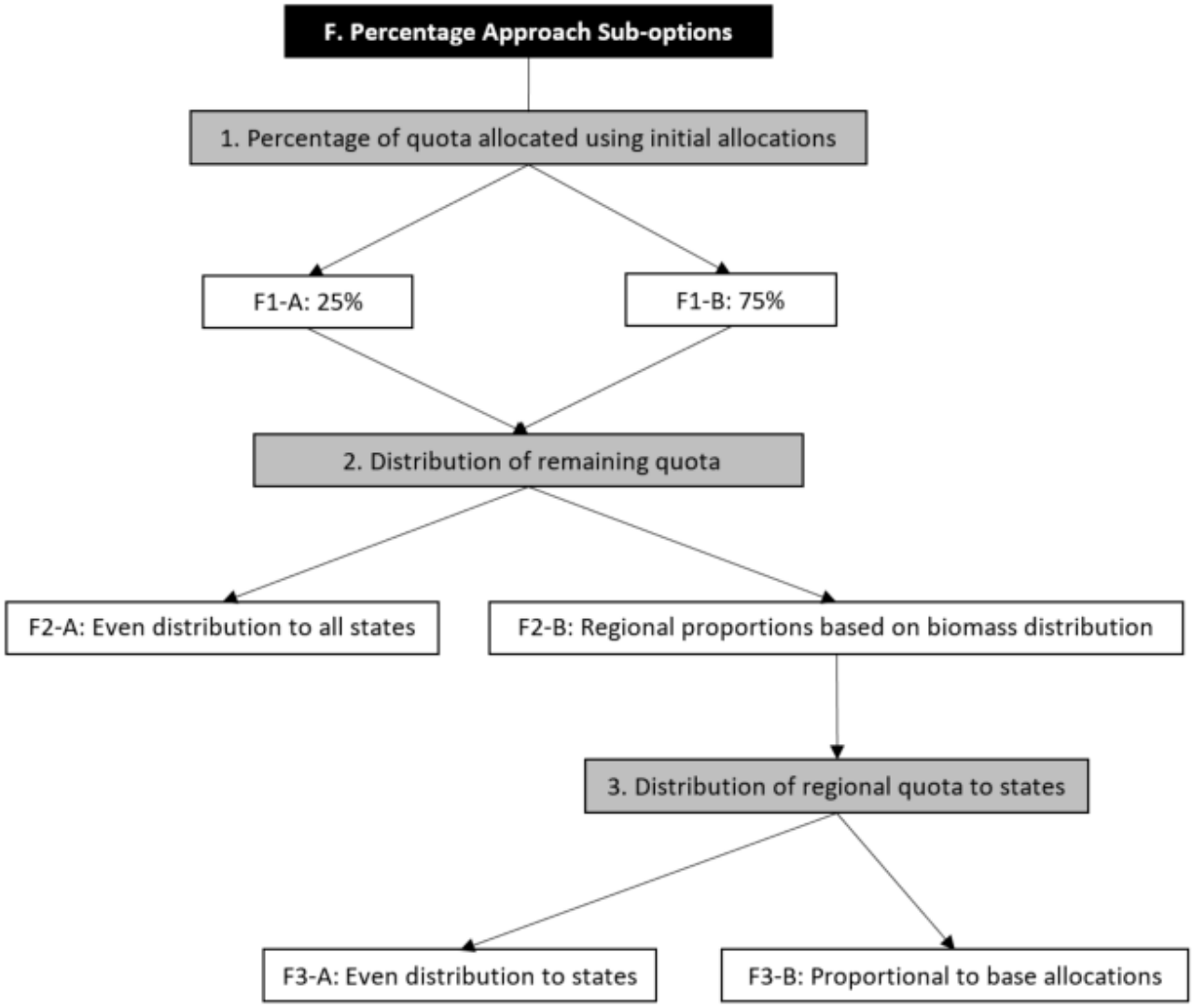
Appendix 1. Flowchart of Management Alternatives for Commercial State Allocations




C. DARA Sub-options
1. Final weights for initial allocations and stock distribution
C1-A: 90%/10%
C1-B: 50%/50%
2. Change in weights per adjustment
C2-A: 5%
C2-B: 20%
3. Frequency of adjustments
C3-A: Every year
C3-B: Every other year
4. Maximum change per adjustment
C4-A: 3%
C4-B: 10%
C4-C: No maximum


D. Trigger Approach Sub-options
1. Trigger value
D1-A: 3 million pounds
D1-B: 4.5 million pounds
2. Distribution of surplus quota
D2-A: Even distribution to states
D2-B: Regional proportions based on biomass distribution
3. Distribution of regional surplus quota to states
D3-A: Even distribution to states
D3-B: Proportional to initial allocations
4. Base allocations over time
D4-A: Static
D4-B: Dynamic


F. Percentage Approach Sub-options
1. Percentage of quota allocated using initial allocations
F1-A: 25%
F1-B: 75%
2. Distribution of remaining quota
F2-A: Even distribution to all states
F2-B: Regional proportions based on biomass distribution
3. Distribution of regional quota to states
F3-A: Even distribution to states
F3-B: Proportional to base allocations

Appendix 2

Proposed New Allocation Alternative For Black Sea Bass: Dynamic Adjustment to Regional Allocations (DARA)

Black Sea Bass PDT

17 July 2020

Introduction

This proposal offers a new alternative for modifying the allocation of the commercial black sea bass quota. It involves a dynamic approach for gradually adjusting state-specific allocations using a combination of historical allocations and current levels of stock distribution. The alternative is modeled after the Transboundary Management Guidance Committee (TMGC) approach, which was developed and used for the management of shared Georges Bank resources between the United States and Canada.

As noted by Gulland (1980), the designation of units for management entails a compromise between the biological realities of stock structure and the practical convenience of analysis and policy making. For black sea bass, the Atlantic Coast states from North Carolina to Maine - acting through and by the MAFMC, ASMFC, and GARFO – use a single management unit encompassing the entire region occupied by the stock, from the southern border of North Carolina northward to the U.S.- Canadian border. While there is a general scientific consensus that the black sea bass population has shifted its center of biomass to the northen portion of its range (Bell et al. 2014 and NEFSC 2017), the current management structure, as reflected by current state-by-state allocations, does not recognize this new population dynamic.

This new alternative sets forth an approach that balances stability within the fishery, based on historical allocations, with gradual adjustments to the fishery, based on regional shifts in stock distribution emanating from updated stock assessments or surveys. The approach affords considerable flexibility, both with regard to initial configurization and application over time. A key feature involves the use of an algorithm to guard against abrupt shifts in allocations.

This new alternative draws upon established principles of resource sharing, which include consideration of access to resources occurring or produced in close spatial proximity to the states in the management unit and historical participation in the exploitation of the resources (Gavaris and Murawski 2004). The former has emerged from the changing distribution of the black sea bass resource and the effects this creates within the fishery. The latter recognizes traditional involvement and investment in the development of the fishery since the the beginning of black sea bass joint management in 1996. Both principles were incorporated in the TMGC approach; historical participation was initially afforded primary emphasis, then gradually down-weighted so that, after a nine-year phase-in period, the annual allocation was based primarily on stock distribution (Murawski and Gavaris 2004). The approach proposed here for black sea bass is similar; the proposal envisions a gradual transition, giving more weight to historical participation at first, then slowly phasing in the distributional aspects over time, and then implements changes to state specific allocations through a two-step process.

Details for the calculations used for the TMGC approach were described by Murawski and Gavaris (2004). Modifications to that approach are necessary, given key differences between the shared Georges Bank resources and the shared black sea bass resource. Those differences include the state-by-state allocation system currently in place for black sea bass, the need to translate from regional to state-specific allocations, and the need to accomodate multiple jurisdictional differences in the fishery.

This new alternative proposes use of existing state-by-state allocations to reflect initial values for historical participation (aka initial allocations) and proposes use of the 2019 update stock assessment results(NEFSC 2019) to determine the values for stock distribution; the two values are then integrated in the form of regional shares. An alternative to using the stock assessment would be to use synoptic trawl survey information. This potential alternative is described in more detail below. The two regions as defined in the assessment are proposed: (1) ME - NY, (2) NJ - NC. They emanate from the spatial stratification of the stock in to units that generally align with those used for the assessment, which used the Hudson Canyon as the dividing line based on several pieces of evidence that stock dynamics had an important break in this area. These regional shares are then sub-divided into state-specific allocations.

The overall approach can be modified by the Board and Council in various ways. For example, sub-alternatives can be developed for:

- the regional configuration;
- the values for historical participation/initial allocations (e.g., current, status quo allocations, or some variant thereof);
- the weighting values for Initial Allocation and Stock Distribution (90:10, or some variant thereof);
- the increment of change in these values from one year to the next (10%/year, or some variant thereof, and;
- the periodicity of adjustments (e.g., annually vs. biannually).

A cap can also be established to limit the amount of change to the allocations during an adjustment (e.g. 3%-10%).

Data and Methods

Formula

Adapted from the TMGC application (TMGC 2002), the approach for calculating the respective regional shares, which takes historical utilization in to account and adapts to shifts in stock distribution, is as follows:

$$\%RegionalShare = (\alpha_y * \sum_r StateSpecAlloc) + (\beta_y * \%ResDistr_{r,y}) \quad (1)$$

Where α_y = percentage weighting for utilization by year; β_y = percentage weighting for stock distribution by year; $\alpha_y + \beta_y = 100\%$; $StateSpecAlloc$ = state specific allocation; $ResDistr$ = stock distribution; r = region; y = year

Proposed regions:
There are two choices for regional configuration: (1) ME - NY and NJ - NC, or (2) ME - NY, NJ, and DE - NC.

Proposed values for historical participation/initial allocation:
See Initial Allocation section below.

Proposed values for stock distribution:
The current proposal is to use the distribution in the two regions based on the stock assessment exploitable biomass calculations. This could be altered to use synoptic trawl survey information, therefore stock distribution would be based on most recent trawl survey information in that case.

Proposed percentage weighting values for initial allocation and stock distribution:
The initial sharing formula is proposed to be based on the weighting of initial allocation (from historical allocations) by 90% and the weighting of stock distribution by 10%. By the end of the period the shares will be the reciprocal; initial allocation at 10% and stock distribution at 90%. Additional alternatives are presented below.

Proposed increments of change in the weighting values from one adjustment period to the next: Initially proposed at 10% per period. Thus, 90:10 to begin, then: 80:20, 70:30, 60:40, 50:50; 40:60; 30:70; 20:80,

concluding at 10:90. Other alternatives are tested below.

Proposed periodicity of the adjustments:
Bi-annually based on stock assessment updates. If the survey alternative were used, this could be increased to annually.

Overall time horizon for the transition:
The initial proposal would conclude in 9 years. If commenced in 2020, it would conclude in 2028. The duration is dependent on the other options chosen

With these - or alternative - parameters assigned, the region-specific shares then need to be prorated into the existing state-specific allocation structure. This can be accomplished by the equation:

$$NewStateAllocation = \frac{Allocation_s}{\sum_r StateSpecAlloc} * \%RegionalShare \quad (2)$$

Where $Allocation_s$ = the specific state being calculated and the other parameters have already been defined above. This formula basically takes the existing state specific allocations and reproportions them in to the share they represent within the region.

Initial Allocations

Historical state-specific commercial allocations for black sea bass are codified in Amendment 13 to the Fishery Management Plan for Black Sea Bass (FMP) (MAFMC 2003) (Table 2). These allocations can serve as the basis for the initial allocation values in the allocation formula. These values, as used in the formula, would remain consistent throughout the reallocation process, even as the final state allocations change over time, based on equations 1 and 2. This is philosophically consistent with the FMP, as this portion of the allocation formula is meant to represent the historical fishing aspects of the black sea bass fishery.

However, alternative strategies (set forth in the form of sub-alternatives) could be used to set the initial allocation design. That is, the initial initial allocation portion of the allocation design could be adjusted, via revised state allocations, before transitioning into the formulaic approach to be used as the process moves forward.

One way to implement this type of approach would be the following, working from equation 2 above:

$$NewStateAllocation = \frac{Allocation_s + \lambda_s}{\sum_r StateSpecAlloc} * \%RegionalShare \quad (3)$$

Where λ = a state specific allocation additive or reduction factor and s = the state being calculated.

This formula allows for a shift in initial (status quo) allocations to account for potential discrepencies believed to be represented in the existing allocations. Currently, a proposal to add an initial amount to CT's allocation has been considered by the black sea bass management board, so using the equation above, a new allocation amount (λ) would be added to the historical allocation for CT (s).

Stock Distribution

This proposal offers two options for calculating the stock distribution. The first option would be to use the spatial stock assessment to determine the amount of resource in each region (north = NY, CT, RI, MA, NH, ME; south = NJ, DE, MD, VA, NC). The spatial stock assessment calculates a north and south exploitable biomass value, which can then be turned in to a proportion. The benefit of this approach is this number is calculated through a synthesis of many biological parameters and represents the best available science for the population. The drawback is that the assessment is updated periodically (not every year), therefore the information will not be evaluated every year, but would depend on the assessment cycle. Additionally, if the spatial stock assessment were to fail at some point in the future, this would impact the ability to do the dynamic allocation calculations. The current estimated allocation from the 2019 update assessment would be 5,272 MT (2018 exploitable biomass) in the south, 16,924 MT (2018 exploitable biomass) in the north,

equating to 24% of the exploitable biomass in the south and 76% of the exploitable biomass in the north (NEFSC 2019). It is important to note that these are the unadjusted exploitable biomass amounts from the assessment. Since data are readily available for this option, an example calculation and projection has been developed below. The process set forth below addresses total biomass, but it could be modified (and presented as a sub-alternative) to address exploitable biomass.

As an alternative, values for stock distribution can be obtained and calculated using scientific surveys, with results apportioned into regions. Since surveys are undertaken annually, the values for stock distribution, by region, can be recalculated and updated annually, biannually, or upon whatever timeframe is deemed most appropriate, affording an opportunity to regularly adjust allocations in sync with shifts in stock distribution. Such shifts may, or may not, follow consistent trends. Accordingly, the technique affords a dynamic approach, consistent with actual changes in stock distribution. Drawing upon the TMGC approach, a swept area biomass, considered a relative index of abundance, can be computed in each stratum, then summed to derive the biomass index for each region. The biomass index estimate derived from each survey would represent a synoptic snapshot of stock distribution at a specific time during a year. Combining the results of multiple surveys requires an understanding of seasonal movement patterns and how much of the biological year each survey represents. For this reason, it is proposed to use the National Marine Fisheries Service (NMFS) Trawl Survey in combination with the North East Area Monitoring and Assessment Program (NEAMAP) Survey. These are both well-established surveys, currently used in the stock assessment, and are synoptic, covering both offshore and inshore strata. As proposed in this alternative, the existing survey strata could be used to partition the survey information into two stock regions: (1) ME - NY, and (2) NJ - NC. The strata do not align perfectly with these two spatial configurations, but they are relatively close (Figures 1 and 2). Table 1 provides an example of how the strata could be applied for each region.

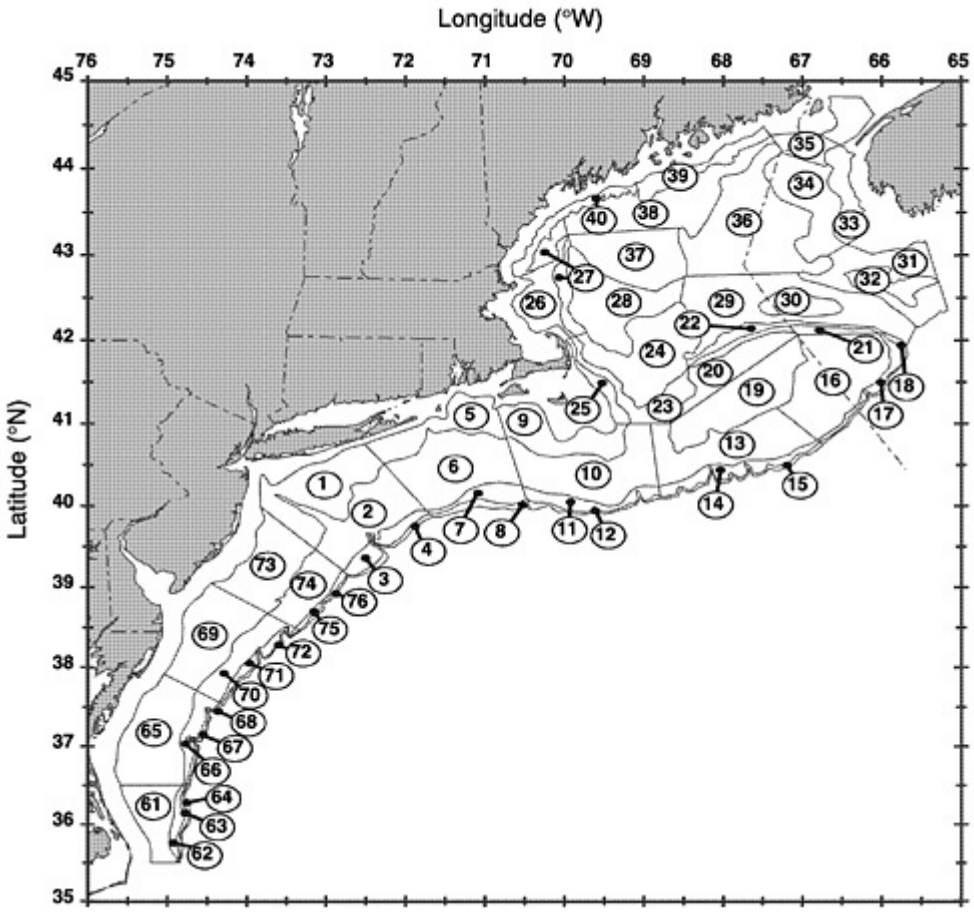


Figure 1: Map of National Marine Fisheries Service trawl survey strata.

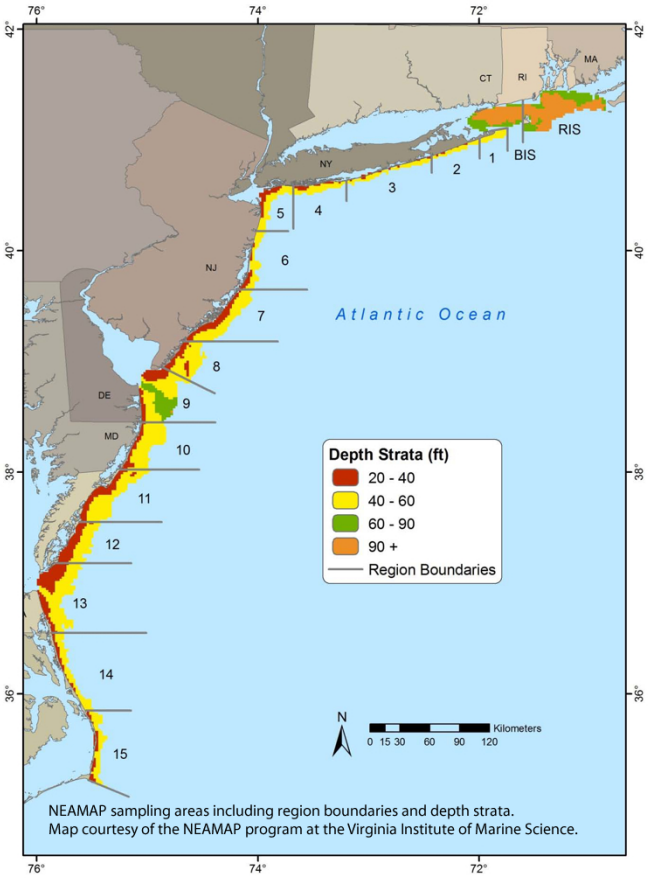


Figure 2: Map of North East Area Monitoring and Assessment Program trawl survey strata.

Table 1 - Strata or Region assigned to each region for stock distribution calculations.

Regions	NMFS Strata	NEAMAP Regions
Region 1: ME - NY	1 - 40	1 - 5, BIS, RIS
Region 2: NJ - NC	3, 61 - 76	6 - 15

*Note: This is a first cut, these should be finalized through discussions between the TC and survey staff.

This approach could be refined over time by developing area polygons that better align with the boards desired regional configuration. Then, using the spatial information from the surveys, the survey information could be partitioned into the polygons.

Additionally, there may be ways to use state survey information within the analysis – either directly by averaging those surveys into the swept area biomass calculations, or indirectly such as using them to verify or corroborate the information from the surveys used in the calculations. Such use of state survey information could be developed and integrated into the process over time via analysis and recommendations from the monitoring and technical committees.

A robust, locally weighted regression algorithm (Cleveland 1979), referred to as LOESS, could then be used to mitigate excessive variations in sampling results. Per the TMGC approach, a 30% smoothing parameter could be used. That level of smoothing was chosen because it reflected current trends, was responsive to changes, and provided the most appropriate results for contemporary resource sharing. The recommended

default of two robustness iterations also was adopted (Cleveland 1979) in the TMGC approach and could also be adopted here. Stock distributions could then be updated annually by incorporating data from the latest survey year available and dropping data from the earliest survey used in the previous year so that a consistent window of data is maintained. After the surveys are combined, the LOESS smoother would be applied to the survey data. The fixed initial allocation (90% weighting in year 1) and the most recent stock distributions as calculated by the surveys (10% weighting in year 1) can then be applied to the sharing formula to determine regional allocation shares for the upcoming fishing year.

The benefit of this approach is that it could be performed annually with the most contemporary data. The drawback is that survey data are prone to variability. The LOESS smoothing and the adjustment cap that is set forth below are designed to account for some of this variability to keep it from causing unreasonable changes in a single year.

As a final nuance to the survey alternative, a sophisticated modeling approach could be developed to achieve the same information as above. Techniques like the use of the VAST model (Thorson 2015) have been shown to be appropriate for this type of an analysis and could be adopted, in lieu of the swept area biomass technique, as a method for calculating stock distribution by region.

For this proposal, the assessment technique will be used as there is actual data that can be used to examine an example. With additional work, a retrospective analysis using trawl survey information could be developed.

Adjustment cap

In addition to the formula for calculating the regional allocations and then translating into the state specific allocations, additional measures could be added by way of an adjustment cap. Such measures would enable various checks and balances to be incorporated into the process to guard against unintended consequences.

One such algorithm, proposed here, is to guard against any abrupt change occurring to any regional allocation in any given year (or other time frame), and thus minimize short-term impacts, by capping the amount of any annual or bi-annual change to the regional shares anywhere between 3 - 10%. This can be shown as:

$$\%RegionalShare = \begin{cases} 3to10\%, & \text{if } \Delta AnnualChange > 3to10\% \\ \%RegionalShare, & \text{if } \Delta AnnualChange \leq 3to10\% \end{cases} \quad (1)$$

The effect would be to ensure that any changes to allocations occur incrementally, even in a case of large shifts in stock distribution in any given year or period. This algorithm serves as an additional layer of protection against large changes, in addition to the other factors outlined above that are also built in to contend with uncertainty and variability.

Flexibility

A key attribute of this proposed new approach for modifying the allocation system is its flexibility. All of the decision points set forth in this proposal, once agreed to, can be adjusted as the process moves forward. Such adjustments, emanating from routine reviews by the Board and Council, can address any of the range of parameters initially set by the Board and Council. The Board and Council could define how changes to the system would be considered and enacted moving forward - e.g., via Addenda and Frameworks, the specifications process, or some other mechanism. The ranges of parameters/issues that readily lend themselves to such adjustment include:

- The α and β parameters can be adjusted to change the way the utilization and distribution are weighted in the equation;
- The increment of change in the α and β parameters can be adjusted to increase or decrease the transition speed;
- The initial state allocations can be set at status quo, or shifted to accommodate various objectives; and
- The adjustment cap can be adjusted to be more or less protective of incremental changes.

Given such flexibility, the Board and Council could decide to implement a transition program that begins in 2021, with either current, status quo allocations, or some variant thereof, and based on assessment information through 2018 (same information used for the proposed 2019 operational stock assessment update), establish stock distribution values for each of the two regions. Using those parameters, and a weighting of allocations by 90% and stock distribution by 10%, enact new, slightly revised state-specific allocations for 2021. If the Board and Council opted for a transitional program involving 10% annual increments, until the weightings reached 10% utilization from initial allocations and 90% stock distribution, this sharing formula would transition from a 90:10 initial allocation-to-stock distribution weighting in 2021 to a 10:90 weighting by 2029. During every adjustment , the trawl survey information would be updated and factored into the stock distribution values. As such, each regional and associated state-specific adjustment would not necessarily be the same, whether in magnitude or direction.

Alternatively, the Board and Council could opt for a transitional program involving 10% increments every two years, or 5% annual increments, or 5% increments every two years, etc. Those alternatives would significantly slow the transition. Some of these variants are illustrated below as examples.

Example

The following are examples of how the new approach can be applied; it incorporates various proposed or strawman parameters, all of which can be modified upon review and consideration by the Board and Council:

- The assessment information is used to calculate the Stock Distribution values.
- Step 1: Apply the state-specific allocations and stock distribution information to equation 1.
  - Summed state allocations for Region 1 (sum of ME-NY)

```
sum.reg1
```

```
## [1] 0.33
```

  - Summed state allocation for Region 2 (NJ - NC)

```
sum.reg2
```

```
## [1] 0.67
```

- Step 2: Apply the Stock Distribution information to equation 1.
  - Strawman values:

```
dist.reg1 = 0.76
dist.reg2 = 0.24
```

- Step 3: Select the increment of adjustment, which will determine the α and β parameters for equation 1 for year 1:
  - The initial sharing formula is proposed to be based on an annual 10% adjustement resulting in the weighting of historical allocations by 90% and the weighting of stock distribution by 10%. Thus:

```
alpha = 0.9
beta = 0.1
```

- Step 4: Calculate the results, in the form of proportional regional shares, from equation 1:

```
# Region 1 equation and result
Reg1.Share = (alpha*sum.reg1) + (beta*dist.reg1)
Reg1.Share
```

```
## [1] 0.373
```

```
# Region 2 equation and result
Reg2.Share = (alpha*sum.reg2) + (beta*dist.reg2)
Reg2.Share
```

```
## [1] 0.627
```

  - This does not account for any change to the original allocations, see step 6 below.

- Step 5: Determine need to apply the adjustment cap

```
# Algorithm
if (abs(Reg1.Share-sum.reg1) > 0.1 | abs(Reg2.Share-sum.reg2) > 0.1 ) {
  if (Reg1.Share-sum.reg1 > 0) {
    Reg1.Share = (sum.reg1*(0.1))+sum.reg1
    Reg2.Share = (sum.reg2*(-0.1))+sum.reg2

  }
  if (Reg2.Share-sum.reg2 > 0) {
    Reg1.Share = (sum.reg1*(-.1))+sum.reg1
  Reg2.Share = (sum.reg2*(0.1))+sum.reg2

  }

}
```

  - As proposed, the rule would cap any change at 10%. Since none of the resulting shares change by more than 10%, the algorithm would not apply in this case.

- Step 6: Establish the state-specific allocation structure to be pro-rated by the regional shares. This example **does not** apply a λ value to alter the allocations per equation 3.

  - The state-specific allocations could be the current, status quo allocations; or they could be variants, established via equation 3.

Table 2 - Current state by state allocations.

State	Current Allocation
Maine	0.005
New Hampshire	0.005
Massachusetts	0.130
Rhode Island	0.110
Connecticut	0.010
New York	0.070
New Jersey	0.200
Delaware	0.050
Maryland	0.110
Virginia	0.200
North Carolina	0.110

Four hypothetical examples of state-specific allocations under the new program were performed and are presented below (Tables 3, 4, and 5; Figures 3, 4, and 5).

Example 1: The first example represents a configuration resulting in more liberal change in state allocations. The parameters are set as follows: 2 regions (ME - NY; NJ - NC); initial allocation = status quo allocations ; transition from 90:10 to 10:90; 10% per year change in the transition from utilization to distribution; annual adjustments; the transition time to 90% weight on the stock distribution is 9 years; 10% adjustment cap; distribution assumption is based on the exploitable biomass by region from the assessment for the time period of 2004 - 2012; distribution of adjustments to states within a region are based on initial allocations.

Example 2: The second example represents a more conservative configuration, with more limited changes to state allocations. The parameters are set as follows: 2 regions (ME - NY; NJ - NC); initial allocation = status quo allocations; transition from 90:10 to 30:70; 5% per year change in the transition from utilization to distribution; annual adjustments; the transition time to 70% weight on the stock distribution is 12 years; 3% adjustment cap; distribution assumption is based on the exploitable biomass by region from the assessment for the time period of 2004 - 2015; distribution of adjustments to states within a region are based on initial allocations.

Example 3: The final example is intended to showcase a number of additional modifications that could be made to the approach to achieve certain objectives. In discussions amongst the PDT (and previously the Board regarding recreational black sea bass) it has been noted that it may be appropriate to treat New Jersey as an individual region due to its geographic position straddling the division of the Northern and Southern regions adjacent to Hudson Canyon. Additionally, this option increases the allocations for Connecticut and New York due to their allocations being disproportionate to their current resource availability (as defined in Equation 3 above). Lastly, the PDT discussed the option of holding Maine and New Hampshire's current allocations static throughout the transaction. To demonstrate these modifications, the parameters are set as follows: 4 regions (ME and NH remaining as a non-dynamic region with static allocations; MA - NY; NJ as a stand-alone region; and DE - NC); initial allocation = CT and NY base allocations increased by 1% in each of the first three years; transition from 90:10 to 10:90; 10% per year change in the transition from utilization to distribution; annual adjustments; the transition time to 90% weight on the stock distribution is 9 years; 10% adjustment cap; distribution assumption is based on the exploitable biomass by region from the assessment for the time period of 2004 - 2012, and assumes NJ gets 10% of its allocation from the northern region distribution and 10% of its allocation from the southern region distribution; distribution of adjustments to states within a region are based on initial allocations plus the incremental change as noted above.

The allocations presented in these tables would be different if any of the parameters were changed. Additionally, note that these examples are based on a scenario where the approach was implemented in 2004. The example shows how the system would work and the effects to the states over the initial period of adjustment from initial allocation having the highest weight in the equation to stock distribution having the highest weight during a period of time where the exploitable biomass was rapidly changing.

Table 3 - Allocation trajectory for all states under the parameters outlined in example 1 above. The adjustment cap is not triggered in any year in this example. This is a retrospective analysis as if this method were in place beginning in 2004.

State	2004	2005	2006	2007	2008	2009	2010	2011	2012
Maine	0.005	0.006	0.006	0.007	0.008	0.008	0.009	0.011	0.011
New Hampshire	0.005	0.006	0.006	0.007	0.008	0.008	0.009	0.011	0.011
Massachusetts	0.137	0.147	0.158	0.174	0.195	0.210	0.238	0.275	0.293
Rhode Island	0.116	0.125	0.134	0.147	0.165	0.178	0.201	0.233	0.248
Connecticut	0.011	0.011	0.012	0.013	0.015	0.016	0.018	0.021	0.023
New York	0.074	0.079	0.085	0.094	0.105	0.113	0.128	0.148	0.158
New Jersey	0.195	0.187	0.179	0.167	0.151	0.139	0.119	0.090	0.076
Delaware	0.049	0.047	0.045	0.042	0.038	0.035	0.030	0.023	0.019
Maryland	0.107	0.103	0.098	0.092	0.083	0.077	0.065	0.050	0.042
Virginia	0.195	0.187	0.179	0.167	0.151	0.139	0.119	0.090	0.076
North Carolina	0.107	0.103	0.098	0.092	0.083	0.077	0.065	0.050	0.042

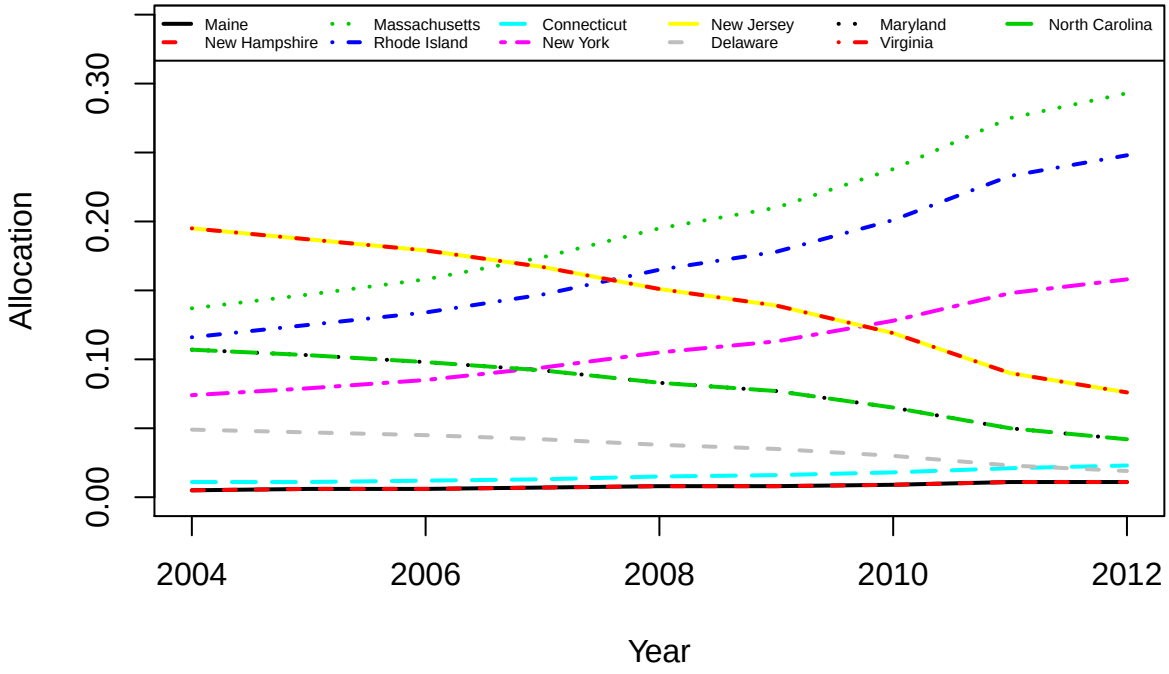


Figure 3: Allocation trajectory for all states under the parameters outlined in example 1 above. The adjustment cap is not triggered in any year in this example. This is a retrospective analysis as if this method were in place beginning in 2004.

Table 4 - Allocation trajectory for all states under the parameters outlined in example 2 above. The adjustment cap is triggered in each year from 2012 through 2015 in this example. This is a retrospective analysis as if this method were in place beginning in 2004. The adjustment cap is triggered in 2012 - 2015 in this example.

State	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Maine	0.005	0.005	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.008	0.008
New Hampshire	0.005	0.005	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.008	0.008
Massachusetts	0.134	0.139	0.144	0.152	0.162	0.170	0.176	0.182	0.187	0.193	0.198	0.205
Rhode Island	0.113	0.117	0.122	0.129	0.137	0.144	0.149	0.154	0.159	0.163	0.168	0.173
Connecticut	0.010	0.011	0.011	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.015	0.016
New York	0.072	0.075	0.078	0.082	0.088	0.092	0.095	0.098	0.101	0.104	0.107	0.110
New Jersey	0.197	0.193	0.189	0.183	0.175	0.170	0.164	0.159	0.154	0.150	0.145	0.141
Delaware	0.049	0.048	0.047	0.046	0.044	0.042	0.041	0.040	0.039	0.037	0.036	0.035
Maryland	0.109	0.106	0.104	0.101	0.096	0.093	0.090	0.087	0.085	0.082	0.080	0.077
Virginia	0.197	0.193	0.189	0.183	0.175	0.170	0.164	0.159	0.154	0.150	0.145	0.141
North Carolina	0.109	0.106	0.104	0.101	0.096	0.093	0.090	0.087	0.085	0.082	0.080	0.077

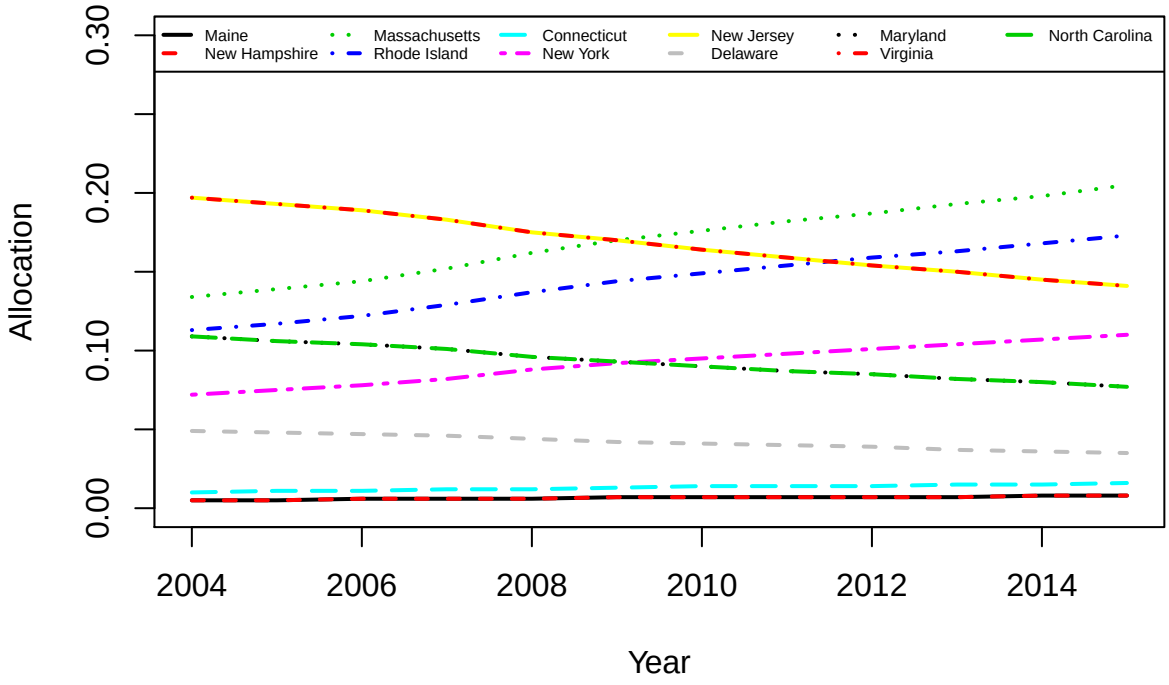


Figure 4: Allocation trajectory for all states under the parameters outlined in example 2 above. The adjustment cap is triggered in each year from 2012 through 2015 in this example. This is a retrospective analysis as if this method were in place beginning in 2004. The adjustment cap is triggered in 2012 - 2015 in this example.

Table 5 - Allocation trajectory for all states under the parameters outlined in example 3 above. The adjustment cap is not triggered in any year in this example. This is a retrospective analysis as if this method were in place beginning in 2004.

State	2004	2005	2006	2007	2008	2009	2010	2011	2012
Maine	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
New Hampshire	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Massachusetts	0.128	0.125	0.122	0.131	0.143	0.154	0.171	0.190	0.200
Rhode Island	0.108	0.105	0.102	0.109	0.120	0.128	0.143	0.159	0.167
Connecticut	0.020	0.030	0.040	0.043	0.047	0.051	0.056	0.063	0.066
New York	0.081	0.090	0.100	0.108	0.118	0.127	0.141	0.157	0.164
New Jersey	0.194	0.194	0.195	0.197	0.199	0.201	0.210	0.213	0.216
Delaware	0.046	0.043	0.040	0.037	0.033	0.030	0.025	0.019	0.017
Maryland	0.105	0.100	0.098	0.090	0.081	0.073	0.061	0.047	0.041
Virginia	0.193	0.187	0.184	0.170	0.152	0.138	0.115	0.089	0.077
North Carolina	0.105	0.100	0.098	0.090	0.081	0.073	0.061	0.047	0.041

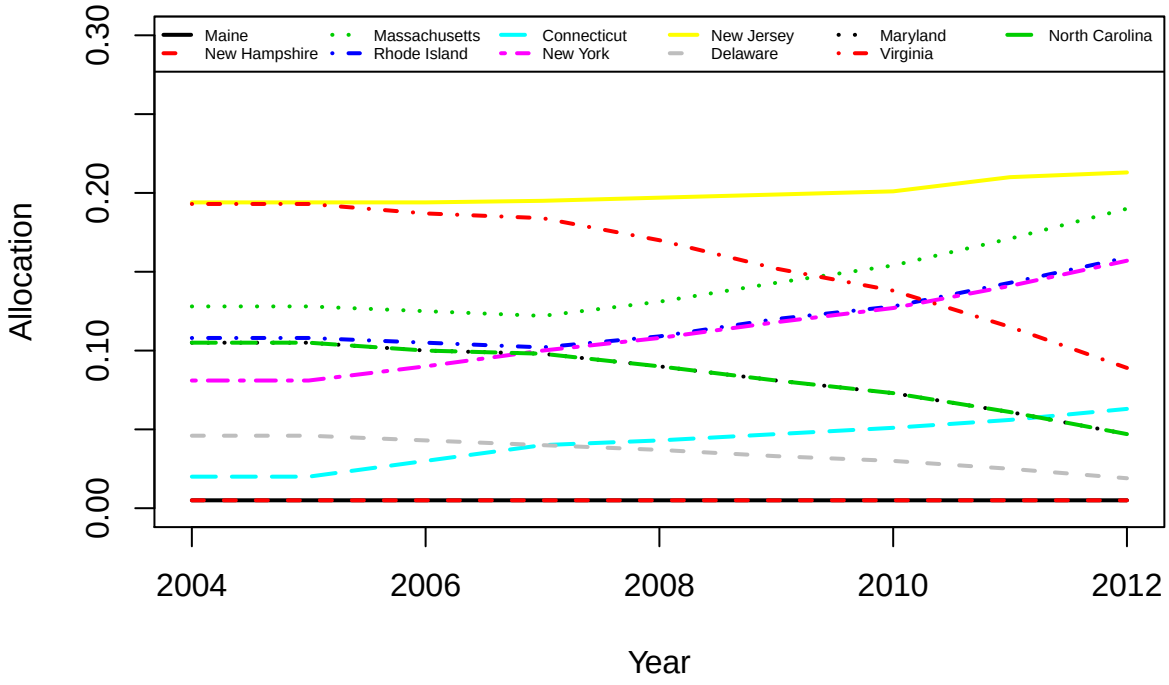


Figure 5: Allocation trajectory for all states under the parameters outlined in example 3 above. The adjustment cap is not triggered in any year in this example. This is a retrospective analysis as if this method were in place beginning in 2004.

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Appendix 3. Example changes in allocation distribution under various trigger and percentage approaches

Appendix 3 Examples			
Example	**Alternative**	**Trigger/Percentage**	**Approach**
1-A	Trigger	3 million	Static trigger with surplus allocated regionally and proportional to states' initial allocations
1-B	Trigger	3 million	1-A, if one year's quota is below the trigger
2	Trigger, Three regions	3 million	Static trigger with surplus allocated regionally and proportional to states' initial allocations with NJ as a third region
3	Trigger	3 million	Static trigger with surplus allocated regionally and equally between states
4-A	Trigger	3 million	Dynamic trigger with surplus allocated regionally and proportional to states' base allocations
4-B	Trigger	3 million	4-A, if one year's quota is below the trigger
5	Trigger	3 million	Dynamic trigger with surplus allocated regionally and equally between states
6	Trigger	4.5 million	Dynamic trigger with surplus allocated regionally and proportional to states' base allocations
7-A	Trigger with Increase to CT and NY First	3 million	Static trigger with surplus allocated regionally and proportional to states' initial allocations
7-B	Trigger with Increase to CT and NY First	3 million	7-A, if one year's quota is below the trigger
8	Percentage	25%	Surplus allocated equally between states
9	Percentage	25%	Surplus allocated regionally and equally between the states
10	Percentage	25%	Surplus allocated regionally and proportional to states' initial allocations
11	Percentage	75%	Surplus allocated regionally and equally between the states
12	Percentage	75%	Surplus allocated regionally and proportional to states' initial allocations

Appendix 3 EXAMPLE 1-A

Trigger Value: 3 million pounds

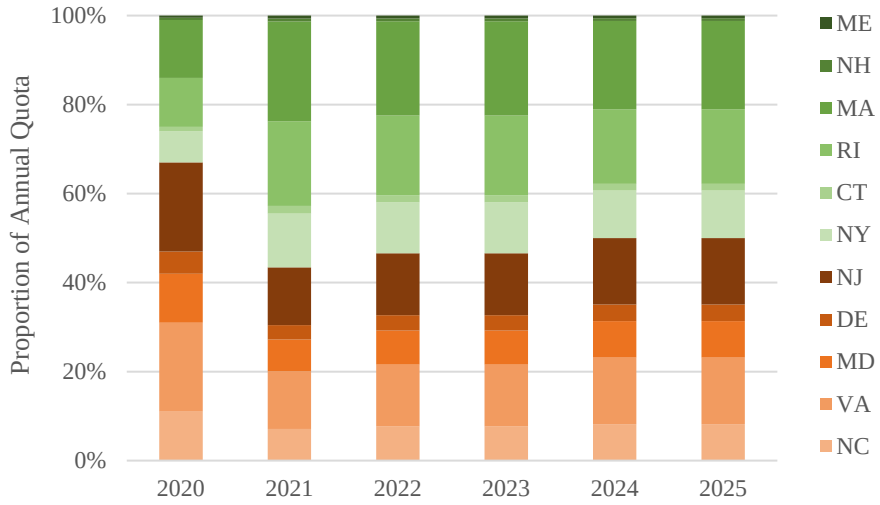
Base allocations: Static

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to initial allocations.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	22.5%	21.2%	21.2%	19.8%	19.8%
RI	11.0%	19.0%	17.9%	17.9%	16.8%	16.8%
CT	1.0%	1.7%	1.6%	1.6%	1.5%	1.5%
NY	7.0%	12.1%	11.4%	11.4%	10.7%	10.7%
NJ	20.0%	13.0%	13.9%	13.9%	14.9%	14.9%
DE	5.0%	3.2%	3.5%	3.5%	3.7%	3.7%
MD	11.0%	7.1%	7.7%	7.7%	8.2%	8.2%
VA	20.0%	13.0%	13.9%	13.9%	14.9%	14.9%
NC	11.0%	7.1%	7.7%	7.7%	8.2%	8.2%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	53.4%	53.4%	50.0%	50.0%
South	67.0%	43.4%	46.6%	46.6%	50.0%	50.0%



Appendix 3 EXAMPLE 1-B *(1-A approach with one year's quota under the trigger)*

Trigger Value: 3 million pounds

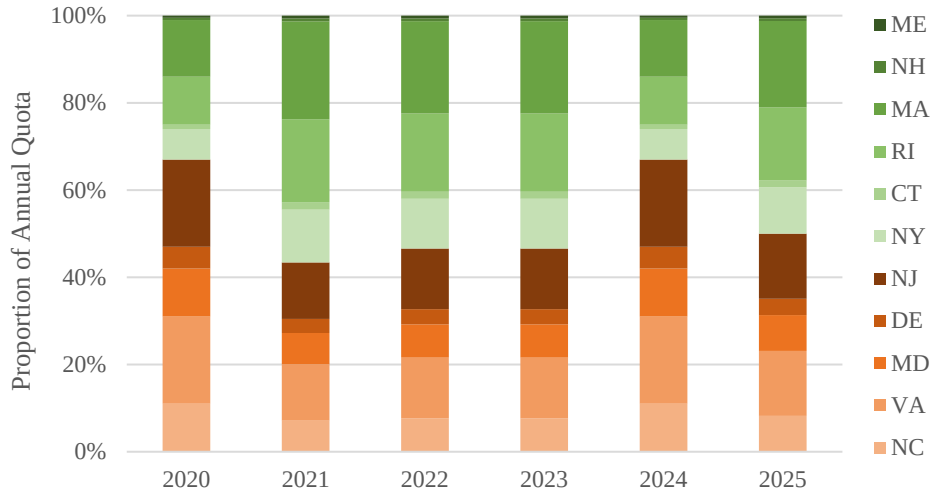
Base allocations: Static

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to initial allocations.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	**2,800,000**	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.6%	0.6%	0.5%	0.6%
NH	0.5%	0.7%	0.6%	0.6%	0.5%	0.6%
MA	13.0%	22.5%	21.2%	21.2%	13.0%	19.8%
RI	11.0%	19.0%	17.9%	17.9%	11.0%	16.8%
CT	1.0%	1.7%	1.6%	1.6%	1.0%	1.5%
NY	7.0%	12.1%	11.4%	11.4%	7.0%	10.7%
NJ	20.0%	13.0%	13.9%	13.9%	20.0%	14.9%
DE	5.0%	3.2%	3.5%	3.5%	5.0%	3.7%
MD	11.0%	7.1%	7.7%	7.7%	11.0%	8.2%
VA	20.0%	13.0%	13.9%	13.9%	20.0%	14.9%
NC	11.0%	7.1%	7.7%	7.7%	11.0%	8.2%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	53.4%	53.4%	33.0%	50.0%
South	67.0%	43.4%	46.6%	46.6%	67.0%	50.0%



Appendix 3 EXAMPLE 2

Trigger Value: 3 million pounds

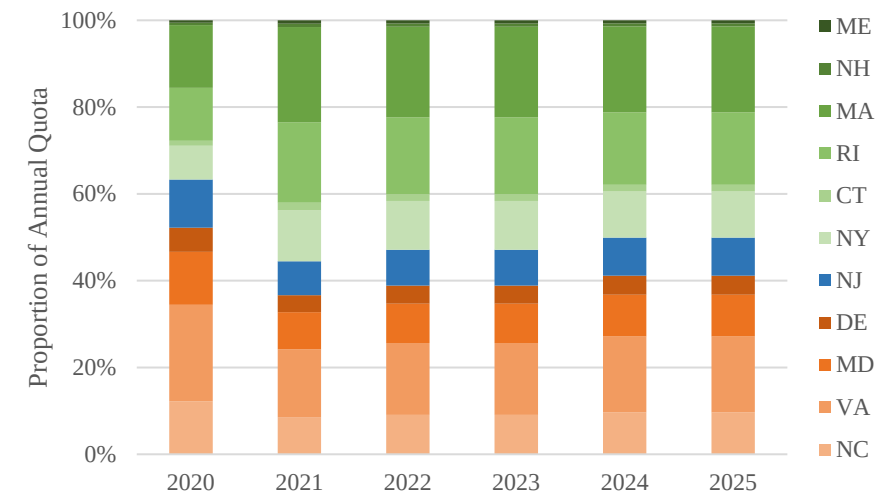
Base allocations: Static

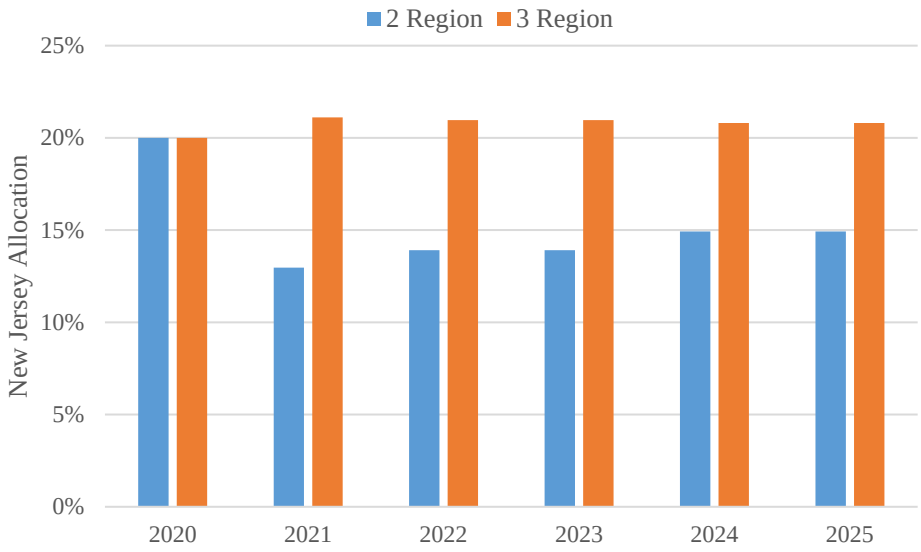
Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to initial allocations.

Regional configuration: ME-NY, NJ, DE-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	18.8%	18.0%	18.0%	17.2%	17.2%
RI	11.0%	15.9%	15.2%	15.2%	14.5%	14.5%
CT	1.0%	1.4%	1.4%	1.4%	1.3%	1.3%
NY	7.0%	10.1%	9.7%	9.7%	9.2%	9.2%
NJ	20.0%	21.1%	21.0%	21.0%	20.8%	20.8%
DE	5.0%	3.3%	3.6%	3.6%	3.8%	3.8%
MD	11.0%	7.3%	7.8%	7.8%	8.4%	8.4%
VA	20.0%	13.3%	14.2%	14.2%	15.2%	15.2%
NC	11.0%	7.3%	7.8%	7.8%	8.4%	8.4%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	47.5%	45.6%	45.6%	43.5%	43.5%
NJ	20.0%	21.1%	21.0%	21.0%	20.8%	20.8%
South	47.0%	31.4%	33.5%	33.5%	35.7%	35.7%





The above Figure provides a comparison of NJ's percent allocation under the 2 region configuration provided in Example 1 (blue bars) and the 3 region configuration provided in Example 2 (orange bars). All other variables are held constant between Example 1-A and Example 2.

Appendix 3 EXAMPLE 3

Trigger Value: 3 million pounds

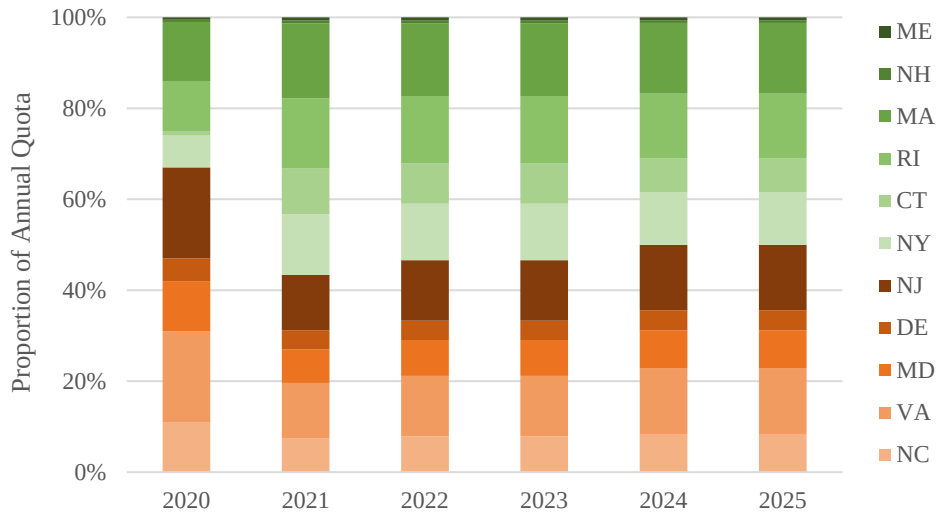
Base allocations: Static

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated equally to each state.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.7%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	16.5%	16.0%	16.0%	15.5%	15.5%
RI	11.0%	15.4%	14.8%	14.8%	14.2%	14.2%
CT	1.0%	10.1%	8.8%	8.8%	7.5%	7.5%
NY	7.0%	13.3%	12.4%	12.4%	11.5%	11.5%
NJ	20.0%	12.2%	13.3%	13.3%	14.4%	14.4%
DE	5.0%	4.2%	4.3%	4.3%	4.4%	4.4%
MD	11.0%	7.4%	7.9%	7.9%	8.4%	8.4%
VA	20.0%	12.2%	13.3%	13.3%	14.4%	14.4%
NC	11.0%	7.4%	7.9%	7.9%	8.4%	8.4%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	53.4%	53.4%	50.0%	50.0%
South	67.0%	43.4%	46.6%	46.6%	50.0%	50.0%



Appendix 3 EXAMPLE 4-A

Trigger Value: 3 million pounds

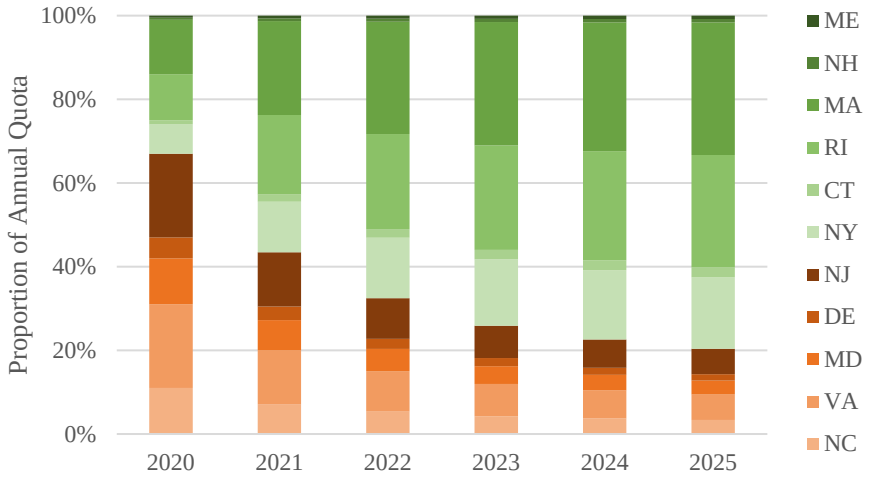
Base allocations: Dynamic

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to base allocations.

Regional configuration: ME-NY and NJ-NC.

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
NH	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
MA	13.0%	22.5%	26.8%	29.5%	30.8%	31.7%
RI	11.0%	19.0%	22.7%	24.9%	26.1%	26.8%
CT	1.0%	1.7%	2.1%	2.3%	2.4%	2.4%
NY	7.0%	12.1%	14.5%	15.9%	16.6%	17.1%
NJ	20.0%	13.0%	9.7%	7.7%	6.7%	6.1%
DE	5.0%	3.2%	2.4%	1.9%	1.7%	1.5%
MD	11.0%	7.1%	5.3%	4.2%	3.7%	3.3%
VA	20.0%	13.0%	9.7%	7.7%	6.7%	6.1%
NC	11.0%	7.1%	5.3%	4.2%	3.7%	3.3%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	67.5%	74.1%	77.4%	79.6%
South	67.0%	43.4%	32.5%	25.9%	22.6%	20.4%



Appendix 3 EXAMPLE 4-B *(4-A approach with one year's quota under the trigger)*

Trigger Value: 3 million pounds

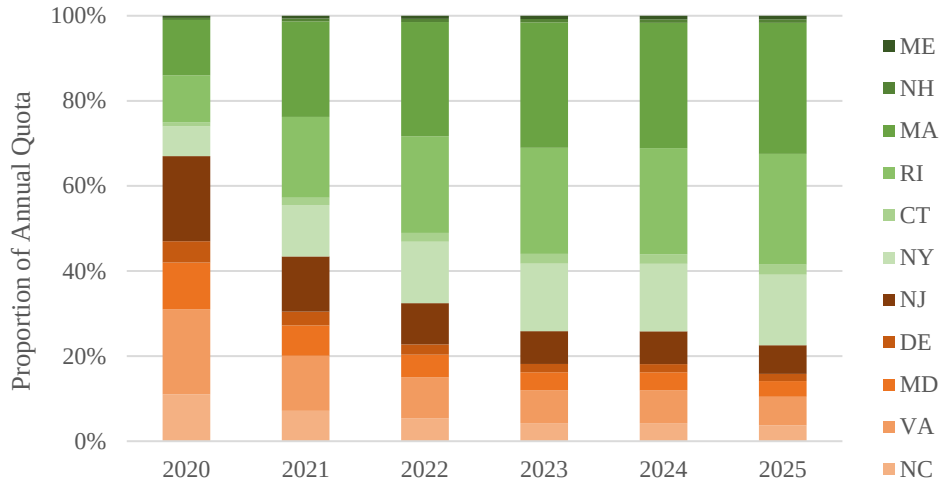
Base allocations: Dynamic

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to base allocations.

Regional configuration: ME-NY and NJ-NC.

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	**2,800,000**	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
NH	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
MA	13.0%	22.5%	26.8%	29.5%	29.5%	30.8%
RI	11.0%	19.0%	22.7%	24.9%	24.9%	26.0%
CT	1.0%	1.7%	2.1%	2.3%	2.3%	2.4%
NY	7.0%	12.1%	14.5%	15.9%	15.9%	16.6%
NJ	20.0%	13.0%	9.7%	7.7%	7.7%	6.7%
DE	5.0%	3.2%	2.4%	1.9%	1.9%	1.7%
MD	11.0%	7.1%	5.3%	4.2%	4.2%	3.7%
VA	20.0%	13.0%	9.7%	7.7%	7.7%	6.7%
NC	11.0%	7.1%	5.3%	4.2%	4.2%	3.7%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	67.5%	74.1%	74.2%	77.4%
South	67.0%	43.4%	32.5%	25.9%	25.8%	22.6%



Appendix 3 EXAMPLE 5

Trigger Value: 3 million pounds

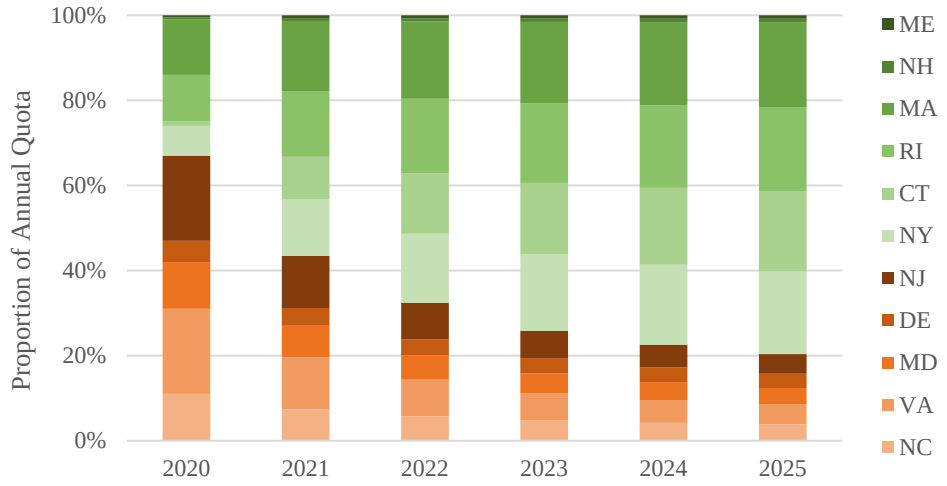
Base allocations: Dynamic

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated equally to each state.

Regional configuration: ME-NY and NJ-NC.

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
NH	0.5%	0.7%	0.7%	0.8%	0.8%	0.8%
MA	13.0%	16.5%	18.1%	19.1%	19.6%	19.9%
RI	11.0%	15.4%	17.5%	18.7%	19.3%	19.8%
CT	1.0%	10.1%	14.3%	16.8%	18.1%	18.9%
NY	7.0%	13.3%	16.2%	18.0%	18.8%	19.4%
NJ	20.0%	12.2%	8.6%	6.5%	5.4%	4.6%
DE	5.0%	4.2%	3.8%	3.5%	3.4%	3.4%
MD	11.0%	7.4%	5.7%	4.7%	4.2%	3.9%
VA	20.0%	12.2%	8.6%	6.5%	5.4%	4.6%
NC	11.0%	7.4%	5.7%	4.7%	4.2%	3.9%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	56.6%	67.5%	74.1%	77.4%	79.6%
South	67.0%	43.4%	32.5%	25.9%	22.6%	20.4%



Appendix 3 EXAMPLE 6

Trigger Value: 4.5 million pounds

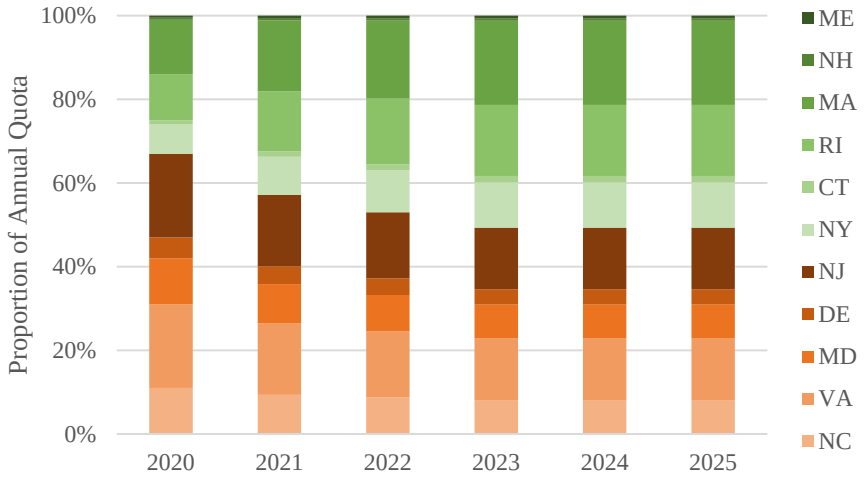
Base allocations: Dynamic

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to base allocations.

Regional configuration: ME-NY and NJ-NC.

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	17.0%	18.6%	20.1%	20.1%	20.1%
RI	11.0%	14.3%	15.7%	17.0%	17.0%	17.0%
CT	1.0%	1.3%	1.4%	1.5%	1.5%	1.5%
NY	7.0%	9.1%	10.0%	10.8%	10.8%	10.8%
NJ	20.0%	17.1%	15.8%	14.7%	14.7%	14.7%
DE	5.0%	4.3%	4.0%	3.7%	3.7%	3.7%
MD	11.0%	9.4%	8.7%	8.1%	8.1%	8.1%
VA	20.0%	17.1%	15.8%	14.7%	14.7%	14.7%
NC	11.0%	9.4%	8.7%	8.1%	8.1%	8.1%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	42.9%	47.0%	50.7%	50.7%	50.7%
South	67.0%	57.1%	53.0%	49.3%	49.3%	49.3%



Appendix 3 EXAMPLE 7-A (Increase to Connecticut and New York Quotas First)

Trigger Value: 3 million pounds

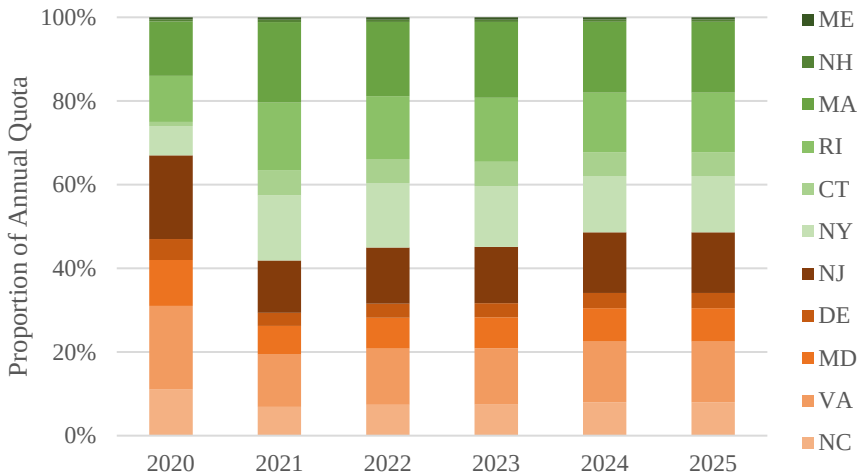
Base allocations: Static

Distribution of surplus quota: Surplus quota first allocated to increase Connecticut to 5%, then to increase New York to 9%. Further surplus is allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to historic allocations.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.6%	0.5%	0.6%	0.5%	0.5%
NH	0.5%	0.6%	0.5%	0.6%	0.5%	0.5%
MA	13.0%	19.2%	17.8%	18.1%	16.9%	16.9%
RI	11.0%	16.3%	15.0%	15.3%	14.3%	14.3%
CT	1.0%	5.9%	5.8%	5.8%	5.6%	5.6%
NY	7.0%	15.6%	15.4%	14.5%	13.4%	13.4%
NJ	20.0%	12.5%	13.4%	13.5%	14.5%	14.5%
DE	5.0%	3.1%	3.4%	3.4%	3.6%	3.6%
MD	11.0%	6.9%	7.4%	7.4%	8.0%	8.0%
VA	20.0%	12.5%	13.4%	13.5%	14.5%	14.5%
NC	11.0%	6.9%	7.4%	7.4%	8.0%	8.0%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	58.1%	55.0%	54.9%	51.4%	51.4%
South	67.0%	41.9%	45.0%	45.1%	48.6%	48.6%



Appendix 3 EXAMPLE 7-B *(7-A approach with one year's quota under the trigger)*

Trigger Value: 3 million pounds

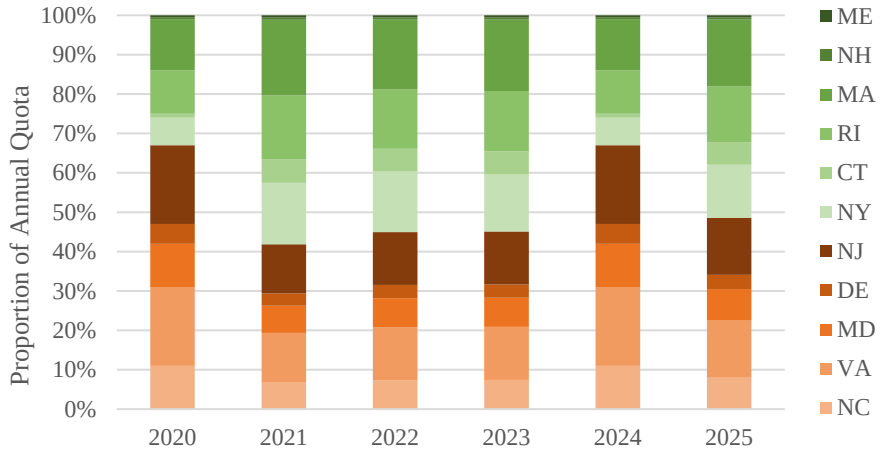
Base allocations: Static

Distribution of surplus quota: Surplus quota first allocated to increase Connecticut to 5%, then to increase New York to 9%. Further surplus is allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated in proportion to historic allocations.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	**2,800,000**	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.6%	0.5%	0.6%	0.5%	0.5%
NH	0.5%	0.6%	0.5%	0.6%	0.5%	0.5%
MA	13.0%	19.2%	17.8%	18.1%	13.0%	16.9%
RI	11.0%	16.3%	15.0%	15.3%	11.0%	14.3%
CT	1.0%	5.9%	5.8%	5.8%	1.0%	5.6%
NY	7.0%	15.6%	15.4%	14.5%	7.0%	13.4%
NJ	20.0%	12.5%	13.4%	13.5%	20.0%	14.5%
DE	5.0%	3.1%	3.4%	3.4%	5.0%	3.6%
MD	11.0%	6.9%	7.4%	7.4%	11.0%	8.0%
VA	20.0%	12.5%	13.4%	13.5%	20.0%	14.5%
NC	11.0%	6.9%	7.4%	7.4%	11.0%	8.0%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	58.1%	55.0%	54.9%	33.0%	51.4%
South	67.0%	41.9%	45.0%	45.1%	67.0%	48.6%



Appendix 3 EXAMPLE 8

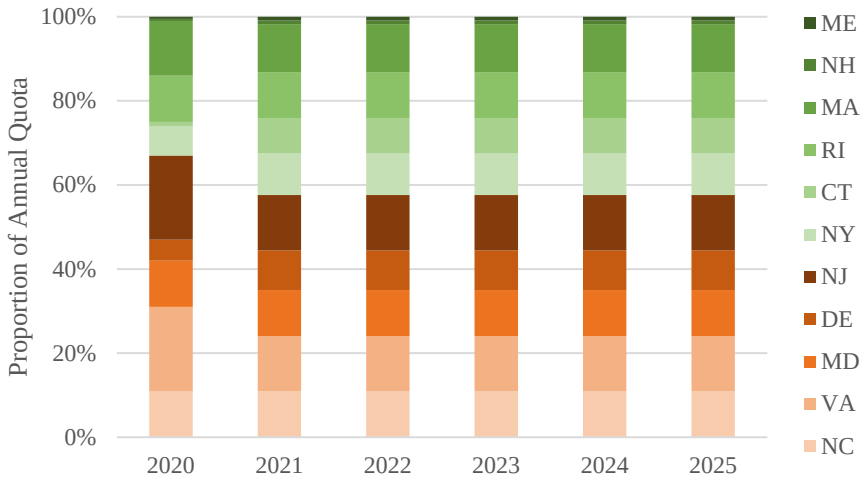
Base percentage: 25%

Distribution of surplus quota: Surplus quota allocated equally to each state from Massachusetts to North Carolina.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.9%	0.9%	0.9%	0.9%	0.9%
NH	0.5%	0.9%	0.9%	0.9%	0.9%	0.9%
MA	13.0%	11.4%	11.4%	11.4%	11.4%	11.4%
RI	11.0%	10.9%	10.9%	10.9%	10.9%	10.9%
CT	1.0%	8.4%	8.4%	8.4%	8.4%	8.4%
NY	7.0%	9.9%	9.9%	9.9%	9.9%	9.9%
NJ	20.0%	13.2%	13.2%	13.2%	13.2%	13.2%
DE	5.0%	9.4%	9.4%	9.4%	9.4%	9.4%
MD	11.0%	10.9%	10.9%	10.9%	10.9%	10.9%
VA	20.0%	13.2%	13.2%	13.2%	13.2%	13.2%
NC	11.0%	10.9%	10.9%	10.9%	10.9%	10.9%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	42.4%	42.4%	42.4%	42.4%	42.4%
South	67.0%	57.6%	57.6%	57.6%	57.6%	57.6%



Appendix 3 EXAMPLE 9

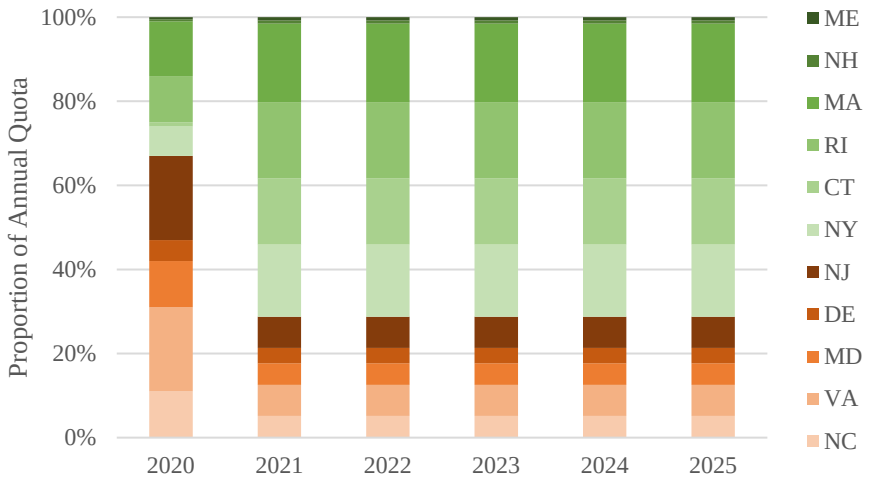
Base percentage: 25%

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated equally to each state.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.8%	0.8%	0.8%	0.8%	0.8%
NH	0.5%	0.8%	0.8%	0.8%	0.8%	0.8%
MA	13.0%	18.7%	18.7%	18.7%	18.7%	18.7%
RI	11.0%	18.2%	18.2%	18.2%	18.2%	18.2%
CT	1.0%	15.7%	15.7%	15.7%	15.7%	15.7%
NY	7.0%	17.2%	17.2%	17.2%	17.2%	17.2%
NJ	20.0%	7.4%	7.4%	7.4%	7.4%	7.4%
DE	5.0%	3.7%	3.7%	3.7%	3.7%	3.7%
MD	11.0%	5.2%	5.2%	5.2%	5.2%	5.2%
VA	20.0%	7.4%	7.4%	7.4%	7.4%	7.4%
NC	11.0%	5.2%	5.2%	5.2%	5.2%	5.2%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	71.3%	71.3%	71.3%	71.3%	71.3%
South	67.0%	28.8%	28.8%	28.8%	28.8%	28.8%



Appendix 3 EXAMPLE 10

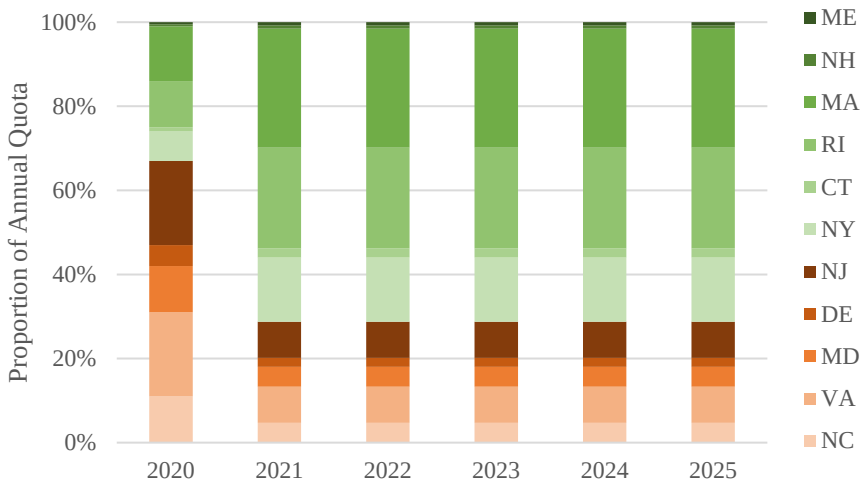
Base percentage: 25%

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated according to initial proportions.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.8%	0.8%	0.8%	0.8%	0.8%
NH	0.5%	0.8%	0.8%	0.8%	0.8%	0.8%
MA	13.0%	28.3%	28.3%	28.3%	28.3%	28.3%
RI	11.0%	24.0%	24.0%	24.0%	24.0%	24.0%
CT	1.0%	2.2%	2.2%	2.2%	2.2%	2.2%
NY	7.0%	15.3%	15.3%	15.3%	15.3%	15.3%
NJ	20.0%	8.6%	8.6%	8.6%	8.6%	8.6%
DE	5.0%	2.1%	2.1%	2.1%	2.1%	2.1%
MD	11.0%	4.7%	4.7%	4.7%	4.7%	4.7%
VA	20.0%	8.6%	8.6%	8.6%	8.6%	8.6%
NC	11.0%	4.7%	4.7%	4.7%	4.7%	4.7%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	71.3%	71.3%	71.3%	71.3%	71.3%
South	67.0%	28.8%	28.8%	28.8%	28.8%	28.8%



Appendix 3 EXAMPLE 11

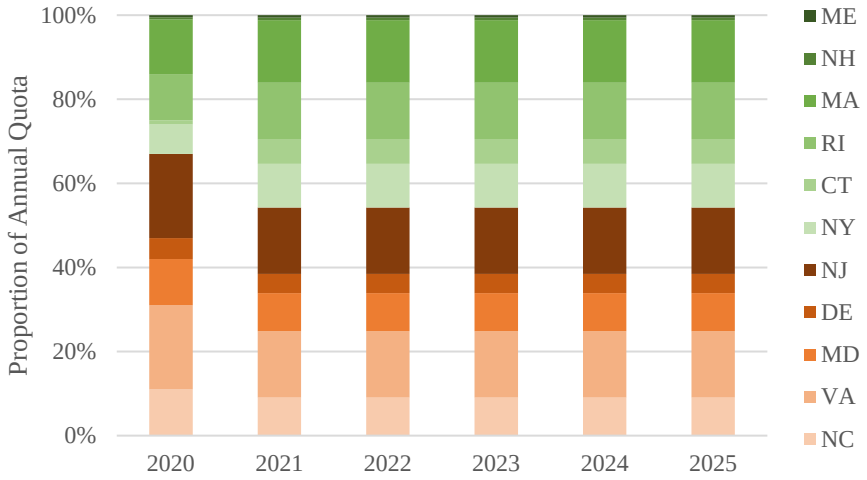
Base percentage: 75%

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated equally to each state.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	14.9%	14.9%	14.9%	14.9%	14.9%
RI	11.0%	13.4%	13.4%	13.4%	13.4%	13.4%
CT	1.0%	5.9%	5.9%	5.9%	5.9%	5.9%
NY	7.0%	10.4%	10.4%	10.4%	10.4%	10.4%
NJ	20.0%	15.8%	15.8%	15.8%	15.8%	15.8%
DE	5.0%	4.6%	4.6%	4.6%	4.6%	4.6%
MD	11.0%	9.1%	9.1%	9.1%	9.1%	9.1%
VA	20.0%	15.8%	15.8%	15.8%	15.8%	15.8%
NC	11.0%	9.1%	9.1%	9.1%	9.1%	9.1%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	45.8%	45.8%	45.8%	45.8%	45.8%
South	67.0%	54.3%	54.3%	54.3%	54.3%	54.3%



Appendix 3 EXAMPLE 12

Base percentage: 75%

Distribution of surplus quota: Surplus quota allocated regionally according to stock distribution (84% in the North and 16% in the South according to the 2019 stock assessment) and, within a region, allocated according to initial proportions.

Regional configuration: ME-NY and NJ-NC

Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Coastwide Quota	5,580,000	5,580,000	5,000,000	5,000,000	4,500,000	4,500,000

State	**Annual % of Quota**					
	2020	**2021**	**2022**	**2023**	**2024**	**2025**
ME	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
NH	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
MA	13.0%	18.1%	18.1%	18.1%	18.1%	18.1%
RI	11.0%	15.3%	15.3%	15.3%	15.3%	15.3%
CT	1.0%	1.4%	1.4%	1.4%	1.4%	1.4%
NY	7.0%	9.8%	9.8%	9.8%	9.8%	9.8%
NJ	20.0%	16.2%	16.2%	16.2%	16.2%	16.2%
DE	5.0%	4.0%	4.0%	4.0%	4.0%	4.0%
MD	11.0%	8.9%	8.9%	8.9%	8.9%	8.9%
VA	20.0%	16.2%	16.2%	16.2%	16.2%	16.2%
NC	11.0%	8.9%	8.9%	8.9%	8.9%	8.9%
Total	100%	100%	100%	100%	100%	100%
North	33.0%	45.8%	45.8%	45.8%	45.8%	45.8%
South	67.0%	54.3%	54.3%	54.3%	54.3%	54.3%