Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Bluefish Management Board

FROM: Dustin Colson Leaning, FMP Coordinator

DATE: May 26, 2021

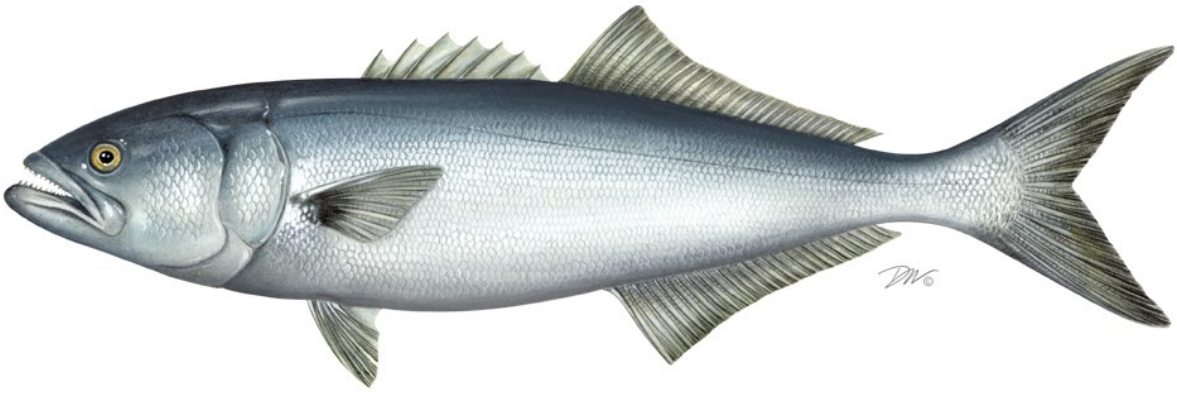
SUBJECT: Revisions to the Bluefish Allocation and Rebuilding Draft Amendment

A minor error was discovered in the commercial allocations to the states alternative set within the Bluefish Allocation and Rebuilding Draft Amendment Document and the Public Hearing Document. This error was in the status quo allocation column of Table 17 in the Draft Amendment (Table 6 in the Public Hearing Document) and included values for some states that were off by a few hundredths of a percent. Given many of the alternatives in the commercial allocations to the states section are linked, this error affected other tables and text within the section. However, all revisions have been made and are highlighted in yellow in the documents. Economic analyses were rerun and all conclusions from the impacts remain the same.

Atlantic States Marine Fisheries Commission

Draft Amendment to the Interstate Fishery Management Plan for Bluefish for Public Comment

Bluefish Allocation and Rebuilding Amendment



May 2021

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

DRAFT DOCUMENT FOR PUBLIC COMMENT

Draft Amendment to the Interstate Fishery Management Plan for Bluefish

Prepared by

Atlantic States Marine Fisheries Commission and
Mid-Atlantic Fishery Management Council's Fishery Management Action Team

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This is a report of the Atlantic States Marine Fisheries Commission pursuant to U.S. Department of Commerce, National Oceanic and Atmospheric Administration Award No. NA20NMF4740012.

The Atlantic States Marine Fisheries Commission (Commission) and Mid-Atlantic Fishery Management Council (Council) seek your input on the following Draft Amendment to the Bluefish Fishery Management Plan.

You are encouraged to submit comments regarding this document during the public comment period. Comments must be received by **April 23.** Regardless of when they were sent, comments received after that time will not be included in the official record. The Commission and Council will consider public comment on this document before finalizing the amendment.

You may submit public comment by attending a public hearing or mailing, faxing, or emailing written comments to the address below. Comments can also be referred to your state's members on the Bluefish Management Board or Bluefish Advisory Panel; however, unless those comments are also submitted as instructed below they will not be considered as part of the official public comment record.

Written comments may be sent by any of the following methods:

1. **Online** at https://www.mafmc.org/comments/bluefish-allocation-rebuilding-amendment
2. **Email** to the following addresses: mseeley@mafmc.org
3. **Mail or Fax** to:

   Chris Moore, Ph.D, Executive Director
   Mid-Atlantic Fishery Management Council
   North State Street, Suite 201
   Dover, DE 19901
   FAX: 302.674.5399

If your organization is planning to release an action alert in response to this Draft Amendment, or if you have questions, please contact either Dustin Colson Leaning (email: dleaning@asmfc.org; phone: 703.842.0740) or Matt Seeley (email: mseeley@mafmc.org; phone at 302.526.5262)

The timeline for completion of the Bluefish Allocation and Rebuilding Amendment is as follows:

	Dec 2019	Feb–Mar 2020	May 2020	May 2020 – Jan 2021	Feb 2020	March – April 2021	June 2021
Approval of Draft PID by Board and Council	**X**						
Public review and comment on PID		**X**					
Board and Council review of public comment; Board direction on what to include in the Draft Amendment			**X**				
Preparation of Draft Amendment				**X**			
Review and approval of Draft Amendment by Board and Council for public comment					**X**		
Public review and comment on Draft Amendment						**X**	
Board review of public comment on Draft Amendment							**X**
Review and approval of the final Amendment by the Council, Board, Policy Board, and Commission							**X**

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1.0 INTRODUCTION

Bluefish (*Pomatomus saltatrix*) fisheries are managed under the Bluefish Fishery Management Plan (FMP) that was prepared cooperatively by the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (ASMFC or Commission). The Commission, under the authority of the Atlantic Coastal Fisheries Cooperative Management Act, is responsible for managing bluefish in state waters (0-3 miles). The Council develops regulations for federal waters (3-200 nautical miles from shore), with final review and approval conducted by NOAA Fisheries.

1.1 BACKGROUND INFORMATION

The Bluefish FMP, approved by the Commission's Bluefish Management Board (Board) and the Council, was the FMP developed jointly by an interstate commission and regional fishery management council. Bluefish is currently managed under Amendment 1 to the Bluefish FMP, which was approved in October 1998 and implemented in 2000. In December 2017, the Board and Council initiated development of an amendment to revisit commercial and recreational sector allocations as well as other management issues in the Bluefish FMP. An initial round of scoping was conducted in the summer of 2018 to gauge public interest on the development of an amendment. After initial scoping, the 2019 bluefish operational assessment incorporated the recalibrated Marine Recreational Information Program (MRIP) recreational catch estimates. The updated biological reference points indicated that bluefish were overfished. Given the overfished designation, the Board and Council recommended including the rebuilding plan into this ongoing amendment.

The Board and Council approved the Supplemental Scoping and Public Information Document for public comment in December 2019. Eleven scoping hearings were held from Massachusetts through Florida between February and March 2020 to solicit public input. The hearings were attended by approximately 208 people and public comment was provided by 159 individuals and organizations in person at the hearings or in writing.

Based on the summary of public input, comments from the Advisory Panels (APs), and recommendations from the Fishery Management Action Team (FMAT), the Board and Council supported reviewing and potentially revising several management issues including 1) FMP goals and objectives, 2) the allocation of quota between the commercial and recreational sectors, 3) commercial allocations to the states, 4) a rebuilding plan for the overfished stock, 5) allocation transfers between sectors, 6) regional commercial allocations, 7) state-to-state transfers of commercial quota, and 8) separate allocations for the for-hire and private sectors of the recreational fishery.

At the August 2020 joint meeting, the Board and Council determined that revisions to the state-to-state quota transfer process and exploration of separate allocations for the for-hire and private sectors of the recreational fishery should be removed from consideration in this Amendment. ASMFC Administrative Commissioners agreed that communication and cooperation between states could improve upon inefficiencies in the commercial quota transfer

process that have lately proved challenging for some states. The Board and Council also recommended that the recreational reform initiative would be better suited to address the for-hire sector separation issue, especially because this issue was simultaneously under consideration for the Summer Flounder, Scup, and Black Sea Bass FMP as well. At the October 2020 joint meeting, the Board and Council decided to remove consideration of regional commercial allocations when several concerns regarding state autonomy and flexibility were raised.

In October 2020, the Board and Council identified the following priority issues for further development within this action including:

1. FMP Goals and Objectives *Section 2.5*
2. Commercial and Recreational Allocation *Section 4.1*
3. Commercial Allocations to the States *Section 4.2*
4. Rebuilding Plan *Section 4.3*
5. Quota Transfers *Section 4.4*
6. Management Uncertainty *Section 4.5*
7. *De Minimis Section 4.6*

1.1.1 Statement of Problem

1.1.1.1 Bluefish Commercial/Recreational Allocation

In 2000, Amendment 1 established an 83% allocation of total allowable landings (TAL) to the recreational sector and a 17% allocation to the commercial sector based on landings data from 1981-1989. In 2011, the Council's Amendment 3 to the Bluefish FMP changed the plan from a landings-based allocation to a catch-based allocation with the establishment of an annual catch limit (ACL), which replaced the TAL. This was done to increase sector accountability for discards. Since the initial allocation percentages were established, each sector's proportional contribution to total landings has changed. Recent changes in how recreational catch is estimated have resulted in an even larger discrepancy between the current levels of estimated recreational catch and the allocation of catch to the recreational sector.

In July 2018, MRIP released a revised time series of catch and harvest estimates based on adjustments to its angler intercept methodology (used to estimate catch rates) and its effort estimation methodology (namely, a transition from a telephone-based effort survey to a mail-based effort survey). These revisions resulted in much higher recreational catch estimates compared to previous estimates, affecting the entire time series of data going back to 1981. The 2018 MRIP recalibration increased recreational catch estimates from 1985-2017 by an average of 116% (from 29.9 million lb to 64.6 million lb), ranging from +63% in 1986 to +291% in 2017.

The recreational data revisions not only impacted catch accounting, but also significantly affected our understanding of the population level for the bluefish stock. Due to the fixed commercial/recreational allocation percentages defined in the FMP, the allocation percentages currently defined in the FMP do not reflect the current understanding of recent and historic proportions of catch and landings from the two sectors. Modifications to these allocation

percentages can only be done through an amendment because they are defined in the Council and Commission FMPs. This Draft Amendment will consider whether the allocations are still appropriate and meeting the objectives of the FMP.

1.1.1.2 Commercial Allocations to the States

The current commercial state allocations are based on 1981-1989 landings data. The Board and Council received many comments during the amendment scoping process requesting that allocations be reconsidered, while some comments supported status quo. Several states have consistently requested transfers of quota from other states that are not fully utilizing their commercial allocation. This suggests that the current state commercial allocations are not meeting the needs of all states' commercial fisheries. These allocations are being reevaluated and compared to more recent years of data to consider changes to commercial state allocations. Equity, economic efficiency, and social impacts are all being considered through this action.

1.1.1.3 Rebuilding Plan

The 2019 operational assessment for bluefish indicated that the stock is overfished, but overfishing was not occurring in 2018. The incorporation of revised MRIP estimates impacted the estimated stock biomass, the biological reference points, and resulting catch limits. However, the revised MRIP data were one of several factors that influenced the overfished designation and the resulting catch limits. For example, almost all indices of abundance showed a decrease from 2017 to 2018. The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires that the Council implement a rebuilding plan within two years of the overfished designation. The MSA requires the Council to implement regulations consistent with the plan to rebuild the stock biomass back to the biomass target. The Council and the Board will work jointly to identify a plan to rebuild the stock as fast as possible, while still taking into consideration the socioeconomic impacts of rebuilding on the bluefish fisheries.

1.1.1.4 Quota Transfers

Quota transfers are a frequently utilized management tool that offers the potential for increased fishing opportunities for the commercial or recreational sectors. Amendment 1 established the ability to transfer quota, subject to a 10.5 million lb cap, from the recreational sector to the commercial sector. The decision to transfer quota and the size of the transfer is considered annually through the specifications setting process. During the amendment scoping process, the Board and Council received several comments in support of changing the one-way transfer of quota into a bi-directional option. In effect, this would update the transfer process to allow for transfers of quota from the commercial sector to the recreational sector. The sector transfer cap is also being reevaluated to ensure its applicability to a bi-directional transfer. This updated process would allow for an expedient response to a potential future pressing need for increased recreational fishing opportunities.

1.1.1.5 Management Uncertainty

The Monitoring Committee (MC) annually identifies and reviews the relevant sources of management uncertainty in the commercial and recreational bluefish fisheries. Upon determining sources of uncertainty, the MC can recommend that the Board and Council revise down the annual catch target (ACT) through the specifications process. In effect, this provides a buffer to reduce the probability of overfishing. However, the current FMP does not allow for a targeted application of management uncertainty to one specific sector, and is instead is applied to both the recreational and commercial sectors. Members of the MC, the Board, and the Council have voiced support for updating this process to allow for a more targeted management uncertainty approach.

1.1.1.6 De Minimis

Under the Commission's current FMP, states which land less than 0.1% of the coastwide commercial landings in the year prior are exempt from fishery independent monitoring requirements for the following year. During the amendment scoping process, a comment was received from the Georgia Department of Natural Resources in support of expanding upon the existing *de minimis* provision for bluefish by also exempting a state from recreational measures. Under this proposal, states that contribute minimally to coastwide harvest would not have to deal with the administrative burden of frequently altering recreational measures.

1.1.2 Benefits of Implementation

This Draft Amendment is a thorough reevaluation of multiple aspects of the Bluefish FMP that have not been considered since 2000. The abundance, distribution, and health of the stock have changed in some significant ways since these issues were last addressed. Reevaluation of bluefish management processes helps to ensure fair and equitable access to all fishery participants. In addition, the implementation of a rebuilding plan promotes sustainable use of the bluefish resource moving forward.

1.1.2.1 Ecological Benefits

Bluefish are opportunistic feeders that inhabit a key ecological role in the coastal marine food chain. Bluefish will often feed on schools of forage fish including menhaden, herring, and weakfish, but are also preyed upon by larger predators at all life stages. Commercially and recreationally important species such as striped bass, summer flounder, and tuna as well marine mammals frequently feed upon adult bluefish. Rebuilding the stock back to its target level will help to ensure that bluefish maintain their ecological role.

1.1.2.2 Social and Economic Benefits

Recreational and commercial fisheries for bluefish extend along the entire Atlantic coast. Despite bluefish's historic low price per pound, there are several commercial fishing ports that rely on bluefish landings as an important source of revenue. While bluefish are not often described as a primary target species for the for-hire recreational industry, many for-hire captains from the Mid-Atlantic region will assert that bluefish are an important "fallback" species that will help to save a charter trip when other fish are not biting. Bluefish also provide

cultural value to the many private anglers that target bluefish from the shore and piers along the coast. Addressing the revised MRIP information, recent fishing trends, and the needs of the commercial and recreational fisheries to inform the allocation between the two sectors and the allocations between states may enhance social and economic benefits by increasing economic returns and increasing access to the bluefish resource. This in turn could increase resilience in fishery-dependent communities along the Atlantic coast.

1.2 DESCRIPTION OF THE RESOURCE

Bluefish are a migratory, pelagic species found throughout the world in most temperate coastal regions, except the eastern Pacific. In the western North Atlantic, the population ranges from Nova Scotia to Florida. Bluefish travel in schools of like-sized individuals and undertake seasonal migrations, moving into the Mid-Atlantic Bight (MAB) during the spring, and south or farther offshore during the fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Juvenile stages have been recorded in all estuaries within the MAB, but eggs and larvae occur in oceanic waters (Able and Fahay 1998). Bluefish live to age 12 or greater (Salerno et al. 2001), and may reach a length of 3.5 ft, and a weight of 27 lb (Bigelow and Schroeder 2002).

Bluefish eat a wide variety of prey. The species has been described by Bigelow and Schroeder (2002) as “perhaps the most ferocious and bloodthirsty fish in the sea, leaving in its wake a trail of dead and mangled mackerel, menhaden, herring, alewives, and other species on which it preys." Bluefish born in a given year (young of the year) typically fall into two distinct size classes suggesting that there are two spawning events along the east coast. More recent studies suggest that spawning is a single, continuous event, but natural mortality increases during the middle portion of the spawning period resulting in the appearance of a split season. As a result of the bimodal size structure of juveniles, young are referred to as the spring-spawned cohort or summer-spawned cohort. In the MAB, the spring cohort appears to be the primary source of fish that recruit into the adult population.

In August 2019, a bluefish operational assessment, which included revised bluefish MRIP estimates, changed the stock status and biological reference points from the 2015 benchmark stock assessment. The updated biological reference points for bluefish include a fishing mortality threshold of $F_{MSY} = F_{35\%}$ (as the F_{MSY} proxy) = 0.183, and a biomass reference point of $SSB_{MSY} = SSB_{35\%}$ (as the SSB_{MSY} proxy) = 438.10 million lbs (198,717 mt). The minimum stock size threshold (1/2 SSB_{MSY}), is estimated to be 219.05 million lbs (99,359 mt). SSB in 2018 was 200.71 million lbs (91,041 mt) (Figure 1.).

Operational assessment results indicate that the bluefish stock was overfished and overfishing was not occurring in 2018 relative to the biological reference points. Fishing mortality (*F*) on the fully selected age 2 fish was 0.146 in 2018, 80% of the updated *F* threshold reference point (Figure 2.). There is a 90% probability that *F* in 2018 was between 0.119 and 0.205.

The bluefish stock has experienced a decline in SSB over the past decade, coinciding with an increasing trend in F. Recruitment has remained fairly steady, fluctuating just below the time-series mean of 46 million fish. Both commercial and recreational fisheries had poor catch in 2016 (44.91 million lbs or 20,370 mt), and 2018 (24.89 million lbs or 11,288 mt), resulting in the second lowest and lowest catches on record, respectively. As a result of the very low catch in 2018, fishing mortality was estimated below the reference point for the first time in the time-series. These lower catches are possibly a result of availability. Anecdotal evidence suggests larger bluefish stayed offshore and remained inaccessible to most recreational fishery participants during the past two years (NEFSC 2019).

The Board and the Council are in the process of initiating a rebuilding plan that must be submitted by November 2021 (two years after receiving notice from NOAA Fisheries) with the goal of rebuilding the bluefish stock in no more than 10 years. See *Section 4.3* for a more detailed discussion of the rebuilding plan and the proposed alternatives under consideration.

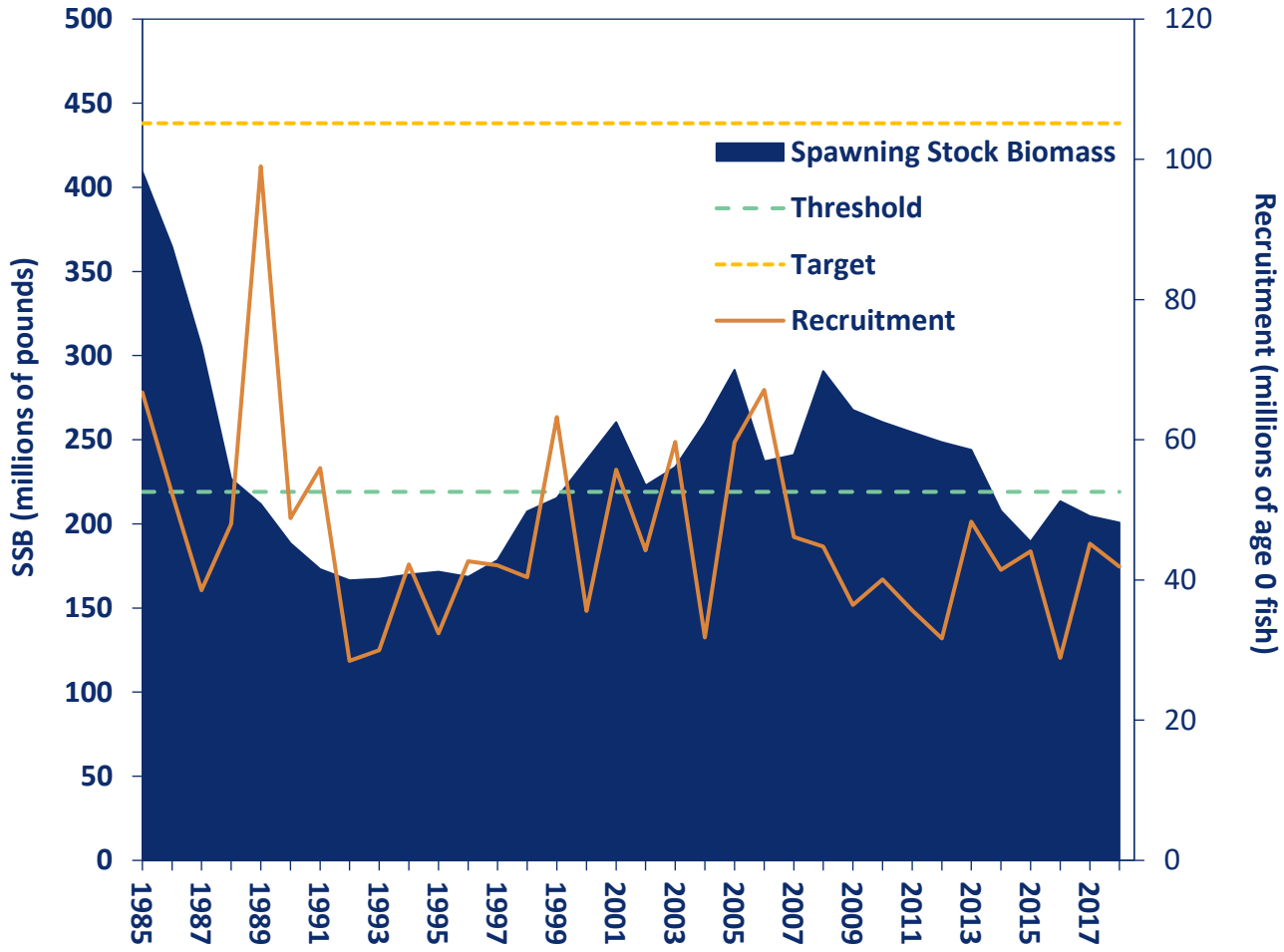


Figure 1. Bluefish spawning stock biomass and recruitment at age 0 by calendar year. The yellow horizontal dashed line is the updated biomass target $SSB_{MSY\ proxy}$ = $SSB_{40\%}$ = 198,717 mt, and the dotted black line is the $SSB_{Threshold}$ = 99,359 mt. Source: 2019 Bluefish Operational Stock Assessment, NEFSC.

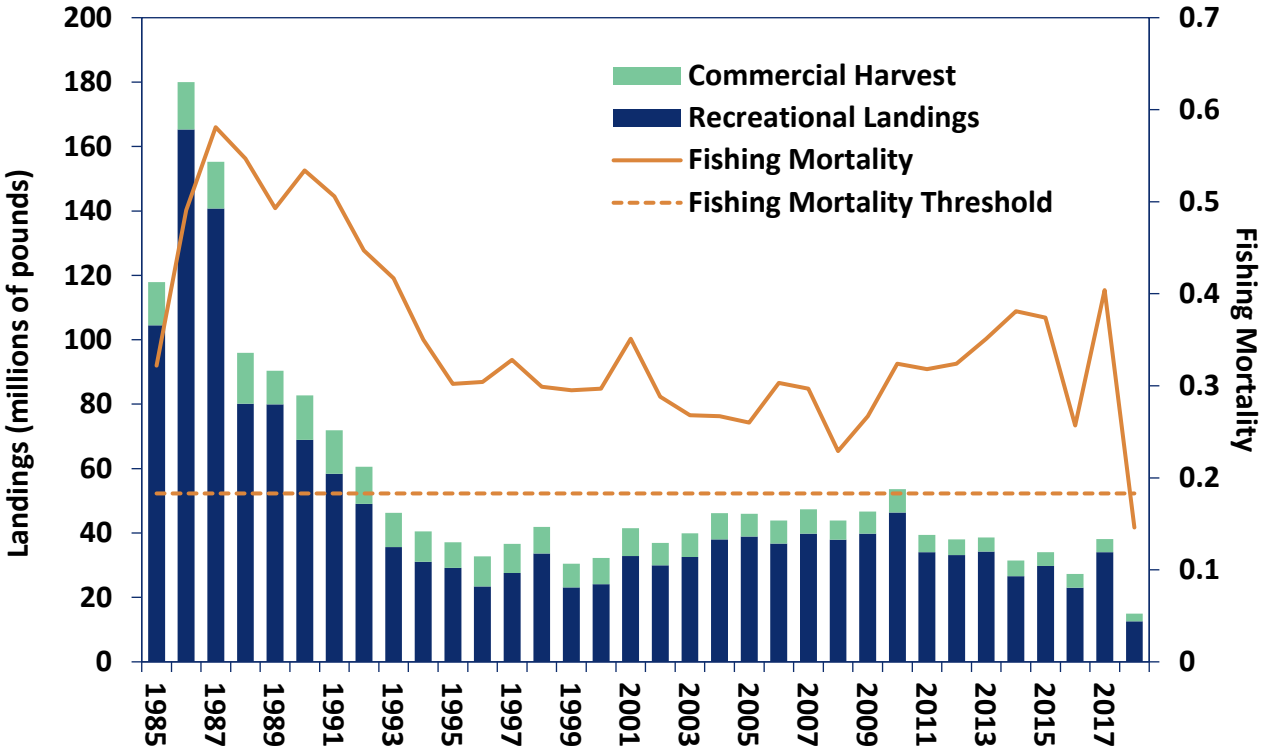


Figure 2. Commercial and recreational landings and fishing mortality for bluefish. The horizontal dashed line is the updated F_{MSY} proxy = $F_{35\%}$ = 0.183. Source: 2019 Bluefish Operational Stock Assessment, NEFSC.

1.3 DESCRIPTION OF THE FISHERIES

Bluefish are targeted by commercial and recreational fishermen[1] throughout Southern New England, the Mid-Atlantic, and the South Atlantic. The commercial and recreational fisheries in each state are driven by the seasonal availability of bluefish. During the summer, concentrations of bluefish are found in waters from Maine to Cape Hatteras, North Carolina. During winter's colder months they tend to be offshore between Cape Hatteras and Florida. Data for commercial landings, recreational landings, and recreational dead discards are available back to 1981. Discards are considered negligible within the commercial fishery, and as such, are assumed to be zero for the purposes of this Amendment. Bluefish are predominately a recreational fishery with recreational landings accounting for 73% of the total catch by weight since 1981, with recreational dead discards accounting for 13%, and commercial landings about 14%. Over the more recent time period of 2015-2019, the comparable percentages are 69% recreational landings, 20% recreational dead discards, and 11% commercial landings (Figure 3).

[1] The term fishermen in this document is used to describe both men and women who fish.

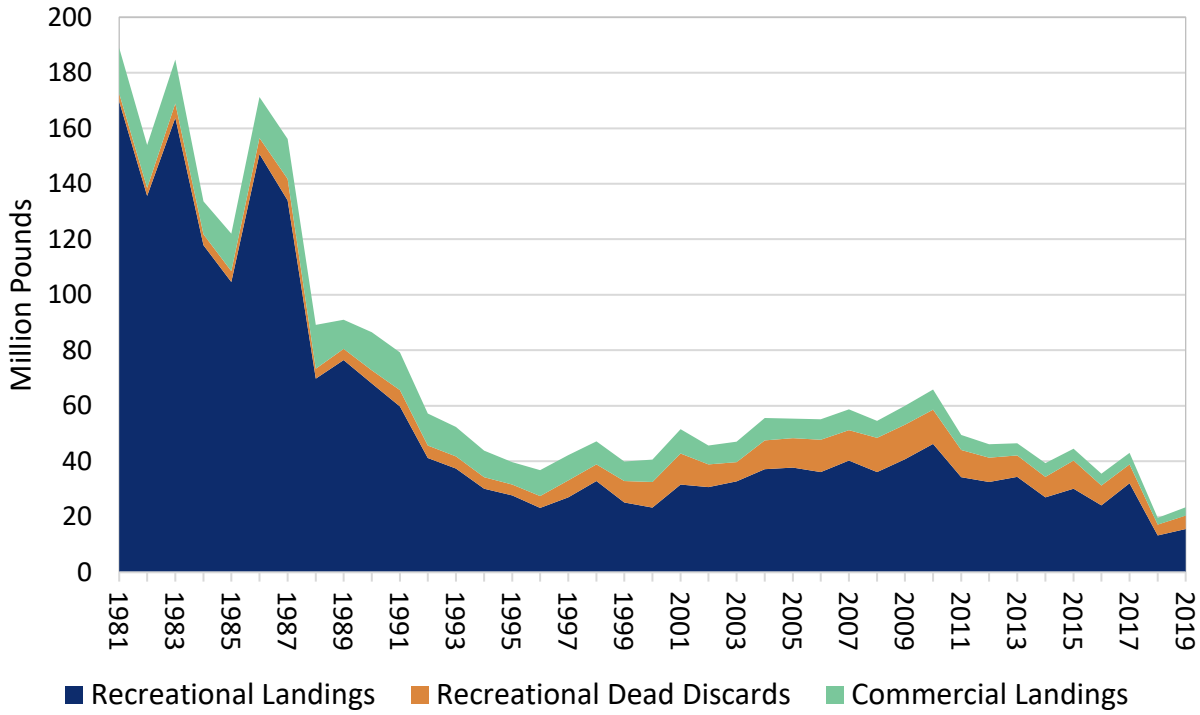


Figure 3. Commercial and recreational bluefish landings and recreational dead discards, 1981-2019. Source: ACCSP Data Warehouse.

Bluefish Commercial Fishery

The commercial quota is divided among the states based on the allocation percentages established in the FMP. States set measures to achieve their state-specific commercial quotas.

Table 1 displays the current commercial state allocations that have been in place since Amendment 1. Modifications to the state allocations are being considered in *Section 4.2*.

Table 1. Bluefish state allocation of annual commercial quota.

State	Percent Allocation
ME	0.67%
NH	0.41%
MA	6.72%
RI	6.81%
CT	1.27%
NY	10.39%
NJ	14.82%
DE	1.88%
MD	3.00%
VA	11.88%
NC	32.06%
SC	0.04%
GA	0.01%
FL	10.06%
Total	100%

In 2019, commercial fishermen landed 2.99 million pounds of bluefish, about 39% of the total commercial quota of 7.71 million pounds. Over the past two decades, total bluefish ex-vessel revenue ranged from a low of $1.9 million in 2000 to a high of $3.5 million in 2015. Total ex-vessel value in 2019 was $2.37 million, resulting in an average price per pound of $0.85. In general, the price of bluefish tends to be lower when landings are higher, and vice versa. This relationship is not linear and many other factors besides landings also influence price. The highest average price per pound over the past two decades was $0.95 in 2018, and the lowest average price per pound was $0.35 in 2004. All revenue and price values were adjusted to 2019 dollars to account for inflation (
Figure 4).

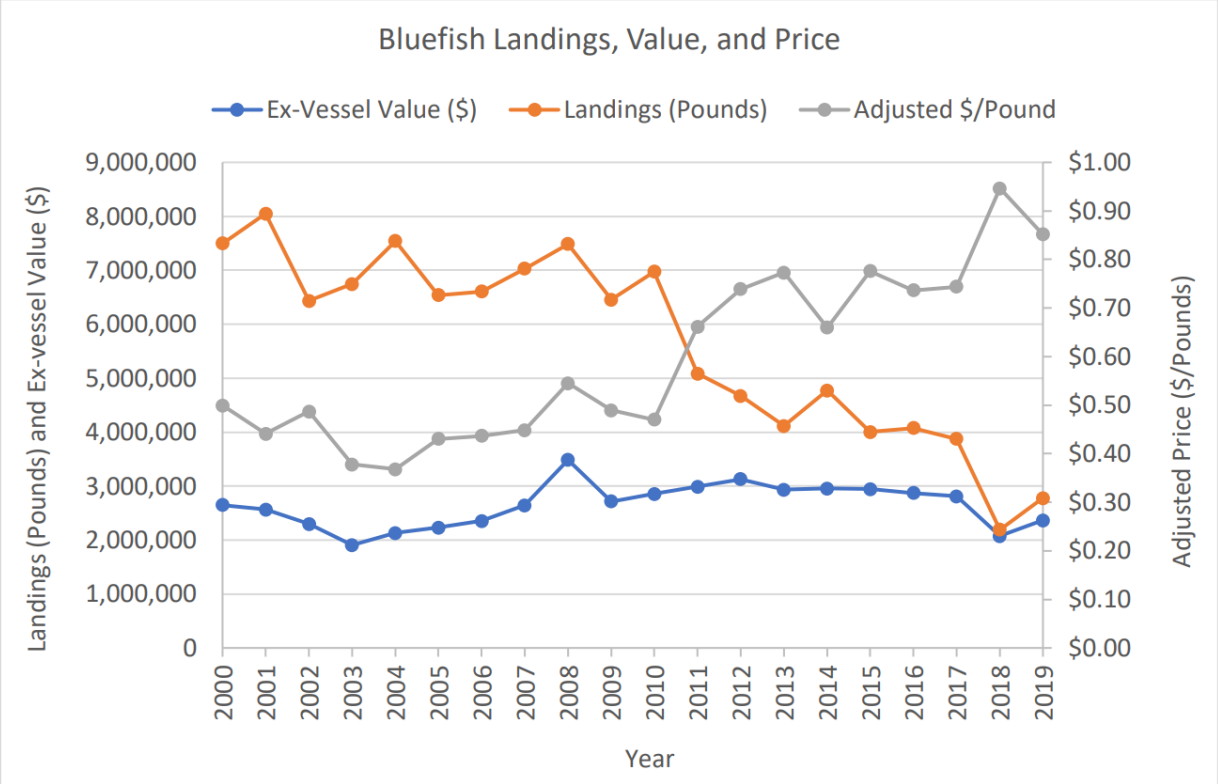


Figure 4. Landings, ex-vessel value, and price for bluefish landed on the Atlantic coast, 2000-2019. Ex-vessel value and price are inflation-adjusted to 2019 dollars using the Gross Domestic Product Price Deflator. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e., "DERS"), which include both state and federal dealer data).

Table 2 shows commercial landings of bluefish by state in 2015-2019. State landings have decreased in recent years, which is most likely attributable to low availability due to the overfished stock status. North Carolina comprises the majority contribution to the coastwide total landings with New York, Rhode Island, New Jersey, Massachusetts, and Florida comprising the bulk of the remaining landings in that order. Commercial bluefish landings from Maine, New Hampshire, South Carolina, and Georgia are confidential and are not displayed in the table. The landings from these states are also minimal, if they occur at all.

Table 2. State Commercial Bluefish Landings in lbs. (2015-2019). C = confidential data Source: ACCSP Data Warehouse, which includes both state and federal dealer data.

State	2015	2016	2017	2018	2019
Maine	C	C	C	C	C
New Hampshire	C	C	C	C	C
Massachusetts	600,883	499,627	364,862	195,378	184,171
Rhode Island	514,223	463,419	647,257	237,121	415,809
Connecticut	40,305	68,290	42,023	54,239	35,551
New York	954,419	917,279	717,559	538,168	594,842
New Jersey	710,610	669,316	305,552	56,206	203,272
Delaware	72,664	15,667	12,317	6,070	17,166
Maryland	94,376	66,720	39,997	18,985	22,776
Virginia	192,317	199,281	195,349	96,165	124,681
North Carolina	804,094	1,148,643	1,544,037	910,262	1,107,902
South Carolina	C	C	C	C	C
Georgia	C	C	C	C	C
Florida	240,463	240,976	266,728	316,425	284,696
Total	4,225,548	4,289,429	4,135,725	2,429,191	2,866,208

VTR data suggest that NOAA Fisheries statistical areas 611, 539, 613, 626 and 632 were responsible for the largest percentage of commercial bluefish catch in 2019. Statistical area 611, within the Long Island Sound, had the highest number of trips which caught bluefish (Table 3; Figure 5).

Table 3. Statistical areas which accounted for at least 5% of the total commercial bluefish catch (by weight) in 2019, with associated number of trips. Source: Unpublished NOAA Fisheries dealer data (i.e., "AA tables", which include both state and federal dealer data).

Statistical area	% of 2019 commercial bluefish catch	Number of trips
611	18%	1,667
539	18%	1,051
613	14%	727
626	9%	84
632	6%	27

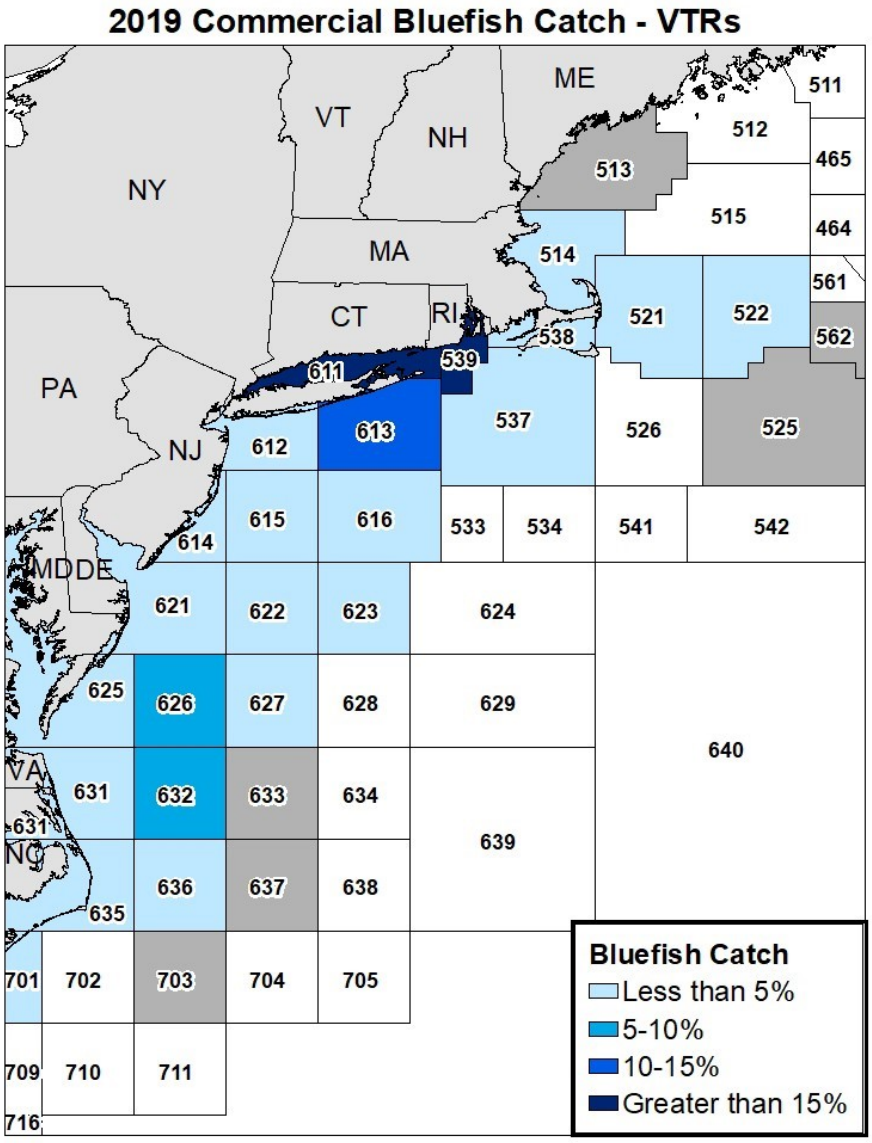


Figure 5. Proportion of bluefish catch by statistical area in 2019 based on federal VTR data. Statistical areas marked "confidential" are associated with fewer than three vessels and/or dealers. Statistical areas with confidential data collectively accounted for less than 1% of commercial catch reported on VTRs in 2019. Source: Unpublished NOAA Fisheries Vessel Trip Report data.

The commercial bluefish fishery in state and federals waters is predominantly a gill net fishery. On average about 59% of the commercial bluefish landings (by weight) reported by state and federal dealers were caught with gill nets over the period 2000 to 2019. Over the same period, trawls accounted for about 10% of landings, hook and line accounted for 6% of landings, pound nets accounted for 6% of landings, seines accounted for 1% of landings, while all other gear types accounted for 2% or less of the commercial bluefish landings. Sixteen percent of landings

reported by dealers during 2000 to 2019 were of an unknown gear type (Figure 6). Many of the commercial fisheries do not fish exclusively for bluefish, but instead target a combination of species including croaker, mullet, Spanish mackerel, spot, striped bass, and weakfish.

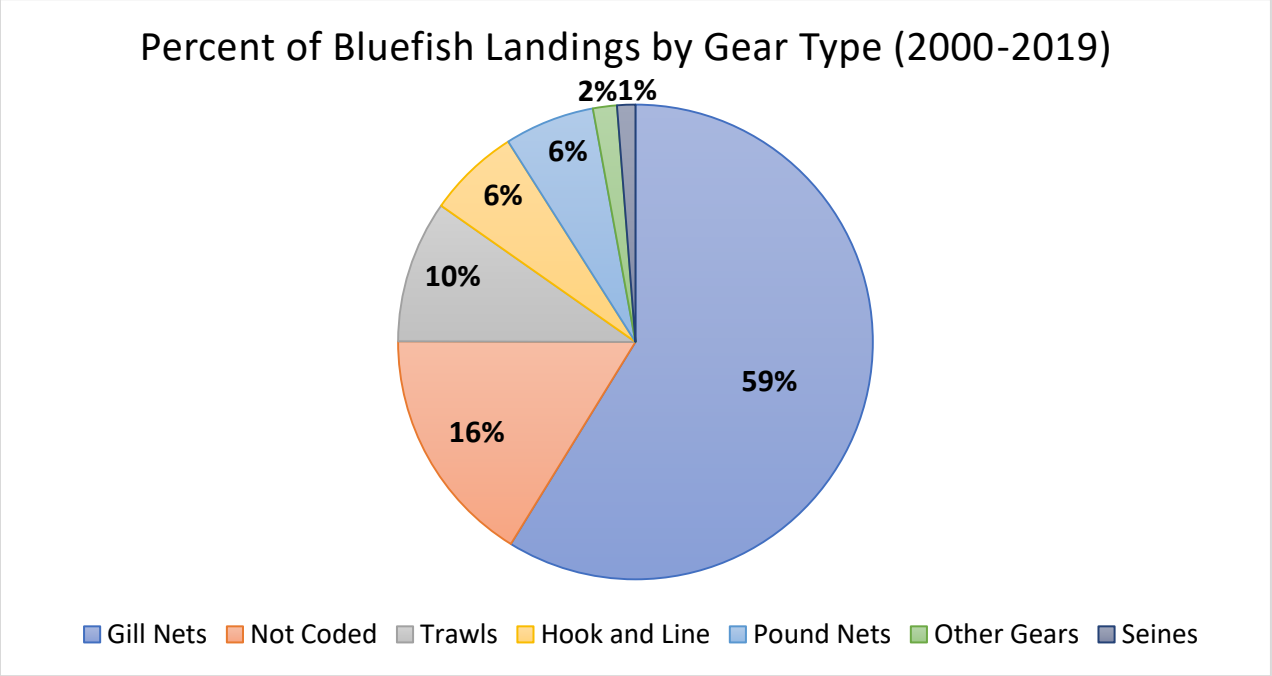


Figure 6. Proportion of bluefish caught by gear type over the period 2000-2019. Source: ACCSP Data Warehouse

At least 100,000 pounds of bluefish were landed by commercial fishermen in 6 ports in Rhode Island, New York and North Carolina in 2019. These ports accounted for approximately 72% of all 2019 commercial bluefish landings. Hatteras, North Carolina was the leading port, both in terms of landings and number of vessels landing bluefish (Table 4).

Table 4. Ports reporting at least 100,000 pounds of commercial bluefish landings in 2019, based on dealer data.

Port	Bluefish landings (lb)	% of total commercial bluefish landings	Number of vessels landing bluefish
Hatteras, NC	393,056	28%	127
Point Judith, RI	283,941	21%	76
Wanchese, NC	273,277	10%	36
Montauk, NY	269,418	7%	52
Hampton Bays, NY	147,959	4%	19
Little Compton, RI	111,107	2%	7

Bluefish Recreational Fishery

NOAA Fisheries has conducted recreational fishing surveys since 1979 to obtain estimates of participation, effort, and catch by recreational anglers in marine waters. Prior to 2004,

recreational data were generated by the Marine Recreational Fishery Statistics Survey (MRFSS). Recreational data for 2004 and later are available from MRIP. Note that MRIP has recently undergone major changes in its collection of effort data[2], as well as changes to its angler intercept methods for private boat and shore anglers.[3] As such, major changes to the time series of recreational catch and landings were released in July 2018. A more detailed description of the revisions to the MRIP sampling methodology may be found in *Section 1.1.1.1*.

The 2018 MRIP recalibration increased recreational catch estimates from 1985-2017 by an average of 116% (from 29.9 million lb to 64.6 million lb), ranging from +63% in 1986 to +291% in 2017 (NEFSC 2019). The revised MRIP data is used in describing the characteristics of the bluefish recreational fishery in the paragraphs below.

Bluefish are a migratory species that school by size. Schools of bluefish can extend over a kilometer, often pursuing schools of baitfish. Bluefish abundance is also tied to season. The majority of recreational bluefish catch occurs in Florida during the winter, followed by North Carolina in the spring, then New York and New Jersey in the summer, and North Carolina again in the fall. However, bluefish can be unpredictable and their north/south and inshore/offshore migration patterns can vary year to year.

From 1981-2019, recreational catch and landings of bluefish on the Atlantic coast peaked in 1981 at 75.76 and 65.35 million bluefish, respectively. Recreational catch was lowest in 1995 with an estimated 25.08 million bluefish were caught, but landings reached a time series low in 2018 when only 10.25 million bluefish were landed. Recreational anglers along the Atlantic coast from Maine through Florida caught an estimated 38.63 million bluefish and landed 12.14 million bluefish (about 15.56 million pounds) in 2019 (

[2] See https://www.fisheries.noaa.gov/recreational-fishing-data/effort-survey-improvements
[3] See https://www.fisheries.noaa.gov/event/access-point-angler-intercept-survey-calibration-workshop

Table 5).

Bluefish are one of the most popular sport fish along the Atlantic coast. While many anglers do catch bluefish for consumption, many others do not due to its strong flavor and its tendency to spoil quickly. The digestive enzymes of bluefish are powerful, and their meat can go bad if not put on ice or cooked soon after capture. Approximately 65% of total recreational catch is comprised of releases in numbers of fish for the period 2010 to 2019. Scientific studies indicate that on average 15% of recreationally released bluefish die, which means that recreational dead discards have accounted for approximately 21% of the total recreational catch in weight over the same period.

Based on MRIP estimates, about 60% of recreational bluefish landings (in numbers of fish) in 2019 were from anglers fishing from shore, approximately 36% were from anglers fishing on private or rental boats, and about 4% were from anglers fishing from party or charter boats (Figure 7).

The majority of recreational bluefish harvest occurs in state waters when the fish migrate inshore. Between 2017 and 2019, about 97% of recreational bluefish landings (in numbers of fish) occurred in state waters and about 3% occurred in federal waters (Figure 8). During the past three years New York (20.2%), New Jersey (14.4%), North Carolina (25.5%), and Florida (16.6%) have comprised the majority (78.7%) of the total coastwide landings in numbers of fish (Table 6).

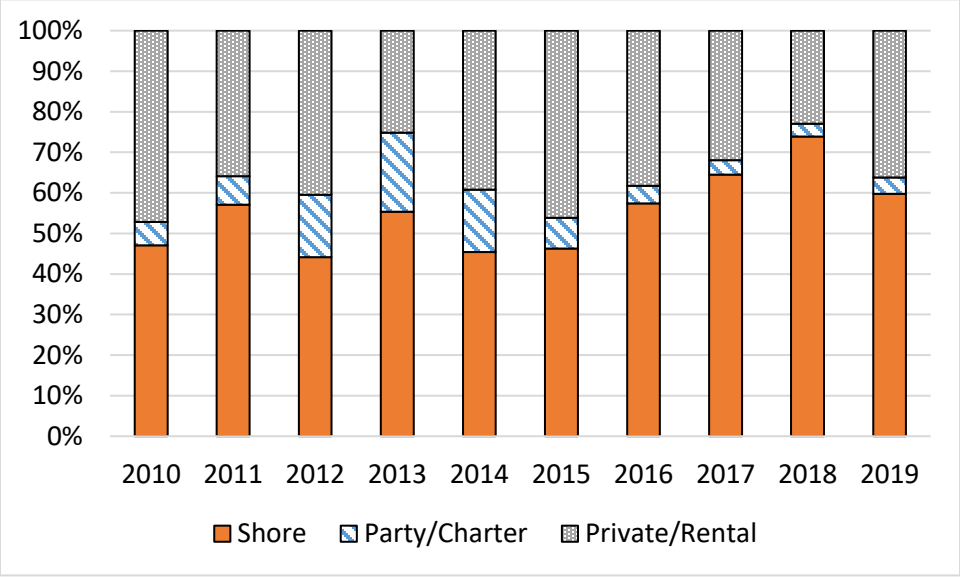


Figure 7. The percent of bluefish harvested by recreational fishing mode in numbers of fish, Maine through Florida, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, December 31, 2020

Table 5. Recreational bluefish landings, catch, and mean weight of landed fish, Maine through Florida, 1981-2019. Source: MRIP

Year	Catch (number of fish)	Landings (number of fish)	Landings (lbs)	Mean weight of landed fish (lb)
1981	75,758,405	65,354,727	169,626,286	2.60
1982	57,971,455	49,994,993	135,646,634	2.71
1983	65,692,855	53,273,556	163,756,917	3.07
1984	65,363,811	52,644,496	117,871,513	2.24
1985	50,820,919	40,993,554	104,585,434	2.55
1986	58,208,887	47,496,866	150,748,617	3.17
1987	54,036,164	40,310,965	133,966,553	3.32
1988	24,866,437	19,679,223	69,739,293	3.54
1989	53,652,330	38,850,679	76,442,812	1.97
1990	43,895,414	30,936,948	68,090,997	2.20
1991	41,416,279	27,317,927	59,792,834	2.19
1992	29,447,521	20,180,576	41,217,702	2.04
1993	27,427,204	15,369,463	37,415,745	2.43
1994	28,624,143	13,063,625	30,145,683	2.31
1995	25,084,131	11,532,806	27,710,089	2.40
1996	25,864,667	11,126,336	23,207,235	2.09
1997	30,448,294	12,400,977	27,039,376	2.18
1998	28,511,672	13,397,306	32,880,414	2.45
1999	52,596,232	16,878,789	25,106,096	1.49
2000	47,102,862	12,879,478	23,357,123	1.81
2001	60,512,249	18,048,645	31,654,980	1.75
2002	49,810,121	17,607,380	30,654,388	1.74
2003	37,746,239	16,411,936	32,758,672	2.00
2004	49,239,084	18,631,909	37,133,464	1.99
2005	48,482,666	18,341,456	37,742,809	2.06
2006	54,310,045	19,397,265	36,081,959	1.86
2007	56,313,394	19,189,747	40,239,102	2.10
2008	46,044,998	14,845,431	36,166,828	2.44
2009	49,866,591	18,085,387	40,731,434	2.25
2010	62,350,106	21,929,515	46,302,792	2.11
2011	58,290,651	20,814,882	34,218,751	1.64
2012	50,658,371	18,578,840	32,530,916	1.75
2013	53,494,668	19,975,053	34,398,326	1.72
2014	55,093,760	21,510,648	27,044,278	1.26
2015	42,148,960	13,725,107	30,098,650	2.19
2016	42,528,751	14,899,733	24,155,299	1.62
2017	42,163,136	13,845,807	32,071,431	2.32
2018	30,928,701	10,245,712	13,270,863	1.30
2019	38,631,938	12,137,295	15,555,892	1.28

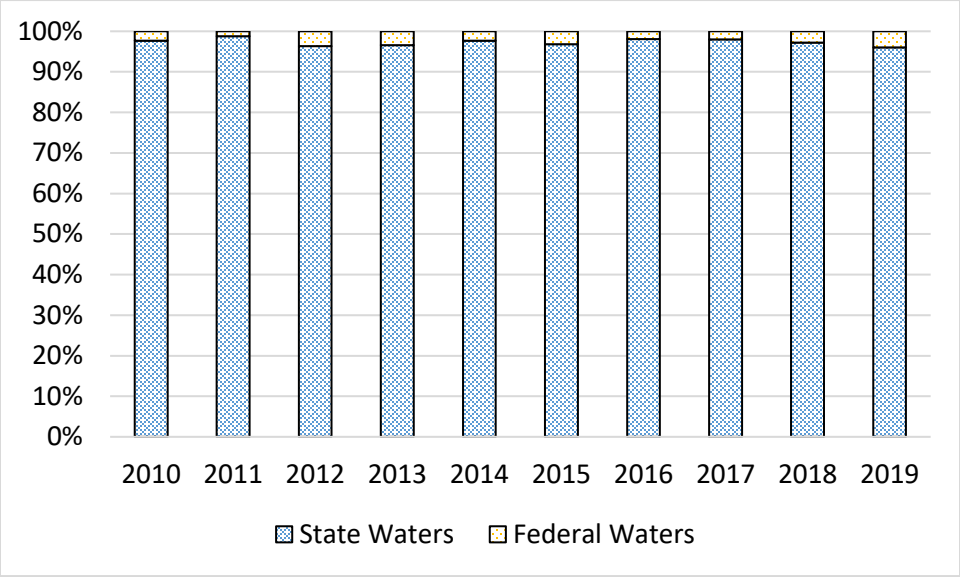


Figure 8. Estimated percentage of bluefish recreational landings (numbers of fish) in state vs. federal waters, Maine through Florida, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, December 31, 2020

Table 6. State contribution (as a percentage) to total recreational landings of bluefish (in numbers of fish), from Maine through Florida, 2017-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, December 31, 2020

State	2017	2018	2019	Avg 2017-2019
Maine	0.0%	0.0%	0.0%	0.0%
New Hampshire	0.0%	0.0%	0.0%	0.0%
Massachusetts	4.3%	1.8%	2.2%	2.9%
Rhode Island	3.0%	1.2%	3.1%	2.5%
Connecticut	4.2%	3.0%	5.5%	4.3%
New York	22.1%	11.7%	25.0%	20.2%
New Jersey	22.0%	13.9%	6.1%	14.4%
Delaware	1.9%	0.7%	1.2%	1.3%
Maryland	1.3%	2.7%	0.9%	1.6%
Virginia	1.3%	4.3%	6.2%	3.8%
North Carolina	22.9%	32.3%	22.7%	25.5%
South Carolina	5.4%	7.5%	7.2%	6.6%
Georgia	0.1%	0.9%	0.2%	0.3%
Florida	11.5%	20.0%	19.5%	16.6%
Total	100%	100%	100%	100%

1.3.4 Interactions with Other Fisheries

Non-target species are those species caught incidentally while targeting other species, in this case, while targeting bluefish. Some non-target species are occasionally retained, others are commonly discarded. This section describes the non-target species commonly caught in the commercial and recreational bluefish fisheries and summarizes their management status and stock status.

Identification of Major Non-Target Species

It can be difficult to develop accurate quantitative estimates of catch of non-target species. The intended target species for any given tow or set is not always obvious. Fishermen may intend to target one or multiple species and the intended target species may change mid-trip. Given the mixed species nature of the bluefish fishery, incidental catch of non-target species does occur. Table 7 reports the commercial non-target species catch as a percentage of total catch on bluefish observed or captain reported hauls on a trip in 2019 using the observer database. All species reported represent 4% or greater of the observed or reported catch on a trip where bluefish was either the primary or secondary target species. Smooth and spiny dogfish, scup, striped bass, Atlantic bonito and black sea bass were the most commonly caught non-target species on commercial bluefish trips. Table 8 presents the most recent stock information for these species (SEDAR, 2015; NEFSCa, 2018; NEFSC, 2019; NEFSCb, 2018).

Table 7: Percent of commercial non-target species caught on an observed or captain reported haul where bluefish was either the primary or secondary target species in 2019.

Species	% of total catch on bluefish observed or reported trips, 2019
Smooth Dogfish	39.1%
Spiny Dogfish	11.8%
Scup	11.0%
Striped Bass	8.8%
Atlantic Bonito	4.3%
Black Sea Bass	4.0%
Other	20.9%

Table 8: Most recent stock status information for commercial non-target species identified in this action for the bluefish fishery.

	Stock Biomass Status	Fishing Mortality Rate Status
Smooth Dogfish	Not overfished	Overfishing not occurring
Spiny Dogfish	Not overfished	Overfishing not occurring
Scup	Not overfished	Overfishing not occurring
Striped Bass	Overfished; SSB_{2017} estimated at 68,476 mt compared to the $SSB_{Threshold}$ of 91,436 mt	Overfishing occurring; F_{2017} estimated at 0.307 compared to the $F_{Threshold}$ of 0.240
Atlantic Bonito	Unknown	Unknown
Black Sea Bass	Not overfished	Overfishing not occurring

Of all non-target species caught on hauls where bluefish was either the primary or secondary target species on a trip, striped bass is the only species with a concerning stock status and fishing mortality rate (overfished and overfishing occurring). Bluefish and striped bass utilize similar habitat and co-exist in waters throughout their life histories. However, striped bass are caught on only a limited number of bluefish trips, and by comparison to other species, these interactions remain low. Typically, bluefish are a fallback species for fishermen that are not catching their primary target and are often bycatch in other fisheries. Overall, the impact of the bluefish commercial fishery on the non-target species is low, but commercial bluefish fishing effort should continue to be monitored in relation to striped bass. In contrast, the overfished stock status of striped bass and bluefish may result in less directed trips for these two species due to fishermen preferring to target other more abundant demersal species.

A "species guild" approach was used to examine non-target species interactions in the recreational fishery for bluefish. This analysis identified species that were caught together on 5% or more of recreational trips in 2018. The Atlantic coast was split into two regions (Maine to Virginia and North Carolina to Florida) to more effectively classify species based on region. In the north, black sea bass and scup were highly correlated with bluefish in the recreational fishery. In the south, Spanish mackerel and spotted seatrout were highly correlated with bluefish. Other frequently caught non-target species included striped bass, paralichthys flounders, pinfish, and lizard fish (J. Brust, personal communication December 2019).

The status of recreational non-target species relevant to this action are summarized in Table 9. Scup and black sea bass are jointly managed by the MAFMC and the ASMFC. The 2019 operational stock assessments indicate the stocks are not overfished and overfishing was not occurring (NEFSC, 2019). Spanish mackerel is jointly managed by the South Atlantic Fishery Management Council and the Commission. The most recent stock assessment for Spanish mackerel at the 2012 Southeast Data, Assessment and Review indicated the stock is not overfished and overfishing is not occurring (SEDAR, 2012). Spotted sea trout have not been assessed coastwide, therefore their overfished and overfishing status is unknown.

Table 9. Most recent stock status information for non-target species in the recreational bluefish fishery.

Species	Biomass Status	Fishing Mortality Rate Status
Summer Flounder	Not overfished	Overfishing not occurring
Scup	Not overfished	Overfishing not occurring
Black Sea Bass	Not overfished	Overfishing not occurring
Spanish Mackerel	Not overfished	Overfishing not occurring
Spotted Sea Trout	Unknown (not assessed)	Unknown (not assessed)

1.4 HABITAT CONSIDERATIONS

This section of the Draft Amendment currently only contains a description of the physical habitat that bluefish inhabit. Prior to final action, this section will comprise sections that cover: 1) the environmental requirements of bluefish, 2) the anthropogenic impacts on bluefish and

their habitat, and 3) a description of programs to protect, restore, and preserve bluefish. These sections will be drafted in coordination with the Council's Environmental Assessment process.

1.4.1 Description of Physical Habitat

Bluefish are a migratory pelagic species found in most temperate and tropical marine waters throughout the world. Along the U.S. Atlantic coast, bluefish are commonly found in estuarine and continental shelf waters from the Gulf of Maine to the Dry Tortugas in Florida. Bluefish are a schooling species that migrate in response to seasonal changes, moving north and inshore during spring and south and offshore in the late autumn. The Atlantic bluefish fishery exploits what is considered to be a single stock of fish.

Information about the physical environment of the Gulf of Maine, Mid-Atlantic, and South Atlantic regions were adapted from Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden (2017), available here: http://www.asmfc.org/uploads/file//5a4c02e1AtlanticMenhadenAmendment3_Nov2017.pdf

1.4.1.1 Gulf of Maine

The Gulf of Maine is a semi-enclosed sea of 36,300 mi2 (90,700 km2) bordered on the northeast, north and west by the coasts of Nova Scotia, New Brunswick, and the New England states. To the south and east, the Gulf is open to the North Atlantic Ocean; however, Georges Bank forms a partial southern boundary below about 165 ft (50 m). The interior of the Gulf of Maine is characterized by five major deep basins (>600 ft, 200 m) which are separated by irregular topography that includes shallow ridges, banks, and ledges. Basins make up about 30% of the floor area (Thompson, 2010). Retreating glaciers (18,000–14,000 years ago) left behind a variety of patchily distributed sediment types including silt, sand, clay, gravel, and boulders (NMFS, 2015). Major tributary rivers are the St. John in New Brunswick; St. Croix, Penobscot, Kennebec, Androscoggin, and Saco in Maine; and Merrimack in Massachusetts.

The predominantly rocky coast of Maine is characterized by steep terrain and bathymetry, with numerous islands, embayments, pocket beaches, and relatively small estuaries. Tidal marshes and mud flats occur along the margins of these estuaries. Farther south, the coastline is more uniform with few sizable bays, inlets, or islands, but with many small coves. Extensive tidal marshes, mud flats, and sandy beaches along this portion of the coast are gently sloped. Marshes exist along the open coast and within the coves and estuaries.

The surface circulation of the Gulf of Maine is generally counterclockwise, with an offshore flow at Cape Cod which joins the secondary, clockwise gyre on the northern edge of Georges Bank. The Northeast and Great South Channels, which bookend Georges Bank, serve as the primary inflow and outflow channels of marine waters, respectively. Some of the water entering the Northeast Channel flows into the Bay of Fundy; another portion turns west to feed the Maine Coastal Current, initiating the counterclockwise direction of flow. The counterclockwise gyre is more pronounced in the spring when river runoff adds to the southwesterly flowing coastal 16 current. Surface currents reach velocities of 1.5 knots (80 cm/sec) in eastern Maine but

gradually diminish to 0.2 knots (10-20 cm/sec) in Massachusetts Bay where tidal amplitude is about 10 ft (3 m) (Thompson, 2010).

There is great seasonal variation in sea surface temperature in the Gulf, ranging from 4°C in March throughout the Gulf to 18°C in the western Gulf and 14°C in the eastern Gulf in August. The Gulf of Maine sea surface temperature has been warming steadily over the last 35 years. In the most recent decade, the warming trend (0.23 °C /year) was faster than 99 percent of the global ocean (Pershing et al., 2015). The warming is related to a northward shift in the Gulf Stream and to changes in the Atlantic Multidecadal Oscillation and Pacific Decadal Oscillation (Pershing et al., 2015). The salinity of the surface layer also varies seasonally, with minimum values in the west occurring during summer, from the accumulated spring river runoff, and during winter in the east under the influence of runoff from the St. Lawrence River (from the previous spring). With the seasonal temperature and salinity changes, the density stratification in the upper water column also exhibits a seasonal cycle. From well mixed, vertically uniform conditions in winter, stratification develops through the spring and reaches a maximum in the summer. Stratification is more pronounced in the southwestern portion of the Gulf where tidal mixing is diminished.

1.4.1.2 Mid-Atlantic Region

The coastal zone of the Mid-Atlantic states varies from a glaciated coastline in southern New England, to the flat and swampy coastal plain of North Carolina. Along the coastal plain, the beaches of the barrier islands are wide, gently sloped, and sandy, with gradually deepening offshore waters. The area is characterized by a series of sounds, broad estuaries, large river basins (e.g., Connecticut, Hudson, Delaware, and Susquehanna), and barrier islands. Conspicuous estuarine features are Narragansett Bay (Rhode Island), Long Island Sound and Hudson River (New York), Delaware Bay (New Jersey and Delaware), Chesapeake Bay (Maryland and Virginia), and the nearly continuous band of estuaries behind barrier islands along southern Long Island, New Jersey, Delaware, Maryland, Virginia, and North Carolina. The complex estuary of Currituck, Albemarle, and Pamlico Sounds behind the Outer Banks of North Carolina (covering an area of 2,500 square miles) is an important feature of the region. Coastal marshes border those estuaries along much of the glaciated coast from Cape Cod to Long Island Sound. Nearly continuous marshes occur along the shores of the estuaries behind the barrier islands.

At Cape Hatteras, the Continental Shelf extends seaward approximately 20 mi (33 km), and gradually widens northward to about 68 mi (113 km) off New Jersey and Rhode Island where it is intersected by numerous underwater canyons. Surface circulation north of Cape Hatteras is generally southwesterly during all seasons, although this may be interrupted by coastal in drafting and some reversal of flow at the northern and southern extremities of the area. Speeds of drift north of Cape Hatteras are on the order of six miles (9.7 km) per day. There may be a shoreward component to this drift during the warmer half of the year and an offshore component during the colder half. The western edge of the Gulf Stream meanders off Cape Hatteras, sometimes coming within 12 mi (20 km) of the shore; however, it becomes less 17 discrete and veers to the northeast above Cape Cod. Surface currents as high as 4 knots (200 cm/sec) have been measured in the Gulf Stream off Cape Hatteras.

Hydrographic conditions in the Mid-Atlantic region vary seasonally due to river runoff and changing water temperatures. The water column becomes increasingly stratified in the summer and homogeneous in the winter due to fall-winter cooling of surface waters. In the winter, the mean range of sea surface temperatures is 0-7°C off Cape Cod and 1-14°C off Cape Charles (at the southern end of the Delmarva Peninsula). In the summer, the mean range is 15-21°C off Cape Cod and 20-27°C off Cape Charles. The tidal range averages slightly over 3 ft (1 m) on Cape Cod, decreasing to the west. Within Long Island Sound and along the south shore of Long Island, tide ranges gradually increase, reaching 6 ft (2 m) at the head of the Sound and in the New York Bight. South of the Bight, tide ranges decrease gradually to slightly over 3 ft (1 m) at Cape Hatteras. Prevailing southwest winds during the summer along the Outer Banks often lead to nearshore upwelling of colder bottom water from offshore, so that surface water temperatures can vary widely during that period (15-27°C over a period of a few days).

The waters of the coastal Mid-Atlantic region have a complex and seasonally dependent circulation pattern. Seasonally varying winds and irregularities in the coastline result in the formation of a complex system of local eddies and gyres. Surface currents tend to be strongest in late spring, due to river runoff, and during periods of highest winds in the winter. In late summer, when winds are light and estuarine discharge is minimal, currents tend to be sluggish, and the water column is generally stratified.

1.4.1.3 South Atlantic Region

The south Atlantic coastal zone extends in a large oceanic bight from Cape Hatteras south to Biscayne Bay and the Florida Keys. North of Florida, the south Atlantic coastal zone is bordered by a coastal plain that stretches inland for a hundred miles and a broad continental shelf that reaches into the ocean for nearly an equal distance. This broad shelf tapers down to a very narrow and precipitous shelf off the southeastern coast of Florida. The irregular coastline of North Carolina, South Carolina, Georgia, and eastern Florida is generally endowed with extensive bays and estuarine waters, bordered by nutrient-rich marshlands. Barrier beaches and dunes protect much of the shoreline. Along much of the southern coast from central South Carolina to northern Florida, estuarine salt-marsh is prominent. Most of the east coast of Florida varies little in general form. Sand beaches with dunes are sporadically interrupted by mangrove swamps and low banks of earth and rock.

The movements of oceanic waters along the South Atlantic coast have not been well defined. The surface currents, countercurrents, and eddies are all affected by environmental factors, particularly winds. The Gulf Stream flows along the coast at 6-7 miles per hour (10-11 km/hr). It is nearest to the coast off southern Florida and gradually moves away from the coast as it flows northward. Inshore of the Gulf Stream, there is a current that flows southward for most of the year in regions north of Cape Canaveral.

Sea surface temperatures during the winter increase southward from Cape Hatteras to Fort Lauderdale, Florida, with mean minimums ranging from 2-20oC and maximums ranging from 17-26°C. In the summer, the increases are more gradual, ranging north to south from minimums of 21-27°C to maximums of 28-30°C. Mean sea-surface salinity is generally in the

range of 34 to 36 ppt year round. Mean tidal range is just over 3 ft (1 m) at Cape Hatteras and increases gradually to about 6-7 ft (2 m) along the Georgia coast. Tides decrease south of Cape Canaveral to 3 ft (1 m) at Fort Lauderdale.

1.4.2 Anthropogenic Impacts on Bluefish and Their Habitat

A baseline fishing effects analysis is provided in the Mid-Atlantic Council's specification of management measures for the 2004 fishing year (MAFMC 2003). This analysis considered 1995-2001 as the baseline time period. Baseline conditions (i.e., the distribution and intensity of bottom otter trawling in the commercial bluefish fishery) have not changed significantly since 2001. The 2004 evaluation of the habitat impacts of bottom otter trawls, gillnets, and handlines used in the commercial bluefish fishery indicated that the baseline impact of the fishery was minimal and temporary in nature. Additionally, only these gear types which contact the bottom impact physical habitat. Consequently, adverse effects of the bluefish fishery on EFH did not need to be minimized. Since commercial landings of bluefish have remained stable since 2001, the adverse impacts of the bluefish fishery have continued to be minimal during the time period 2001-2018. The FMP limits recreational specifications for bluefish to possession limits and recreational harvest limits. The principal gears used in the recreational fishery for bluefish are rod and reel and handline. The potential adverse impacts of these gears on EFH for this federally managed species in the region is minimal (Stevenson et al. 2004).

Only those gear types which contact the bottom impact physical habitat. The actions proposed in this document are relevant to both the commercial and recreational bluefish fisheries. The recreational fishery is almost exclusively a hook and line fishery. Recreational hook and line gears generally have minimal impacts on physical habitat and EFH in this region (Stevenson et al. 2004). Weighted hook and line gear can contact the bottom, but the magnitude and footprint of any impacts resulting from this contact is likely minimal. Thus, the recreational fisheries are expected to have very minor or no impacts on habitat.

The limited commercial fishery for bluefish is primarily prosecuted with gill net gear (Figure 6) and has limited contact with the bottom. Thus, the magnitude and footprint of any impacts resulting from this contact is likely minimal.

Stevenson et al. (2004) compiled a detailed summary of several studies on the impacts of a variety of gear types on marine habitats. Conclusions relevant for this action are briefly summarized below with a focus on bottom trawl gear since this is the gear type used in commercial harvest that causes the greatest impact, when it occurs.

Otter trawl doors can create furrows in sand, mud, and gravel/rocky substrates. Studies have found furrow depths that range from 2 to 10 cm. Bottom trawl gear can also re-suspend and disperse surface sediments and can smooth topographic features. It can also result in reduced abundance, and in some cases reduced diversity, of benthic species such as nematodes, polychaetes, and bivalves. It can also have short-term positive ecological impacts such as increased food value and increased chlorophyll production in surface sediments. The duration

of these impacts varies by sediment type, depth, and frequency of the impact (e.g., a single trawl tow vs. repeated tows). Some studies documented effects that lasted only a few months. Other studies found effects that lasted up to 18 months. Impacts tend to have shorter durations in dynamic environments with less structured bottom composition compared to less dynamic environments with structured bottom. Shallower water, stronger bottom currents, more wave action, finer-grained sediments, and higher frequencies of natural disturbance are characteristics that make environments more dynamic (Stevenson et al. 2004).

1.4.3 Description of Programs to Protect, Restore, & Preserve Bluefish

The Mid-Atlantic Council developed some fishery management actions with the sole intent of protecting marine habitats. For example, in Amendment 9 to the Mackerel, Squid, and Butterfish FMP, the Council determined that bottom trawls used in Atlantic mackerel, longfin and Illex squid, and butterfish fisheries have the potential to adversely affect EFH for some federally-managed fisheries (MAFMC 2008). As a result of Amendment 9, closures to squid trawling were developed for portions of Lydonia and Oceanographer Canyons. Subsequent closures were implemented in these and Veatch and Norfolk Canyons to protect tilefish EFH by prohibiting all bottom trawling activity. In addition, Amendment 16 to the Mackerel, Squid, and Butterfish FMP prohibits the use of all bottom-tending gear in fifteen discrete zones and one broad zone where deep sea corals are known or highly likely to occur (81 Federal Register 90246, December 14, 2016). In addition, section 4.3 details the rebuilding plan alternatives which aim to restore bluefish back to its biomass target.

1.5 IMPACTS TO THE FISHERY MANAGEMENT PROGRAM

The following sections provide a brief summary of biological, economic and social impacts that may result from the changes to the Bluefish FMP considered through this Amendment. Impacts to the fisheries are alternative specific, and a more detailed discussion of alternatives and their impacts can be found in *Section 4*.

1.5.1 Biological Impacts

Changes to the recreational/commercial sector allocations and the commercial state allocations affect the size of each sector's and state's landings limits. Depending on the scale of the change, a decrease in the commercial quota or additional restrictions on the recreational fishery could lead to increased regulatory discards of these species compared to recent levels. However, accountability measures are still in place and designed to prevent harvest and dead discards from exceeding the overfishing threshold. None of the alternatives are expected to change patterns in landings, discards, or fishing effort in such a way that they negatively impact stock status for any of the three species.

The 2019 operational stock assessment indicated that the bluefish stock was overfished. This triggered the requirement under the MSA to submit a rebuilding plan within two years of the overfished designation. The rebuilding plan alternatives under consideration in this Amendment are all projected to rebuild the stock within 7 years or less. The shorter duration rebuilding plans require greater restrictions on fishing mortality to achieve a rebuilt stock

within the timeline. The biological implications of a faster rebuilding plan include the restoration of a robust stock and the reduction of time that bluefish remain in a vulnerable overfished state. That being said, the MSA requires that an overfished stock be rebuilt in as short of a period as possible, and the duration be no longer than 10 years. Regardless of which rebuilding plan is selected, the Council, in coordination with the Bluefish Board, is required to rebuild the stock back to the target biomass level.

1.5.2 Economic Impacts

Section 1.1.1 introduced the many management changes under consideration in this Amendment, all of which have direct or indirect impacts on stakeholder access to the bluefish resource. Access to the resource is managed differently for commercial versus recreational stakeholders, but bluefish fishery management is centered on the landing limits or quotas that each sector is allocated. Changes to a sector's allocation can significantly impact the economic activity associated with access to the bluefish resource.

For the recreational fishery, changes in the Recreational Harvest Limit (RHL) may lead to a liberalization or restriction of recreational measures, which can impact angler access to the bluefish resource. Increased access could take the form of more fish to take home (under higher possession limits or lower minimum fish sizes), while decreased access could mean the ability to retain fewer fish and reduced opportunities to target bluefish (under a shorter open season). This can affect angler satisfaction, revenues for for-hire businesses (e.g., by impacting demand for party and charter trips), and revenues for support businesses such as bait and tackle shops.

For the commercial fishery, changes to the overall commercial sector allocation as well as the commercial allocations to the states are being considered. Depending upon the alternatives adopted through this Amendment, commercial industry members may experience a change in revenue due to corresponding changes to quotas and potential landings of bluefish. Due to the complex interplay between all the management approaches under consideration, it is challenging to determine what the net effect of this Amendment will be on the economic welfare of individual commercial fishermen. However, analyses and descriptions of economic impacts associated with specific alternatives are discussed in more detail in *Section 4*.

1.5.3 Social Impacts

MSA National Standard 8 (NS8) requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen would be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

A fundamental difficulty exists in forecasting social change relative to management alternatives, since communities or other societal groups are constantly evolving in response to

external factors (e.g., market conditions, technology, alternate uses of waterfront, tourism). Certainly, fishery regulations influence the direction and magnitude of social change, but attribution is difficult with the tools and data available.

While the focus here is on the social impacts of the alternatives, external factors may also influence change, both positive and negative, in the affected communities. External factors may lead to unanticipated consequences of a regulation, due to cumulative impacts. These factors contribute to a community's ability to adapt to new regulations. When examining potential social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); bluefish dealers and processors; final users of bluefish; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short-term negative impact on some communities, these should be weighed against potential long-term benefits to all communities which can be derived from a sustainable bluefish fishery.

Social Impact Factors

The social impact factors outlined below can be used to describe the Atlantic bluefish fishery, its sociocultural and community context, and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NOAA Fisheries guidance (NMFS 2007) and other texts (e.g., Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. Qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts.

The social impact factors fit into five categories:

1. *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.
2. The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.
3. The *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities, as well as effects on the community's social structure, politics, etc.
4. The *Non-Economic Social Aspects* of the fishery; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
5. The *Historical Dependence on and Participation in* the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS 2007).

Community Fishing Engagement and Social Vulnerability Indicators

In addition to traditional economic indicators such as landings and revenue, fishing communities can also be understood in terms of overall engagement in the commercial and recreational fishery and other social and economic community conditions. NOAA Fisheries social scientists produce indicators of commercial and recreational fishing engagement, reliance, and other community characteristics for virtually all fishing communities throughout the United States, referred to as the Social Indicators of Fishing Community Vulnerability and Resilience (Colburn and Jepson 2012). The Social Indicators are composite indices of factors that comprise community-level latent constructs, such as commercial fishing engagement or social vulnerability. The strength of these indicators is that they provide greater depth and contextualization to our understanding of fishing communities than the more commonly utilized landings and revenue statistics. The Social Indicators provide a more comprehensive view of fishing communities by including social and economic conditions that can influence the viability of commercial and recreational fishing activities, such as gentrification pressure, poverty, and housing characteristics, among other factors.

2009-2018 Recreational Engagement and Reliance

The Recreational Engagement Indicator is a numerical index that reflects the level of a community's engagement in recreational fisheries relative to other communities in the Northeast and Mid-Atlantic. This index was generated using a principal components factor analysis (PCFA) of variables related to recreational fishing activity from the NOAA Fisheries MRIP datasets. PCFA is a common statistical technique used to identify factors that are related, yet linearly independent, and likely represent a latent or unobservable concept when considered together, such as factors that contribute to the level of a community's social vulnerability or engagement in commercial fishing. The variables that were identified to best reflect community engagement in recreational fisheries included; 1) the total number of shore trips per community for each year; 2) the total number of charter trips per community for each year; and 3) the total number of private recreational trips per community for each year. The Recreational Reliance Indicator is calculated by dividing these three variables by the total community population obtained from the U.S. Census Bureau's American Community Survey (ACS). It should be noted that a high engagement score does not necessarily mean that a community or its fishery participants are solely dependent upon recreational fishing activities. There may be other fishing or economic activities that may sustain the livelihoods of individuals or entities within these communities that have relied on recreational fishing historically.

Figure 9 displays the factor scores for the Recreational Engagement Indicator for the fifteen communities that have the highest average recreational engagement between 2009 and 2018. The index factor scores are commonly categorized from low to high based on the number of standard deviations from the mean, which is set at zero. Categories rank from 0.00 or below as "low", 0.00 – 0.49 as "medium," and 0.50 – 0.99 as "medium-high," and 1 standard deviation or above as "high." All of the ports displayed in Figure 10 have "high" recreational engagement. However, there has also been substantial year-to-year variability in recreational engagement for many of these ports. For example, communities in Florida with high average engagement have seen large increases in engagement in recent years relative to the earlier part of the time

series, whereas communities in New York and New Jersey have experienced wide fluctuations over time in their extent of recreational fishing engagement.

Figure 11 shows the factor scores for the Recreational Reliance Indicator for the fifteen communities that have the highest average recreational reliance between 2009 and 2018. A comparison of Figure 9 and Figure 11 reveals that some highly engaged communities may not be as highly reliant on recreational fisheries due to the size of those communities and the accompanying opportunities for other social and economic activities. Among the five most highly reliant communities on recreational fisheries over the period of 2009 to 2018 were Barnegat Light, NJ, Topsail Beach, NC, Orient, NY, Hatteras (and all other communities throughout the Outer Banks), NC, and Montauk, NY. In recent years, Nags Head, NC, and Melbourne Beach, FL, have increased considerably in their reliance on recreational fisheries.

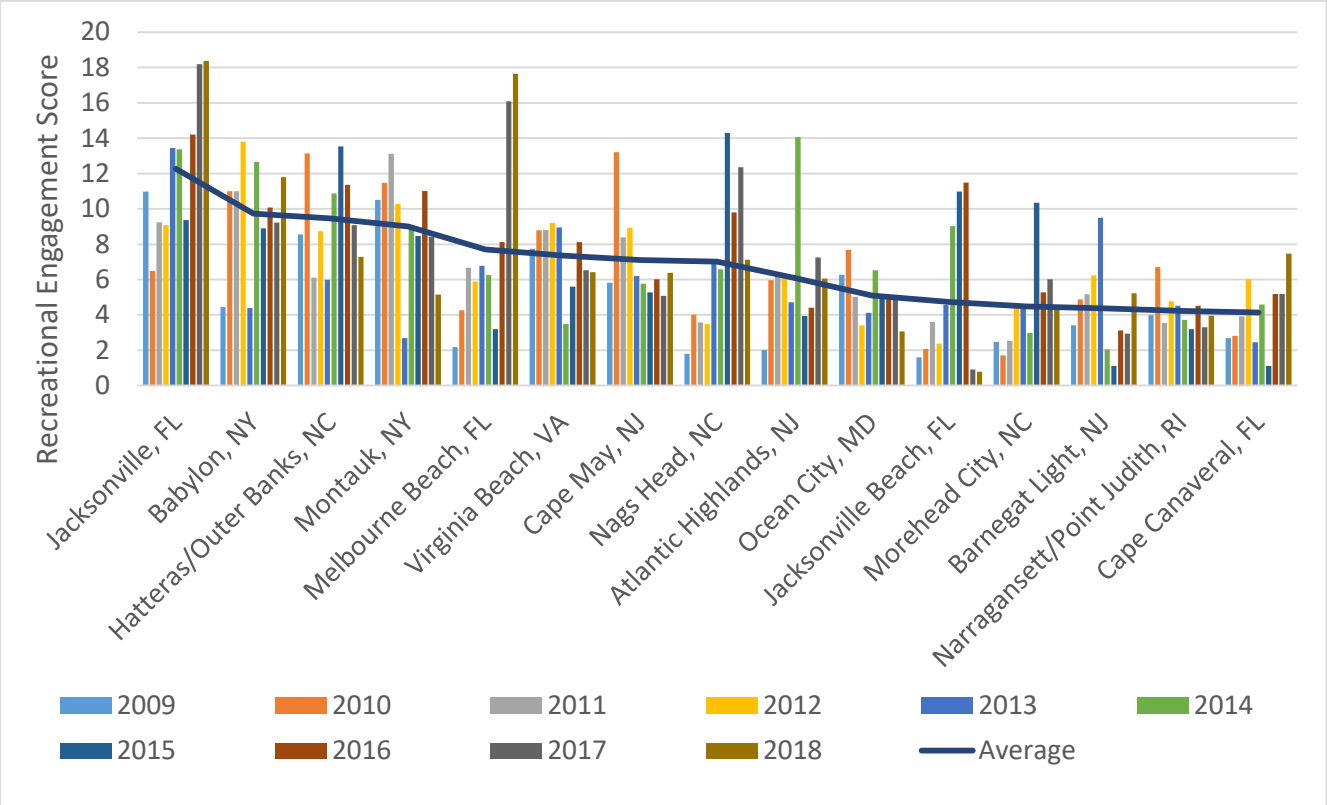


Figure 9: Recreational Fishing Engagement Scores by Community: Top Fifteen Communities in Average Engagement from 2009-2018.

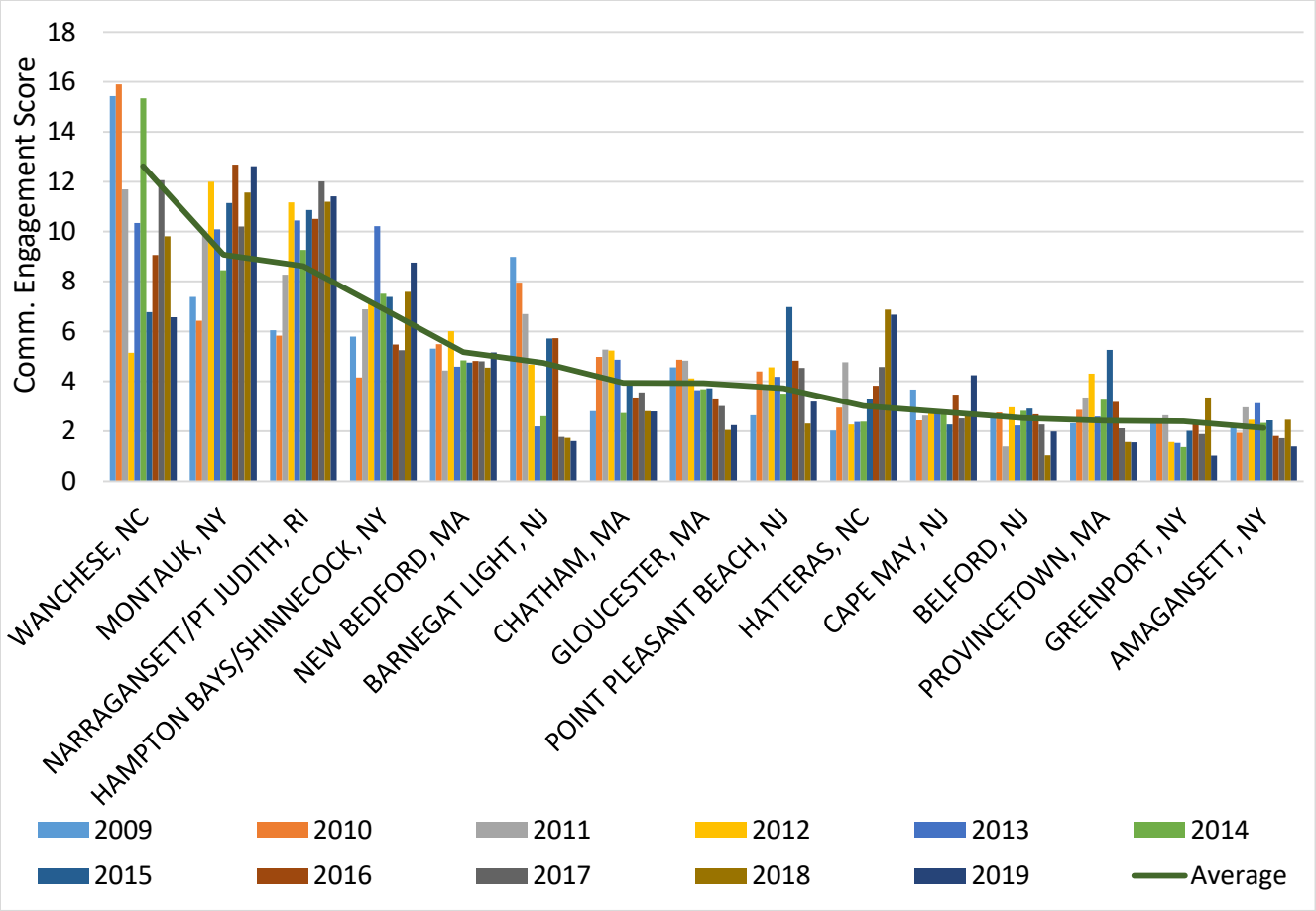


Figure 10: Commercial Bluefish Engagement Scores by Community: Top Fifteen Communities in Average Engagement from 2009-2019.

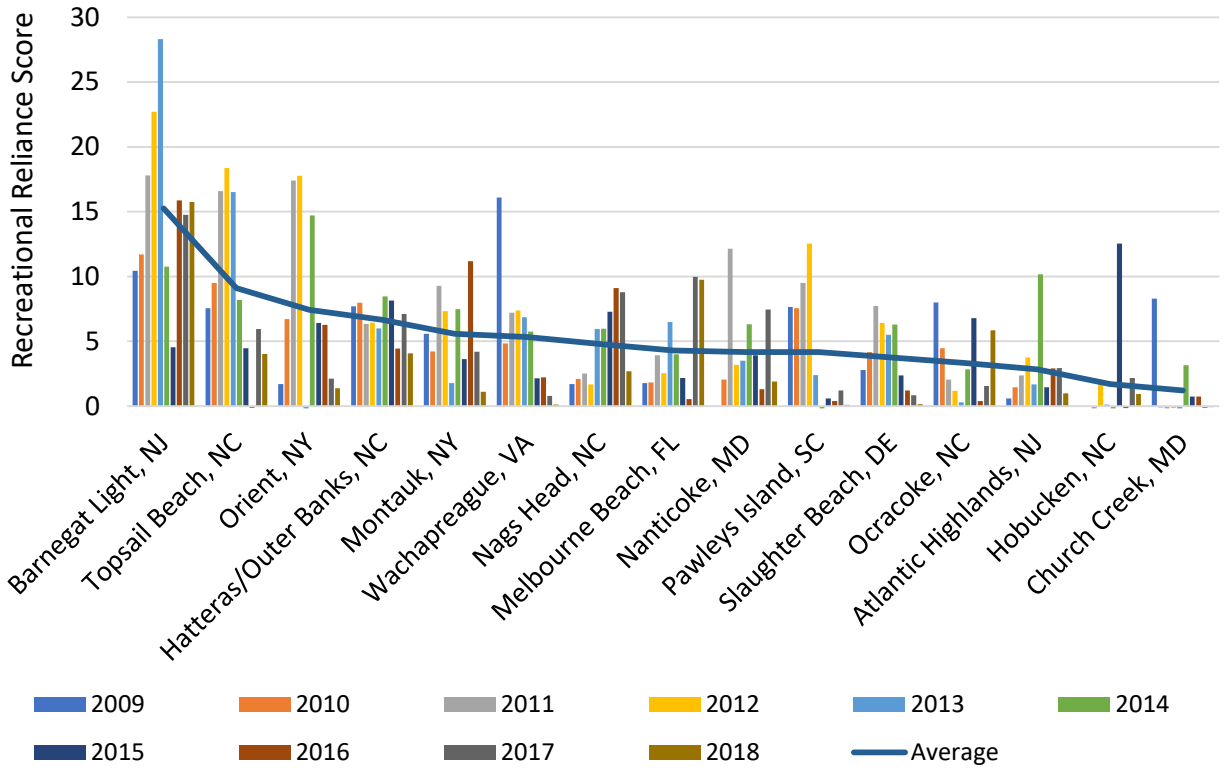


Figure 11: Recreational Fishing Reliance Scores by Community: Top Fifteen Communities in Average Reliance from 2009-2018.

Community Social Vulnerability Indicators

The Community Social Vulnerability Indicators (CSVI) include indices of labor force structure, housing characteristics, poverty, population composition, and personal disruption. The labor force structure index measures the makeup of the labor force and is reversed scored so that a higher factor score represents fewer employment opportunities and greater labor force vulnerability. The housing characteristics index measures vulnerability related to infrastructure and home and rental values. It is also reversed score so that a higher score represents more vulnerable housing infrastructure. The poverty index captures multiple different factors that contribute to an overall level of poverty in a given area. A higher poverty index score would indicate a greater level of vulnerability due to a higher proportion of residents receiving public assistance and below federal poverty limits. The population composition index measures the presence of vulnerable populations (i.e., children, racial/ethnic minorities, and/or single-parent, female-headed households) and a higher score would indicate that a community's population is composed of more vulnerable individuals. Finally, the personal disruption index considers variables that affect individual-level vulnerability primarily and include factors such as low individual-level educational attainment or unemployment. Higher scores of personal disruption likely indicate greater levels of individual vulnerability within a community, which can in turn impact the overall level of community social vulnerability.

Gentrification Pressure Indicators include housing disruption, urban sprawl, and retiree migration. The Housing Disruption Index combines factors that correspond to unstable or shifting housing markets in which home values and rental prices may cause residents to become displaced. The Urban Sprawl Index indicates the extent of population increase due to migration from urban centers to suburban and rural areas, which often results in cost of living increases and gentrification in the destination communities. The Retiree Migration Index characterizes communities by the concentration of retirees or individuals above retirement age whose presence often raises the home values and rental rates, as well as increase the need for health care and other services. These components of gentrification pressure influence the degree to which the current residents, communities, and local economies can remain in place, generally, and the extent to which those in the fishing industry in these communities are able to withstand or overcome changes to fisheries conditions and management, specifically. As places go through the process of gentrification, housing becomes less available and/or unaffordable for the existing population and the historically significant local fishing businesses and industries that had once thrived become displaced or replaced by new and emerging industries, such as tourism, finance, real estate, and service.

Data used to develop these indices come from multiple secondary data sources, but primarily the U.S. Census ACS at the place level (Census Designated Place and Minor Civil Division). More information about the data sources, methods, and other background details can be found online at https://www.st.nmfs.noaa.gov/humandimensions/social-indicators/.

Table 10 displays the CSVI categorical scores for all of the highly engaged and/or reliant communities on recreational fishing activities.

Table **11** displays CSVI categorical scores for all highly engaged communities in commercial bluefish fishery activities.

Socioeconomic Survey of Hired Captains and Crew in New England and Mid-Atlantic Commercial Fisheries (Crew Survey)

The Socioeconomic Survey of Hired Captains and Crew in New England and Mid-Atlantic Commercial Fisheries (hereafter referred to as the Crew Survey) is an ongoing effort conducted by the Social Sciences Branch of the National Oceanic and Atmospheric Administration Fisheries Northeast Fisheries Science Center intended to gather general information about the characteristics and experiences of commercial fishing crew members (including hired captains) because little is known about this critical segment of the commercial fishing industry. Information collected by the survey include demographic information, wage calculations systems, well-being, fishing practices, job satisfaction, job opportunities, and attitudes towards fisheries management, among other subjects. There have been two waves of Crew Survey data collection thus far – Wave 1 in 2012-13 and Wave 2 in 2018-19.

Table 10: 2018 Community Social Vulnerability Indicator Categorical Scores for Recreational Fishing Communities.

Community	Poverty	Labor Force	Housing Characteristics	Population Composition	Personal Disruption	Housing Disruption	Retiree Migration	Urban Sprawl
Slaughter Beach, DE	Low	High	Low	Low	Low	High	High	Low
Cape Canaveral, FL	Low	Med-High	Med-High	Low	Low	Med-High	Med-High	Low
Jacksonville, FL	Medium	Low	Medium	Medium	Medium	Low	Low	Low
Jacksonville Beach, FL	Low	Low	Low	Low	Low	High	Low	Low
Melbourne Beach, FL	Low	Medium	Low	Low	Low	Medium	Med-High	Low
Church Creek, MD	Low	Low	Medium	Low	Medium	Medium	Low	Low
Nanticoke, MD	Low	Med-High	Low	Low	Low	Low	High	Low
Ocean City, MD	Low	Medium	Med-High	Low	Low	Med-High	Med-High	Low
Hatteras/Outer Banks, NC	Med-High	Low	Medium	Low	Med-High	Med-High	Medium	Low
Hobucken, NC	High	Low	Low	Low	Medium	Low	Med-High	Low
Morehead City, NC	Medium	Medium	Med-High	Low	Medium	Medium	Medium	Low
Nags Head, NC	Low	Low	Low	Low	Low	High	Low	Low
Ocracoke, NC	Med-High	Med-High	Low	Medium	High	Low	Med-High	Low
Topsail Beach, NC	Medium	Med-High	Low	Low	Low	Low	Med-High	Low
Atlantic Highlands, NJ	Low	Low	Low	Low	Low	Medium	Low	Medium
Barnegat Light, NJ	Low	High	Low	Low	Low	High	High	Med-High
Cape May, NJ	Low	Med-High	Low	Low	Low	High	High	Medium
Babylon, NY	Low	Low	Low	Low	Low	Med-High	Low	High
Montauk, NY	Low	Medium	Low	Low	Low	High	Med-High	Med-High
Orient, NY	Low	High	Low	Low	Low	High	High	Med-High
Narragansett/Point Judith, RI	Low	Medium	Low	Low	Low	Med-High	Medium	Low
Pawleys Island, SC	Low	High	Low	Low	Low	Medium	High	Low
Virginia Beach, VA	Low	Low	Low	Medium	Low	Medium	Low	Low
Wachapreague, VA	Low	Med-High	Medium	Low	Low	Low	Med-High	Low

Table 11: 2018 Community Social Vulnerability Indicator Categorical Scores for Commercial Bluefish Fishing Communities.

Community	Poverty	Labor Force	Housing Characteristics	Population Composition	Personal Disruption	Housing Disruption	Retiree Migration	Urban Sprawl
Chatham, MA	Low	High	Low	Low	Low	High	High	Medium
Gloucester, MA	Low	Low	Low	Low	Low	Medium	Low	Medium
New Bedford, MA	High	Low	Medium	Med-High	Med-High	Medium	Low	Med-High
Provincetown, MA	Low	Medium	Low	Low	Low	High	Med-High	Med-High
Hatteras, NC	Low	High	Low	Low	Low	Low	High	Low
Wanchese, NC	Low	Low	Med-High	Medium	Low	Medium	Low	Low
Barnegat Light, NJ	Low	High	Low	Low	Low	High	High	Med-High
Belford, NJ	Low	Low	Low	Low	Low	High	Low	Medium
Cape May, NJ	Low	Med-High	Low	Low	Low	High	High	Medium
Point Pleasant Beach, NJ	Low	Medium	Low	Low	Low	High	Medium	Med-High
Amagansett, NY	Low	Med-High	Low	Low	Low	High	Med-High	High
Greenport, NY	Low	Medium	Low	Medium	Medium	High	Medium	Med-High
Hampton Bays/Shinnecock, NY	Low	Low	Low	Medium	Low	High	Medium	Med-High
Montauk, NY	Low	Medium	Low	Low	Low	High	Med-High	Med-High
Narragansett/Pt Judith, RI	Low	Medium	Low	Low	Low	Med-High	Medium	Low

2.0 GOALS AND OBJECTIVES

2.1 HISTORY OF MANAGEMENT

The original MAFMC-ASMFC FMP (1989) established a 10 fish bag limit for the recreational sector, a 20% allocation of total allowable catch to the commercial sector, state by state commercial quotas, permit requirements, a plan to begin annually reviewing the performance of management measures, and the ability to adjust gear regulations. Since then, six amendments have been developed and approved. Amendment 1 was implemented jointly by the Commission and the Council, the remaining amendments were implemented by the Council.

Amendment 1 (2000) brought the FMP into compliance with new and revised National Standards and other required provisions of the Sustainable Fisheries Act, implemented a rebuilding plan, and required that a commercial quota and recreational harvest limit be based on projected stock size estimates as derived from the latest stock assessment information.

Amendment 2 (2007) implemented a standardized bycatch reporting methodology

Amendment 3 (2011) established Annual Catch Limits (ACLs) and Accountability Measures (AMs)

Addendum I: Biological Monitoring Program (2012) Addendum I established a coastwide monitoring program for bluefish to improve the quantity and quality of age data used in bluefish stock assessments.

Amendment 4 (2013) modified the AMs for the Council's recreational fisheries.

Amendment 5 (2015) implemented a new standardized bycatch reporting methodology to address a legal challenge.

Amendment 6 (2017) implemented management measures to prevent the development of new, and the expansion of existing, commercial fisheries on certain forage species in the Mid-Atlantic.

Board revises Addendum I (2021) sampling program to include Florida among states required to collect bluefish age data for use in stock assessments.

2.2 JOINT MANAGEMENT

The Council and Commission work cooperatively to develop fishery regulations for bluefish off the east coast of the United States. The Council and Commission work in conjunction with NOAA Fisheries, which serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch is taken from both state (0-3 miles offshore) and federal waters (3-200 miles offshore, also known as the EEZ).

The Commission has primary authority for development of FMPs for state waters under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) of 1993. Recognizing the interjurisdictional nature of fishery resources and the necessity of the states and federal government coordination on regulations, under this act, all Atlantic coast states that are included in a Commission FMP must implement required conservation provisions of the plan or the Secretary of Commerce may impose a moratorium for fishing in the noncompliant state's waters.

The Council, under the MSA, has primary authority for developing federal FMPs for Council managed species. The Commission and the Council meet jointly at least twice a year to approve management measures for the fishery for the upcoming year or years. State fishery departments implement FMP measures under the ACFCMA, while NOAA Fisheries issues rules for the approved FMPs prepared by the Councils.

State regulations apply to vessels fishing in state waters; however, vessels with federal permits must abide by the federal regulations regardless of where they are fishing. If state and federal measures differ, the vessel must abide by whichever measure is more restrictive. Approved regulations are enforced through cooperative actions of the U.S. Coast Guard, NOAA Fisheries Law Enforcement, and state authorities.

The Secretary of Commerce has the ultimate responsibility for federal measures. The Council's proposed FMPs and amendments are submitted to the Secretary of Commerce for approval, which in most cases is delegated to NOAA Fisheries. NOAA Fisheries typically prepares specifications and implementing federal regulations for the fisheries based on the recommendations of the Council and Commission, if such recommendations are deemed to be consistent with the MSA and other applicable law. NOAA Fisheries publishes proposed rules in the *Federal Register* for public comment. As mentioned above, the Secretary of Commerce also has ultimate responsibility for determining whether individual state measures are consistent with the Commission's FMP. If the Commission finds a state out of compliance and is unable to rectify this issue, the Commission may notify the Secretary. Within 30 days of receiving the Commission's notice, the Secretary must decide whether the state is out of compliance, and if so, whether the noncompliance compromises the conservation of the resource. If it does, the Secretary can impose a moratorium on all fishing (commercial and recreational) for the species in question, until the Commission and the Secretary determine that the noncompliance has ceased.

2.3 MANAGEMENT UNIT

Bluefish fisheries are managed cooperatively by the Commission in state waters (0-3 miles), and by the Council and NOAA Fisheries in federal waters (3-200 miles). The management unit for bluefish in US waters is the western North Atlantic Ocean from Florida northward to the US-Canadian border.

2.4 PURPOSE AND NEED FOR ACTION

The purpose of this amendment is to consider modifications to the FMP goals and objectives, current allocations between the commercial and recreational sectors, current commercial allocations to the states, initiate a rebuilding plan, revise the quota transfer processes, revise how the FMP accounts for management uncertainty, and revise *de minimis* provisions in the Commission's FMP.

The current sector-based and commercial state-to-state allocations were set in 2000 using data from 1981-1989 and have not been revised since that time. Recreational catch and harvest data are provided by the Marine Recreational Information Program (MRIP). In July 2018, MRIP released revisions to their time series of catch and harvest estimates based on adjustments for a revised angler intercept methodology (used to estimate catch rates) and a new effort estimation methodology (namely, a transition from a telephone-based effort survey to a mail-based effort survey). These revisions resulted in much higher recreational catch estimates compared to previous estimates, affecting the entire time series of data going back to 1981.

These data revisions have management implications due to the fixed commercial/recreational allocation percentages defined in the FMP. These allocation percentages do not reflect the current understanding of the recent and historic proportions of catch and landings from the two sectors. Since these allocation percentages are defined in the Council and Commission FMPs, they cannot be modified without an FMP amendment. This amendment will consider whether the allocations are still appropriate and meeting the objectives of the FMP. In reviewing/adjusting the allocations, the need for transfers may be reduced, however, improvements to the transfer processes will also be reviewed.

Bluefish was deemed overfished with overfishing not occurring as a result of the 2019 Operational Assessment. Therefore, the Council is mandated to initiate a rebuilding plan within two years of notice by the Greater Atlantic Regional Fisheries Office (GARFO) Regional Administrator. Under a rebuilding plan, the stock will be considered rebuilt once spawning stock biomass reaches the target biomass (spawning stock biomass maximum sustainable yield proxy) of 198,717 mt. The MSA requires the overfished stock to be rebuilt within ten years once the regional office notifies the Council of the overfished state. Under the current amendment timeline, the rebuilding plan would be implemented at the beginning of 2022.

Several other issues identified during scoping for this action were considered by the Council and Board for inclusion in this amendment but have since been removed. Some of those issues will be taken up through other initiatives or actions. More information on removed issues is available in past meeting documents and meeting summaries for this amendment, available at: https://www.mafmc.org/actions/bluefish-allocation-amendment.

2.5 GOALS AND OBJECTIVES

The Board and Council are considering revisions to the existing FMP goals and objectives for bluefish through this amendment. The no action/status quo option keeps the existing FMP goals and objectives that were developed in 1991. The proposed FMP goals and objectives include revisions based on input provided by the public, bluefish advisory panel members, and Board and Council members.

While these revisions are not included as an explicit alternative within this amendment, the proposed revisions are not final until approved by the Council and Board. The Council and Board are seeking feedback from the public on the proposed revisions during the public hearing process.

2.5.1 Current Fishery Management Plan Goals and Objectives

Goal: Conserve the bluefish resource along the Atlantic coast.

Objective 1: Increase understanding of the stock and of the fishery.

Objective 2: Provide the highest availability of bluefish to U.S. fishermen while maintaining, within limits, traditional uses of bluefish.

Objective 3: Provide for cooperation among the coastal states, the various regional marine fishery management councils, and federal agencies involved along the coast to enhance the management of bluefish throughout its range.
Objective 4: Prevent recruitment overfishing.
Objective 5: Reduce the waste in both the commercial and recreational fisheries.

2.5.2 Proposed Fishery Management Plan Goals and Objectives

Goal 1: Conserve the bluefish resource through stakeholder engagement to maintain sustainable recreational fishing and commercial harvest.

Objective 1.1: Achieve and maintain a sustainable spawning stock biomass and rate of fishing mortality.
Objective 1.2: Promote practices that reduce discard mortality within the recreational and commercial fishery.
Objective 1.3: Maintain effective coordination between the National Marine Fisheries Service, Council, and Commission and its member states by promoting compliance and to support the development and implementation of management measures.
Objective 1.4: Promote compliance and effective enforcement of regulations.
Objective 1.5: Promote science, monitoring, and data collection that support and enhance effective ecosystem-based management of the bluefish resource.

Goal 2: Provide fair and equitable access to the fishery across all user groups throughout the management unit.

Objective 2.1: Ensure the implementation of management measures provides fair and equitable access to the resource across to all groups along the coast.
Objective 2.2: Consider the economic and social needs and priorities of all groups that access the bluefish resource in the development of new management measures.
Objective 2.3: Maintain effective coordination with stakeholder groups to ensure optimization of economic and social benefits.

3.0 MONITORING PROGRAM SPECIFICATION

In order to achieve the goals and objectives of this Amendment, the collection and maintenance of quality data is necessary. All state fishery management agencies were encouraged to pursue full implementation of the standards of the Atlantic Coastal Cooperative Statistics Program (ACCSP).

3.1 COMMERCIAL CATCH AND LANDINGS PROGRAM

The reporting requirements for the bluefish commercial fishery are specified by two general permit types: 1) state issued commercial permits and 2) federal commercial permits. State commercial permits are issued to individuals, with qualification and reporting requirements varying by state. Weekly landings information including species landed by gear and state are submitted by the Atlantic coastal states through the Standard Atlantic Fisheries Information System (SAFIS). Landings information assembled in the SAFIS database include both state and

federal landings data. ACCSP's standard for commercial catch and effort statistics requires mandatory, trip-level reporting of all commercial harvested marine species, with fishermen and/or dealers required to report standardized data elements for each trip by the 10th of each month. For federal permit holders, commercial landings information is collected from VTRs monthly and are submitted 15 days after the end of the reporting month. Discards are estimated from the NEFSC observer program, and, if needed, from the VTR data. The NEFSC weigh out program provides commercial age and length information.

3.2 RECREATIONAL FISHERY CATCH REPORTING PROCESS

MRIP provides estimated bluefish catch from 1981-2019. Recreational catch was previously collected through the MRFSS, which was a recreational data collection program used from 1981-2003. The MRFSS program was replaced by MRIP in 2004 and was designed to provide more accurate and timely reporting as well as greater spatial coverage. The MRFSS and MRIP programs were simultaneously conducted in 2004-2006 and this information was used to calibrate past MRFSS recreational harvest estimates against MRIP recreational harvest estimates.

In 2018, MRIP implemented the Fishing Effort Survey (FES) which used an improved methodology to address several concerns with the prior Coastal Household Telephone Survey. These concerns included under-coverage of the angling public, declining number of households with landline telephones, reduced response rates, and memory recall issues. Past estimates have been recalibrated to the FES. This calibration resulted in a much higher recreational catch estimates compared to previous estimates.

Recreational bluefish catch were downloaded from http://www.st.NOAA Fisheries.noaa.gov/st1/recreational/queries/index.html using the query option.

An online description of MRIP survey methods can be found here: http://www.st.NOAA Fisheries.noaa.gov/recreational-Fisheries/index#meth

3.3 SOCIAL AND ECONOMIC COLLECTION PROGRAMS

Data on a number of variables relevant to social and economic dimensions of bluefish fisheries are collected through existing ACCSP data collection programs and MRIP; however, no explicit mandates to collect socioeconomic data for this species currently exist. In addition to landed quantities, commercial harvesters and dealers may report ex-vessel prices or value, fishing and landing locations, landing disposition, and a variety of measures capturing fishing effort. MRIP regularly collects information on recreational fishing effort and landings, and occasionally gathers socioeconomic data on angler motivations and expenditures.

3.4 BIOLOGICAL DATA COLLECTION PROGRAMS

3.4.1 Fishery-Dependent Data Collection

Addendum I to Amendment 1 implemented a biological monitoring program to enhance age and length data used in bluefish stock assessments. Under Addendum I, states that account for

more than 4% of total coastwide removals (sum of recreational and commercial landings and dead discards) for the 2010-2019 period are required to collect a minimum of 100 bluefish ages with a target of collecting 50 from January through June and 50 from July through December. Those states are Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Virginia, North Carolina, and Florida. Age samples are primarily collected from fishery-dependent sources (e.g., party/charter boats, fishing tournaments and volunteer anglers), although samples collected from fishery-independent sources are sometimes utilized as needed to fulfill this requirement.

3.4.2 Observer Program

As a condition of state and/or federal permitting, many vessels are required to carry at-sea observers when requested. A minimum set of standard data elements are to be collected through the ACCSP at-sea observer program (refer to the ACCSP Program Design document for details). Specific fisheries priorities will be determined by the Discard/Release Prioritization Committee of ACCSP.

3.4.3 Fishery-Independent Data Collection

Many states, Northeast Fisheries Science Center (NEFSC) National Marine Fisheries Service (NOAA Fisheries), the Northeast Area Monitoring and Assessment Program (NEAMAP), and the Southeast Area Monitoring and Assessment Program (SEAMAP) conduct fishery-independent surveys. New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Maryland, Virginia, and South Carolina (SEAMAP) provide indices of juvenile bluefish abundance for stock assessment, and Connecticut, New Jersey, Virginia (NEAMAP), and North Carolina provide indices of adult abundance. Although not included in the 2019 operational assessment, Massachusetts, Delaware, Georgia and Florida also maintain indices of abundance from surveys that encounter bluefish. In addition, Rhode Island, Connecticut, and New Jersey collect release length data from voluntary angler surveys that help to characterize the length frequency distribution of recreationally released fish.

4.0 MANAGEMENT PROGRAM

Several aspects of the Bluefish FMP are subject to Board and Council review in the amendment. Six issues are specified below to allow for public comment and Board and Council decisions on these issues.

4.1 COMMERCIAL AND RECREATIONAL ALLOCATION ALTERNATIVES AND IMPACTS

Section 4.1.1 describes the alternatives for commercial and recreational allocations for bluefish, and *Section 4.1.2* describes the expected impacts. The range of allocation alternatives includes options that would maintain the current allocations, as well as options to revise allocations based on updated data using modified base years. *Section 4.1.3* describes options to phase in any allocation changes over multiple years, and the expected impacts of these phase-in provisions are discussed in *Section 4.1.4.*

Under the current FMP for bluefish, the Acceptable Biological Catch (ABC) equals the fishery level ACL, which is then divided into a commercial and recreational Annual Catch Target (ACT) based on the allocation percentages defined in the FMP. Sector-specific expected discards are subtracted from the sector-specific ACTs to derive a commercial quota and a RHL.

Commercial discards are considered negligible within the bluefish fishery (NEFSC 2015). Recreational discards are estimates based on the MRIP B2s (released alive). Managers assume a 15% mortality rate on the released alive fish (NEFSC 2015). The number of fish are converted to weight by multiplying by the average weight of landed fish coastwide in a given year. This approach assumes that the weight of released fish is equal to the weight of landed fish.

Aside from the status quo option (alternative 2a-1), the following approaches revise the allocation percentages based on modified base years or different data sets.

4.1.1 Commercial/Recreational Allocation Alternatives

Table 12 lists the alternatives under consideration for the commercial and recreational bluefish allocation percentages based on both catch and landings data. The current allocations for bluefish are based on commercial and recreational landings data from 1981-1989 that have not been updated with a renewed understanding of historic fishery performance. The current allocations for bluefish are represented by the no action/status quo alternative (alternative 2a-1, highlighted in green in Table 12).

Table 12: Bluefish commercial/recreational allocation alternatives. The current allocations are highlighted in green.

Allocation Percentages	
Alternative	**Basis**
2a-1: 83% recreational, **17%** commercial	No action/status quo (1981-1989 landings data)
2a-2: 89% recreational, **11%** commercial	Multiple approaches: 2014-2018 and 2009-2018 catch data
2a-3: 87% recreational, **13%** commercial	1999-2018 catch data
2a-4: 86% recreational, **14%** commercial	Multiple approaches: 1981-2018 catch data; 2014-2018 and 2009-2018 landings data
2a-5: 84% recreational, **16%** commercial	Multiple approaches: 1981-2018 and 1999-2018 landings data

4.1.2 Impacts of Commercial/Recreational Allocation Alternatives

Alternatives 2a-2 through 2a-5 result in lower commercial allocations and higher recreational allocations compared to the no action/status quo alternative (2a-1).

Table **13** compares the commercial and recreational allocation alternatives by displaying the percent change in allocation share from the status quo alternative. The relative percent change to each sector's allocation differs notably. Since the commercial sector's share of the fishery-

level ACL is much smaller by comparison to the recreational sector's share, any changes to the allocation percentages have a larger impact on the commercial sector relative to the impact on the recreational sector.

Table 13: Percent change (in green and red) of commercial and recreational allocations for each alternative relative to status quo. The grey boxes refer to the status quo alternative.

Alternative	2a-1	2a-2	2a-3	2a-4	2a-5
Proposed Recreational Allocation	83%	89%	87%	86%	84%
% Change from Status Quo	0%	+7%	+5%	+4%	+1%
Proposed Commercial Allocation	17%	11%	13%	14%	16%
% Change from Status Quo	0%	-35%	-24%	-18%	-6%

An increase in the recreational allocation would result in increased RHLs compared to the current allocations. RHLs are tied to recreational measures such as possession limits, fish size restrictions, and open/closed seasons. These measures are adjusted as needed to allow the RHL to be achieved, but not exceeded. Depending on the magnitude of the increase, an increased recreational allocation may not allow for liberalized recreational management measures compared to recent years in all cases. In some cases, recreational restrictions may still be needed if the allocation increase is not enough to account for recent increases in the MRIP harvest estimates.

Liberalizing or restricting recreational measures can impact angler access to bluefish. Increased access could take the form of more fish to take home (under higher possession limits and/or lower minimum fish sizes) and more opportunities to target the species (under longer open seasons), while decreased access could mean the ability to retain fewer fish and reduced opportunities to target the species. This can affect angler satisfaction, revenues for for-hire businesses (e.g., by impacting demand for for-hire trips), and revenues for support businesses such as bait and tackle shops.

With respect to the commercial sector, alternatives other than status quo will result in lower quotas relative to status quo with impacts described below.

Social Impacts

Alternative 2a-1 is anticipated to have positive social impacts for commercial stakeholders in general due in part to the support for the status quo from written and oral comments received during the amendment scoping process. The plurality of comments (41%) supported the status quo on Issue 2: Commercial/Recreational Allocation (MAFMC et al 2020). Moreover, the majority of commercial crew surveyed in both the 2012 and 2018 Crew Surveys reported that the rules and regulations change so quickly that it can be hard to keep up. While these results are not necessarily representative of bluefish commercial crew in general, they do align with

the overall sentiment supporting the status quo among those who provided comment during the scoping process.

Alternative 2a-2 would increase the recreational fishery allocation by 6 percentage points and reduce the commercial allocation by the same amount using 2014-2018 and 2009-2018 catch data. Results from the Commercial Crew Survey indicate that the majority of crew and hired captains believe the rules and regulations in their respective commercial fisheries are too restrictive. An increase in allocation to the recreational sector could allow for a liberalization of measures, potentially providing positive social impacts. Further reducing the commercial allocation could lead to negative impacts with respect to commercial fishers' attitudes towards management, as well as detrimental impacts on the ability of some fishers to continue to participate in the fishery. According to the Social Performance Indicators[4], the five most highly engaged communities in the commercial bluefish fishery from 2009 to 2019 are: 1) Wanchese, NC; 2) Montauk, NY; 3) Narragansett/Point Judith, RI; 4) Hampton Bays/Shinnecock, NY; and 5) New Bedford, MA (Figure 10). For commercial bluefish stakeholders located in these ports, the reduction in allocation to the commercial fishery may have the most substantial negative social impacts.

Relative to the status quo alternative, alternative 2a-2 would have positive impacts for recreational user groups, and in particular for those groups in communities that are highly engaged in and reliant upon recreational fisheries. The top fifteen communities in recreational fishing engagement and reliance are displayed in Figure 9 and Figure 11. Please note that the recreational fishing engagement and reliance scores are not bluefish specific, the metrics were based off of fishing engagement and reliance for all recreational species. For a more thorough introduction of community fishing engagement and social vulnerability indicators please reference Appendix A.

These communities are likely to benefit from Alternative 2a-2, but some may see greater positive social impacts based on relative social vulnerabilities and reliance on the recreational industry. Communities in NC in particularly, such as Topsail Beach, Hatteras, and throughout the Outer Banks, have high reliance on recreational fisheries while at the same time moderate to high poverty, labor force vulnerability, and housing vulnerability. Increasing recreational allocations for bluefish could improve economic opportunities and result in positive social outcomes for these communities in particular.

Alternative 2a-3 proposes to set the recreational allocation at 87% and adjust the commercial allocation down to 13%, based on the 1999 to 2018 catch data. Under alternative 2a-4, the recreational allocation would be set to 86% and the commercial allocation would be 14%, based on multiple approaches including 1981-2018 catch data, 2014-2018 landings data, and 2009-2018 landings data. The commercial and recreational impacts described for alternative 2a-2 likely apply to a lesser degree to alternatives 2a-3 and 2a-4 considering that the shifts in

[4] https://apps-nefsc.fisheries.noaa.gov/socialsci/pm/index.php.

allocation from the commercial to the recreational sector are smaller than what is proposed in alternative 2a-2.

Under alternative 2a-5, the recreational allocation would increase slightly from the status quo to 84% and the commercial allocation would correspondingly decrease slightly to 16%. These allocation determinations would be based on multiple approaches using the 1981-2018 and 1999-2018 landings data. Alternative 2a-5 is expected to have neutral to low positive social impacts on the recreational bluefish fishery relative to the status quo, whereas 2a-5 would likely produce neutral to low negative impacts on the commercial fishery as compared to the status quo. While the allocations would change, the increases and decreases for each user group are comparatively minimal to alternatives 2a-2, 2a-3, or 2a-4.

At the community level, impacts may be greatest for communities with or near recreational fishing sites, communities where for-hire businesses are based, and communities with tourism that is impacted by recreational fishing.

Economic Impacts

Aside from the no action/status quo alternatives, all alternatives result in a reduced allocation to the commercial sector, which is expected to decrease commercial quotas compared to the current allocations. The commercial sector could experience a loss in revenue due to corresponding decreased quotas and a reduction in potential landings of bluefish. However, with the exception of 2020, the commercial sector has not fully utilized its post transfer quota in over a decade, so a decrease in allocation may not necessarily lead to a decrease in commercial landings or revenues in the long term. The economic analysis discussed below looks at historical landings to inform the potential future economic impacts of a reduction in the commercial allocation.

The economic impacts stemming from alterations in the commercial pre-transfer bluefish allocations were assessed using historical realized and predicted bluefish landings for the commercial sector. The time series used spans from 1999-2019[5] where realized landings are compared to pre-transfer landings across the various proposed sub-alternatives, allocating 17% (i.e., the status quo), 11%, 13%, 14%, or 16% of the ACL to the commercial sector (sub-components 2a-1 to 2a-5, respectively) (Figure 12). A key assumption of this analysis is that all the allocated quota is landed. When comparing the pre-transfer allocated quota to the total realized landings, there are 14 of 95 cases where the pre-transfer quotas exceed the realized landings quantities. Each allocation sub-alternative (2a-1 to 2a-5) contains at least one year in which the pre-transfer commercial allocation exceeds the realized annual commercial landings, suggesting that in these years, the pre-transfer allocation would not have been a limiting factor in landing bluefish. Ultimately, losses in landings resulting from smaller pre-transfer quota allocations relative to realized landings becomes relevant if transfers from the recreational sector to the commercial sector are discontinued.

[5] Regulations and catch limits for this fishery are not clearly defined until Amendment 1 (approved in 1999). The year of 2019 was the last full year of data on record when this economic assessment was drafted.

Post transfer, projected quotas exceed the realized commercial landings for all alternatives each year except in for 2a-2 and 2a-3 in 2001, 2015 (2a-2 only) and 2016. However, if MRIP recalibration was factored into these years when transfers occurred, the commercial sector may not have actually received any transfers (or the transfers may have been much smaller). Ultimately, if sector transfers are to continue and are not substantially lower than previous years, changes in landings stemming from the pre-sector transfer quota allocations are expected to be minimal.

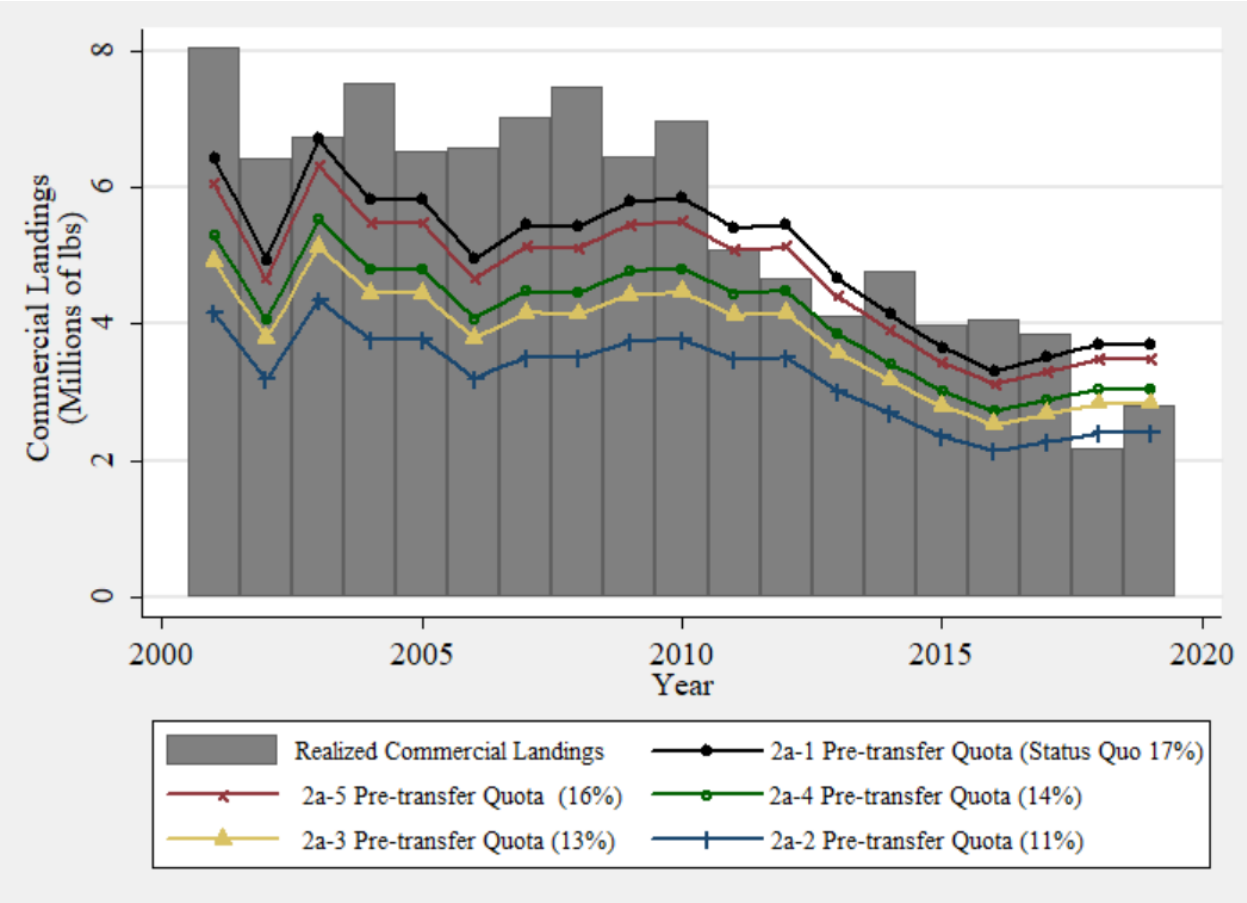


Figure 12: Realized commercial bluefish landings and proposed pre-transfer commercial landings (Millions of lbs.) by sub-allocation alternative and year (2001-2019).

For this analysis, commercial revenues are estimated for allocations under the status quo of pre-transfer quota (i.e.,17% of the ACL) and are compared to revenues estimated under the four additional proposed allocation sub-alternatives (2a-2 – 2a-5, 11%,13%,14%, and 16% of the ACL) to provide insight into how allocation changes could impact revenue. Revenues are estimated using the allocated pre-transfer quota percentage and all quota is assumed to be landed. The price model described in Appendix B is used to generate average annual ex-vessel bluefish prices at the various landings levels. The pre-transfer landings are multiplied by the predicted price and presented in 2020 constant dollars as the estimated revenue. Average differences in revenues between the status quo (17% of the ACL) and the additional proposed

allocation percentages are presented in Table 14. Over 1999-2019, annual revenues decrease by an average of $200K (6%), $590K (18%), $790K (29%) and $1.19M (35%) under the 16%, 14%, 13% and 11% commercial allocations relative to the 17% allocation, respectively. Average differences in annual revenues decrease in magnitude when averaged over the last 10 years and further decrease when compared to the 5-year average annual revenue differences driven by relatively lower historical ABC's from 2010-2019. This analysis is informative in the potential average reduction in revenue that may be experienced under each allocation alternative. However, it is important to remember that this analysis assumes that the entire commercial quota be landed, which may not always be the case, especially when considering that commercial quotas will increase substantially as the stock rebuilds back to the biomass target.

Table 14: Average differences in estimated commercial bluefish revenues by pre-transfer alternative relative to the pre-transfer quota status quo (2a-1 vs. 2a-2-5).

Time Series	Average Differences in Estimated Revenues (Millions of 2020 Constant Dollars)			
	11% Commercial Quota (2a-2) vs 17% Status Quo (2a-1)	**13% Commercial Quota (2a-3) vs 17% Status Quo (2a-1)**	**14% Commercial Quota (2a-4) vs 17% Status Quo (2a-1)**	**16% Commercial Quota (2a-5) vs 17% Status Quo (2a-1)**
Averaged over Entire Time Series (1999-2019) *Standard Deviation*	-$1.19M *0.14*	-$0.79M *0.09*	-$0.59M *0.07*	-$0.20M *0.02*
Averaged over Past 10 Years (2010-2019) *Standard Deviation*	-$1.09M *0.12*	-$0.72M *0.08*	-$0.54M *0.06*	-$0.18M *0.02*
Averaged over Past 5 Years (2015-2019) *Standard Deviation*	-$0.98M *0.03*	-$0.65M *0.02*	-$0.49M *0.01*	-$0.16M *0.00*
Average Percent Decrease Relative to Annual Status Quo Revenues (1999-2019)	35%	24%	18%	6%

Note: This calculation does not consider transfers from the recreational sector and is based solely on the full utilization of the pre-transfer quota.

Impacts from a reduction in commercial quota will not be uniform across all states and commercial industry participants. Commercial fishermen from states that fully utilize quota are more likely to experience losses in revenue, restrictive trip limits, and seasonal closures to account for the reduced commercial quota. States that have historically underutilized their quota may still be impacted in the medium- to long-term; reduced access to quota may inhibit the ability for market expansion in the future. These states could also be impacted in the near-term depending on the magnitude of allocation reduction. If the commercial allocation is

reduced substantially, quotas in some states may drop below what is currently being utilized. Again, the impacts across states are also dependent upon the state commercial allocation alternative selected in *Section 4.2.*

Ultimately, alternatives 2a-2 through 2a-5 may limit the potential for market expansion and future increases in landings and ex-vessel revenue compared to the status quo alternative (2a-1).

Currently, accountability measures (AM)[6] are implemented when the fishery-level ACL is exceeded, and a transfer was deemed not the cause of the overage. When there has been a sector transfer to the commercial fishery that is larger than the overage, there will be no transfer allowed in the following fishing year unless the transfer amount is smaller than the overage. However, given the bluefish stock is currently overfished, a combination of management measures and a pound for pound payback may be implemented.

Under *Section 4.5*, management uncertainty is discussed. If alternative 6b is selected, which creates sector-specific ACLs, AMs will be modified to ensure overages by one sector do not affect the other sector, unless a transfer has occurred and was the cause of an overage.

It is difficult to identify and quantify the economic impacts stemming from increases in recreational bluefish quota. Without a demand model, it is impossible to estimate the changes in angler effort and expenditures resulting from quota increases. Qualitatively, increases in recreational bluefish quota is expected to have neutral or slightly positive economic impacts which may result from increases in recreational sector quota. Increases in bag limits might increase angler satisfaction as well as recreational for-hire and independent angler trips which would result in increased expenditures and effort. However, the economic impacts resulting from increases in recreational quota could be neutral given the high catch and release nature of the sector—where the same number of trips may occur despite the changes in quota.

Biological Impacts

As described above, all but the no action/status quo alternatives would reduce the commercial allocations, which would in turn result in lower commercial quotas than the no action/status quo alternatives.

Depending on the scale of the change, a decrease in the commercial quota or additional restrictions on the recreational fishery could lead to altered fishing behavior and increased regulatory discards compared to recent levels. Actual changes will depend on many factors such as weather, availability of other target species, and market demand. Discards are also influenced by availability of bluefish, both overall abundance and by size class. For example, a new large year class can lead to high availability of fish smaller than some states' minimum size for a few years, which can lead to increased regulatory discards. Lower availability of legal-sized

[6] Current accountability measures for bluefish can be found in Amendment 4: Bluefish Accountability Measures.

fish can lead to decreased discards. For these reasons, it is challenging to predict future discards based on changes in allocations.

In all cases, total dead catch will continue to be constrained by the overall ABC, which is set based on the best scientific information available and is intended to prevent overfishing. In this way, none of the alternatives are expected to change patterns in landings, discards, or fishing effort in such a way that they negatively impact stock status.

In 2019, the operational stock assessment indicated that the bluefish stock was at 46% of the biomass target level. The stock will begin a rebuilding program in 2022 with the goal of reaching the biomass target within ten years or less.

4.1.3 Allocation Change Phase-in Alternatives

The alternatives listed in Table 15 consider if any changes to the allocation percentages considered through alternative sets 2a should occur in a single year (alternative 2b-1, no phase-in) or if the change should be spread out over 4, 5, or 7 years (alternatives 2b-2). The Council and Board agreed that if alternative 2b-2 is selected, the duration over which new allocations will be phased in will match the duration of the selected rebuilding plan (alternatives 4a-4d). The choice of whether to use a phase-in approach, and the phase-in approach duration, may depend on the magnitude of allocation change proposed. *A phase-in period may not be desired if the overall allocation change is relatively small.* However, larger allocation changes may be less disruptive to fishing communities if they are phased in over several years (Table 16).

Table 15: Bluefish commercial/recreational allocation change phase-in alternatives.

Phase-in Alternatives
2b-1: No phase-in
2b-2: Allocation change spread evenly over the same duration as the selected rebuilding plan

Table 16: Percent shift in bluefish commercial/recreational allocation per year for 4, 5, and 7-year phase-in options for all allocation change alternatives.

Bluefish Allocation Change Phase-In			
Current allocation (2a-1): 83% recreational, 17% commercial			
Allocation Alternatives	**4-year phase-in**	**5-year phase-in**	**7-year phase-in**
2a-2: 89% Rec., **11%** Comm.	**1.5%** change per year	**1.2%** change per year	**0.86%** change per year
2a-3: 87% Rec., **13%** Comm.	**1%** change per year	**0.8%** change per year	**0.57%** change per year
2a-4: 86% Rec., **14%** Comm.	**0.75%** change per year	**0.6%** change per year	**0.43%** change per year
2a-5: 84% Rec., **16%** Comm.	**0.25%** change per year	**0.2%** change per year	**0.14%** change per year

4.1.4 Impacts of Allocation Change Phase-in Alternatives

The biological, social, and economic impacts of the phase-in alternatives under consideration in this amendment are dependent on two main factors: 1) the difference between the status quo allocation percentage and the allocation percentage selected, and 2) the duration of the phase-

in period, which will be the same duration as the preferred rebuilding plan. Based on the range of allocation percentages for bluefish (*Section 4.1.1*), the commercial and recreational sector allocations could shift by as much as 1.5% per year, or as little as 0.2% per year under the above phase-in timeframes of 4-7 years. Ideally, minimal transfers will occur while phasing-in allocations considering reallocation will reflect more up-to-date landings history.

Considering the small range that the phased-in allocations would change over 4-7 years, minimal impacts are expected for the recreational fishery, which already holds the larger share of the ACL. However, a 1.5% shift in allocation away from the commercial sector is a much larger annual impact to the commercial sector relative to its smaller initial allocation. As such, a phase-in approach may slightly reduce the economic burden on commercial stakeholders. A phase-in would most likely have short-term economic benefits in the form of increased landings and revenues over the non-phase in alternative if all else was held constant.

Under Alternative 2b-1, the preferred allocation selected from the 2a set of alternatives will occur in a single year upon implementation. This will likely have a range of social impacts depending upon the alternative selected from the 2a allocation set. Alternative 2b-1 will likely have neutral to low negative impacts on the commercial fishery if alternatives 2a-4 or 2a-5 are selected, but the negative impacts increase substantially if alternatives 2a-2 or 2a-3 are selected due to the abrupt and sizeable change in allocations to the commercial fishery. However, this remains contingent on the continuation of sector transfers and if the transfers decrease in relation to historical transfers given the MRIP update.

By contrast, an abrupt shift from alternative 2b-1 in concert with 2a-2 or 2a-3 could have substantial short-term positive social impacts on the recreational fishery user group. A single year increase of 4-6% in the recreational allocation could provide additional employment and income opportunities, especially in communities most highly engaged in and/or reliant upon recreational fisheries in general (Figure 9 and Figure 11).

Under alternative 2b-2, the new allocation selected from the 2a set of alternatives will be phased in over the period of time that matches the selected rebuilding plan. The phase-in approach of alternative 2b-2 will likely have the most substantial social impacts if alternative 2a-2 is selected, with diminishing impacts across the other alternatives with smaller percent changes in allocations. The 7-year phase-in approach may reduce the negative impacts to the commercial industry the most, with less than a one percent reduction in the commercial allocation per year. For communities that are the most highly engaged in commercial bluefish (Figure 10) a prolonged phase-in approach may buffer against negative social impacts that accompany abrupt employment and income losses that result from the allocation reductions associated with alternatives 2a-2 through 2a-5.

4.2 COMMERCIAL ALLOCATIONS TO THE STATES ALTERNATIVES AND IMPACTS

This section describes alternatives for commercial allocations of bluefish to the states, along with their expected impacts. The range of allocation alternatives includes options that would maintain the current allocations as well as options to revise them based on updated data using

modified base years. Only landings data were used to develop allocation alternatives since commercial discards are considered negligible. *Section 4.2.3* describes options to phase in any allocation changes over multiple years, and the expected impacts of these phase-in provisions. *Section 4.2.5* describes options to implement quota-based triggers that would reallocate any commercial quota that exceeds a specified threshold, and the expected impacts of those trigger provisions. *Section 4.2.7* describes options to implement minimum default allocations, and the expected impacts of these provisions.

The alternatives in *Section 4.2.1* are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from set 3a, 3b, 3c, and 3d. Considering *Section 4.2* contains multiple moving parts, the Fishery Management Action Team (FMAT) recommends that the Council and Board select either a trigger approach or minimum default allocation, but not both. Using too many management tools at once can overcomplicate the process and reduce the benefits associated with just using one approach.

4.2.1 Commercial Allocations to the States Alternatives

Table 17 lists the alternatives under consideration for the bluefish commercial allocations to the states using only landings data since commercial discards are considered negligible. The percent allocations represent the share of coastwide quota that is annually allocated to each state. The current allocations are represented by the no action/status quo alternative (alternative 3a-1, highlighted in green in Table 17), which was set through Amendment 1 using General Canvass Data.

Table 17: State-by-state commercial bluefish allocations along the U.S. Atlantic coast using different proposed time series. Percentages sum to > 100% due to rounding; actual allocations will not exceed 100% of quota.

Landings-Based Allocation Alternatives				
State	3a-1	3a-2	3a-3	3a-4
	No action/ Status quo (1981-1989)	5 year (2014-2018)	10 year (2009-2018)	1/2 '81-'89 1/2 '09-'18
ME	0.67%	0.00%	0.01%	0.49%
NH	0.41%	0.03%	0.12%	0.33%
MA	6.72%	10.64%	10.16%	7.66%
RI	6.81%	11.81%	9.64%	7.59%
CT	1.27%	1.18%	1.00%	1.19%
NY	10.39%	20.31%	19.94%	13.01%
NJ	14.82%	11.23%	13.94%	14.57%
DE	1.88%	0.58%	0.40%	1.47%
MD	3.00%	1.50%	1.84%	2.68%
VA	11.88%	4.62%	5.85%	10.26%
NC	32.06%	32.06%	32.38%	32.13%
SC	0.04%	0.00%	0.00%	0.03%

GA	0.01%	0.00%	0.00%	0.01%
FL	10.06%	6.07%	4.75%	8.59%
Total	**100.02%**	**100.01%**	**100.03%**	**100.00%**

4.2.2 Impacts of Commercial Allocations to the States Alternatives

Under alternative 3a-1, no changes to the commercial allocations would be made, meaning this alternative would result in impacts to the bluefish stock, non-target species, habitat, protected resources, and human communities that are generally similar to conditions in recent years. Bluefish landings and effort would continue to be constrained by the annual quotas and associated management measures. States would continue to be constrained to their existing state allocation, and the distribution of landings by state would remain similar to the generally stable levels observed since allocations were implemented in 2000 (Figure 13). Typically, landings by state as a percentage of coastwide landings do not fluctuate much from year to year since allocations are constant and most states land or come close to landing their quota. Exceptions do occur, as bluefish often display an idiosyncratic nature in movements into deeper waters offshore and up the coast, and states often receive transfers of quota from other states. Commercial landings from ME, NH, SC, and GA are minimal if they occur at all, since directed fisheries for bluefish do not exist in these states. The majority of landings in these states are incidental.

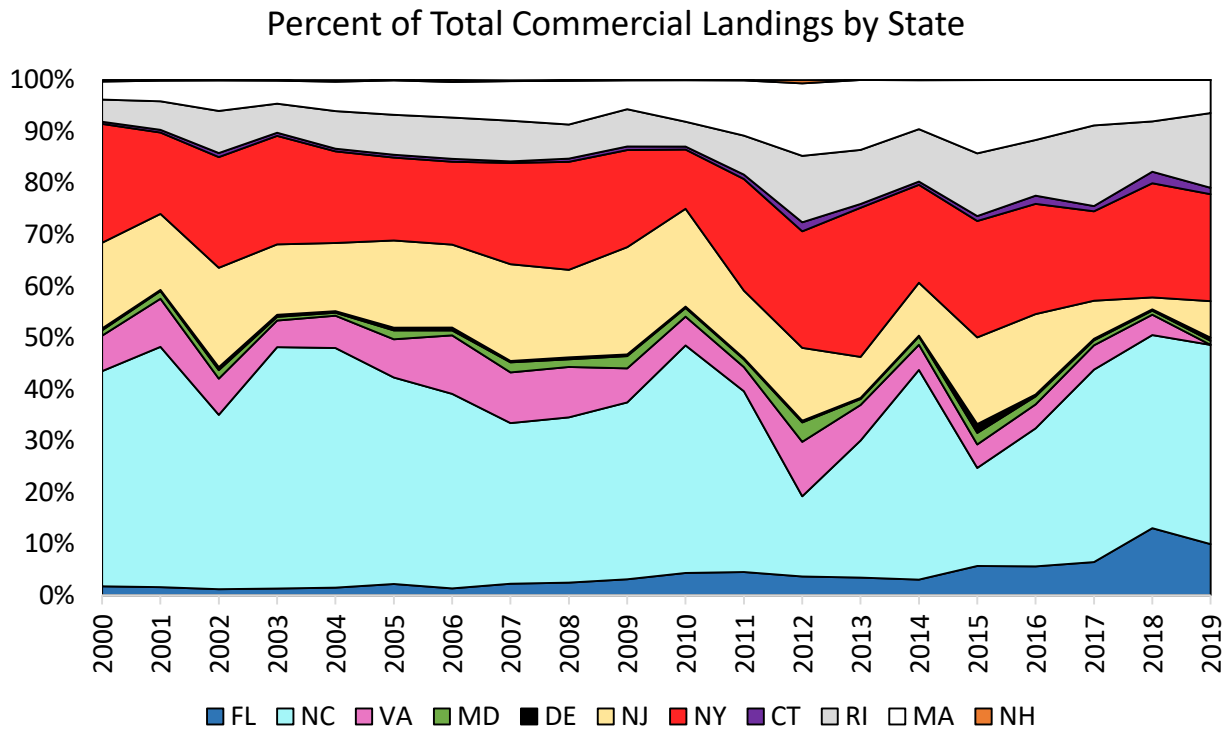


Figure 13: Percentage of coastwide landings by state from 2000-2019 (Atlantic coast excluding ME, SC and GA). ME, SC, and GA each account for less than 0.1% of landings each year.

Alternatives 3a-2 and 3a-3 are both based on recent time series (most recent 5 and 10-year time series, respectively) Therefore, the allocations are relatively similar given both time series reflect more recent landings. In contrast, alternative 3a-4 is based on the average of one recent

time series (2009-2018) and one historic time series (1981-1989) to encompass the recent state of the commercial fishery as well as historical fishery performance. In capturing recent and historical fishery performance, the allocations associated with alternative 3a-4 equally weigh both time series resulting in allocations that are closer to the status quo (3a-1) alternative than alternatives 3a-2 and 3a-3. Table 18 displays the four alternatives and the resulting percentage increase (blue) or decrease (red) relative to the current allocations (3a-1) for each state.

Table 18: State-by-state commercial bluefish allocations along the U.S. Atlantic coast including the percent change (negative in red; positive in blue) from status quo for each alternative.

Allocation Alternatives Based on Landings Data							
	3a-1	3a-2		3a-3		3a-4	
State	Status quo (1981-1989)	5 year (2014-2018)		10 year (2009-2018)		1/2 '81-'89 1/2 '09-'18	
ME	**0.67%**	0.00%	***-100%***	0.01%	***-99%***	0.49%	***-27%***
NH	**0.41%**	0.03%	***-93%***	0.12%	***-71%***	0.33%	***-20%***
MA	**6.72%**	10.64%	***58%***	10.16%	***51%***	7.66%	***14%***
RI	**6.81%**	11.81%	***73%***	9.64%	***42%***	7.59%	***11%***
CT	**1.27%**	1.18%	***-7%***	1.00%	***-21%***	1.19%	***-6%***
NY	**10.39%**	20.31%	***95%***	19.94%	***92%***	13.01%	***25%***
NJ	**14.82%**	11.23%	***-24%***	13.94%	***-6%***	14.57%	***-2%***
DE	**1.88%**	0.58%	***-69%***	0.40%	***-79%***	1.47%	***-22%***
MD	**3.00%**	1.50%	***-50%***	1.84%	***-39%***	2.68%	***-11%***
VA	**11.88%**	4.62%	***-61%***	5.85%	***-51%***	10.26%	***-14%***
NC	**32.06%**	32.06%	***0%***	32.38%	***1%***	32.13%	***0%***
SC	**0.04%**	0.00%	***-100%***	0.00%	***-100%***	0.03%	***-25%***
GA	**0.01%**	0.00%	***-100%***	0.00%	***-100%***	0.01%	***-0%***
FL	**10.06%**	6.07%	***-40%***	4.75%	***-53%***	8.59%	***-15%***
Total	**100.02%**	**100.01%**[7]		**100.03%**		**100.00%**	

Social Impacts

The socioeconomic impacts of the existing allocations vary from state to state. Some states report negative economic impacts associated with current allocations due to a mismatch between their current allocation and their fishery capacity and/or bluefish availability in their waters. Commercial fishermen that land bluefish within a state that consistently harvests less than its quota have the benefit of operating within an unconstrained fishery. Future fluctuations in stock size are less likely to restrict fishing effort and mitigate revenue losses within that state. Each state manages their fishery differently in terms of total number of participants, trip limits, seasons, and other measures. A restriction in one or more of these measures is the driver of the social and economic impacts to industry participants. For example,

[7] Some percentages exceed 100% due to rounding but will be adjusted by the regional office upon implementation.

a restriction in the daily trip limit will likely have an outsized impact on larger vessels compared to smaller vessels which may already harvest bluefish under the newly imposed daily trip limit.

The proposed allocation alternatives incorporate more recent data that are reflective of current state-specific performance and have the potential to increase economic efficiency. Nonetheless, any reduction in allocation may limit a state's potential for market expansion and future increases in landings and ex-vessel revenue compared to the no action alternative. Revenue is also variable in nature and is influenced by fluctuations in costs and prices.

Under alternative 3a-1, impacts are likely negative for commercial fishery stakeholders located in states with smaller proportions of allocations relative to what commercial stakeholders believe should be their states' allocations. The submitted scoping comments were divided roughly in half, with 52% of commenters supporting status quo and 48% in favor of altering the commercial allocations to the states. Among the commercial stakeholders who submitted comments opposed to altering the state allocations were those from NJ (and other states where reductions would take place) who were opposed to reductions in the NJ allocation. Others supported the status quo so long as flexibility remained to transfer quotas between states when necessary. On the other hand, roughly half of the submitted comments were in favor of revisiting state commercial allocations.

Alternative 3a-2 would set allocations using a five-year time series of landings data (2014-2018). MA, RI, and NY would see the most substantial increases in allocations using this approach, whereas NJ, VA, and FL would see the largest reductions in commercial allocations under this approach. NY has two of the top five (Montauk and Hampton Bays/Shinnecock) and four of the fifteen most highly engaged communities in the commercial bluefish fishery (Figure 11). Relative to status quo, alternative 3a-2 would likely result in positive social impacts for these NY communities given the substantial increase in allocations to the state. While FL and VA do not have any communities among the top fifteen in commercial bluefish engagement, four of the fifteen highest in engagement are located in NJ. Therefore, while FL and VA may not experience substantial negative impacts from the reductions in commercial allocations, NJ communities and user groups will likely experience negative social impacts from alternative 3a-2.

Under alternative 3a-3, a 10-year time series of landings data would inform the distribution of state allocations of commercial bluefish. This scenario would increase the allocations for RI (~3%), MA (~3%), and NY (~9%) considerably, but reduce allocations for VA and FL by a similarly substantial amount (~6%). Unlike alternative 3a-2, however, this alternative would only reduce the NJ allocation by less than one percent. Relative to the status quo, alternative 3a-3 would likely result in positive social impacts for commercial stakeholders in MA, RI, and NY, while at the same time limiting the negative impacts of reducing the allocation to NJ. As discussed under alternative 3a-2, communities in FL and VA do not feature among the most highly engaged in commercial bluefish activity (Figure 11), whereas MA, RI, NY, and NJ all have several communities with relatively high engagement in commercial bluefish fishery activities.

Alternative 3a-3 provides relative benefits to most of the north Mid-Atlantic and New England user groups without affecting stakeholders in NJ as dramatically as alternative 3a-2.
Under alternative 3a-4, state allocations would be redistributed based partially on landings data from the 1981-1989 time series and partially on the 2009-2018 time series. This approach provides the most limited change in state allocations among other alternatives to the status quo. Northern states such as MA, RI, and NY would see modest increases in allocations (under 3%), while southern states such as NJ, VA, and FL would only see minor decreases in allocations (~2% or less). Alternative 3a-4 would likely result in neutral to low positive social impacts for the northern states and neutral to low negative impacts for the southern states relative to the status quo alternative. Among all state allocation alternatives, alternative 3a-4 would likely produce the least impactful changes to the social factors among commercial bluefish fishery stakeholders and communities.

Economic Impacts

The current state-level commercial allocations consider landings data from 1981-1989. Through transfers, states which predict to land bluefish quantities above their allocated quota can request additional quota from states which are not expected to land their allocation. This transfer increases the requesting state's landings and revenues, overall. In addition, no incentives are given to the state transferring out quota. In theory, this transaction could be classified as a Pareto improvement, where the transfer of quota does not negatively impact either participating party. Given that these state-to-state transfer channels exist, the economic impacts of the proposed reallocations at the state-level are expected to be marginal during years of higher bluefish population levels given that 1) allocations are based on realized landings/catch data and 2) states can transfer quota depending on their predicted performance in any given year. However, in years when the coastwide commercial quota is low resulting from an overfished stock, there may not be a sufficient number of states with additional quota available to cover other states' needs. During these years, states with a small allocation relative to their share of recent coastwide landings are likely to be negatively impacted the most. In addition, there is opportunity cost in the form of time and effort associated with transfers. There is a decrease in economic efficiency linked with the processing and approving of transfer requests. If transfers continue, the maximum economic benefits are associated with the reallocation plan which accurately captures each states' quota needs and minimizes the need for quota transfers.

To highlight how each allocation alternative relates to decreases in state quota transfers, both realized landings and average reallocation quantities by sub-alternative are depicted in Figure 14. Here, the distribution of each state's annual bluefish landings are summarized by box and whisker plots. The interquartile range of state-level bluefish landings are portrayed by the gray boxes and the whiskers, which indicate the maximum and minimum annual bluefish landing quantity for each state from 1999-2019.[8] Average annual allocations are calculated using the percentages presented in 3a-1 to 3a-4 which include the status quo of allocations determined

[8] The 1999-2019 time series is used to show how the proposed allocations align with realized landings over the past two decades.

using the 1981-1989 time series of landings data, allocations based on the previous five years of state landings, allocations based on landings from the previous 10 years, and allocations based on landings from 1981-89 and 2009-18. State allocations by sub-alternative are calculated using the historical commercial sector quota and each allocation plan's corresponding quota percentage from 1999-2019. The average allocations by state and plan are plotted against realized bluefish landings for comparison.

There is no consistent trend in impacts stemming from each reallocation sub-alternative when compared across states. For example, under status-quo, quota allocations for FL would be much greater than the state's median landings value (above the state's maximum annual landings value); however, for NY, quota allocated under the status quo alternative would be much less than the state's median realized landings. When comparing which sub-alternative is closest in value to the median realized landings of each state, plan 3a-3 (ten-year) performs the best, with landings predictions closest to 38% of state median landings values and furthest from only 8% of state median landings.[9] The 3a-2 plan (five-year) is second in performance based on this metric, which is closest to the median landings for 31% of states but furthest from the median value for 25% of states. The status quo (3a-1) plan had average allocations most similar to the median landings values for 23% of states but is furthest from the median landings value for 67% of states. Lastly, 3a-4 (1989-91 & 2009-18 based allocations) is nearest to 8% of state median landings values but furthest from the median value of 0% of the states. It should be reiterated that landings and revenues may not be impacted by the state-level reallocations if transfer requests continue to be issued and approved. However, by determining the plan which best predicts state landings, the need for transfers will decrease—increasing efficiency within the commercial sector. A slight economic advantage is expected for states which are allocated quota above their historic median landings value, as these states will have the ability to land above their expected median landings without requesting additional quota from another state, while states which are allocated a quota slightly below their annual median may need to request quota on an annual basis.

[9] This analysis excludes Georgia and South Carolina because each plan had an equal average allocation estimate.

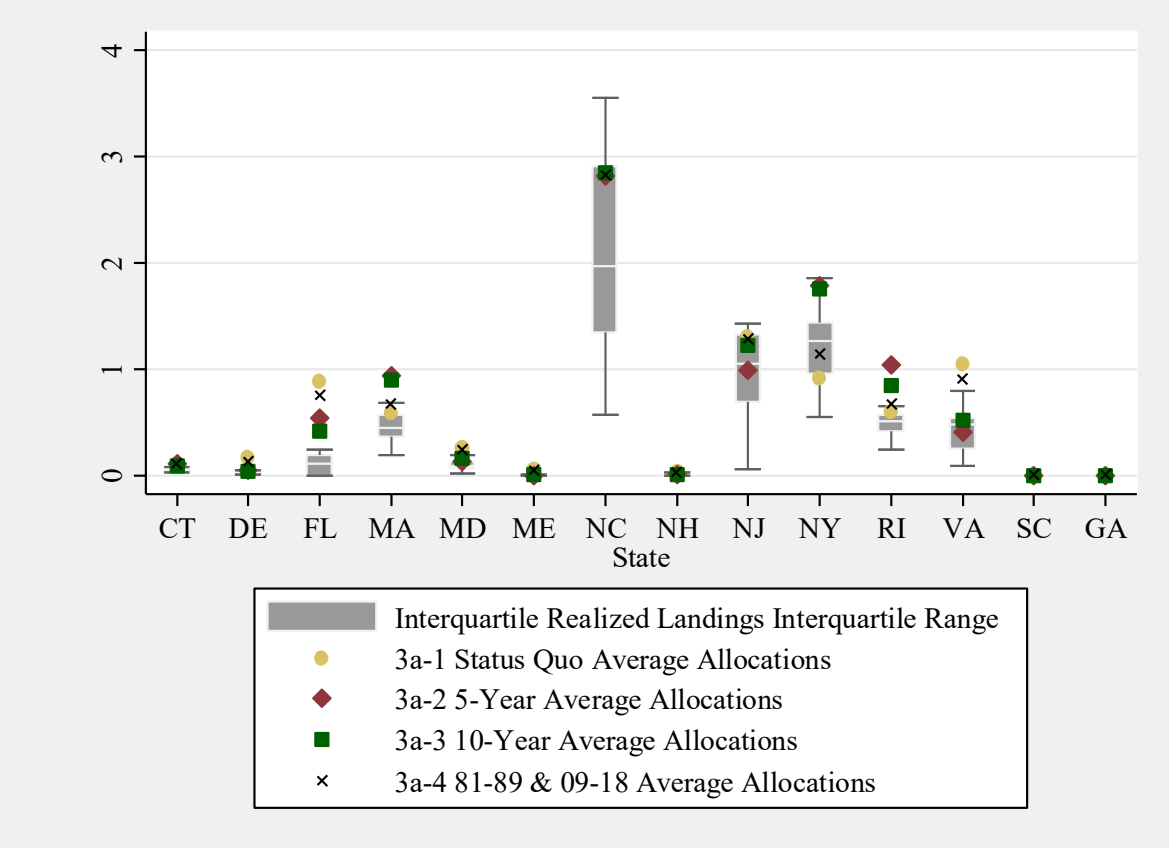


Figure 14: Realized annual commercial bluefish landings box and whisker plots (1999-2019) and average annual allocations (1999-2019) by proposed state-level allocation sub-alternative by state. Median landings represented by white horizontal line within box and whisker.

Biological Impacts

Currently, bluefish discards in the commercial fishery are considered negligible. Depending on the scale of the allocation change, a decrease in the commercial quota or additional restrictions on the commercial fishery could lead to increased regulatory discards compared to recent levels. Actual changes in discards will depend on many factors such as fishing behavior, weather, availability of other target species, and market demand. Discards are also influenced by availability of bluefish, both overall abundance and by size class. Therefore, it is challenging to predict future discards based on changes in allocations.

4.2.3 Commercial Allocation Change Phase-In Alternatives

The alternatives listed in

Table **19** consider if any changes to the allocation percentages considered through alternative set 3a should occur in a single year (alternative 3b-1, no phase-in) or if the change should be spread out over 4, 5, or 7 years (alternative 3b-2). The Council and Board agreed that if alternative 3b-2 is selected, the duration over which new allocations will be phased in will match the duration of the selected rebuilding plan (*Section 4.3*). The choice of whether to use a

phase-in approach may depend on the magnitude of allocation change proposed. Larger allocation changes may be less disruptive to fishing communities if they are phased in over several years as identified by the percent point change (Table 20).

Table 19: Bluefish state commercial allocation change phase-in alternatives

Phase-in Alternatives
3b-1: No phase-in
3b-2: Allocation change spread evenly over the same duration as the selected rebuilding plan

Table 20: Percentage point shifts in bluefish state commercial allocation per year for 4, 5, and 7-year phase-in options for all allocation change alternatives

		5 year (2014-2018) See 3a-2			**10 year (2009-2018)** See 3a-3			**1/2 '81-'89 1/2 '09-'18** See 3a-4		
State	**Current Allocations**	**4-year**	**5-year**	**7-year**	**4-year**	**5-year**	**7-year**	**4-year**	**5-year**	**7-year**
ME	0.67%	-0.17%	-0.13%	-0.10%	-0.17%	-0.13%	-0.09%	-0.05%	-0.04%	-0.03%
NH	0.41%	-0.10%	-0.08%	-0.05%	-0.07%	-0.06%	-0.04%	-0.02%	-0.02%	-0.01%
MA	6.72%	0.98%	0.78%	0.56%	0.86%	0.69%	0.49%	0.23%	0.19%	0.13%
RI	6.81%	1.25%	1.00%	0.71%	0.71%	0.57%	0.40%	0.19%	0.16%	0.11%
CT	1.27%	-0.02%	-0.02%	-0.01%	-0.07%	-0.05%	-0.04%	-0.02%	-0.02%	-0.01%
NY	10.39%	2.48%	1.98%	1.42%	2.39%	1.91%	1.36%	0.65%	0.52%	0.37%
NJ	14.82%	-0.90%	-0.72%	-0.51%	-0.22%	-0.18%	-0.13%	-0.06%	-0.05%	-0.04%
DE	1.88%	-0.33%	-0.26%	-0.19%	-0.37%	-0.30%	-0.21%	-0.10%	-0.08%	-0.06%
MD	3.00%	-0.38%	-0.30%	-0.21%	-0.29%	-0.23%	-0.17%	-0.08%	-0.06%	-0.05%
VA	11.88%	-1.82%	-1.45%	-1.04%	-1.51%	-1.21%	-0.86%	-0.41%	-0.32%	-0.23%
NC	32.06%	0.00%	0.00%	0.00%	0.08%	0.06%	0.05%	0.02%	0.01%	0.01%
SC	0.04%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	<0.01%	<0.01%	<0.01%
GA	0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	0.00%	0.00%	0.00%
FL	10.06%	-1.00%	-0.80%	-0.57%	-1.33%	-1.06%	-0.76%	-0.37%	-0.29%	-0.21%

Section 4.2.5 discusses alternatives related to the trigger approach. The trigger approach requires baseline quotas to determine the allocation of the quota greater than the trigger threshold. By design, the phase-in approach alters each state's baseline quota on a yearly basis, which greatly complicates the calculation of each state's additional quota. The various combinations of phase-in and trigger alternatives would require numerous tables to display each state's allocation for each year during the phase-in period. *As such, examples are not included in this document and the combination of these approaches is not recommended.* *Section 4.2.7* discusses alternatives related to minimum default allocations. If the Council and Board decide to select both phase-in and a minimum default allocation, the percentage point shifts in Table 20 will be slightly smaller (see Appendix C).

4.2.4 Impacts of Commercial Allocation Change Phase-In Alternatives

The impacts described in *Section 4.1.4* largely apply here to the commercial allocations to the states. The biological, social, and economic impacts of the phase-in alternatives for the commercial allocations to the states under consideration in this amendment are dependent on three main factors: 1) the difference between the status quo allocation percentage and the allocation percentage selected, 2) the duration of the phase-in period, which will be the same duration as the preferred rebuilding plan (*Section 4.3*), and 3) the continuation of state-to-state transfers (*Section 4.4*). Based on the range of allocation percentages in *Section 4.2.1*, the commercial allocations to the states could shift by as much as 2.48 percentage points per year (NY), or as little as 0.01 percentage points (NH, SC, GA) per year under the above phase-in timeframes of 4-7 years. Table 18 (red/blue showing change in *Section 4.2.2*) presents the percent change that would be associated with each alternative.

In summary, under alternative 3b-1, the state allocations selected from among the 3a set of alternatives would occur in a single year upon implementation. The social impacts of alternative 3b-1 will align with whichever 3a alternative is selected for determining the future of state allocations of commercial bluefish.

Under alternative 3b-2, both the positive and negative social impacts discussed in *Section 4.2.2* would still apply, but they would be phased in over time. This could mitigate to an extent the negative social impacts by providing a buffer through smaller percentage changes over time, but also slow the realization of some states' increases in quota and their associated positive social impacts.

4.2.5 Commercial Quota Trigger Alternatives

This alternative set would create state allocations that vary with overall stock abundance and resulting coastwide commercial quotas (

Table **21**). The selection of alternative 3c-1 would implement no trigger, which is consistent with the current FMP. Alternative 3c-2 would implement a trigger level equal to the average of the initial commercial quota for each time series associated with alternative set 3a that do not include transfers from the recreational to commercial fishery. Alternative 3c-3 would implement a trigger level equal to the average of the final commercial quota that includes transfers from the recreational to the commercial fishery. Ultimately, the commercial quota time series selected will correspond with the time series associated with the alternative selected in *Section 4.2.1*.

Please note, no trigger threshold was developed under the status quo state commercial allocations because no formal commercial quotas existed prior to the implementation of Amendment 1 in 2000. As such, the trigger approach is not able to be implemented under status quo commercial allocations to the states (alternative 3a-1).

Table 21: Trigger threshold levels for additional quota allocations.

Commercial Quota Time Series	**No Trigger** Alternative: **3c-1**	**Pre-Transfer** Alternative: **3c-2**	**Post Transfer** Alternative: **3c-3**
No Action/Status quo [3a-1]	No trigger approach implemented	N/A	N/A
5-year (2014-2018) [3a-2]		3.67 M lbs	6.67 M lbs
10-year (2009-2018) [3a-3]		4.31 M lbs	8.21 M lbs
½ 1981-1989 and ½ 2009-2018 [3a-4]		4.31 M lbs*	8.21 M lbs*

*No formal commercial quota existed before the implementation of Amendment 1 in 2000; the average represents the quota for available years only.

For all years when the annual commercial quota is at or below a specified annual commercial quota trigger level, the state allocations would be specified by the selected option from alternative set 3a. In years when the annual coastwide quota exceeds the specified trigger level, quota up to the trigger amount would be distributed according to the chosen allocation alternative from alternative set 3a, and the distribution of quota over the trigger would be set according to the allocations listed in Table 22.

Table 22: Bluefish commercial state allocations applying a trigger threshold for all commercial allocation time series.

Allocation of additional quota greater than the trigger threshold.				
State	**Status quo (1981-1989)**	**5 year (2014-2018)**	**10 year (2009-2018)**	**1/2 '81-'89 1/2 '09-'18**
ME	0.10%	0.10%	0.10%	0.10%
NH	0.10%	0.10%	0.10%	0.10%
MA	7.50%	16.60%	19.60%	7.50%
RI	7.50%	16.60%	7.50%	7.50%
CT	3.00%	3.00%	0.10%	3.00%
NY	15.12%	16.60%	19.60%	17.03%
NJ	15.12%	16.60%	19.60%	17.03%
DE	3.00%	0.10%	0.10%	3.00%
MD	3.00%	3.00%	3.00%	3.00%
VA	15.12%	3.00%	7.50%	17.03%
NC	15.12%	16.60%	19.60%	17.03%
SC	0.10%	0.10%	0.10%	0.10%
GA	0.10%	0.10%	0.10%	0.10%
FL	15.12%	7.50%	3.00%	7.50%
Total	100%	100%	100%	100%

The allocations in Table 22 were developed by using the tiered approach displayed in Table 23 where the baseline quota allocations selected from alternative set 3a determine how the quota greater than the trigger will be allocated to each state. In summary, the trigger threshold level and the associated additional quota allocation are all informed by the time series selected in alternative set 3a.

Table 23: Range of baseline quotas and the associated additional quota allocation once a trigger threshold is surpassed.

Range of Baseline Quota Tiers	Associated Additional Quota Allocations
<=1%	0.10%
>1-5%	3.00%
>5-10%	7.50%
>10%	Remainder

Section 4.2.7 discusses alternatives related to minimum default allocations. If the Council and Board decide to select both a trigger approach and minimum default allocations, the percentages in Table 22 will shift slightly. On occasion, specific state allocations in the proposed time series will cross a threshold into a different percentage of associated additional quota (see Appendix C).

4.2.6 Impacts of Commercial Quota Trigger Alternatives

Between alternatives 3c-2 and 3c-3, the trigger thresholds associated with 3c-2 are more likely to be exceeded given the thresholds are much lower. These thresholds are approximately half those associated with alternative 3c-3 because they account for the commercial quotas prior to incorporating historical transfers from the recreational to commercial fishery. Figure 15 displays the four potential trigger thresholds and the post-transfer commercial quotas as well as total coastwide commercial landings for the years 2000-2018. Both of the potential pre-transfer trigger thresholds associated with alternative 3c-2 would have been exceeded by the commercial quota every year going back to 2000. By comparison, both of the potential post-transfer trigger thresholds associated with alternative 3c-3 would have been exceeded by the commercial quota for every year except 2015 and 2016 when the commercial quota was much lower. The trigger approach only impacts states directly in years when the trigger threshold level is exceeded. Following this logic, the impacts discussed in the economic impacts section are experienced to a greater degree under the lower pre-transfer trigger (3c-2) compared to the higher post-transfer trigger (3c-3).

The trigger approach could also provide additional beneficial social impacts or buffers against negative impacts, for states that are either receiving increased allocations or having allocations reduced. Therefore, alternatives 3c-2 and 3c-3 are likely to have a range of social impacts from neutral to low positive varying state-to-state, depending upon the alternative selected from the 3a set. Ultimately, the impacts are difficult to ascertain because of the number of combinations that can arise under the trigger option. Some states will experience neutral to positive impacts,

others neutral to negative, and those impacts might change when quotas are below the trigger vs above the trigger. In summary, it is difficult to know what the impacts are, and the impacts will depend on other decisions made in this document.

Considering the bluefish FMP will be going through rebuilding starting at the end of this year, the FMAT concluded that it is unlikely the initial ABCs will be large enough to exceed the trigger threshold.

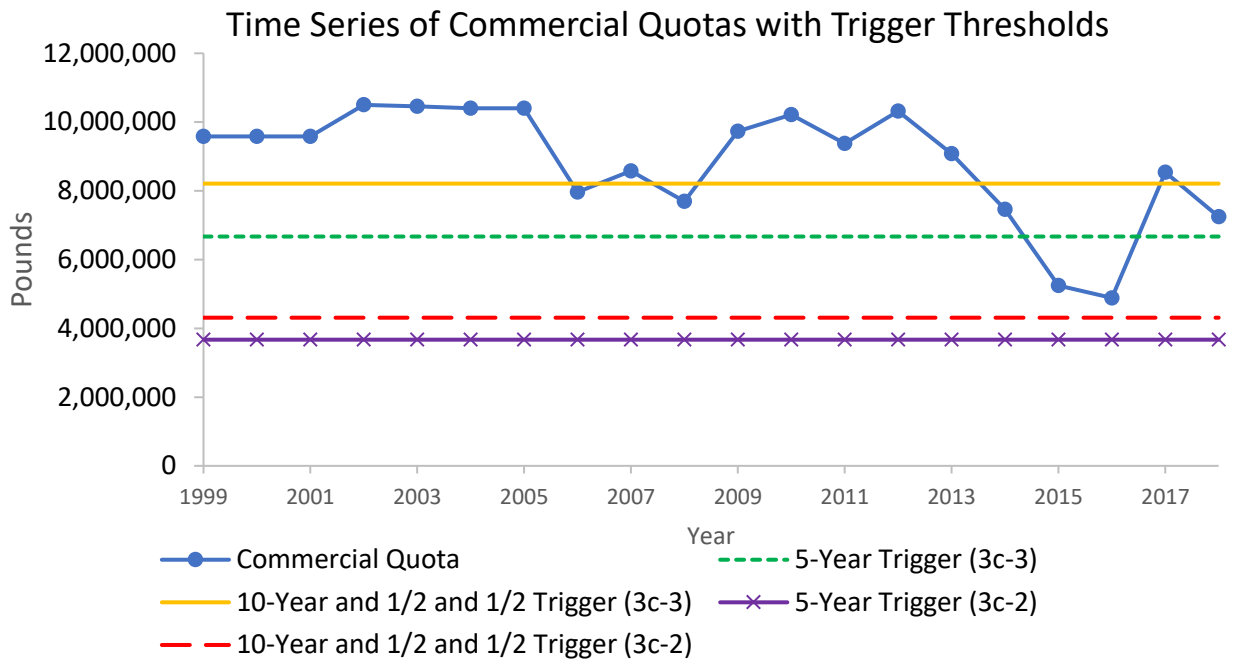


Figure 15: Trigger thresholds for additional quota compared to commercial quotas.

Economic Impacts

Section 4.2.5 would allocate quota differently above a specified pre- or post-transfer threshold (i.e., the trigger) than the allocation method described in *Section 4.2.1* To analyze the economic impacts of this difference in allocation, a commercial quota 100,000 lbs. above both the pre- and post-transfer threshold levels is used.[10] Revenues are calculated at the state-level using allocations under the trigger scheme. The revenues generated from the trigger-allocated quota are compared to revenues generated under a no-trigger allocation scenario across the various commercial sector allocations proposed in *Section 4.2.5* (i.e., 3a-1 through 3a-4). Since ex-vessel bluefish prices are needed at the state-level and a state-level price model has yet to be developed, annual state ex-vessel bluefish prices, averaged over 1996-2019, are used for the calculation of revenues and reported in 2020 constant dollars. One limitation of this analysis is that average state prices omit the inverse relationship between ex-vessel prices and estimated

[10] Average total realized bluefish landings from 1999-2019 equal 5.68 M lbs. which also informs the average price data used calculate revenues. Given that the post-transfer trigger quantities exceed the average realized landings, a minimum overage quantity of 100,000 lbs. was chosen to highlight the possible economic impacts of the trigger-induced allocation process of additional quota.

landing quantities. Average state prices reflect landing quantities closer to that of the pre-transfer trigger threshold amounts, as bluefish landings have never reached the proposed post-transfer trigger threshold levels.

Conceptually, when the trigger is activated, states will receive greater quantities of quota if they are grouped into an allocation category which results in higher allocations than the non-trigger alternative allocation method. The opposite is true for a state that is allocated a higher percentage of quota under the non-trigger allocation but is grouped in an allocation bracket lower than its original allocation. For example, ME is allocated 0.67% under the status quo (i.e., 17% of the ABC for commercial sector pre-transfer allocations) with no trigger. With a trigger, the allocation of additional quota to ME would be set at 0.1% given that it falls in the ≤1% allocation range, resulting in less allocated quota than would be received under the state's baseline allocation percentage. The state of MA, on the other hand, would be allocated 6.72% of the additional quota under the status quo with no trigger, but quota allocation after the trigger threshold would increase to 7.50% under the trigger sub-alternative.

When an additional 100,000 lbs. is allocated under the trigger vs. the non-trigger status quo, average revenues decrease for NC, ME and NH, when averaged across all state allocation alternatives (Figure 16). On average, NC revenues would decrease by $7,912, ME by $167, and NH by $101. It should be noted, however, that whether a state earns increases or decreases in revenues varies across the allocation alternatives. For example, RI would earn a revenue increase of $2,854 under 3a-2 (i.e., the five-year allocation) but a decrease in revenues (-$1,275) under 3a-3 (i.e., the ten-year allocation). The highest increases in revenues when averaged across the alternatives are earned by MA, NJ and VA with increases of $3,430, $2,508, and $1,378, respectively.

This analysis highlights the variation in economic outcomes and their dependence on the allocation sub-alternatives proposed in *Section 4.2.5*. Though triggers would impact the initial allocation of the quota, this analysis assumes that each state will fully utilize their allocated quota with no state-to-state transfers. If additional allocations resulting from the trigger method are not utilized and transfers are to continue, there may be little change in landings/revenues and the burden of transfers will be the main economic consequence of this sub-alternative.

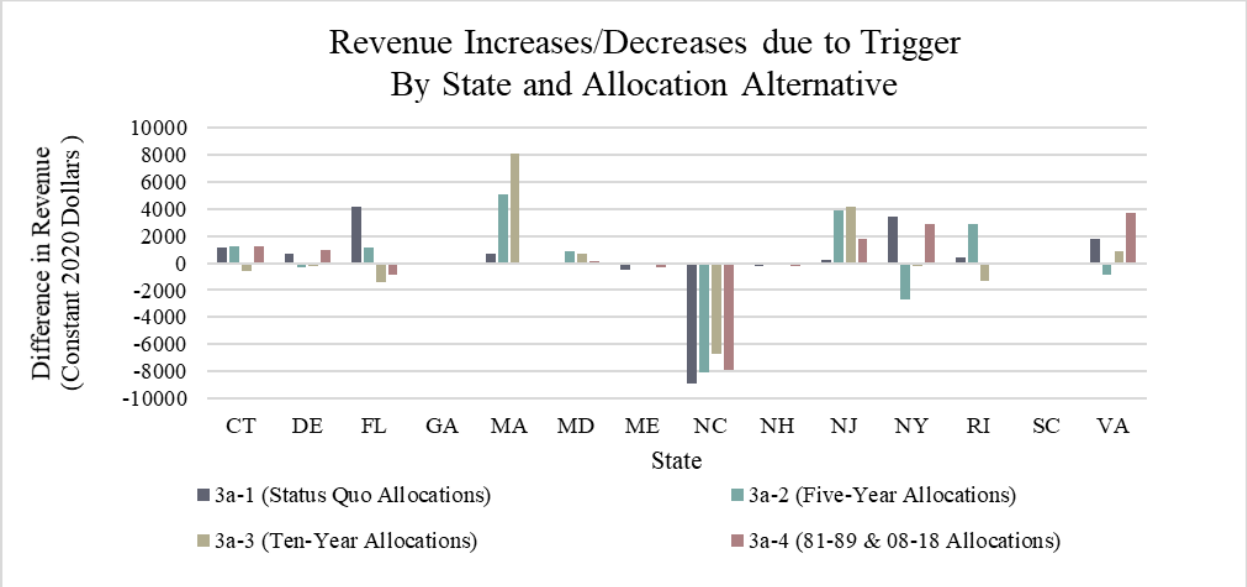


Figure 16: Differences in commercial bluefish revenues (2020 constant dollars) resulting from trigger-induced allocations by state and state-level allocation sub-alternative.

4.2.7 Minimum Default Allocation Alternatives

This alternative set would establish minimum default commercial quota allocations for each state within the bluefish management unit. A minimum default allocation provides each state with a fixed minimum percentage allocation of the coastwide commercial quota, and the remainder would be allocated based on the commercial allocation alternative selected from *Section 4.2.1*. The minimum default allocation alternatives are presented in Table 24. If 0.1% (3d-2) is selected, 1.4% of the allocation would be evenly distributed amongst the 14 states within the bluefish management unit. Then, the remaining 98.6% of the commercial quota would be distributed in accordance with the preferred alternative in *Section 4.2.1*. If 0.25% (3d-3) is selected, 3.5% of the allocation would be evenly distributed to the 14 states. Then, the remaining 96.5% of the commercial quota would be distributed following the preferred alternative in *Section 4.2.1*.

Table **25** and
Table **26** present the final state allocations with the incorporated minimum default allocations of 0.10% and 0.25%, respectively.

Table 24: Minimum default allocation alternatives.

Minimum Default Allocation Alternatives	
3d-1	No Action/Status quo: No Minimum Default Allocation
3d-2	0.10% Minimum Default Allocation
3d-3	0.25% Minimum Default Allocation

Table 25: State-by-state commercial bluefish allocations along the U.S. Atlantic coast using different proposed time series and a minimum default allocation of 0.10%.

3d-2		0.10% Minimum Default Allocation			
State	No Action 1981-1989	Status quo 1981-1989	5-year 2014-2018	10-year 2009-2018	1/2 '81-'89 1/2 '09-'18
ME	0.67%	0.76%	0.10%	0.11%	0.58%
NH	0.41%	0.50%	0.13%	0.22%	0.42%
MA	6.72%	6.73%	10.59%	10.12%	7.65%
RI	6.81%	6.81%	11.74%	9.61%	7.58%
CT	1.27%	1.35%	1.26%	1.09%	1.28%
NY	10.39%	10.34%	20.12%	19.76%	12.93%
NJ	14.82%	14.71%	11.17%	13.85%	14.46%
DE	1.88%	1.95%	0.67%	0.49%	1.55%
MD	3.00%	3.06%	1.57%	1.92%	2.75%
VA	11.88%	11.81%	4.65%	5.87%	10.22%
NC	32.06%	31.71%	31.71%	32.03%	31.78%
SC	0.04%	0.14%	0.10%	0.10%	0.13%
GA	0.01%	0.11%	0.10%	0.10%	0.11%
FL	10.06%	10.02%	6.08%	4.78%	8.57%

Table 26: State-by-state commercial bluefish allocations along the U.S. Atlantic coast using different proposed time series and a minimum default allocation of 0.25%.

3d-3		0.25% Minimum Default Allocation			
State	No Action 1981-1989	Status quo 1981-1989	5-year 2014-2018	10-year 2009-2018	1/2 '81-'89 1/2 '09-'18
ME	0.67%	0.90%	0.25%	0.26%	0.72%
NH	0.41%	0.65%	0.28%	0.36%	0.56%
MA	6.72%	6.73%	10.52%	10.05%	7.64%
RI	6.81%	6.82%	11.65%	9.56%	7.57%
CT	1.27%	1.48%	1.39%	1.22%	1.40%
NY	10.39%	10.28%	19.85%	19.49%	12.80%
NJ	14.82%	14.55%	11.09%	13.70%	14.31%
DE	1.88%	2.06%	0.81%	0.64%	1.67%
MD	3.00%	3.15%	1.69%	2.03%	2.84%
VA	11.88%	11.71%	4.71%	5.89%	10.16%
NC	32.06%	31.19%	31.19%	31.50%	31.25%
SC	0.04%	0.29%	0.25%	0.25%	0.28%
GA	0.01%	0.26%	0.25%	0.25%	0.26%
FL	10.06%	9.96%	6.10%	4.83%	8.54%

4.2.8 Impacts of Minimum Default Allocation Alternatives

Minimum default allocations were proposed to ensure states currently allocated a small share of the coastwide commercial quota do not lose their entire allocation through the re-allocation process. ME, NH, SC, and GA stand to benefit most from the implementation of a minimum default commercial allocation. All four of these states are currently allocated less than 1% of the coastwide quota. Furthermore, the allocation alternatives under consideration in *Section 4.2.1* would provide these states with allocations close to 0%. The commercial fisheries in these states are quite small, but bluefish are still occasionally landed. Without a sufficient share of the commercial quota, fishermen operating within ME, NH, SC, and GA waters may be forced to discard incidental bluefish catch or travel further to offload landings in another state. The adoption of a minimum default allocation may reduce these negative biological and economic impacts. In addition, bluefish are historically a cyclical species and highly migratory. States like Maine and New Hampshire may encounter bluefish more in the future due to distribution shifts in the bluefish population. If this occurs, these two northern states would be afforded a small allocation that would allow some harvest of bluefish.

Alternatives 3d-2 and 3d-3 provide for minimum default allocations to states of 0.10% and 0.25%, respectively. Relative to the status quo/no action alternative, 3d-1, these minimum default allocations may result in neutral to low positive social impacts on state commercial bluefish stakeholders, depending upon the alternative selected from the 3a set. The difference between 3d-2 and 3d-3, however, is relatively small in terms of default percentages and thus the difference in social impacts between these two alternatives is anticipated to be neutral or negligible.

Economic Impacts

Differences in state bluefish revenues resulting from allocations with minimum defaults vs. allocations without the minimum defaults are calculated across the various state-allocation alternatives proposed (3a-1 through 4). Revenues are estimated and compared across both of the proposed minimum defaults (0.10% and 0.25%). Landings for each allocation series (3a-1 to 3a-4) are simulated using historic pre-sector transfer quota quantities given that pre-sector transfer allocations are closer to realized landings relative to post-transfer quantities (1999-2019) and the assumption that all allocated quota is landed is necessary for the analysis. The simulated allocated quota, and therefore estimated landings, for each series is multiplied by the average state ex-vessel bluefish price. Average annual state bluefish prices ($/lb) are used rather than an econometric model as a peer-reviewed state-level annual price model has yet to be developed. The use of average state bluefish prices omits the inverse relationship between price and quantity of bluefish landed, which is a limitation of this specific analysis. The average difference in revenues under minimum default allocations and their non-minimum default counterparts are presented in Figure 17.

In terms of revenue gains or losses, NC's revenues decrease the most under the minimum default allocation, with average losses of $55K and $137K for the 0.10% and 0.25% minimum defaults, respectively (Figure 17). This is followed by NY and NJ where revenues decrease on average by $29K and $19K under the 0.10% minimum default and $66K and $49K under the

0.25% minimum default for NY and NJ, respectively. The states with the highest increases in revenues are NH, ME, GA and SC. This is not surprising given that these states have the lowest allocations across all of the state-level reallocation plans, all of which are allocated under 1% of the commercial quota on when averaged across the non-minimum default allocations. SC, GA, ME and NH earn average annual revenue increases of $21K, $21K, $25K and $25K under the 0.10% minimum default and $52K, $52K, $62K and $62K under the 0.25% minimum default, respectively. Revenues for the states not mentioned previously range from an average decrease of $8K to average increase of $17K for the 0.10% minimum default and an average decrease of $15K to average gain of $41K under the 0.25% minimum default when summarized across all proposed state-level allocation alternatives. Lastly, if transfers are to occur and if the states receiving minimum allocations are not projected to land their quota, it is possible for quota transfers to counteract the decreases in revenue stemming from minimum default allocations.

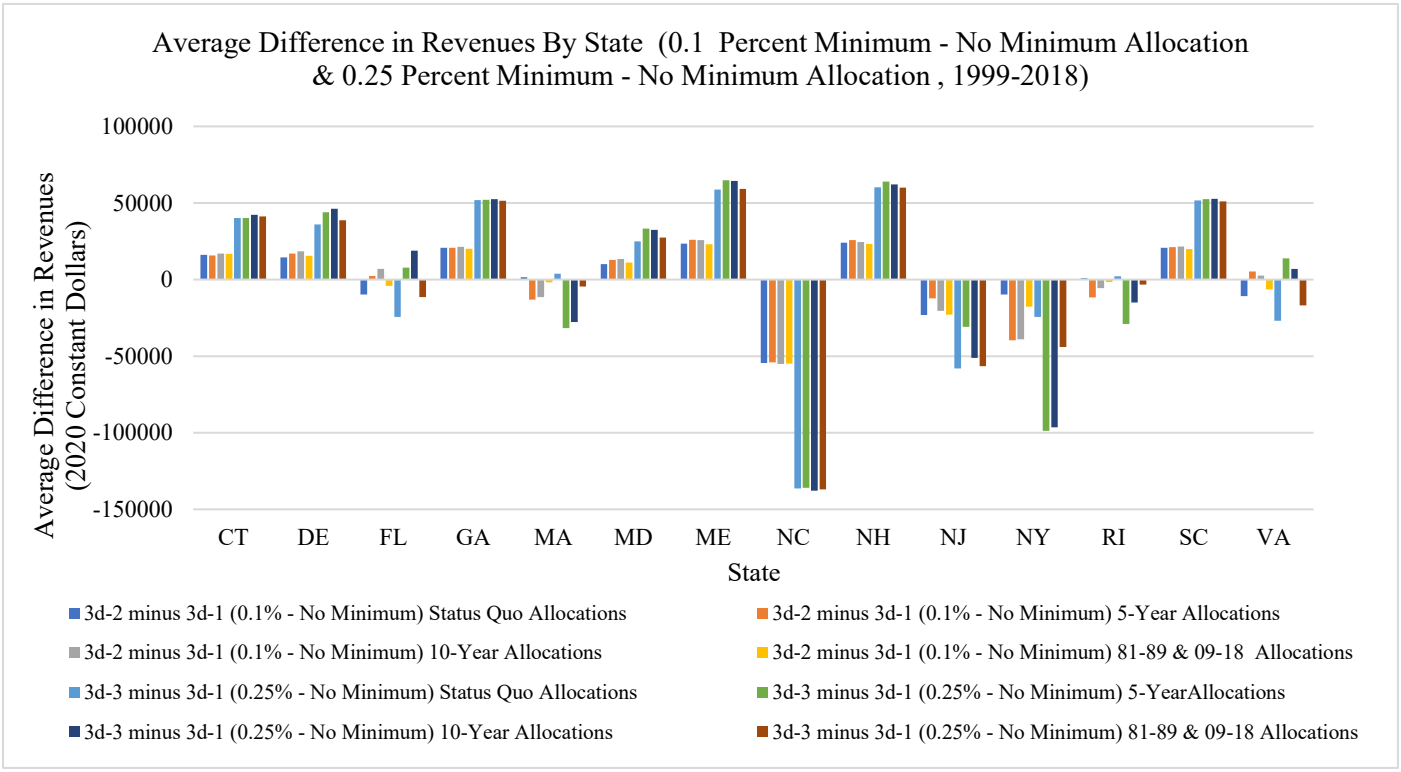


Figure 17: Average difference in commercial bluefish revenues under minimum default allocations and no minimum default allocations (1999-2019) by commercial allocation alternative and state.

4.3 REBUILDING PLAN ALTERNATIVES AND IMPACTS

The 2019 operational stock assessment indicates that the bluefish stock is overfished, but overfishing was not occurring in 2019[11]. Section 304(e)(3) of the MSA states: "Within 2 years after…notification…the appropriate Council…shall prepare and implement a fishery

[11] 2019 Bluefish Operational Stock Assessment Report

management plan, plan amendment, or proposed regulations…to end overfishing immediately in the fishery and to rebuild affected stocks of fish…" Furthermore, the MSA states that FMPs shall "contain the conservation and management measures… necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery." If adequate progress is not made through the rebuilding plan, the regional office will immediately make revisions necessary to achieve adequate progress. NOAA Fisheries technical guidance on MSA National Standard 1 recommends that in these situations the rebuilding fishing mortality proxy (F) be set at 75% of the target F. This means that if the selected rebuilding plan is demonstrating difficulty in achieving the target on time, F may be further decreased to achieve a rebuilt stock.

Spawning stock biomass (SSB) was estimated to be 91,041 metric tons in 2018, or 46% of the SSB target. The biomass target is the SSB associated with the fishing mortality proxy (F) that achieves maximum sustainable yield (MSY) or SSB_{MSY} proxy. Under a rebuilding plan, the stock will be considered rebuilt once SSB reaches the SSB_{MSY} proxy equal to 198,717 mt (Figure 18). Once rebuilt, the MSYproxy is estimated to be 26,677 mt. Total fishing mortality is also available for reference (
Figure **19**). Again, MSA requires the overfished stock to be rebuilt within 10 years once the regional office notifies the Council of the overfished state. Under the current amendment timeline, the rebuilding plan would be implemented at the beginning of 2022.

In mid-2021, a management track assessment will be conducted to re-assess the bluefish stock. As a result of this assessment, the biological reference points may shift. Moreover, rebuilding projections will be rerun to reflect the updated status of the stock. Then, Council and Commission staff will work with the NOAA Fisheries regional office and the Scientific and Statistical Committee (SSC) to identify how these new projections will be translated into future specifications.

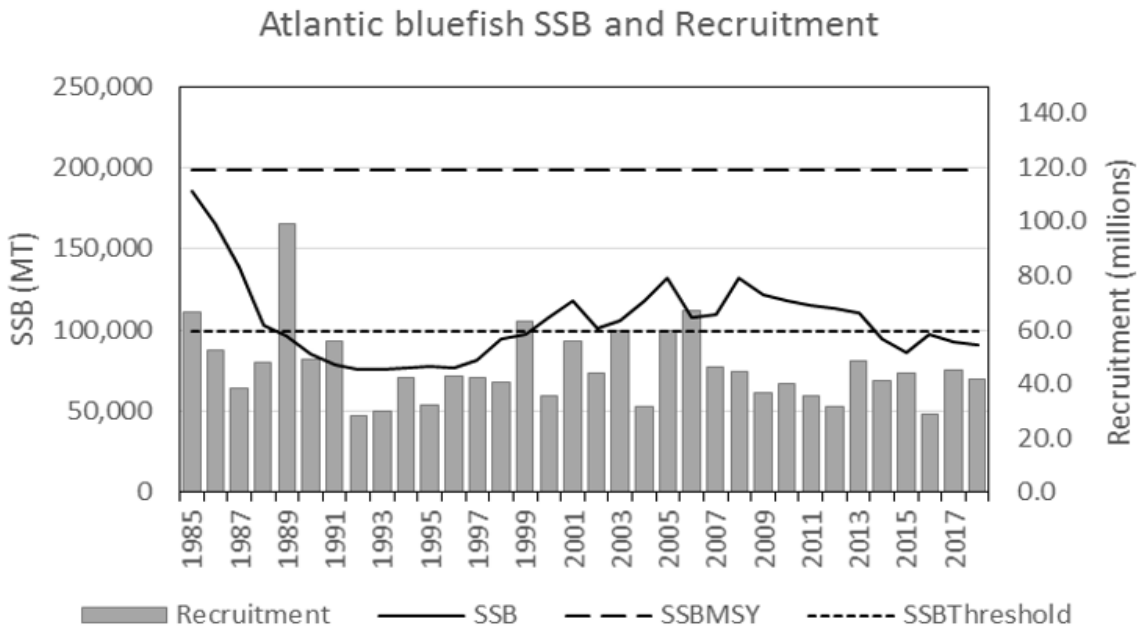


Figure 18: Atlantic bluefish SSB and recruitment at age 0 (R; gray vertical bars) by calendar year. The horizontal dashed line is the updated SSBMSY proxy = SSB40% = 198,717 mt.

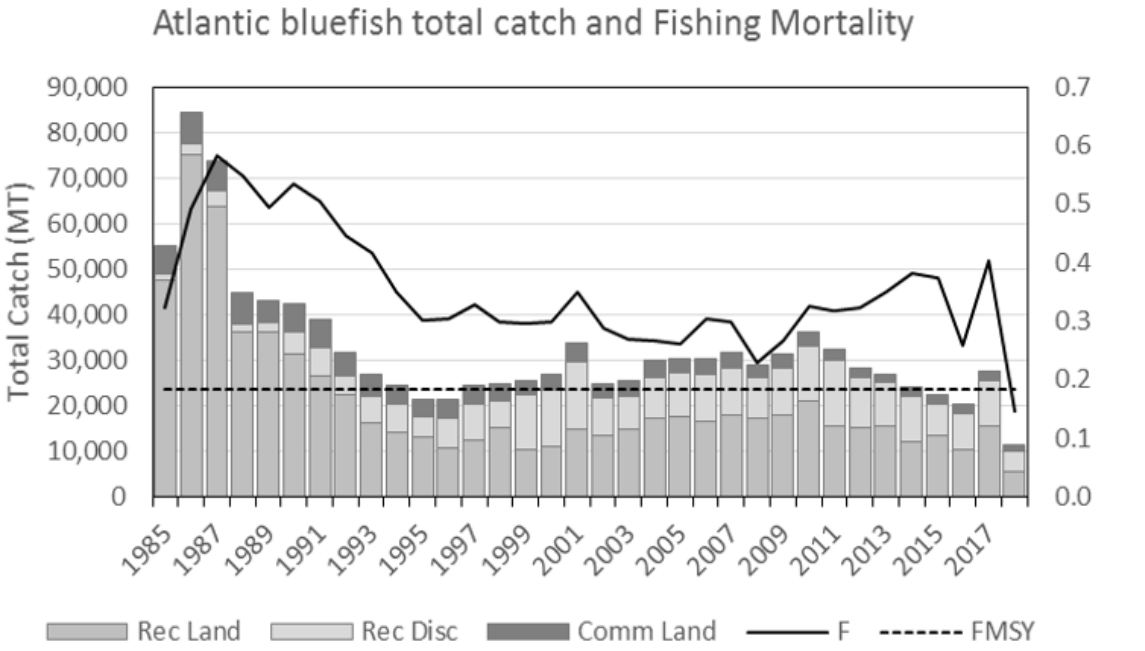


Figure 19: Total fishery catch (metric tons; mt; solid line) and fishing mortality (F, peak at age 3; squares) for Atlantic bluefish. The horizontal dashed line is the updated FMSY proxy = F35% = 0.183.

4.3.1 Rebuilding Plan Alternatives

This section introduces the four rebuilding plan alternatives under consideration, including status quo (Table 27). SSB values and catch projections are provided for reference for each of the three rebuilding plans. The proposed rebuilding plans assume all the projected catch will be caught. Regardless of which alternative is selected, the stock assessment scientist will perform assessment updates and rerun projections every two years. Each projection is based on current stock status information, meaning the catch values are subject to change depending upon the latest assessment. The SSC will then use the projections to develop recommendations for the specification packages that remain in line with the goals of the rebuilding plan.

Table 27: Rebuilding projection alternatives and the duration until rebuilt.

Alternative	Rebuilding Plan	Duration	Adjustment to Council Risk Policy
4a	No Action/ Status Quo	N/A	N/A
4b	Constant Harvest	4 years	No
4c	P* (Council Risk Policy)	5 years	N/A
4d	Constant Fishing Mortality	7 years	Yes

All rebuilding alternative sections contain tables detailing the biomass levels, fishing mortality, catch, SSB_{MSY} proxy, and $SSB_{Threshold.}$ The P* approach includes all the same metrics, but in terms of the projected ABCs. Table 28, Table 29, and
Table **30** all begin in 2019 despite the rebuilding plans beginning in 2022. These data are presented for reference to display the assumed catch values when the projection was run in 2020.

4.3.1.1 No Action/Status quo (Alternative 4a)

The no action/status quo alternative would not initiate a rebuilding plan, no changes to the current risk policy would occur, and the current specifications would remain in place, as described in the proposed rule for the 2021 specifications package[12].The Council is legally bound to develop a rebuilding pan and this alternative is included as a formality.

4.3.1.2 Constant Harvest – 4-year Rebuilding Plan (Alternative 4b)

[12] https://www.federalregister.gov/documents/2020/11/05/2020-24364/fisheries-of-the-northeastern-united-states-atlantic-bluefish-fishery-2021-bluefish-specifications.

The 4-year constant harvest rebuilding alternative specifies that the stock be rebuilt by the end of 2025. The rebuilding plan projection presented in Table 28

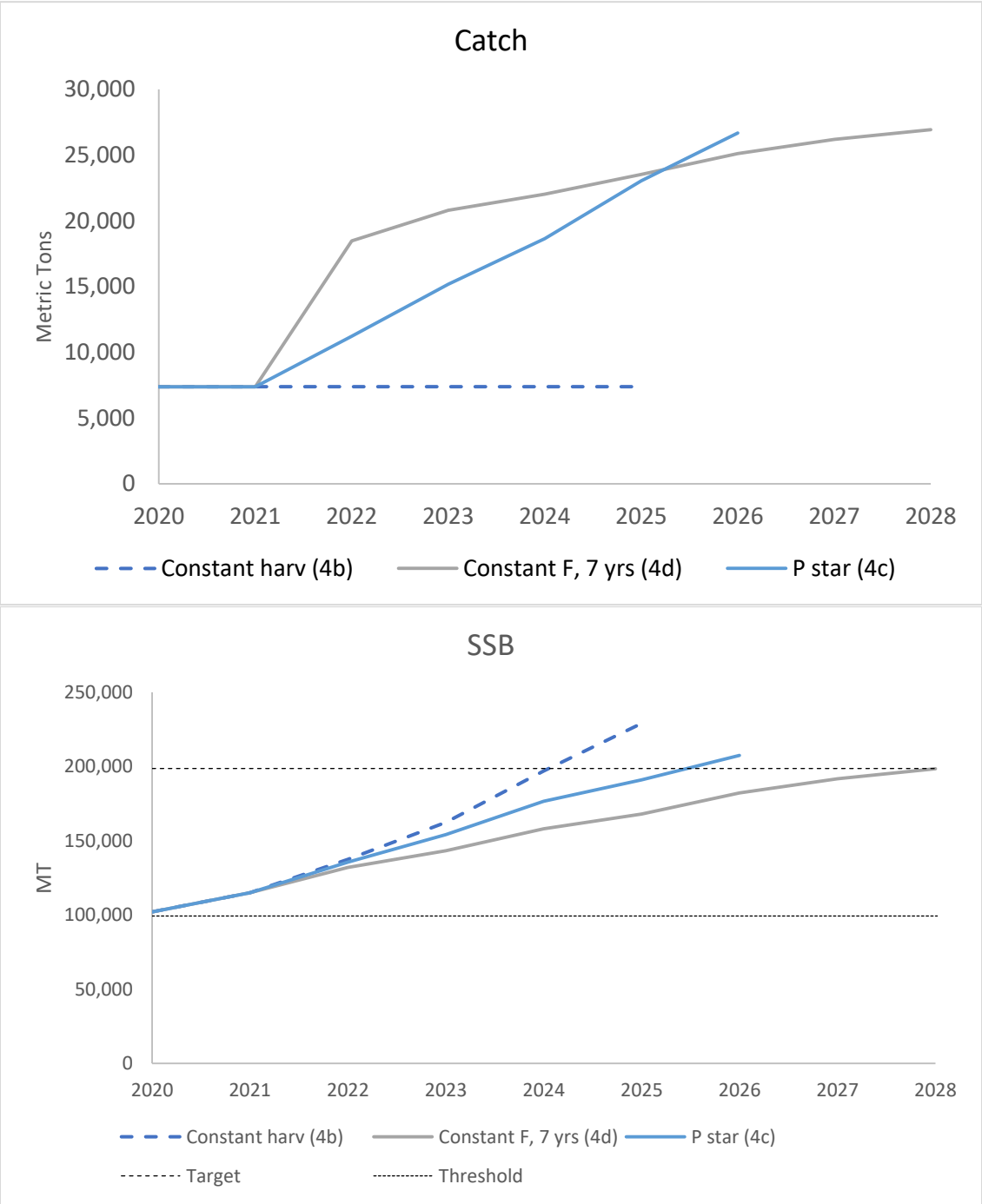
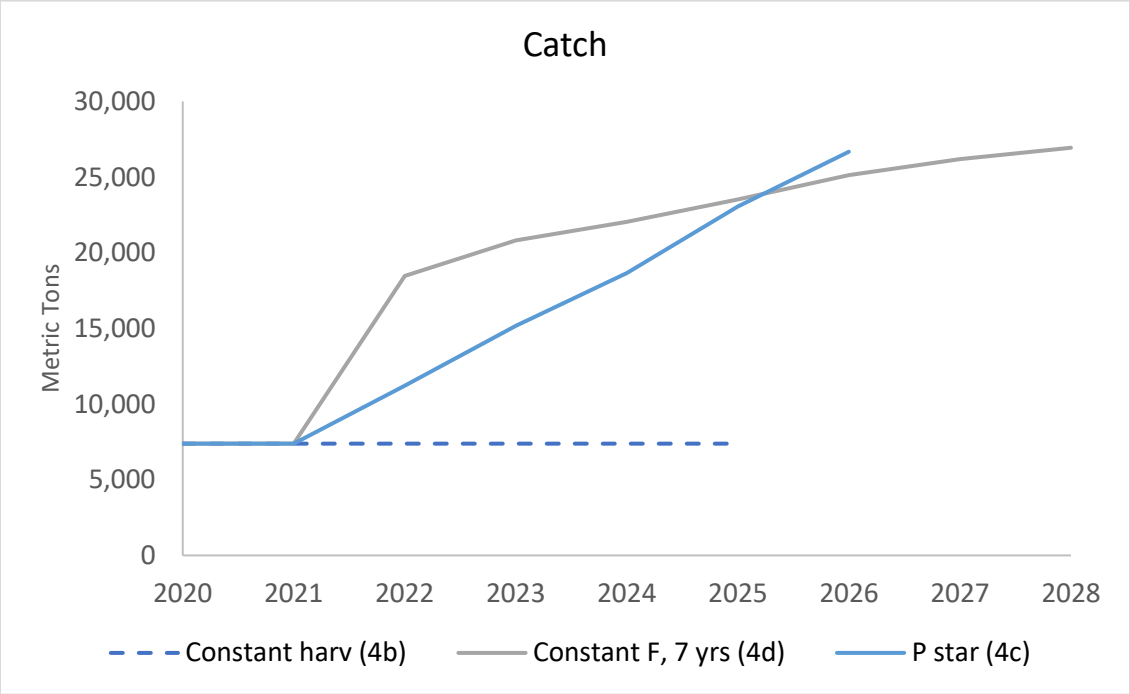


Figure 20: Rebuilding plan projections including catch (top) and SSB (bottom) for alternatives 4b, 4c, and 4d.

Table 28 and Figure 20 demonstrates that the projected catch and SSB values remains constant across the four years. However, as previously mentioned, the stock assessment scientist will conduct assessment updates and rerun projections every 2 years, which means the catch values may be adjusted up or down depending upon the assessment results. This alternative does not require an adjustment to the Council's risk policy because the catches are less than those described under the P* approach. In 2022, fishing mortality rates peak at F=0.064, but still remains below the overfishing threshold (MSY Proxy above 0.183). Rebuilding projections indicate that this alternative would be expected to rebuild bluefish to slightly above the SSB_{MSY} proxy as defined in the recent bluefish operational assessment (198,717 mt) by 2025.



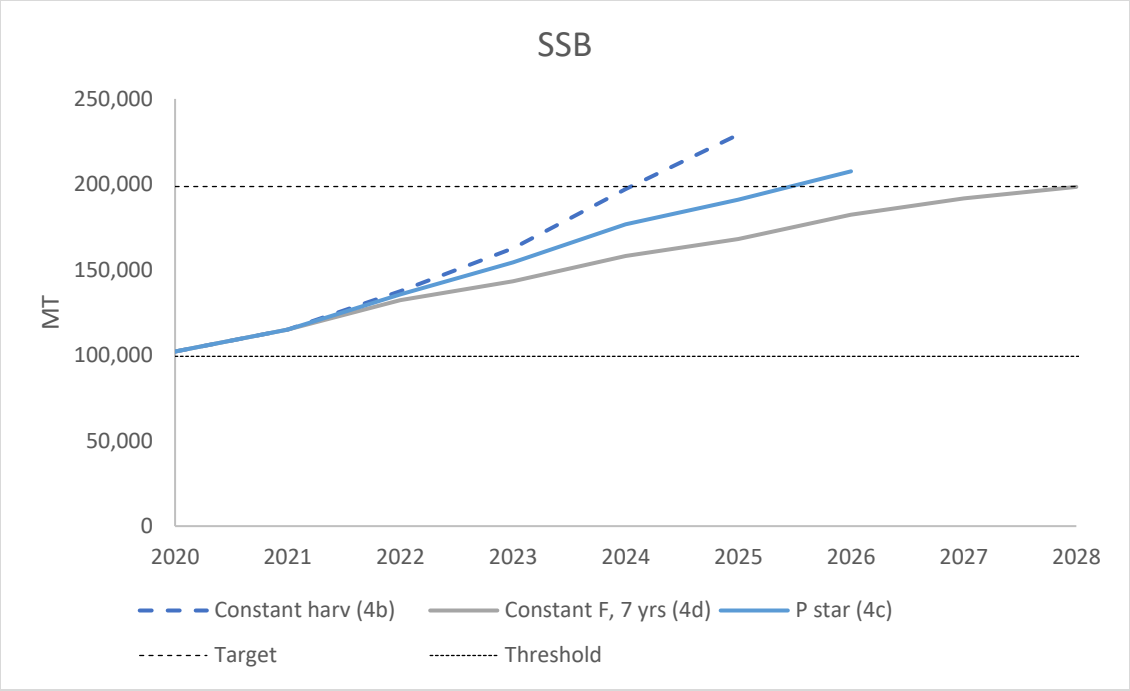


Figure 20: Rebuilding plan projections including catch (top) and SSB (bottom) for alternatives 4b, 4c, and 4c.

Table 28: Constant harvest projection to rebuild over 4 years.

Year	SSB (MT)	Recruits (000s)	*F*	Catch (MT)	SSB_{MSY} (MT)	$SSB_{threshold}$ (MT)
2019	92,779	43,282	0.279	22,614	198,717	99,359
2020	102,165	43,455	0.087	7,385	198,717	99,359
2021	115,085	43,428	0.075	7,385	198,717	99,359
2022	137,450	43,460	0.064	7,385	198,717	99,359
2023	162,495	43,353	0.052	7,385	198,717	99,359
2024	197,141	43,239	0.045	7,385	198,717	99,359
2025	229,121	43,379	0.039	7,385	198,717	99,359

4.3.1.3 P Council Risk Policy – 5-year Rebuilding Plan (Alternative 4c)*

The 5-year P* Council risk policy rebuilding alternative specifies that the stock be rebuilt by the end of 2026. The catch values shown in Table 29 are in accordance with the ABC control, which is guided by the Council's risk policy. Figure 20 provides a visual of catch and SSB rebuilding over the 5-year period. In 2022, the probability of overfishing is 29%. This coincides with a projected fishing mortality rate of F=0.098, which remains below the overfishing threshold (FMSY proxy = F35% = 0.183). Rebuilding projections indicate that this alternative would be expected to rebuild bluefish to slightly above the SSB_{MSY} proxy as defined in the recent bluefish operational assessment (198,717 mt) by 2026. As previously stated, the ABC values presented

in Table 29 are based on the 2019 operational assessment and are subject to revision following each stock assessment update.

Table 29: Rebuilding projection based on P* using the Council's risk policy to rebuild over 5-years.

Year	OFL Total Catch (MT)	ABC Total Catch (MT)	ABC *F*	ABC P_{star}	ABC SSB (MT)	SSB_{MSY} (MT)	$SSB_{threshold}$ (MT)
2019	15,368	22,614	0.280	0.183	92,732	198,717	99,359
2020	16,212	7,385	0.087	0.207	102,174	198,717	99,359
2021	17,205	7,385	0.075	0.239	115,012	198,717	99,359
2022	20,237	11,222	0.098	0.291	135,586	198,717	99,359
2023	23,998	15,181	0.113	0.338	154,257	198,717	99,359
2024	26,408	18,653	0.127	0.394	176,619	198,717	99,359
2025	28,807	23,048	0.144	0.431	191,063	198,717	99,359
2026	30,848	26,677	0.157	0.450	207,619	198,717	99,359

4.3.1.4 Constant Fishing Mortality – 7-year Rebuilding Plan (Alternative 4d)

The 7-year constant fishing mortality rebuilding plan alternative specifies that the fishing mortality rate be set constant across the duration of the rebuilding period with a rebuilt date set for 2028.

Table **30** presents the project catch and SSB values associated with the rebuilding plan and Figure 20 presents catch and SSB over time. Starting in 2022 and for the duration of the rebuilding plan, the fishing mortality rate is projected to be at F=0.166, which remains below the overfishing threshold. However, because these catches are higher than the P* catches described in 4c, the Council would also adjust its risk policy for this rebuilding plan. The Council's current risk policy states that the SSC should provide ABCs that are the lesser of rebuilding ABCs or standard risk policy (P*) ABCs (4c follows the current P* approach). The P* catches in 4c are lower than 4d. In absence of a risk policy adjustment, ABCs prescribed under alternative 4c would override those in 4d. The adjustment to the Council risk policy would be limited to only bluefish for this specific rebuilding alternative. Approval of this adjustment to the risk policy is necessary for the implementation of any rebuilding plan exceeding five years with the associated higher catches. Rebuilding projections indicate that this alternative would be expected to rebuild bluefish to slightly above the SSB_{MSY} proxy as defined in the recent bluefish operational assessment (198,717 mt) by 2028. As previously discussed, the catch values produced by the projection are subject to change following new stock assessment information.

Table 30: Constant 7-year F rebuilding projection.

Year	SSB (MT)	Recruits (000s)	*F*	Catch (MT)	SSB*MSY* (MT)	$SSB_{threshold}$ (MT)
2019	92,755	43,320	0.279	22,614	198,717	99,359
2020	102,186	43,531	0.087	7,385	198,717	99,359

2021	115,073	43,310	0.075	7,385	198,717	99,359
2022	132,150	43,390	0.166	18,477	198,717	99,359
2023	143,271	43,292	0.166	20,813	198,717	99,359
2024	158,152	43,272	0.166	22,033	198,717	99,359
2025	168,006	43,395	0.166	23,532	198,717	99,359
2026	182,311	43,336	0.166	25,121	198,717	99,359
2027	191,855	43,578	0.166	26,191	198,717	99,359
2028	198,520	43,411	0.166	26,939	198,717	99,359

4.3.2 Impacts of Rebuilding Plan Alternatives

All proposed alternatives, with the exception of no action, are projected to rebuild the stock to the SSB_{MSY} proxy biomass target of 198,717 by 2028 or earlier. The catch values associated with each rebuilding plan scale up with the duration of the rebuilding period. The recreational and commercial sectors are likely to experience significantly different impacts from each rebuilding plan considering the varied duration and projected catch values.

When comparing impacts of the three rebuilding plans, individuals need to consider how a longer rebuilding timeline will affect ABCs, fishing mortality rates, and the resulting ACL, which may be constrained with various management measures, if necessary.

Social Impacts

Alternative 4a is the status quo alternative under which no action would be taken to initiate a rebuilding plan and therefore the bluefish stock would remain in an overfished state. It is likely that there would be negative social impacts from the no action alternative due to the negligence of the MAFMC to comply with its legal obligation to develop a rebuilding plan when a stock is overfished. This would likely lead to an erosion of trust and confidence among stakeholders across user groups in the ability of the MAFMC to handle its responsibilities to ensure the equitable sustainability of the bluefish resource. According to the written and oral comments provided during the scoping process, about 40% of commenters supported some type of rebuilding plan. By contrast, about 21% doubted the overfished status of the stock or viewed the stock status as “cyclical,” and 17% reported that they believed the stock to be affected by environmental factors and more research is needed on those issues. These stakeholder perspectives indicate that a plurality of resource users would prefer the MAFMC take action on rebuilding the stock, but the approach in doing so would need to be carefully considered in terms of its impacts and equitability for stakeholders across user groups.

Under alternative 4b, a constant harvest approach would be utilized until the stock is rebuilt. The projected date for the stock to be rebuilt under this scenario is the end of 2025 (4 years). This approach applies perhaps the most constraining rebuilding plan given that catch would be set at a constant level of 7,385 mt over the four-year period. Relative to the no action alternative, alternative 4b would have positive social impacts due to the MAFMC implementing a rebuilding plan as it is legally required to do, but this approach may have neutral to negative social impacts relative to the other rebuilding plan alternatives under consideration. Most commercial crew and hired captains reported through Crew Survey results that they believed

the rules and regulations in their primary fisheries have been too restrictive. If the projection holds and the stock is rebuilt in four years, however, the potential negative impacts may be offset by an improved stock status and likely increases in catch thereafter, subject to constraining fishing mortality below the threshold.

Alternative 4c would utilize the MAFMC risk policy (P*) to rebuild the stock. This approach is projected to rebuild the stock by the end of 2026 (i.e., a 5-year rebuilding plan). Under this alternative, there would likely be positive social impacts relative to the no action alternative and positive impacts relative to alternative 4b, the four-year rebuilding plan. Alternative 4c provides for more catch over the course of the rebuilding plan, thus allowing more flexibility for stakeholders across user groups to continue to access the resource and potentially preserve employment and income opportunities in the short term as the stock is being rebuilt.

Under alternative 4d, the rebuilding plan would follow a constant fishing mortality approach through which the stock is projected to be rebuilt by the end of the year in 2028 (i.e., a 7-year rebuilding plan). This alternative would likely produce positive social impacts relative to the no action alternative and alternative 4b but might result in only neutral to low positive impacts relative to alternative 4c. While the amount of allowable catch is higher in the short term than under alternative 4c, the additional time to rebuild the stock might reduce the opportunities for employment and income from the bluefish resource over the longer-term relative to a shorter rebuilding plan target. However, if alternative 4d provides the greatest probability of rebuilding the stock then the potential negative impacts relative to alternative 4c might be negated by the benefits of a rebuilt stock for stakeholders to utilize across the spectrum of resource user groups. Additionally, most crew and hired captains interviewed through the Crew Surveys reported that the rules and regulations change so quickly that it can be hard to keep up. A longer rebuilding period with more gradual changes to allowable catch might reduce the amount of uncertainty in fishing business decisions and thus mitigate potential negative social impacts of a rebuilding plan.

Economic Impacts

Forecasted bluefish commercial landings and revenues are compared across the 4-year (alternative 4b), 5-year (alternative 4c), and 7-year (alternative 4d) rebuilding schedules. Landings and revenues are estimated from 2019 to 2028 for each rebuilding plan with the expectation that each plan will be implemented in 2022. Landings and revenues for 2019 and 2020 in this analysis were based off of the values used in the projections and likely differ from 2019 and 2020 realized values because the projections were conducted before final data for these years were made available Moreover, rebuilding projections will continue to be revised every two years as the assessment is updated. For plans which indicate the stock will be rebuilt in less than 7 years, the ABC upon rebuilding the stock is assumed to equal 26,677 mt (58.8M lb)[13] for the remaining years in the time series, allowing for meaningful comparison between rebuilding schedules. For each plan, a minimum and maximum commercial allocation

[13] The 26,677 MT quantity is the terminus year of the 5-year rebuilding projection based on P* using the Mid-Atlantic Fishery Management Council's rebuilding risk policy.

percentage was used to simulate allocations (11% and 17%, respectively, as proposed by alternatives 2a-1 and 2a-2). This analysis assumes that all allocated commercial quota is landed in each forecasted year. Revenue streams are estimated using the predicted landings and ex-vessel bluefish prices are predicted using the modeling methods and parameters specified in Appendix B. Once estimated, future revenues streams are discounted to obtain present values for each rebuilding plan. Discounting revenue streams accounts for the time value of money when assessing future benefits. We present three different discount rates (0%, 3% and 7%) which are applied to the forecasted revenue streams.[14] The 0% discount rate serves as a baseline, while the 3% and 7% discount rates are suggested by NOAA's Social Rate of Time Preference (NOAA 1999) and the Executive Branch's Office of Management and Budget Circular No. A-94 discounting recommendations, respectively.

Trends in landings by rebuilding plan are shown in
while average landings are summarized in Figure 22, where A and B represents the 11% and 17% commercial allocations for each figure, respectively. Alternative 4b (i.e., the 4-year plan) had the lowest overall landings in terms of average landings (3.6 M lb and 5.5 M lb under the 11% and 17% commercial allocations, respectively). Alternative 4d had the highest average annual landings with averages of 4.9 M lb and 7.5 M lb under the 11% and 17% commercial allocations, respectively.

Discounted revenue streams across the various rebuilding timelines are shown in Figure 23, where the three discount rates (0%, 3% and 7%) are applied to the 11% commercial quota allocations for panels A-C and to the 17% commercial allocations in panels D-F. Additionally, average revenues by plan are presented in

Figure **24** where panels A and B refer to the 11% and 17% commercial quota allocations, respectively. The highest average annual revenues by rebuilding plan follow trends similar to those of the landings results. Average annual revenues for alternative 4b range from $1.8M-$2.7M and $2.8M-$4.2M across the discounted revenue streams under the 11% and 17% commercial allocations, respectively. The highest average annual revenues range from $2.2M-$3.3M and $3.5M-$5.1M across the three discount rates under the 11% and 17% commercial allocations, respectively. Overall, alternative 4d (i.e., 7-year schedule) has the highest economic benefits and alternative 4b (i.e., 4-year schedule) the lowest, in terms of average annual bluefish landings and revenues.

[14] The discount rate is a highly disputed topic in the field of economics. The discount rates presented are used to ensure that a low and high discount rate is accounted for when presenting results.

Without a demand model, it is unclear how the proposed rebuilding plans will impact recreational bluefish fishing effort. However, given the high catch and release nature of the fishery, there is likely to be little shift in the demand for recreational fishing given the changes in proposed ABCs by the rebuilding plans. Any increases in recreational TAL may have a slight positive economic impact in possibly more for-hire trips which may have higher value on catching and retaining fish. It is overall unclear to what degree recreational effort and angler expenditures will be impacted by the proposed rebuilding plans.

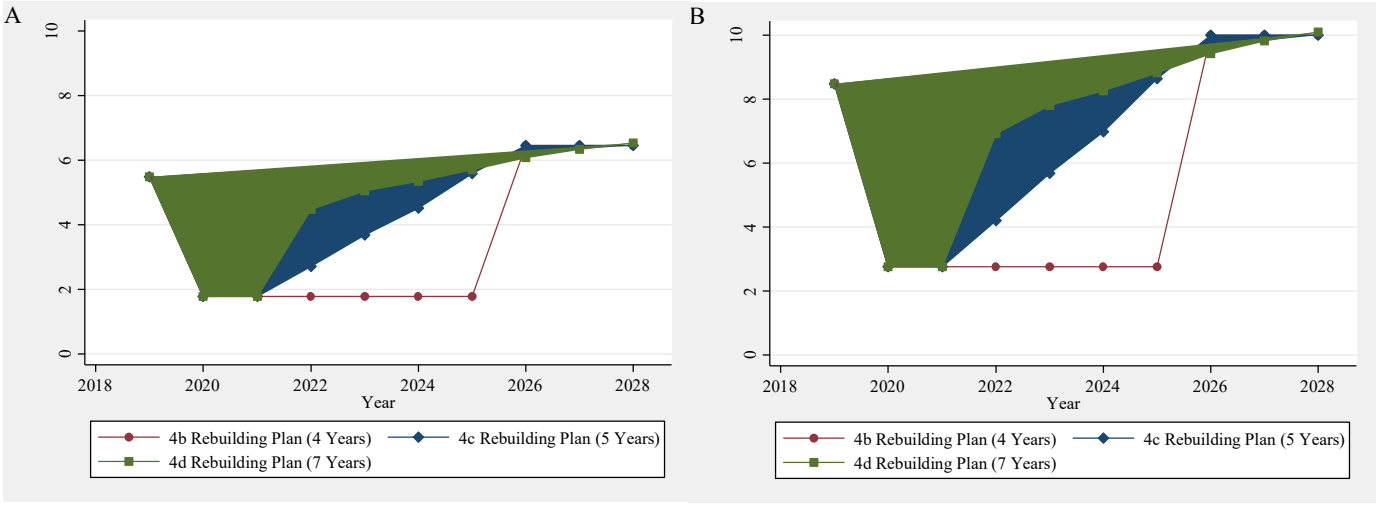


Figure 21: Projected commercial bluefish landings under an 11% and 17% commercial sector allocation (A and B, respectively) by rebuilding plan for years 2019-2028.

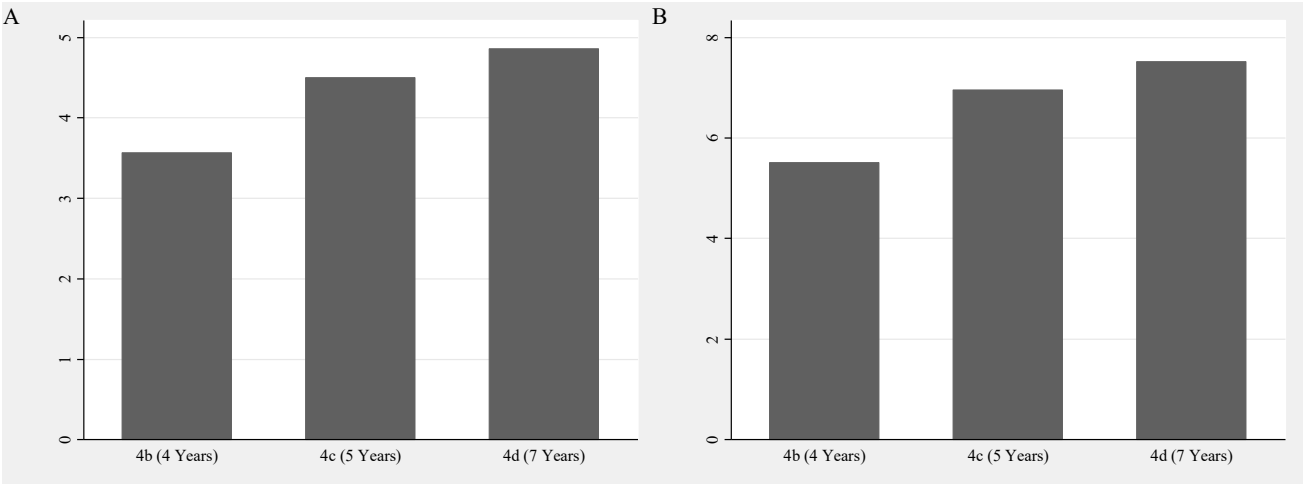


Figure 22: Average projected commercial bluefish landings (2019-2028) under an 11% and 17% commercial sector allocation (A and B, respectively) by rebuilding plan.

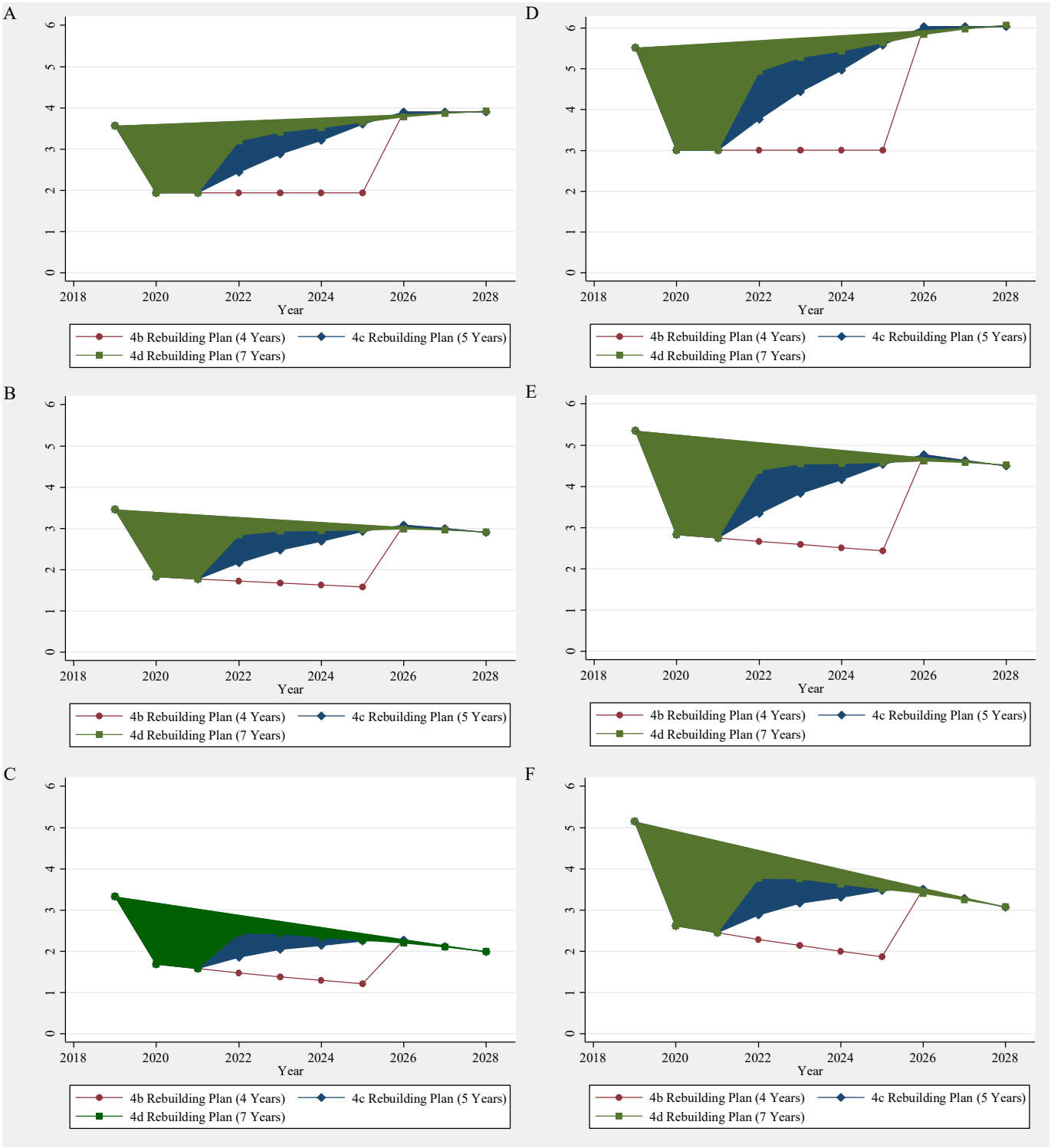


Figure 23: Estimated commercial bluefish revenues under 11% (A-C) and 17%(D-F) commercial allocations and discounted at 0%, 3%, and 7% by rebuilding plan and year (2019-2028).

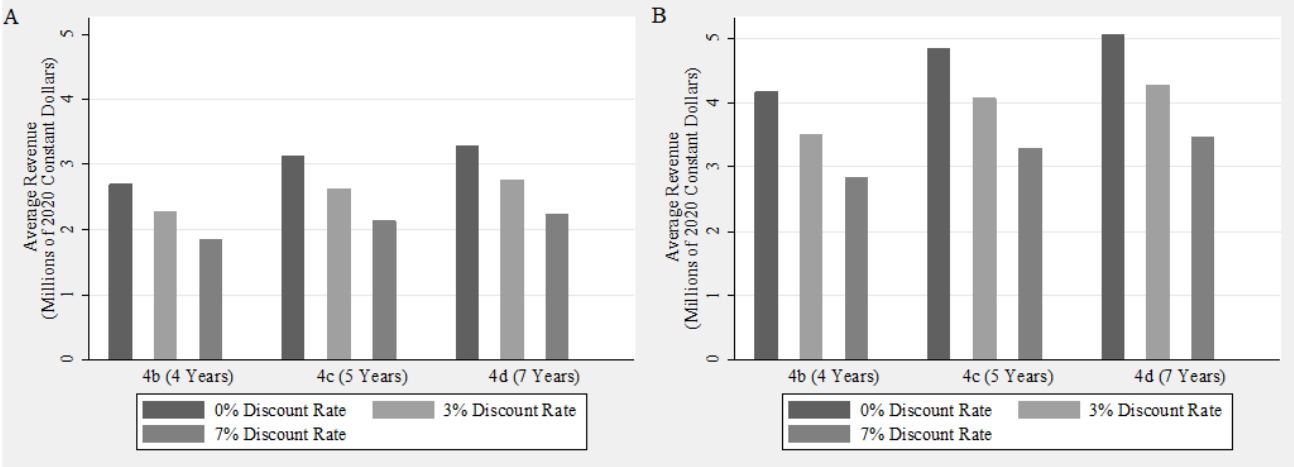


Figure 24: Average annual commercial bluefish revenues (2019-2028) discounted at 0%, 3% and 7% by rebuilding alternative and under 11% (A) and 17% (B) commercial quota allocations.

4.4 QUOTA TRANSFER ALTERNATIVES AND IMPACTS

The following alternatives describe options for allowing annual transfer of quota between the commercial and recreational sectors as part of the specifications setting process (i.e., the annual process of setting or reviewing catch and landings limits for the upcoming fishing year). *Section 4.4.1* discusses quota transfer process alternatives while *Section 4.4.3* addresses options for a cap on the total amount of a transfer.

4.4.1 Sector Transfer Provision Alternatives

Alternatives under consideration for quota transfer provisions are presented in Table 31.

Table 31: Alternatives for annual transfer of quota between the commercial and recreational sectors.

Alternatives	Annual Quota Transfer Alternatives
5a-1	No Action/Status Quo
5a-2	Allow for optional bi-directional transfers through the annual specifications process with pre-defined guidelines and process. The transfer would consist of a portion of the total ABC in the form of a landings limit (i.e., commercial quota and RHL) transfer. Transfers would not occur if the stock is overfished or overfishing is occurring.

Under alternative 5a-1, transfers from the recreational to the commercial sector could continue but transfers from the commercial to the recreational sector would not be included as an option in the FMP.

Under alternative 5a-2, each year during the setting or review of annual catch limits, the Council and Board would have the ability to recommend a transfer of quota between the recreational and commercial sectors, affecting the final commercial quota and RHL. The Council and Board could recommend a transfer from the commercial fishery to the recreational fishery or from the recreational fishery to the commercial fishery. The transfer amount would not exceed the cap adopted via one of the sub-alternatives under alternative set 5b. Table 32 describes how the process of transfers works within the Council and Board's current specifications process under alternative 5a-1 and would work under alternative 5a-2.

Table 32: Quota transfer process during a typical specifications cycle under alternative 5a-1. The quota transfer process would differ slightly under alternative 5a-2 as described in the green shaded rows.

July: **Assess the need for a transfer**	Staff and the Monitoring Committee (MC) assesses the potential need for a transfer and develop recommendations to the Council and Board as part of the specifications setting or review process. The MC considers the expected commercial quota and RHL (pending Council and Board review/approval) in the coming year, and each sector's performance relative to landings limits in recent years. The MC has very limited data for the current year and is not able to develop precise current year projections of landings for each sector. The MC also considers factors including but not limited to: • Projected changes in stock size, availability, or year class strength; • Recent or expected changes in management measures; • Recent or expected changes in fishing effort; The MC considers how these factors might have different impacts on the commercial and recreational sectors. The effects of these considerations are largely difficult to quantify and there is currently no methodology that allows the MC to quantitatively determine the need for a transfer with a high degree of precision. The MC uses their best judgement to recommend whether a transfer furthers the Council and Board's policy objectives, using mostly recent trends by sector.
August: **Council and Board consider whether to recommend a transfer**	The Council and Board considers MC recommendations on transfers while setting or reviewing annual catch and landings limits. Similar to the process for jointly setting catch limits, the Council and Board need to jointly agree on the transfer amount.
August: **Alternative 5a-2**	In addition to the steps described in the row above, the Council and Board would also need to jointly consider the direction of transfer if alternative 5b-2 were to be adopted.

Table 33 (continued): Quota transfer process during a typical specifications cycle under alternative 5a-1. The quota transfer process would differ slightly under alternative 5a-2 as described in the green shaded rows.

October: **Council staff submits specifications package to NOAA Fisheries**	Council staff prepares and submits supporting documents if needed to modify catch limits or implement transfers.
Mid-December: **Recreational measures adopted***	The Council and Board would adopt federal waters recreational measures and a general strategy for coastwide recreational management including any reductions or liberalizations needed in state waters. These recommendations are based on the expected post-transfer RHL which are not always implemented via final rule but have usually been recommended by the Council and Board and proposed to the public.
Late December: **Final specifications published**	NOAA Fisheries approves and publishes the final rule for the following year's catch and landings limits (if new or modified limits are needed), including any transfers.
January 1: **Fishing year specifications effective, including any transfers**	Fishing year specifications including any transfers would be effective January 1.
February: **NOAA Fisheries post-implementation review and adjustment**	NOAA Fisheries compares the estimate of recreational landings for the previous year to the RHL to make any necessary adjustments before finalizing the amount of quota transferred. The adjustment notice with final specifications is usually published in March/April.
February: **Alternative 5a-2**	No post-implementation reviews and adjustments to the transfer amount would occur given the final rule would recently have published, and recreational measures would have already been considered based on expected post-transfer RHLs.

*While this step is not directly part of the quota transfer process, the timing of the recreational measures setting process influences the necessary timeline of transfer-related decisions.

If transfer provisions under alternative 5a-2 are adopted, some changes to the AMs may need to be considered. The AMs indicate that if the MC determines that a transfer from the recreational to commercial sector caused the fishery-level ACL to be exceeded, the transfer amount could be deducted from the receiving fishery in a subsequent year. The Council and Board could consider whether to include these changes in this amendment or develop a follow-up action.

4.4.2 Impacts of Sector Transfer Alternatives

The impacts of transfers depend on the frequency of transfer, the amount transferred in each year, the direction of transfer between sectors, and to what extent each sector has been or is expected to achieve their limits. The impacts of a transfer are also dependent on the marginal economic value of additional allowable landings for each sector (in terms of commercial and for-hire revenues and revenues for associated commercial and recreational businesses), as well as the positive or negative impacts on angler satisfaction that may arise from modifying or maintaining recreational measures. As described below, many additional factors can influence how the commercial and recreational fisheries may be impacted by a transfer, including market conditions, overall availability of the species, availability of substitute species, and trends in effort driven by external factors.

Commercial to Recreational Transfers

If the recreational fishery receives a transfer, they will experience positive socioeconomic impacts due to outcomes such as the potential for liberalized measures, the ability to maintain measures when a reduction may otherwise be needed, and a reduced risk of an RHL or ACL overage that may impose negative consequences in a future year. These outcomes are likely to result in maintained or increased revenues for recreational businesses as well as improved or maintained levels of angler satisfaction, compared to if no commercial to recreational transfer occurred.

In this scenario, the commercial sector would give up quota that is not expected to be fully utilized. In theory, if the decision to transfer is based on a pattern of underutilization in the commercial sector, the economic impacts to the commercial sector from such a transfer would be neutral. However, the commercial sector could experience a loss in revenue if the potential for underutilization is incorrectly evaluated. This could be due to a disconnect in the data used to evaluate the transfer and conditions in the relevant fishing year, possibly driven by changes in market conditions or fishery participation and effort.

Impacts to the commercial fisheries are not likely to be felt equally across states given different commercial quota management systems and differing quota utilizations by state. While coastwide commercial landings can frequently fall short of the total commercial quota, individual states vary considerably in utilizing or underutilizing their individual quotas. A coastwide projected underutilization could occur even if one or more states would be expected to fully utilize their quota in the upcoming year. This could have negative economic impacts to the commercial industries in states that regularly achieve their quotas.

Recreational to Commercial Transfers

If the commercial fishery receives a transfer, they will experience positive social and economic impacts in the year of the transfer due to increased revenue earning potential associated with higher potential landings. In general, quota increases tend to result in higher revenues, although some of these benefits may be partially offset by decreases in price per pound that can be associated with higher quotas. All else held constant, transfers from the recreational to commercial sector would lead to positive impacts for the commercial sector.

In theory, if the decision to transfer is based on a pattern of underutilization by the recreational sector, negative socioeconomic impacts to the recreational sector from such a transfer may not be realized. However, this would limit the potential for liberalizing recreational management measures. Since recreational harvest is more difficult to predict and control than commercial harvest, recreational management measures are frequently adjusted in order to strike an appropriate balance between conservation and angler satisfaction.

Impacts of Transfers in Either Direction

The impacts of transfers should be considered in combination with the short-term and long-term impacts associated with commercial/recreational allocation modifications under alternative set 2. However, it is difficult to do so quantitatively given the uncertainties about allocation changes as well as the uncertainties in the frequency, amount, and direction of potential transfers. In general, any annual transfers away from a sector can compound the negative impacts experienced due to a reduction in that sector's total allocation, or in the short term could partially offset the positive impacts of an increase in allocation. Annual transfers to a sector can simultaneously create additional positive impacts on top of the positive impacts of reallocation from the perspective of the receiving sector, and also exacerbate negative impacts of a loss in allocation for the donating sector.

The impacts of transfers would also be influenced by annual reductions or increases in the overall ABC based on changes in projected stock biomass and the application of the Council's risk policy. The recipient of a transfer could have some negative socioeconomic impacts from ABC reductions mitigated by receiving a transfer, while the transferring sector may experience exacerbated negative economic impacts from ABC reductions. Conversely, if the ABC were increasing, this could offset negative impacts to the transferring sector and provide additional benefits to the sector receiving the transfer.

The impacts of transfers can also be impacted by the availability and management of substitute species for a particular sector. High availability and access to recreational or commercial substitute species would help mitigate negative impacts of a transfer away from a given sector, while lower availability and access would compound these negative effects.

Social Impacts

Under alternative 5a-1, the status quo would remain, and no action would be taken to allow for bi-directional sector quota transfers. This might result in neutral to low-negative social impacts. Some stakeholders may desire and could benefit from the flexibility to transfer unused quota across sectors in both directions whenever the need or oversupply might arise.

Under alternative 5a-2, bi-directional transfers of quota across sectors would be permissible. This alternative is anticipated to have low positive social impacts relative to the no action alternative. Allowing for bi-directional transfers across sectors might improve flexibility for stakeholders throughout the fluid and changing quota needs of various stakeholders across user groups, sectors, and state lines. This may be especially helpful for some stakeholders in light of new rebuilding plans and allocation changes, which might have disparate impacts on

stakeholders depending upon their initial positions and access to the resource prior to the change in allocations and implementation of a rebuilding plan.

Economic Impacts

The economic impacts of 5a-1 (status quo, recreational to commercial sector transfers, only) are expected to continue to be more or less neutral for the recreational sector and positive for the commercial sector. The commercial sector has historically utilized a portion of the additional transferred quota by increasing landings above the initial pre-transfer commercial allocation. The additional quota transferred from the recreational sector to the commercial sector may also contribute to increases in job opportunities and/or higher paying trips for crew members along with increases in revenues. A bi-directional transfer, suggested by alternative 5a-2, would only provide positive economic impacts to the recreational sector if a future quota transfer were large enough to allow for a liberalization of recreational measures. In the absence of an increase in the bag limit resulting from a higher post-transfer RHL, the recreational sector is likely to experience negligible economic impacts. Within the commercial sector, there is a slight negative economic impact associated with a bi-directional transfer which could result from miscalculations in projected commercial landings which could limit the quantity landed by the commercial sector.

4.4.3 Transfer Cap Alternatives

The no action/status quo transfer cap alternative 5b-1 keeps the existing commercial sector transfer cap in place. If the pre-transfer commercial share of the ACL is less than 10.5 million and the Council and Board determines the need for a transfer from the recreational sector to the commercial sector, the commercial quota may be allocated up to 10.5 million lb as its quota. If the Council and Board selects alternative 5b-1 along with alternative 5a-2, which allows for bi-directional transfers, no transfer cap would be implemented for the recreational sector. Specifically, if the Council and Board determines the need for a transfer from the commercial sector to the recreational sector, the transfer amount and the RHL would not be subject to any cap.

Under alternative 5b-2, any transfer from one sector to the other would be capped at 10% of the ABC (Table 34). This approach allows quota transfers to scale with biomass. The size of the transfer cap will increase and decrease with changes in the acceptable biological catch that are associated with changes in the stock size. Unlike 5b-1, transfers could still occur even when the commercial quota is above 10.5 million pounds.

Table 34: Proposed transfer caps for sector-based transfers.

Alternatives	Transfer Cap
5b-1	No Action/Status Quo
5b-2	Up to 10% of the ABC

4.4.4 Impacts of Transfer Cap Alternatives

Alternative 5b-1 10.5 million lb cap was set through Amendment 1 and was based on the average commercial landings for the period 1990-1997. The existing transfer cap was

specifically designed for one-way transfers, and as such, selecting bi-directional transfers with no action on the transfer cap does not cap transfers from the commercial sector to the recreational sector. However, due to the smaller commercial allocation it is highly unlikely that the commercial sector would ever transfer more than 10.5 million lb to the recreational sector, meaning a 10.5 million lb cap on commercial to recreational transfers would not be restrictive anyway.

Alternative 5b-2 would implement a maximum transfer cap of up to 10% of the ABC. Considering a recent time series of ABCs (
Table **35**), 10% of the average of ABCs from 2000-2019 would result in a sector transfer of 2.97 M lbs. This estimate is smaller than the average transfer over the same time period (4.30 M lb). However, since alternative 5b-2 is a percentage of the total ABC, future transfer amounts would scale with biomass as bluefish continues through the rebuilding plan. By comparison, the status quo alternative will result in no transfers if the commercial quota exceeds 10.5 M lb.

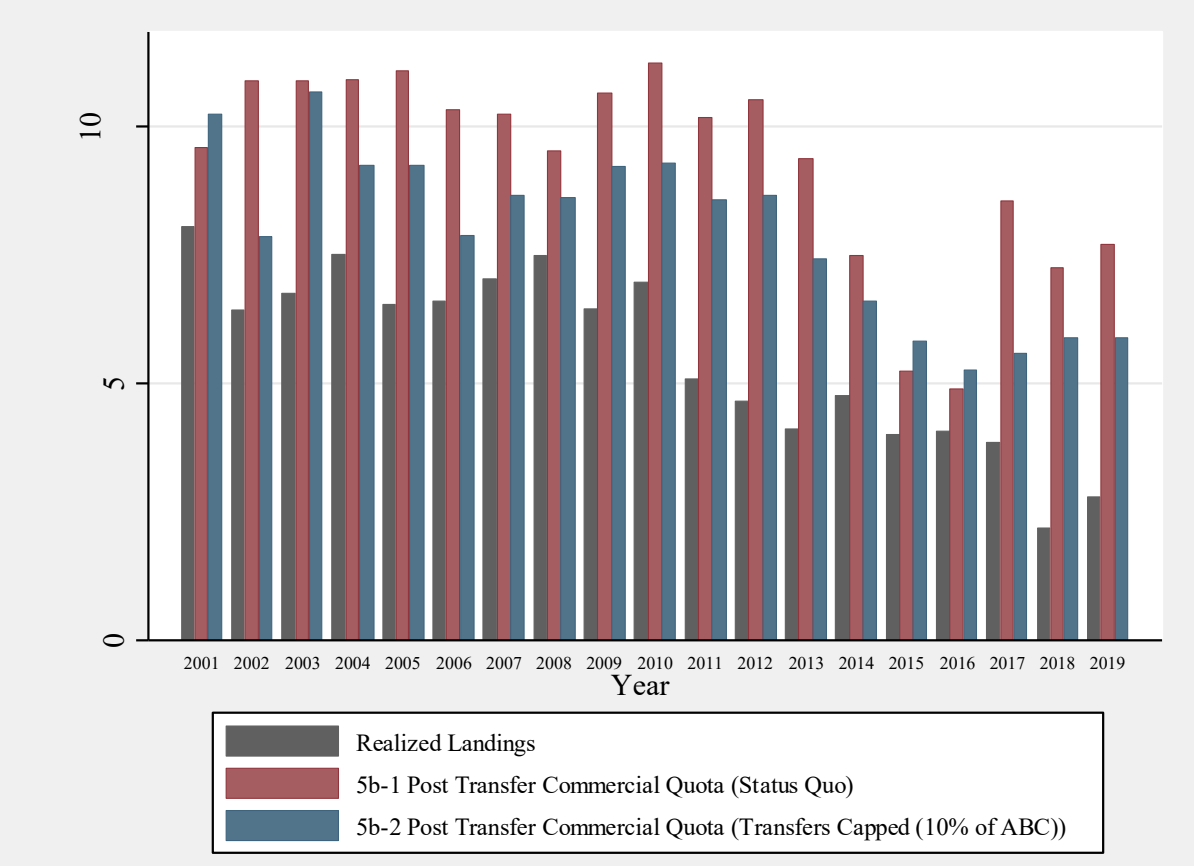
Table 35: Recreational to commercial sector transfer amounts, ABCs in million lb, and estimates of retroactive 10% transfer caps from 2000-2019.

Year	Sector Transfer Amount	ABC	10% Transfer Cap
2000	0	36.840	3.684
2001	3.150	37.840	3.784
2002	5.933	29.100	2.910
2003	4.161	39.500	3.950
2004	5.085	34.215	3.422
2005	5.254	34.215	3.422
2006	5.367	29.150	2.915
2007	4.780	32.033	3.203
2008	4.088	31.887	3.189
2009	4.838	34.081	3.408
2010	5.387	34.376	3.438
2011	4.772	31.744	3.174
2012	5.052	32.044	3.204
2013	4.686	27.472	2.747
2014	3.340	24.432	2.443
2015	1.579	21.544	2.154
2016	1.577	19.456	1.946
2017	5.033	20.642	2.064
2018	3.535	21.815	2.182
2019	4.000	21.82 0	2.182

Economic Impacts

The economic impact of sector transfer caps on the commercial bluefish sector are investigated by comparing realized landings data to predicted landings under a 10% ABC cap transfer

scenario over 2001-2019.[15] Revenues are also estimated under these two scenarios. Ex-vessel bluefish prices are estimated using the price model and methods described in Appendix B. Revenues are estimated as opposed to incorporating realized revenues in order to establish an equal comparison between the status quo transfer cap alternative (5b-1) and the 10% ABC transfer cap alternative (5b-2) and their economic implications. Quotas under alternative 5b-2 are estimated using the historic ABC's for each year and for each of the sector allocation sub-alternatives presented in *Section 4.1.1* (i.e., 2a-1 to 2a-5). Then 10% of the ABC is added to the pre-transfer quantities to produce the post-transfer values. Similar to previous economic analyses, it is assumed that all allocated quota is landed when comparing the projected commercial quotas under alternative 5b-2 to the realized landings. It should be noted that in every year in the time series, realized landings have been less than the full allocation generated under the 5b-2 scenario (Figure 25). If the proposed transfer cap had been implemented over the time series, and all else was held constant, landings would not have been restricted by the transfer cap. Further, in some years (2001, 2015, and 2016) the realized post-transfer quantities are less than the 5b-2 scenario[16] such that a transfer cap equal to 10% of the ABC would not have impacted landings in these years even if the full historic post transfer landings had been fully utilized.



[15] Sector transfers occurred on an annual basis from 2001-2019.
[16] The realized sector transfer was less than 10% of the ABC.

Figure 25: Realized bluefish landings, historical post-transfer commercial bluefish quotas under the status quo alternative 5b-1, and post-transfer commercial bluefish quota with a transfer cap of 10% of the ABC (5b-2) applied over 2001 to 2019.

There are only a handful of years where predicted landings under the 5b-2 transfer scenario are less than realized landings when investigated across the proposed commercial allocations described in *Section 4.1.1* (Figure 26). Specifically, there are only six years where predicted landings are less than realized landings, all occurring under the 2a-2 (11% commercial allocation) alternative.

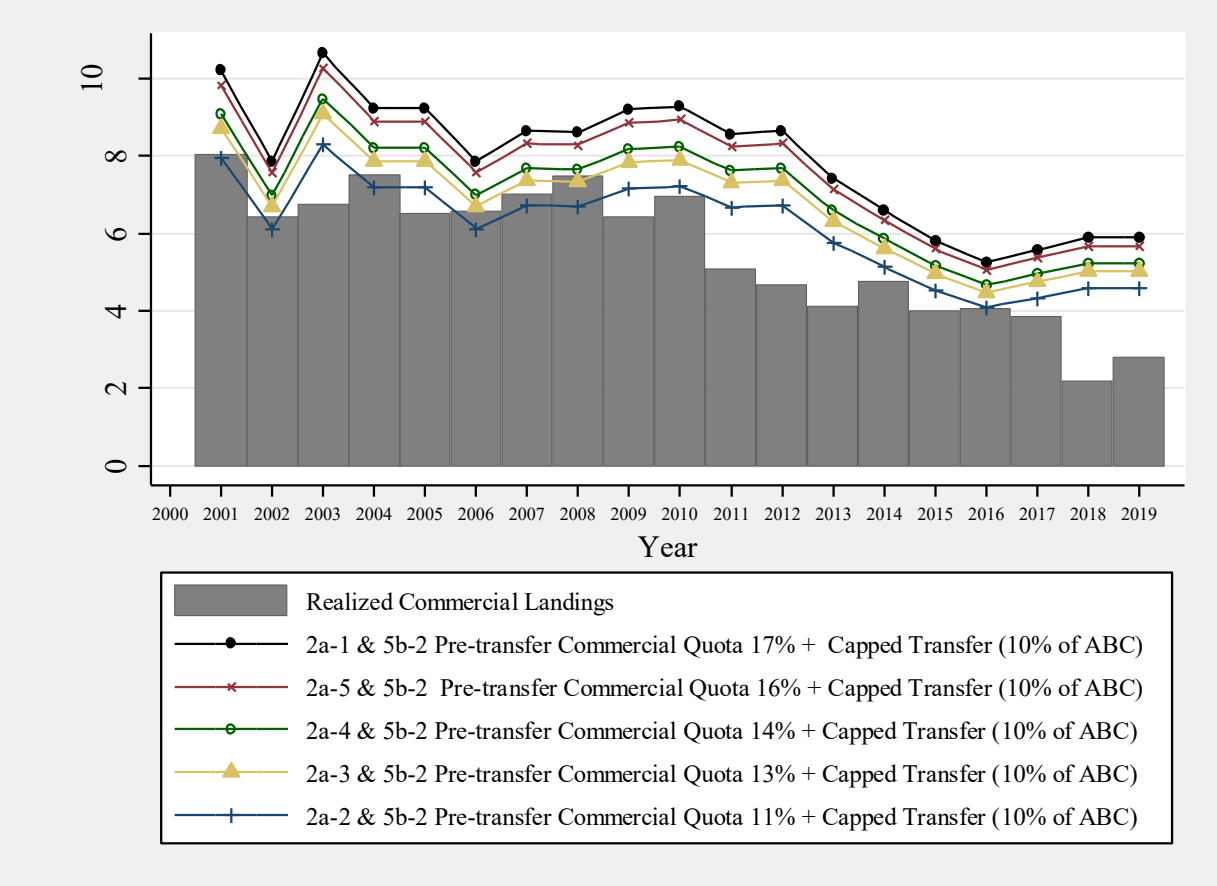


Figure 26: Realized commercial bluefish landings and predicted commercial landings under the 10% ABC cap transfer scenario across proposed commercial allocation alternatives from 2001-2019.

Despite the few instances where realized landings are less than landings predicted under the 5b-2 scenario, estimated revenues are higher under all 5b-2 landings scenarios relative to revenues estimated under the realized landings scenario (Figure 27). This result is driven by the inverse relationship between ex-vessel price and landings (described further in Appendix B). However, higher revenues under the 5b-2 transfer scenario are heavily reliant on the price

model which only describes about 68% of the variability in annual prices and is informed by a limited sample size.

In summary, realized commercial bluefish landings are almost always less than the possible landings under the 5b-2 transfer scenario. In the six cases where realized landings *do* exceed landings from the capped transfer scenarios, the differences in revenue are marginal. Overall, there are few cases where bluefish landings/revenues are expected to be impacted by the implementation of a sector transfer cap of 10% of the ABC.

The economic impacts of implementing a 10% cap on sector transfers on the recreational sector of the bluefish fishery are expected to be negligible. Although, these caps would limit the transfer quantities from the commercial sector to the recreational sector, recreational harvest, effort, and expenditures are not expected to be impacted by this sub-alternative unless a sector transfer resulted in the need to adjust recreational measures. In reverse, transfers from the recreational to the commercial sector only occur when the recreational sector is predicted to harvest quantities below the recreational RHL, such that the existence of a transfer cap should not impact recreational harvest, effort, or expenditures.

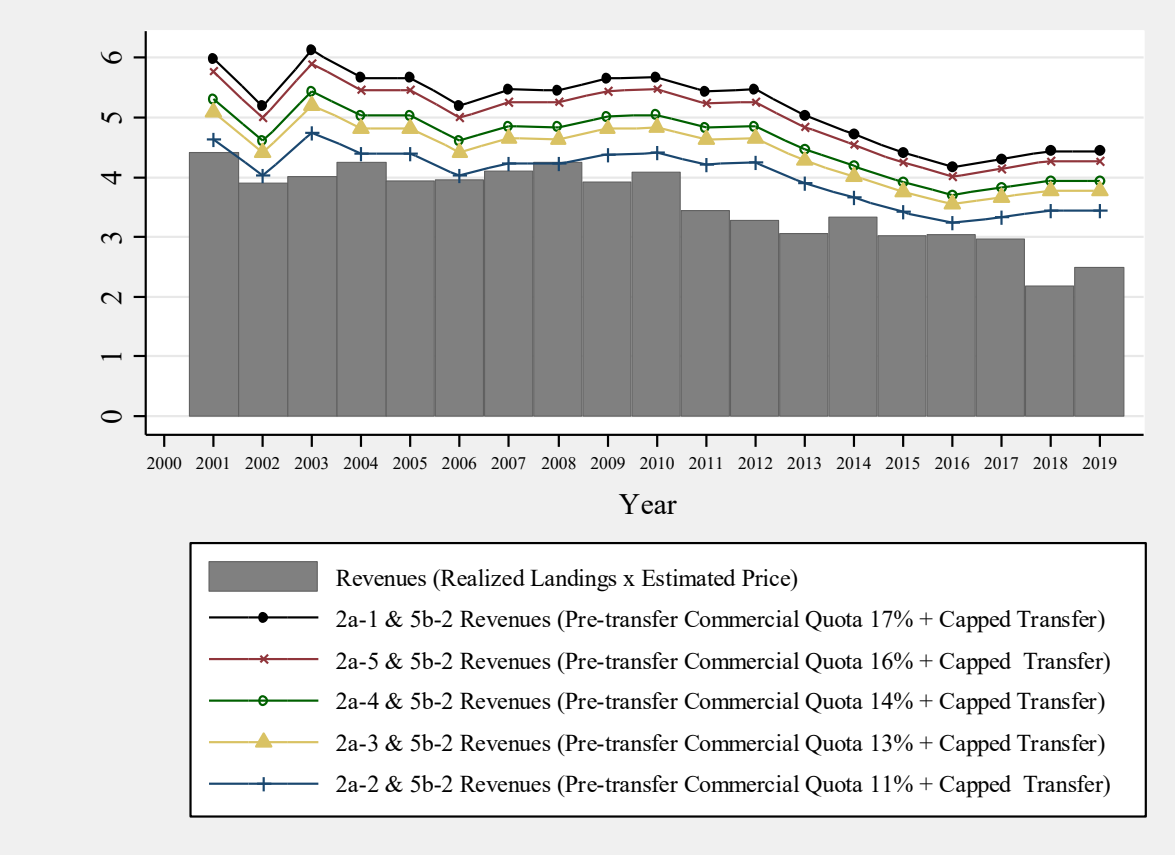


Figure 27: Estimated commercial bluefish revenues (realized landings multiplied by estimated ex-vessel bluefish price) and estimated commercial revenues under the 10% ABC cap sector transfer scenarios across proposed sector allocation alternatives from 2001-2019.

4.5 MANAGEMENT UNCERTAINTY ALTERNATIVES AND IMPACTS

4.5.1 Management Uncertainty Alternatives

This alternative set is included to modify how the Monitoring Committee accounts for management uncertainty (
Table **36**). In the current FMP, the fishery-level ACL may be reduced by a buffer to account for sources of management uncertainty. The ACL minus the management uncertainty buffer equals the ACT as displayed in the bluefish flowchart (Figure 28). The Monitoring Committee annually identifies and reviews the relevant sources of management uncertainty to recommend ACTs for the commercial and recreational fishing sectors as part of the bluefish specification process. The status quo option (alternative 6a) would maintain the bluefish flowchart as displayed in Figure 28, which demonstrates that any uncertainty buffer applied to the fishery-level ACL applies to both sector specific ACTs equally. Alternative 6b would provide greater flexibility by establishing ACLs and ACTs for each sector as displayed in the bluefish flow chart in Figure 29. Specifically, the proposed flowchart allows for management uncertainty to be accounted for within each sector. This targeted approach would allow for the identification of sources of management uncertainty that are specific to one sector and are not present in the other.

Table 36: Proposed management uncertainty alternatives.

Alternatives	Management Uncertainty Alternatives
6a	No Action/Status Quo
6b	Post-Sector Split

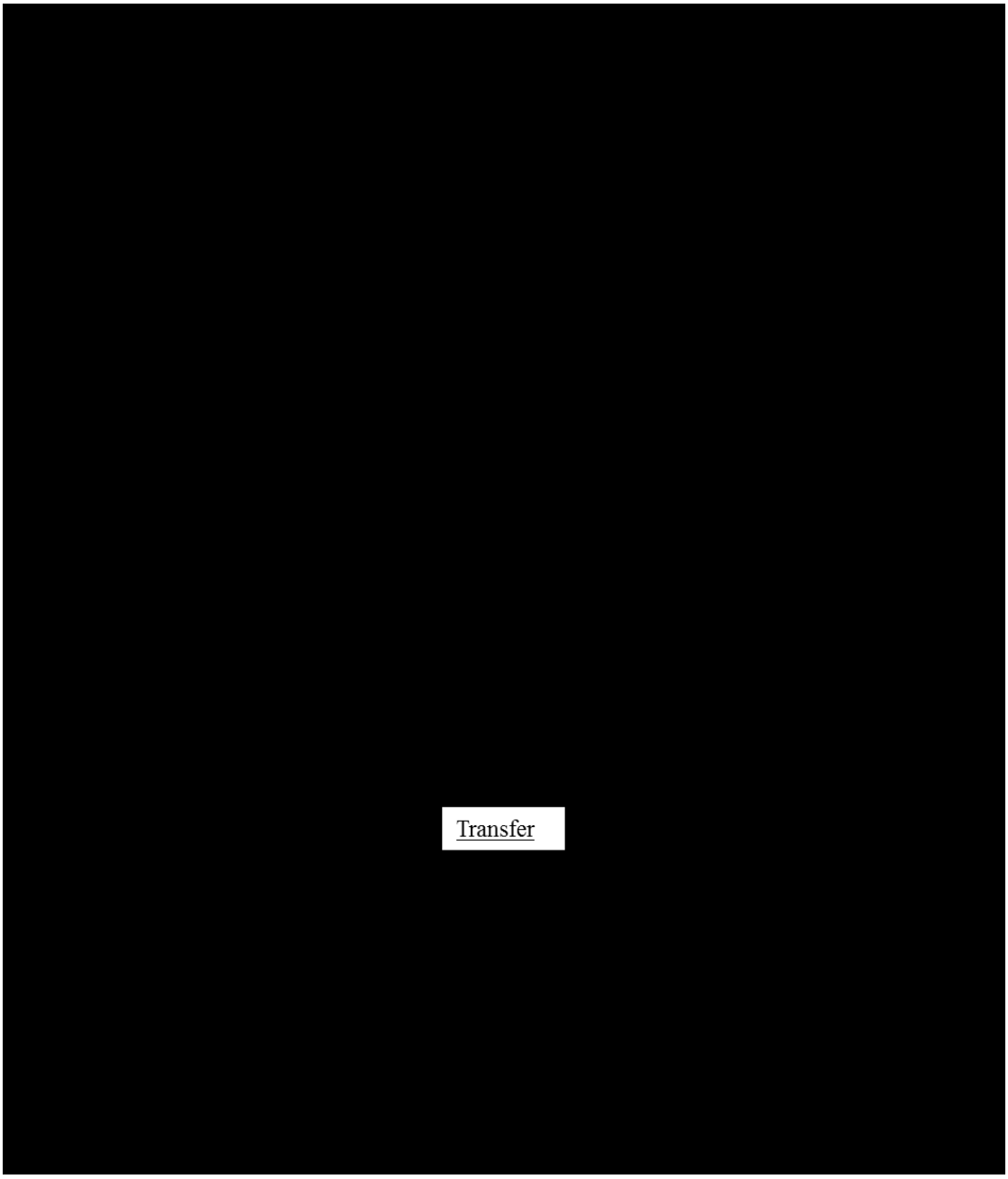


Figure 28: Current bluefish flow chart representing a reduction for management uncertainty prior to the sector split.

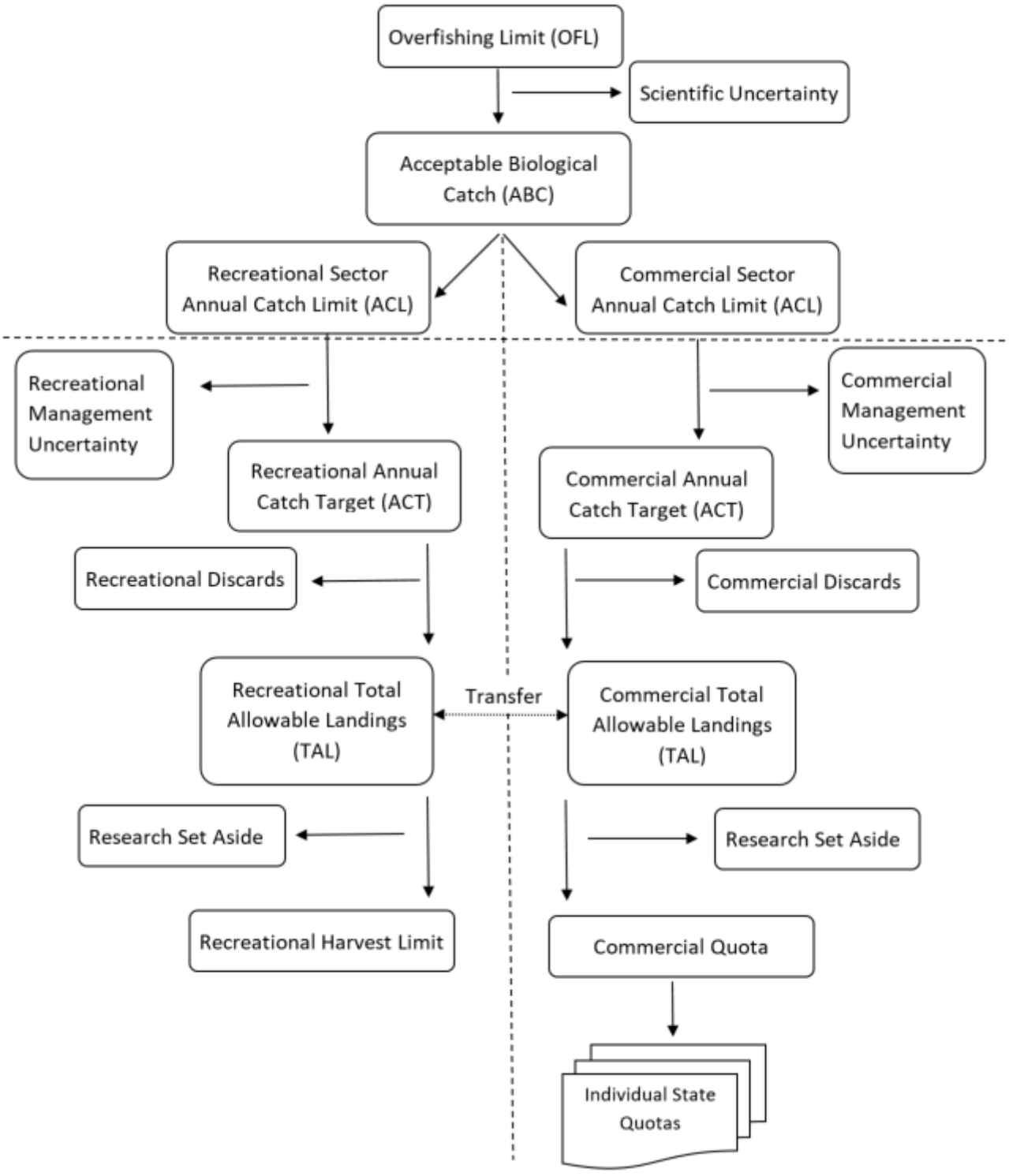


Figure 29: Proposed bluefish flow chart including sector specific management uncertainty.

4.5.2 Impacts of Management Uncertainty Alternatives

Identifying sources of management uncertainty and applying a buffer to reduce the probability of exceeding an ACL is a helpful tool in the management toolkit. However, the status quo

alternative (6a) is lacking in its inability to specifically target sources of uncertainty that are present in one sector and not the other. In the current FMP, the management uncertainty buffer is applied to the fishery-level ACL prior to the sector split and as such has the unintended consequence of reducing both sector's ACLs regardless of the source of management uncertainty. Alternative 6b allows for a more targeted approach, where management uncertainty can be addressed by reducing one sector's ACL to the ACT while leaving the other sector unaffected.

The following example is used for demonstrative purposes only. Under alternative 6a, if the Council and Board are concerned about the lack of data on commercial discards and believe this to be a source of management uncertainty, the fishery-level ACL may be reduced by an agreed upon buffer. According to the flowchart in Figure 28, this reduction trickles down to both the commercial and recreational sectors' ACTs. This negatively impacts the recreational sector's catch and landings limits despite the fact that the source of the management uncertainty was the commercial sector. To avoid these cascading effects, the Council and Board could decide to not implement management uncertainty despite the associated greater potential risk of exceeding the ABC. Using this same example under alternative 6b, the Council and Board has the ability to reduce the commercial sector's ACT through the application of a management uncertainty buffer to the commercial sector ACL. This would leave the recreational sector's ACL unaffected and would not negatively impact the recreational sector's catch or landings limits.

Without the ability to apply sector specific management uncertainty buffers, Council and Board members are faced with the difficult decision of applying management uncertainty to both sectors indiscriminately, or not applying management uncertainty at all and risking potential overages in the fishery-level ACL or ABC.

Ultimately, alternative 6b might have neutral to low positive impacts for resource user groups. If management uncertainty disproportionately affects one sector over another, keeping the process in its current order could continue to frustrate and constrain some stakeholders who might otherwise benefit from determining uncertainties after dividing out sector catch targets. Furthermore, alternative 6b is expected to have minimal to no economic impacts on the commercial and recreational bluefish sectors.

The adoption of alternative 6b would require adjustments to the AMs as currently written. The evaluation of catch overages would transition from the fishery-level ACL to sector specific ACLs. The adoption of sector specific ACLs also has implications for the transfer process. For the purpose of maintaining accurate accounting and accountability of the ACL, both sector's ACLs would be adjusted to reflect the transfer at the landings limit level. If alternative 6b is selected by the Council and Board, the AM regulations would be updated through the federal rule making process for this amendment.

4.6 *DE MINIMIS* PROVISION ALTERNATIVES AND IMPACTS

Under the Commission's current FMP, states which land less than 0.1% of the coastwide commercial landings in the year prior are exempt from fishery independent monitoring requirements for the following year. However, the federal plan does not require states to submit fishery independent monitoring reports, and as such has no *de minimis* provision.

4.6.1 *De Minimis* Provision Alternatives

The *de minimis* alternative set is presented in Table 37. Under the no action/status quo alternative 7a, *de minimis* status would remain excluded from the Federal Bluefish Amendment and maintain the status quo *de minimis* provision in the Commission Amendment.

Alternatives 7b, 7c, 7d, and 7e all expand upon the Commission's current *de minimis* provision, and the existing exemption of the requirement to conduct fishery independent monitoring remains. A state's three-year average of combined recreational and commercial landings compared against coastwide landings for the same period with a 1% threshold would be used to determine status for alternatives 7b, 7c, 7d, and 7e. The key distinction between the four alternatives is the different recreational management measures that *de minimis* states may adopt. Under all alternatives a *de minimis* state has the option to implement the coastwide measures if the state is only requesting *de minimis* status for the purposes of the fishery independent monitoring exemption.

Under alternative 7b, a *de minimis* determination would exempt the state from recreational measures. Since *de minimis* states would be exempt from coastwide recreational measures in state waters, there is potential for recreational effort to shift to *de minimis* states and for landings to become substantial before adequate action can be taken. To mitigate this, *de minimis* states are encouraged to implement recreational bag limits which would deter shifts in effort to their state.

Under alternative 7c, a *de minimis* determination would exempt the state from the coastwide measures. However, a *de minimis* state would still be required to implement recreational management measures of its choosing, which would deter shifts in effort from other states. *De minimis* states would be required to design measures that maintain harvest at levels below the 1% coastwide harvest threshold.

Under alternative 7d, a *de minimis* determination would allow a state to maintain the measures that were in place when the state first requested and qualified for *de minimis* status. The intent of this alternative would be to maintain low levels of harvest with consistent regulations. Please note that the base year of reference would be measures implemented in 2019, which was prior to the most recent change in coastwide measures. For example, Georgia has requested and qualified for *de minimis* status for the years 2019-2021. Upon implementation of this Amendment in 2022, Georgia would be allowed to adopt recreational measures consistent with those in place during the 2019 fishing year, assuming Georgia maintains its *de minimis* status for the 2022 fishing year. North Carolina on the other hand, has not qualified for *de minimis*

status for any of the years 2019-2021. If North Carolina requested and qualified for *de minimis* status in 2022, North Carolina would be able to implement recreational measures consistent with what were in place for 2021.

Under alternative 7e, a *de minimis* determination would allow a state to maintain a set of minimum default recreational measures. At the October 2020 meeting, the Board and Council agreed that the fixed set of minimum default measures would consist of a bag limit of 3 fish for anglers fishing from shore or private vessels and 5 fish for anglers fishing on a for-hire trip, no minimum size, and an open season all year. These measures are consistent with the coastwide measures that were implemented in 2020.

Table 37: Proposed *de minimis* provision alternatives.

Alternatives	*De Minimis* Alternatives
7a	No Action/Status Quo
7b	Recreational *De Minimis* – no management measures
7c	Recreational *De Minimis* – state-selected management measures
7d	Recreational *De Minimis* – rollover management measures
7e	Recreational *De Minimis* – 2020 management measures

4.6.2 Impacts of *De Minimis* Provision Alternatives

Alternative 7a is anticipated to have neutral social impacts to the majority of stakeholders to the bluefish resource across user groups and sectors. Taking no action on the *de minimis* provision is expected to have low negative social impacts to recreational anglers that fish within state waters of *de minimis* states. These anglers would be subject to the coastwide recreational measures, which as of winter 2021 consist of a 3-fish bag limit for private anglers and a 5-fish bag limit for for-hire party and charter vessels. During the scoping process, the Georgia Department of Natural Resources provided a written request to alter the *de minimis* provision to allow for an exemption of restrictive recreational measures. GA, along with SC and ME have historically qualified for *de minimis* status. In the short term, alternatives 7b, 7c, and 7d would likely provide more liberalized recreational measures for anglers operating within these states' waters as well as any states that meet the requirements of *de minimis* status in the future.

Alternatives 7b, 7c, 7d and 7e complicate coastwide management of bluefish from an enforcement perspective. Anglers will need to be cognizant of the differing regulations between state and federal waters, as well as differing regulations when crossing state lines from a non *de minimis* state to a *de minimis* state. However, these concerns are already at play when states implement recreational measures within state lines under the Commission's conservation equivalency policy that differ from the coastwide measures. Alternatives 7b, 7c, and 7d would allow for a greater variety of state measures compared to alternative 7e, which would maintain just one default set of *de minimis* measures.

From a catch accounting perspective, the proposed *de minimis* provision in alternatives 7b, 7c, and 7d would reduce a state's accountability for its recreational harvest in the short term.

Currently, the plan ensures that all states are held accountable by annually evaluating the need to adjust recreational measures to insure coastwide recreational catch does not exceed the RHL. A state that meets the *de minimis* criteria would not be held accountable in the same way, which raises questions about fairness and equity across state user groups. However, if a *de minimis* states' recreational landings increase significantly due to an unforeseen increase in angler effort, the state may exceed the 1% coastwide landings threshold and no longer be afforded *de minimis* status in the coming year. As such, that state will be held accountable and be required to implement recreational measures through the standard specifications process. Thus, *de minimis* states are incentivized under each of the proposed alternatives to implement measures that would prevent large increases in recreational landings. By comparison to incentivizing restrictive measures, alternative 7e requires more restrictive measures, which has a greater likelihood of constraining *de minimis* states to low levels of catch, but restricts flexibility.

Ultimately, the *de minimis* alternatives 7b, 7c, and 7d would result in minor economic benefits for states that meet the *de minimis* criteria. Currently, there is an opportunity cost associated with abiding to the coastwide bluefish recreational regulations, such that relieving a state from adhering to these regulations would give a slight economic advantage to these low-landing states. Alternatives 7b, 7c, and 7d also have the potential to relieve *de minimis* states of the administrative burden of implementing new and changing recreational measures.

4.7 ALTERNATIVE STATE MANAGEMENT REGIMES

4.7.1 General Procedures

A state may submit a proposal for a change to its regulatory program or any mandatory compliance measure under this Amendment to the Commission. Such changes shall be submitted to the Chair of the Plan Review Team (PRT), who shall distribute the proposal to appropriate groups, including the Board, the PRT, the TC, and the AP.

The PRT is responsible for gathering the comments of the TC and the AP. The PRT is also responsible for presenting these comments to the Board for decision.

The Board will decide whether to approve the state proposal for an alternative management program if it determines that it is consistent with the target fishing mortality rate applicable as well as the goals and objectives of this Amendment.

In order to maintain consistency within a fishing season, new rules should be implemented prior to the start of the fishing season. Given the time needed for the TC, AP, and Board to review the proposed regulations, as well as the time required by an individual state to promulgate new regulations, it may not be possible to implement new regulations for the on-going fishing season. In this case, new regulations should be effective at the start of the following season after a determination to do so has been made.

4.7.2 Management Program Equivalency

The Technical Committee, under the direction of the PRT, will review any alternative state proposals under this section and provide its evaluation of the adequacy of such proposals to the Board via the PRT. The PRT can also ask for reviews by the Law Enforcement Committee (LEC) or the AP.

4.7.3 De minimis Fishery Guidelines

The Commission's Interstate Fisheries Management Program Charter defines *de minimis* as a situation in which, under existing conditions of the stock and scope of the fishery, conservation and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by an FMP or amendment. Commission FMPs commonly include *de minimis* provisions to relieve regulatory and monitoring burdens for states that meet predetermined conditions and follow a defined request process. Revisions to the bluefish FMP's de minimis provision are under consideration in *Section 4.6.*

4.8 ADAPTIVE MANAGEMENT

The Board may vary the requirements specified in this Amendment as a part of adaptive management in order to conserve the bluefish resource. The elements that can be modified by adaptive management are listed in *Section 4.8.2*. The process under which adaptive management can occur is provided below.

4.8.1 General Procedures

The PRT will monitor the status of the fishery and the resource and report on that status to the Board annually or when directed to do so by the Board. The PRT will consult with TC, the SASC, and the AP in making such review and report, if necessary.

The Board will review the report of the PRT, and may consult further with the TC, or AP. The Board may, based on the PRT report or on its own discretion, direct the plan development team (PDT) to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement the new provisions.

The PDT will prepare a draft addendum as directed by the Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The PDT will also request comment from federal agencies and the public at large. After at least a 30-day review period, staff, in consultation with the PDT, will summarize the comments received and prepare a final version of the addendum for the Board.

The Board shall review the final version of the addendum prepared by the PDT, and shall also consider the public comments received and the recommendations of the TC, LEC, and AP. The Board shall then decide whether to adopt, or revise and then adopt, the addendum.

Upon adoption of an addendum by the Board, states shall prepare plans to carry out the addendum, and submit them to the Board for approval according to the schedule contained in the addendum.

4.8.2 Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the Board:

1. Minimum fish size
2. Maximum fish size
3. Gear restrictions
4. Gear requirements or prohibitions
5. Permitting restrictions
6. Recreational possession limit
7. Recreational seasons
8. Closed areas
9. Commercial seasons
10. Commercial trip limits
11. Commercial quota system including commercial quota allocation procedure and possible quota set asides to mitigate bycatch
12. Recreational harvest limit
13. Annual specification quota setting process
14. FMP Technical Monitoring Committee composition and process
15. Description and identification of essential fish habitat (EFH) and fishing gear management measures that impact EFH
16. Description and identification of habitat areas of particular concern
17. Overfishing definition and related thresholds and targets
18. Regional gear restrictions
19. Regional season restrictions (including option to split seasons)
20. Restrictions on vessel size (LOA and GRT) or shaft horsepower
21. Operator permits
22. Any other commercial or recreational management measure
23. Any other management measures currently included in the FMP
24. Set aside quotas for scientific research

4.9 EMERGENCY PROCEDURES

Emergency procedures may be used by the Board to require any emergency action that is not covered by, is an exception to, or a change to any provision in this Amendment. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2019).

4.10 MANAGEMENT INSTITUTIONS

4.10.1 Atlantic States Marine Fisheries Commission and ISFMP Policy Board

The Commission and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's Fisheries management activities. The Commission must

approve all fishery management plans and amendments, including this Amendment. The ISFMP Policy Board reviews any non-compliance recommendations of the various Boards and, if it concurs, forwards them to the Commission for action.

4.10.2 Bluefish Management Board

The Board was established under the provisions of the Commission's ISFMP Charter (Section Four; ASMFC 2019) and is generally responsible for carrying out all activities under this Amendment.

The Board establishes and oversees the activities of the Plan Development Team, Plan Review Team, Technical Committee, and the Advisory Panel. In addition, the Board makes changes to the management program under adaptive management, reviews state programs implementing the amendment, and approves alternative state programs through conservation equivalency. The Board reviews the status of state compliance with the management program annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP Policy Board under the terms of the ISFMP Charter.

4.10.3. Bluefish Allocation and Rebuilding Amendment Fishery Management Action Team and Plan Development Team

The Fishery Management Action Team (FMAT) and the Plan Development Team (PDT) is composed of personnel from state and federal agencies who have scientific knowledge of bluefish and management abilities. The FMAT/PDT is responsible for preparing and developing management documents, including amendments, using the best scientific information available and the most current stock assessment information. FMAT and PDT membership and purpose are identical, the key distinction is the FMAT is convened in accordance with MAFMC guidelines and the PDT is convened in accordance with the Interstate Fisheries Management Program Charter. For ease of reading, the PDT/FMAT is simply referred to as FMAT throughout this Amendment. The ASMFC FMP Coordinators are members of the FMAT/PDT. The FMAT/PDT will either disband or assume inactive status upon completion of this Amendment.

4.10.4 Bluefish Commercial/Recreational Allocation Amendment Plan Review Team

The Plan Review Team (PRT) is composed of personnel from state and federal agencies who have scientific and management ability and knowledge of bluefish. The PRT is responsible for providing annual advice concerning the implementation, review, monitoring, and enforcement of this Amendment once it has been adopted by the Commission. After final action on the amendment, the Board may elect to retain members of the PDT as members of the PRT, or appoint new members.

4.10.5 Bluefish Technical Committee

The Bluefish Technical Committee consists of representatives from state or federal agencies, Regional Fishery Management Councils, the Commission, a university, or other specialized personnel with scientific and technical expertise, and knowledge of the bluefish fisheries. The Board appoints the members of the TC and may authorize additional seats as it sees fit. The role of the TC is to assess the species' population, provide scientific advice concerning the

implications of proposed or potential management alternatives, and respond to other scientific questions from the Board, PDT, or PRT.

4.10.6 Bluefish Advisory Panel

The Bluefish Advisory Panel (AP) is established according to the Commission's Advisory Committee Charter. Members of the AP are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about bluefish conservation and management. The AP provides the Board with advice directly concerning the Commission's bluefish management program.

4.10.7 Federal Agencies

4.10.7.1 Management in the Exclusive Economic Zone

Management of bluefish in the EEZ is within the jurisdiction of one Regional Fishery Management Council (the Mid-Atlantic Fishery Management Council) under the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). The Council annually makes recommendations on catch and landings limits as well as gear modifications to the NOAA Fisheries through the specification process.

4.10.7.2 Federal Agency Participation in the Management Process

The Commission has accorded USFWS and NOAA Fisheries voting status on the ISFMP Policy Board and the Bluefish Management Board in accordance with the Commission's ISFMP Charter. NOAA Fisheries can also participate on the Bluefish FMAT, PRT, and TC.

4.10.7.3 Consultation with Fishery Management Councils

At the time of adoption of this Amendment, the Mid-Atlantic Fishery Management Council is the only Regional Fishery Management Council to have implemented a management plan for bluefish; no other Councils have indicated an intent to develop a plan.

4.11 RECOMMENDATIONS TO THE SECRETARY OF COMMERCE FOR COMPLEMENTARY ACTIONS IN FEDERAL JURISDICTIONS

The Bluefish FMP is jointly managed between the Commission, Council, and NOAA Fisheries. The proposed alternatives in this Amendment will affect both state and federal permit holders operating in the commercial and recreational bluefish fisheries in both state and federal waters. The Atlantic states (through the Commission), the Council, and NOAA Fisheries through joint management coordinate to ensure consistency in management between state and federal waters. Therefore, a specific recommendation to the Secretary of Commerce for complementary action in federal jurisdictions is unnecessary at this time. The Board may consider further recommendations to the Secretary if changes to this Amendment occur through the adaptive management process (*Section 4.8*).

4.12 COOPERATION WITH OTHER MANAGEMENT INSTITUTIONS

The Board will cooperate, when necessary, with other management institutions during the implementation of this Amendment, including NOAA Fisheries and the New England, Mid-Atlantic, and South Atlantic Fishery Management Council.

5.0 COMPLIANCE

The full implementation of the provisions included in this Amendment is necessary for the management program to be equitable, efficient, and effective. States are expected to implement these measures faithfully under state laws. The Commission will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan.

The Board sets forth specific elements that the Commission will consider in determining state compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fishery Management Program Charter (ASMFC 2019).

5.1 MANDATORY COMPLIANCE ELEMENTS FOR STATES

A state will be determined to be out of compliance with the provision of this fishery management plan according to the terms of Section Seven of the ISFMP Charter if:

- Its regulatory and management programs to implement this Amendment have not been approved by the Board; or

- It fails to meet any schedule required by *Section 5.2*, or any addendum prepared under adaptive management (*Section 4.6*); or

- It has failed to implement a change to its program when determined necessary by the Board; or

- It makes a change to its regulations required under *Section 4* or any addendum prepared under adaptive management (*Section 4.6*), without prior approval of the Board.

5.1.1 Regulatory Requirements

To be considered in compliance with this fishery management plan, all state programs must include a regime of restrictions on bluefish fisheries consistent with the requirements of *Section 3.1: Commercial Catch and Landings Programs; Section 3.4: Biological Data Collection Programs;* and *Section 4.0: Management Program*. A state may propose an alternative management program under *Section 4.5: Alternative State Management Regimes*, which, if approved by the Board, may be implemented as an alternative regulatory requirement for compliance. Bluefish key compliance items requested through the annual compliance review are listed below in *Section 5.3*.

5.2 COMPLIANCE SCHEDULE

States must implement this Amendment according to the following schedule:

Month Day, 202X:	Submission of state plans to implement the amendment for approval by the Board, if it is necessary to change state law or regulation.
Month Day, 202X:	Implementation date of the Amendment. This date may change based on the timing of Final Approval of the Council FMP by the Secretary of Commerce.

5.3 COMPLIANCE REPORT CONTENT

Each state must submit to the Commission an annual report concerning its bluefish fisheries and management program for the previous year, no later than May 1st. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

The report shall cover:

Request for *de minimis*, where applicable.
Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimis* status.

Previous calendar year's fishery

a. As required by the Biological Monitoring Program implemented through Addendum I, please answer the following?
    i. Was the state able to collect the specified 100 samples? Specify number of samples collected from January – June and from July – December.
    ii. What is the source of the otolith, length, and age data?
b. Activities of fishery independent monitoring (provide a brief review of results and tables).
c. Copy of regulations that were in effect for the prior year. Has the state implemented the required measures as mandated in the FMP, listed below? Please answer with either 'yes' or 'no'.

Has the state implemented the required measure?	yes	no
Bluefish commercial vessel permit requirements		
Party/charter permit requirements		
Dealer permit requirements		
Recreational possession limit 15 or lower?		

*Compliance reports should include an overview of permitting requirements for commercial and party/charter vessels and commercial dealers.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Planned management programs for the current calendar year
Summarize any changes from previous years

5.4 PROCEDURES FOR DETERMINING COMPLIANCE

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section Seven (ASMFC 2019). In brief, all states are responsible for the full and effective implementation and enforcement of fishery management plans in areas subject to their jurisdiction. Written compliance reports as specified in the amendment must be submitted annually by each state with a declared interest. Compliance with this Amendment will be reviewed at least annually; however, the Board, ISFMP Policy Board, or the Commission may request the PRT to conduct a review of state's implementation and compliance with the amendment at any time.

The Board will review the written findings of the PRT within 60 days of receipt of a State's compliance report. Should the Board recommend to the Policy Board that a state be determined out of compliance, a rationale for the recommended noncompliance finding will be addressed in a report. The report will include the required measures of the FMP that the state has not implemented or enforced, a statement of how failure to implement or enforce required measures jeopardizes the species in question's conservation, and the actions a state must take in order to comply with requirements of the FMP.

The ISFMP Policy Board will review any recommendation of noncompliance from the Board within 30 days. If it concurs with the recommendation, it shall recommend to the Commission that a state be found out of compliance.

The Commission shall consider any noncompliance recommendation from the ISFMP Policy Board within 30 days. Any state that is the subject of a recommendation for a noncompliance finding is given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the ISFMP Policy Board, it may determine that a state is not in compliance with the FMP, and specify the actions the state must take to come into compliance.

Any state that has been determined to be out of compliance may request that the Commission rescind its noncompliance findings, provided the state has revised its conservation measures.

5.5 ANALYSIS OF ENFORCEABILITY OF PROPOSED MEASURES

All state programs must include law enforcement capabilities adequate for successfully implementing that state's bluefish regulations. The LEC will monitor the adequacy of a state's enforcement activity.

6.0 MANAGEMENT AND RESEARCH NEEDS

The following lists of research needs have been identified to enhance knowledge of the bluefish resources. These research needs are drawn from the 2015 benchmark stock assessment; the MAFMC's Five Year Research Plan (2020-2024); and the Commission's Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management. The list of research recommendations are classified into 1) stock assessment and population dynamics; 2) research and data needs.

6.1 STOCK ASSESSMENT AND POPULATION DYNAMICS

1. Explore a tag based assessment and associated costs compared to age based assessments to determine if it could supplement or replace other assessment techniques.
2. Characterize dynamics of older fish that are not well sampled by fishery independent trawl surveys by developing additional adult bluefish indices of abundance (e.g., broad spatial scale longline survey or gillnet survey).
3. Expand age structure of the SEAMAP index.
4. Investigate species associations with recreational angler trips targeting bluefish (on a regional and seasonal basis) to potentially modify the MRIP index used in the assessment model
5. Evaluate methods for integrating disparate indices produced at multiple spatial and temporal scales into a stock-wide assessment model.
6. Evaluate changes in selectivity of age-0 bluefish in fishery independent surveys due to shifting environmental conditions. Investigate trends in recruitment.

6.2 RESEARCH AND DATA NEEDS

1. Continue research on species interactions and predator-prey relationships.
2. Investigate the feasibility of alternative survey methods that target bluefish across all aged classes to create a more representative fishery-independent index of abundance.
3. Initiate sampling of offshore populations in winter months.
4. Initiate coastal surf zone seine study to provide more complete indices of juvenile abundance.
5. Conduct a post-release mortality study to determine if the recreational discard mortality rate has changed over time.
6. Investigate the assumption of zero discards in the commercial fishery.

7.0 PROTECTED SPECIES

In the fall of 1995, Commission member states, the National Marine Fisheries Service (NMFS; now, NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) began discussing ways to improve implementation of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in state waters. Historically, these policies have been minimally enforced in state waters (0-3 miles). In November 1995, the Commission, through its ISFMP Policy Board, approved an amendment of its ISFMP Charter (Section Six (b)(2)) so that interactions between Commission-managed fisheries and species protected under the MMPA and ESA be addressed in the Commission's fisheries management planning process. Specifically, the Commission's fishery management plans describe impacts of state fisheries on certain marine mammals and endangered species (collectively termed "protected species"), and recommend ways to minimize these impacts. The following section outlines: (1) the federal legislation which guides protection of marine mammals and sea turtles; (2) the protected species with potential fishery interactions; (3) the specific type(s) of fishery interactions; (4) population status of the affected protected species; and (5) potential impacts to Atlantic coastal state and interstate fisheries.

7.1 MARINE MAMMAL PROTECTION ACT (MMPA) REQUIREMENTS

Since its passage in 1972, one of the primary goals of the MMPA has been to reduce the incidental mortality and serious injury of marine mammals permitted in the course of commercial fishing operations to insignificant levels approaching a zero mortality and serious injury rate. Under the 1994 Amendments, the MMPA requires NOAA Fisheries to develop and implement a take reduction plan to assist in the recovery or prevent the depletion of each strategic stock that interacts with a Category I or II fishery. Specifically, a strategic stock is defined as a stock: (1) for which the level of direct human caused mortality exceeds the potential biological removal (PBR) level; (2) which is declining and is likely to be listed under the Endangered Species Act (ESA) in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA. Category I and II fisheries are those that have frequent or occasional incidental mortality and serious injury of marine mammals, respectively, whereas Category III fisheries have a remote likelihood of incidental mortality and serious injury of marine mammals. Each year, NOAA Fisheries publishes

an annual List of Fisheries which classifies commercial fisheries into one of these three categories.

Under the 1994 mandates, the MMPA also requires fishermen participating in Category I and II fisheries to register under the Marine Mammal Authorization Program (MMAP), the purpose of which is to provide an exception for commercial fishermen from the general taking prohibitions of the MMPA for non-ESA listed marine mammals. All fishermen, regardless of the category of fishery they participate in, must report all incidental injuries and mortalities caused by commercial fishing operations within 48 hours.

Section 101(a)(5)(E) of the MMPA allows for the authorization of the incidental taking of individuals from marine mammal stocks listed as threatened or endangered under the ESA in the course of commercial fishing operations if it is determined that: (1) incidental mortality and serious injury will have a negligible impact on the affected species or stock; (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and (3) where required under Section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with Section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock. Permits are not required for Category III fisheries; however, any mortality or serious injury of a marine mammal must be reported.

7.2 ENDANGERED SPECIES ACT (ESA) REQUIREMENTS

The taking of endangered sea turtles, fish, seabirds, and marine mammals is prohibited and considered unlawful under Section 9(a)(1) of the ESA. In addition, NOAA Fisheries or the USFWS may issue Section 4(d) protective regulations necessary and advisable to provide for the conservation of threatened species. The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." There are several mechanisms established in the ESA to allow exceptions to the take prohibition in Section 9(a)(1). Section 10(a)(1)(A) of the ESA authorizes NOAA Fisheries to allow the taking of 59 listed species through the issuance of research permits for scientific purposes or to enhance the propagation or survival of the species. Section 10(a)(1)(B) authorizes NOAA Fisheries to permit, under prescribed terms and conditions, any taking otherwise prohibited by Section 9(a)(1)(B) of the ESA, if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Finally, Section 7(a)(2) requires federal agencies to consult with NOAA Fisheries to ensure that any action that is authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species. If, following completion of consultation, an action is found to jeopardize the continued existence of any listed species or cause adverse modification to critical habitat of such species, reasonable and prudent alternatives will be identified so that jeopardy or adverse modification to the species is removed and Section 7(a)(2) is met (see Section 7(b)(3)(A)). Alternatively, if, following completion of consultation, an action is not found to jeopardize the continued existence of any listed species or cause adverse modification to critical habitat of such species, reasonable and

prudent measures will be identified that minimize the take of listed species or adverse modification of critical habitat of such species (see Section 7(b)(4)). Section (7)(o) provides the actual exemption from the take prohibitions established in Section 9(a)(1), which includes Incidental Take Statements that are provided at the end of consultation via the ESA Section 7 Biological Opinions.

7.3 ESA-LISTED SPECIES AND MMPA PROTECTED SPECIES

Numerous protected species inhabit the affected environment of the bluefish FMP (Table 38) and have the potential to be impacted by the proposed action (*i.e.*, there have been observed/documented interactions in the fishery or with gear type(s) similar to those used in the fishery (hook and line, bottom trawl or gillnet gear)). These species are under NOAA Fisheries jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 38. Species Protected Under the ESA and/or MMPA that May Occur in the Affected Environment of the Bluefish Fishery. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.[1]

Species	Status[2]	Potentially impacted by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (Megaptera novaeangliae)[3]	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter microcephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)3	Protected (MMPA)	Yes
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[4]	***Protected (MMPA)***	***Yes***

Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	Yes
Giant manta ray (*Brosme brosme*)	Threatened	Yes
Smalltooth sawfish (U.S. DPS) (*Pristis pectinata*)	Endangered	No
Oceanic Whitetip shark (*Carcharhinus longimanus*)	Threatened	No
Nassau grouper (*Epinephelus striatus*)	Threatened	No
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
Corals		
Elkhorn Coral (Acropora palmata)	Threatened	No
Staghorn Coral (Acropora cervicornis)	Threatened	No
Pillar Coral (Dendrogyra cylindrus)	Threatened	No
Rough cactus coral (Mycetophyllia ferox)	Threatened	No
Lobed star coral (Orbicella annularis)	Threatened	No
Mountainous star coral (*Orbicella faveolata)*	Threatened	No
Boulder star coral (*Orbicella franksi)*	Threatened	No
Seagrass		
Johnson's Sea Grass (*Halophila johnsonii)*	Threatened	No
Critical Habitat		
North Atlantic Right Whale	ESA (Protected)	No
Northwest Atlantic Ocean DPS of Loggerhead Sea Turtle	ESA (Protected)	No

Johnson's Sea Grass	ESA (Protected)	No
Elkhorn and staghorn corals	ESA (Protected)	No
Smalltooth sawfish (U.S. DPS)	ESA (Protected)	No

Notes:
[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3, 1972).
[2] The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment), or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.
[3] There are two species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

[4] This includes all stocks of bottlenose dolphins except for the Florida Bay stock (see marine mammal stock assessment reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region).

Cusk (Table 38), a NOAA Fisheries "species of concern," as well as a "candidate species" under the ESA, occurs in the affected environment of the bluefish fishery. Candidate species are those petitioned species that NOAA Fisheries is actively considering for listing as endangered or threatened under the ESA and also include those species for which NOAA Fisheries has initiated an ESA status review through an announcement in the FR. Once a species is proposed for listing, the conference provisions of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, this species will not be discussed further in this section. However, for additional information on cusk and proactive conservation efforts being initiated for the species, visit: http://www.greateratlantic.fisheries.noaa.gov/protected/pcp/soc/cusk.html.

7.1.1 Species and Critical Habitat Not Likely to be Impacted by the Proposed Action

Based on available information, it has been determined that this action is not likely to impact multiple ESA listed and/or marine mammal protected species or any designated critical habitat (Table 38). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or based on the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports, there have been no observed or documented interactions between the species and the primary gear type (i.e., hook and line, gillnet, and bottom trawl) used to prosecute the bluefish fishery (Greater Atlantic Region Marine Animal Incident Database, unpublished data ; Marine

Mammal Stock Assessment Reports (SARs) for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NEFSC observer/sea sampling database, unpublished data; NOAA Fisheries NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries)[17]. In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of critical habitat identified in Table 38 and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2014a; NMFS 2015a,b).

7.1.2 Species Potentially Impacted by the Proposed Action

Table 38 has a list of protected species of sea turtle, marine mammal, and fish species present in the affected environment of the bluefish fishery, and that may also be impacted by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially impacted by the action, the MMPA LOF, and marine mammal SARS and serious injury and mortality reports were referenced (see Marine Mammal SARS for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NEFSC observer/sea sampling database, unpublished data; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html).

To help identify ESA listed species potentially affected by the action, the most recent 10 years of marine animal incidence (e.g., entanglement) and NEFSC observer data (i.e., 2010-2019; NEFSC observer/sea sampling database, unpublished data, Greater Atlantic Region Marine Animal Incident Database, unpublished data), as well as the 2013 Biological Opinion issued by NOAA Fisheries on the operation of seven commercial fisheries, including the bluefish FMP, was referenced (NMFS 2013). The 2013 Opinion, which considered the best available information on ESA listed species and observed or documented ESA listed species interactions with gear types used to prosecute the 7 FMPs (e.g., gillnet, bottom trawl), concluded that the seven fisheries may adversely affect, but was not likely to jeopardize the continued existence of any ESA listed species. The Opinion included an incidental take statement (ITS) authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon. Reasonable and prudent measures and terms and conditions were also issued with the ITS to minimize impacts of any incidental take.

[17] For marine mammals protected under the MMPA the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports are from 2007-2016; however, entanglement data is available through 2019. For ESA listed species, information on observer or documented interactions with fishing gear is from 2010-2019.

New information indicates that North Atlantic right whale abundance has been in decline since 2010 (Pace et al. 2017). This new information is different from that considered and analyzed in the 2013 Opinion and therefore, reveals effects from this fishery that were not previously considered. As a result, per an October 17, 2017, ESA 7(a)(2)/7(d) memo issued by NOAA Fisheries, the 2013 Opinion, as well as several other fishery Opinions, has been reinitiated. However, the October 17, 2017, ESA 7(a)(2)/7(d) memorandum issued by NOAA Fisheries, determined ".....For the consultations being reinitiated..... Allowing these fisheries to continue during the reinitiation period will not increase the likelihood of interactions with these species above the amount that would otherwise occur if consultation had not been reinitiated, because allowing these fisheries to continue does not entail making any changes to any fishery during the reinitiation period that would cause an increase in interactions with whales, sea turtles, sturgeon, or Atlantic salmon. Because of this, the continuation of these fisheries during the reinitiation period would not be likely to jeopardize the continued existence of any whale, sea turtle, Atlantic salmon, or sturgeon species." Until replaced, the bluefish FMP is currently covered by the October 17, 2017, memorandum.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types, to understand the potential risk of an interaction. Information on species occurrence in the affected environment of the bluefish fishery is below, while information on protected species interactions with specific fishery gear is in Section 6.3.3.

7.1.2.1 Sea Turtles

Below is a brief summary of the occurrence and distribution of sea turtles in the affected environment of the bluefish fishery. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant et al. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS et al. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles **-** In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly et al. 1995a,b; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009; Blumenthal et al. 2006; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell et al. 2003; Morreale & Standora 2005). As coastal water temperatures warm in the spring, loggerheads

begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly et al. 1995a,b,c; Griffin et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until late fall (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although it should be noted that hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles **-** Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013b; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014). They are found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014).

7.1.2.2 Large Whales

Humpback, North Atlantic right, fin, sei, and minke whales occur in the Northwest Atlantic. Generally speaking, large whales follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer/fall foraging grounds (primarily north of 41°N; see marine mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). This is a simplification of whale movements, particularly as it relates to winter movements. It is unknown if all individuals of a population migrate to low latitudes in the winter, although increasing evidence suggests that for some species, some portion of the population remains in higher latitudes throughout the winter (Clapham et al. 1993; Davis et at. 2017; Davis et al. 2020; Hayes et al. 2020; Swingle et al. 1993; Vu et al. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the occurrence of large whales in low latitude foraging grounds in the spring/summer/fall is well understood. Large whales consistently return to these foraging areas each year, therefore these areas can be considered important areas for whales (Davis et al. 2017; Davis et al. 2020; Hayes et al. 2020; Payne et al. 1986; Payne et al. 1990; Schilling et al. 1992). For additional information on the biology, status, and range wide distribution of humpback, North Atlantic right, fin, sei, and minke whales, refer to the marine mammal SARs provided at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

7.1.2.3 Small Cetaceans and Pinnipeds

Table 38 lists the small cetaceans and pinnipeds that may occur in the affected environment of the bluefish fishery. Small cetaceans can be found throughout the year in the Northwest Atlantic Ocean (Maine to Florida); however, within this range, there are seasonal shifts in species distribution and abundance. Pinnipeds are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35^{o}N) . For additional information on the biology and range wide distribution of each species of small cetacean and pinniped, refer to the marine mammal SARs provided at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

7.1.2.4 Atlantic sturgeon

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010, 2015; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015a,b; ASMFC 2017b).

Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein et al. 2004 a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon may undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011; Wipplehauser 2012); however, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

For additional information on the biology, status, and range wide distribution of each distinct population segment (DPS) of Atlantic sturgeon please refer to 77 FR 5880 and 77 FR 5914, as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007) and the Atlantic States Marine Fisheries Commission 2017 Atlantic Sturgeon Benchmark Stock Assessment and Peer Review Report (ASMFC 2017).

7.1.2.5 Atlantic salmon

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM), to the coast of Greenland (NMFS and USFWS 2005, 2016; Fay et al. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be

present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay et al. 2006; USASAC 2013; Hyvarinen et al. 2006; Lacroix and McCurdy 1996; Lacroix et al. 2004, 2005; Reddin 1985; Reddin and Short 1991; Reddin and Friedland 1993; Sheehan et al. 2012; NMFS and USFWS 2005, 2016; Fay et al. 2006). For additional information on the on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon, refer to NMFS and USFWS (2005, 2016); Fay et al. (2006).

7.1.2.6 Giant Manta Ray

Based on the giant manta ray's distribution, the species may occur in coastal, nearshore, and pelagic waters off the U.S. east coast (Miller and Klimovich 2017). Along the U.S. East Coast, giant manta rays are usually found in water temperatures between 19 and 22 degrees Celsius (Miller and Klimovich 2017) and have been observed as far north as New Jersey. Given that the species is rarely identified in the fisheries data in the Atlantic, it may be assumed that populations within the Atlantic are small and sparsely distributed (Miller and Klimovich 2017).

7.1.3 Interactions Between Gear and Protected Species

Protected species are at risk of interacting with various types of fishing gear, with interaction risks associated with gear type, quantity, soak or tow duration, and degree of overlap between gear and protected species. Information on observed or documented interactions between gear and protected species is available from as early as 1989 (Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NEFSC observer/sea sampling database, unpublished data). As the distribution and occurrence of protected species and the operation of fisheries (and, thus, risk to protected species) have changed over the last 30 years, we use the most recent 10 years of available information to best capture the current risk to protected species from fishing gear. For marine mammals protected under the MMPA, this primarily covers the period from 2008-2017[18]; however, the Greater Atlantic Region (GAR) Marine Animal Incident Database (unpublished data) contains large whale entanglement reports through 2019. For ESA listed species, the most recent 10 years of data on observed or documented interactions is available from 2010-2019[19] (data. Available information on gear interactions with a given species (or species group) is provided in the sections below. The sections to follow are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the multispecies bluefish fishery (i.e., recreational: hook and line; commercial: sink gillnet and bottom trawl gear).

[18] Waring et al. 2015a; Waring et al. 2016; Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/.

[19] ASMFC 2017; GAR Marine Animal Incident Database, unpublished data; Kocik et al. 2014; Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; Miller and Shepard 2011; Murray 2015; Murray 2018; Murray 2020; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/; NEFSC observer/sea sampling database, unpublished data.

7.1.3.1 Recreational Fisheries Interactions

The recreational bluefish fishery is primarily prosecuted with rod and reel and handline (i.e., hook and line gear). In the absence of an observer program for recreational fisheries, records of recreational hook and line interactions with protected resources are limited. However, as a dedicated observer program exists for all commercial fisheries, there is a wealth of information on observed protected species interactions with all fishing gear types and years of data assessing resultant population level effects of these interactions. Other sources of information, such as state fishing records, stranding databases, and marine mammal SARs, provide additional information that can assist in better understanding hook and line interaction risks to protected species.

Large whales

Large whales have been documented entangled with hook and line gear or monofilament line (GAR Marine Animal Incident Database, unpublished data;Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region;). In the most recent (2008-2017) mortality and serious injury determinations for baleen whales, the majority of cases identified with confirmed hook and line or monofilament entanglement did not result in the serious injury or mortality to the whale (84.8 % observed/reported whales had a serious injury value of 0; 15.2 % had a serious injury value of 0.75; none of the cases resulted in mortality; Cole and Henry 2013; Henry et al. 2017; Henry et al. 2020). In fact, 75.8 % of the whales observed or reported with a hook/line or monofilament entanglement were resighted gear free and healthy; confirmation of the health of the other remaining whales remain unknown as no resightings had been made over the timeframe of the assessment (Cole and Henry 2013; Henry et al. 2017; Henry et al. 2020). Based on this information, while large whale interactions with hook and line gear are possible, there is a low probability that an interaction will result in serious injury or mortality to any large whale species. Therefore, relative to other gear types, such as fixed gear, hook and line gear represents a low source serious injury or mortality to any large whale (Henry et al. 2020).

Small cetaceans and pinnipeds

Table 38 provides a list of small cetaceans and pinnipeds that will occur in the affected environment of the bluefish fishery. Reviewing the most recent 10 years of data provided in the marine mammal SARs (i.e., 2008-2017), of these species, only bottlenose dolphin stocks have been identified (primarily through stranding records/data) as entangled in hook and line gear (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). In some cases, these entanglements have resulted in the serious injury or mortality to the animal. Specifically, reviewing stranding data provided in marine mammal SARs from 2008-2017, estimated mean annual mortality for each bottlenose stock due to interactions with hook and line gear was approximately one animal (Palmer 2017; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). Based on this, although interactions with hook and line gear are possible, relative to other gear types, such as trawl gear, hook and line gear represents a low source serious injury or mortality to any bottlenose dolphin stock. For other species of small

cetaceans or pinnipeds, hook and line gear is not expected to be a source of serious injury or mortality.

Sea turtles
Interactions between ESA listed species of sea turtles and hook and line gear have been documented, particularly in nearshore waters of the Mid-Atlantic (e.g., GAR Sea Turtle and Disentanglement Network, unpublished data; NMFS Sea Turtle Stranding and Salvage Network, unpublished data; Palmer 2017;). Interactions with hook and line gear have resulted in sea turtle injury and mortality and therefore, poses an interaction risk to these species. However, the extent to which these interactions are impacting sea turtle populations is still under investigation, and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of sea turtle populations.

Atlantic Sturgeon
Interactions between ESA-listed species of Atlantic sturgeon and hook and line gear have been documented, particularly in nearshore waters (ASMFC 2017). Interactions with hook and line gear have resulted in Atlantic sturgeon injury and mortality and therefore, poses an interaction risk to these species. However, the extent to which these interactions are impacting Atlantic sturgeon DPSs is still under investigation and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of Atlantic sturgeon DPSs (NMFS 2011b; ASMFC 2017).

Atlantic salmon
Review of the most recent 10 years of data on observed or documented interactions between Atlantic salmon and fishing gear, there have been no observed/documented interactions between Atlantic salmon and hook and line gear (NEFSC observer/sea sampling database, unpublished data). Based on this information, hook and line gear is not expected to pose an interaction risk to any Atlantic salmon and therefore, is not expected to be source of injury or mortality to this species.

Giant Manta Ray
Review of the most recent 10 years of data on observed or documented interactions between giant manta rays and fishing gear, there have been no observed/documented interactions between giant manta rays and hook and line gear (NEFSC observer/sea sampling database, unpublished data). Based on this information, hook and line gear is not expected to pose an interaction risk to giant manta rays and therefore, is not expected to be source of injury or mortality to this species

7.1.3.2 Commercial Fisheries Interactions
The bluefish commercial fishery uses gillnets, bottom otter trawls, and hook and line gear. Except for what has been provided in section 6.3.3.1, no additional information is available on commercial hook and line interactions with protected species. Gillnet and/or bottom otter trawls are known to interact with ESA-listed and MMPA species of marine mammals, fish, and sea turtles.

Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl and/or sink gillnet gear. Pursuant to the MMPA, NOAA Fisheries publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2021 LOF (86 FR 3028 (January 14, 2021)) categorizes commercial gillnet fisheries (Northeast or Mid-Atlantic) as Category I fisheries and commercial bottom trawl fisheries (Northeast or Mid-Atlantic) as Category II fisheries.

Large Whales

Bottom Trawl Gear

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear[20]. In 2008, several minke whales were observed dead in bottom trawl gear attributed to the northeast bottom trawl fishery; estimated annual mortality attributed to this fishery in 2008 was 7.8 minke whales (Waring et al. 2015). Since 2008, serious injury and mortality records for minke whales in U.S. waters have shown zero interactions with bottom trawl (northeast or Mid-Atlantic) gear[21]. Based on this information, large whale interactions with bottom trawl gear are expected to be rare to nonexistent.

Fixed Fishing Gear (e.g., Sink Gillnet Gear)

Large whale interactions (entanglements) with fishing gear have been documented in the waters of the Northwest Atlantic.[22] Information available on interactions with large whales comes from reports documented in the Greater Atlantic Region (GAR) Marine Animal Incident Database (unpublished data). For instance, review of the databases' most recent ten years (i.e.,

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[20] Refer to Greater Atlantic Region Marine Animal Incident Database (unpublished data); Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NEFSC observer/sea sampling database, unpublished data ; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html

[21] Refer to: Greater Atlantic Region Marine Animal Incident Database (unpublished data); Waring et al. 2016; Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Cole and Henry 2013; and, Henry et al. 2014, 2015, 2016, 2017, 2019, 2020; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

[22] **NMFS Atlantic Large Whale Entanglement Reports**: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan (for years prior to 2014, contact David Morin, Large Whale Disentanglement Coordinator, David.Morin@NOAA.gov; GAR Marine Animal Incident Database (unpublished data); **NMFS Marine Mammal** SARs **for the Atlantic Region** :https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; **NMFS NEFSC Marine Mammal Serious Injury and Morality Reference Documents**: https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; **MMPA List of Fisheries**: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries

2010-2019) of validated data indicates that there have been a total of 112 North Atlantic right whale entanglements; these entanglements include those confirmed to country and unknown country of origin (Table 39).[23] The best available data also shows that fin, minke, humpback, and to a lesser extent, sei and sperm whales, have also been observed and documented entangled in fishing gear (see footnote 7).

Table 39 Observed entanglements of North Atlantic right whales from 2010 through 2019 by country of origin. Entanglements resulting in SI/M are presented in the parentheses.

	Number of Entanglements	Confirmed Canada	Confirmed U.S.	Unknown Country of Origin
2010	6 (4)	0	1	5 (4)
2011	14 (5.5)	0	2	12 (5.5)
2012	12 (4)	0	1 (1)	11 (3)
2013	5 (0.75)	0	0	5 (0.75)
2014	17 (8)	1	1 (1)	15 (7)
2015	9 (3.5)	1	0	8 (3.5)
2016	15 (9.5)	3 (3)	1	11 (6.5)
2017	15 (6)	8 (3)	1	6 (3)
2018	12 (5.75)	3 (1)	1	8 (4.75)
2019	7(2)	2(2)	0	5(0)
Total	**112 (49)**	**18 (9)**	**8 (2)**	**86 (38)**

Based on the best available information, the greatest entanglement risk to large whales is posed by fixed gear used in trap/pot or sink gillnet fisheries (Angliss and Demaster 1998; Cassoff et al. 2011; Kenney and Hartley 2001; Knowlton and Kraus 2001; Hartley *et al*. 2003; Johnson *et al*. 2005;Whittingham *et al*. 2005a,b; Knowlton et al. 2012; NMFS 2014; Hamilton and Kraus 2019; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Sharp et al. 2019; see Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). Specifically, while foraging or transiting, large whales are at risk of becoming entangled in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, as well as the net panels of gillnet gear that rise into the water column (Baumgartner et al. 2017; Cassoff et al. 2011; Hamilton and Kraus 2019; Hartley *et al*. 2003; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Johnson *et al*. 2005; Kenney and Hartley 2001; Knowlton and Kraus 2001;Knowlton et al. 2012; NMFS 2014; Whittingham *et al*. 2005a,b; see NMFS Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-

[23] The data included in Table 53, includes entanglement events categorized as serious injury, mortality, or a non-serious injury. These observed events are considered a minimum estimate and the actual entanglement rate is likely higher.

assessment-reports-region).[24] Large whale interactions (entanglements) with these features of trap/pot and/or sink gillnet gear often result in the serious injury or mortality to the whale (Angliss and Demaster 1998; Cassoff et al. 2011; Henry et al. 2014, Henry et al. 2015, Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Knowlton and Kraus 2001, Knowlton et al. 2012; Moore and Van der Hoop 2012; NMFS 2014; Pettis et al. 2019; Sharp et al. 2019; van der Hoop et al. 2016; van der Hoop et al. 2017). As many entanglements, and therefore, serious injury or mortality events, go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, the rate of large whale entanglement, and thus, rate of serious injury and mortality due to entanglement, are likely underestimated (Hamilton et al. 2018; Hamilton et al. 2019; Knowlton *et al.* 2012; Pace et al. 2017; Robbins 2009).

Due to the incidences of interactions with vertical lines associated with gillnet and trap/pot gear, in addition to the endangered status of the species being affected most by these gear types (i.e., North Atlantic right and fin whales), pursuant to the MMPA, these large whale species were designated as strategic stocks. Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. As a result, to address and mitigate the risk of large whale entanglement in fixed fishing gear comprised of vertical lines, including gillnet gear, the Atlantic Large Whale Take Reduction Plan (ALWTRP or Plan) was implemented. The ALWTRP identifies gear modification requirements and restrictions for Category I and II gillnet fisheries in the Northeast, Mid-Atlantic, and Southeast regions of the U.S. (designated management areas); these fisheries must comply with all regulations of the Plan. For further details on the ALWTRP, specifically gear modification requirements, restrictions, and management areas under the ALWTRP, see: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan.

Small Cetaceans

Sink Gillnet and Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with bottom trawl gear.[25] Reviewing marine mammal stock assessment and serious injury reports that cover the most recent 10 years data (i.e., 2008-2017), as well as the MMPA LOF's covering this time frame (i.e., issued between 2016 and 2021), Table 40 provides a list of species that have been observed (incidentally) seriously injured and/or killed by MMPA LOF Category I (frequent interactions) gillnet and/or Category II (occasional interactions) bottom trawl fisheries that operate in the

[24] Through the ALWTRP, regulations have been implemented to reduce the risk of entanglement in in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, as well as the net panels of gillnet gear. For ALWTRP regulations currently implemented: see https://www.fisheries.noaa.gov/action/atlantic-large-whale-take-reduction-plan-regulations-1997-2015.

[25] For additional information on small cetacean and pinniped interactions, see: Chavez-Rosales et al. 2017; Hatch and Orphanides 2014, 2015, 2016, 2019; Josephson et al. 2017; Josephson et al. 2019; Lyssikatos 2015; Lyssikatos et al. 2020; Orphanides 2020; Read *et al*. 2006; Waring et al. 2015b; Marine Mammal SARS: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA LOF at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

affected environment of the bluefish fishery. Of the species provided in Table 40, gray seals, followed by harbor seals, harbor porpoises, short beaked common dolphins, and harps seals are the most frequently bycaught small cetacean and pinnipeds in sink gillnet gear in the Greater Atlantic Region (GAR; Hatch and Orphanides 2014, 2015, 2016, 2019; Orphanides 2020). In terms of bottom trawl gear, short-beaked common dolphins, Risso's dolphins, and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in the GAR, followed by gray seals, long-finned pilot whales, bottlenose dolphin (offshore), harbor porpoise, harbor seals, and harp seals (Lyssikatos 2015; Chavez-Rosales et al. 2017, Lyssikatos et al. 2020).

Table 40: Small cetacean and pinniped species observed seriously injured and/or killed by Category I and II sink gillnet or bottom trawl fisheries in the affected environment of the bluefish fishery.

Fishery	Category	Species Observed or reported Injured/Killed
Northeast Sink Gillnet	I	Bottlenose dolphin (offshore)
		Harbor porpoise
		Atlantic white sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Pilot whales
		Harbor seal
		Hooded seal
		Gray seal
		Harp seal
Mid-Atlantic Gillnet	I	Bottlenose dolphin (Northern Migratory coastal)
		Bottlenose dolphin (Southern Migratory coastal)
		Bottlenose dolphin (offshore)
		Harbor porpoise
		Short-beaked common dolphin
		Harbor seal
		Harp seal
		Pilot whales
		Atlantic white sided dolphin
		Risso's dolphin
		Gray seal
Northeast Bottom Trawl		Harp seal
		Harbor seal
		Gray seal
		Pilot whales

	II	Short-beaked common dolphin
		Atlantic white-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	Atlantic white-sided dolphin
		Short-beaked common dolphin
		Pilot whales
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Source: MMPA 2012-2021 LOFs at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries		

MMPA Section 118(f)(1) requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with Category I or II fisheries. Thus, the Harbor Porpoise TRP (HPTRP) and the Bottlenose Dolphin TRP (BDTRP) were developed and implemented for these species.[26] Also, due to the incidental mortality and serious injury of small cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid-Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was implemented. Additional information on each TRP or Strategy is at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams.

Sea Turtles

Bottom Trawl Gear

Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso and Epperly 2006; NMFS Observer Program, unpublished data). Since 1989, the date of our earliest observer records for federally managed fisheries, sea turtle interactions with trawl gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2008; Murray 2015b; Murray 2020; NMFS Observer Program, unpublished data; Warden 2011 a, b). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with trawl gear in this region. As a result, the bycatch estimates and discussion below are for trawl gear in the Mid-Atlantic and Georges Bank.

[26] Although the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal SARs (Hayes et al. 2020) no longer designates harbor porpoise as a strategic stock, HPTRP regulations are still in place per the mandates provided in Section 118(f)(1).

Murray (2020) provided information on sea turtle interaction rates from 2014-2018 (the most recent five-year period that has been statistically analyzed for trawls). Interaction rates were stratified by region, latitude zone, season, and depth. The highest loggerhead interaction rate (0.43 turtles/day fished) was in waters south of 37º N during November to June in waters greater than 50 meters deep. The greatest number of estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters less than 50 meters deep. Within each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads (Murray 2020).

Based on Murray (2020)[27], from 2014-2018, 571 loggerhead (CV=0.29, 95% CI=318-997), 46 Kemp's ridley (CV=0.45, 95% CI=10-88), 20 leatherback (CV=0.72, 95% CI = 0-50), and 16 green (CV=0.73, 95% CI=0-44) sea turtle interactions were estimated to have occurred in bottom trawl gear in the Mid-Atlantic region over the five-year period. On Georges Bank, 12 loggerheads (CV=0.70, 95% CI=0-31) and 6 leatherback (CV=1.0, 95% CI=0-20) interactions were estimated to have occurred from 2014-2018. An estimated 272 loggerhead, 23 Kemp's ridley, 13 leatherback, and 8 green sea turtle interactions resulted in mortality over this period (Murray 2020).

Sink Gillnet Gear

Interactions between sink gillnet gear and green, Kemp's ridley, loggerhead, and leatherback sea turtles have been observed in the Greater Atlantic region since 1989 (NEFSC observer/sea sampling database, unpublished data). Specifically, sea turtle interactions with gillnet gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2009a,b; Murray 2013; Murray 2018; NEFSC observer/sea sampling database, unpublished data). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with sink gillnet gear in this region. As a result, the bycatch estimates and discussion below are for sink gillnet gear in the Mid-Atlantic and Georges Bank.

From 2012-2016 (the most recent five-year period that has been statistically analyzed for gillnets), Murray (2018) estimated that sink gillnet fisheries in the Mid-Atlantic and Georges Bank bycaught 705 loggerheads (CV=0.29, 95% CI over all years: 335-1116), 145 Kemp's ridleys (CV =0.43, 95% CI over all years: 44-292), 27 leatherbacks (CV =0.71, 95% CI over all years 0-68),

[27] Murray (2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2008; Murray 2015b; Warden 2011a,b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be similar to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007, Murray and Orphanides 2013, Orphanides 2010).

and 112 unidentified hard-shelled turtles (CV=0.37, 95% CI over all years (64-321).[28] Of these, mortalities were estimated at 557 loggerheads, 115 Kemp's ridley, 21 leatherbacks, and 88 unidentified hard-shelled sea turtles. Total estimated loggerhead bycatch was equivalent to 19 adults. The highest bycatch rate of loggerheads occurred in the southern Mid-Atlantic stratum in large mesh gear during November to June. Though only one sea turtle was observed in this stratum, observed effort was low, leading to a high bycatch rate. Bycatch rates of all other species were lower relative to loggerheads. Highest estimated loggerhead bycatch occurred in the northern mid-Atlantic from July to October in large mesh gears due to the higher levels of commercial effort in the stratum. Mean loggerhead bycatch rates were ten times those of Kemp's ridley bycatch rates in large mesh gear in the northern Mid-Atlantic from July to October (Murray 2018). Although interactions between sink gillnet gear and green sea turtles have been observed (NEFSC observer/sea sampling database, unpublished data); green sea turtles were excluded from the bycatch rate calculations in Murray (2018) because the observed interaction occurred in waters of North Carolina, and therefore, outside the study region.

Atlantic Sturgeon

Sink Gillnet and Bottom Trawl Gear

Since 1989, Atlantic sturgeon interactions (i.e., bycatch) with sink gillnet and bottom trawl gear have frequently been observed in the Greater Atlantic Region, with most sturgeon observed captured falling within the 100 to 200cm total length range; however, both larger and small individuals have been observed (ASMFC 2007; ASMFC 2017; Miller and Shepard 2011; NEFSC observer/sea sampling database, unpublished data; Stein et al. 2004). For sink gillnets, higher levels of Atlantic sturgeon bycatch have been associated with depths of less than 40 meters, mesh sizes of greater than 10 inches, and the months of April and May (ASMFC 2007). For otter trawl fisheries, the highest incidence of Atlantic sturgeon bycatch have been associated with depths less than 30 meters (ASMFC 2007). More recently, over all gears and observer programs that have encountered Atlantic sturgeon, the distribution of haul depths on observed hauls that caught Atlantic sturgeon was significantly different from those that did not encounter Atlantic surgeon, with Atlantic sturgeon encountered primarily at depths less than 20 meters (ASMFC 2017).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The stock assessment analyzes fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. The total bycatch of Atlantic sturgeon from bottom otter trawls ranged between 624-1,518 fish over the

[28] Murray (2018) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2009, 2013), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be similar to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007, Murray and Orphanides 2013, Orphanides 2010).

2000-2015 time series, while the total bycatch of Atlantic sturgeon from gillnets ranged from 253-2,715 fish. Focusing on the most recent five-year period of data provided in the stock assessment report[29], the estimated average annual bycatch during 2011-2015 of Atlantic sturgeon in bottom otter trawl gear is 777.4 individuals and in gillnet gear is 627.6 individuals.

Atlantic salmon

Sink Gillnet and Bottom Trawl Gear

Atlantic salmon are at risk of interacting with bottom trawl or gillnet gear (NEFSC observer/sea sampling database, unpublished data; Kocik *et al*. 2014). NEFOP data from 1989-2019 show records of incidental bycatch of Atlantic salmon in seven of the 31 years, with a total of 15 individuals caught, nearly half of which (seven) occurred in 1992 (NEFSC observer/sea sampling database, unpublished data).[30] Of the observed incidentally caught Atlantic salmon, ten were listed as "discarded," which is assumed to be a live discard (Kocik, pers comm.; February 11, 2013). Five of the 15 were documented as lethal interactions. The incidental takes of Atlantic salmon occurred in bottom otter trawls (4) and gillnets (11). Observed captures occurred in March (2), April (2), May (1), June (3), August (1), and November (6). Given the very low number of observed Atlantic salmon interactions in gillnet and bottom trawl gear, interactions with these gear types are believed to be rare in the Greater Atlantic Region.

Giant Manta Ray

Giant manta rays are potentially susceptible to capture by bottom trawl and gillnet gear based on records of their capture in fisheries using these gear types (NEFSC observer/sea sampling database, unpublished data). Review of the most recent 10 years of NEFOP data showed that between 2010-2019, two (unidentified) Giant Manta Rays were observed in bottom trawl gear and two were observed in gillnet gear (NEFSC observer/sea sampling database, unpublished data). Additionally, all of the giant manta ray interactions in gillnet or trawl gear recorded in the NEFOP database (13 between 2001 and 2019) indicate the animals were encountered alive and released alive. However, details about specific conditions such as injuries, damage, time out of water, how the animal was moved or released, or behavior on release is not always recorded. While there is currently no information on post-release survival, NOAA Fisheries Southeast Gillnet Observer Program observed a range of 0 to 16 giant manta rays captured per year between 1998 and 2015 and estimated that approximately 89% survived the interaction and release (see NOAA Fisheries reports available at: http://www.sefsc.noaa.gov/labs/panama/ob/gillnet.htm).

[29] The period of 2011-2015 was chosen as it is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

[30] There is no information available on the genetics of these bycaught Atlantic salmon, so it is not know how many of them were part of the GOM DPS. It is likely that some of these salmon, particularly those caught south of Cape Cod, may have originated from the stocking program in the Connecticut River. Those Atlantic salmon caught north of Cape Cod and/or in the Gulf of Maine are more likely to be from the GOM DPS.

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APPENDIX I PRICE MODEL

To assess the economic impacts of the various rebuilding alternatives as well as estimation of revenues under various landing scenarios, ex-vessel bluefish prices require estimation. In lieu of well-developed market supply and demand models, an inverse-demand based price model is used to estimate ex-vessel bluefish prices. Though price and quantity demanded are jointly determined such that Gauss Markov assumptions of exogeneity are violated, here, we assume harvest is weakly exogenous to ex-vessel price given the quota allocations and seasonal constraints which cause fishermen to maximize catch in order to maximize profits (Gordon 2020). This specification implies that the decision to fish is independent of ex-vessel prices. This assumption, as well as ex-vessel price models, are not uncommon in fishery economics literature.[31]

The Generalized Least Squares bluefish price model is given as:

$$(\log)\text{Ex-vessel Price}_t = \alpha + \beta_1 (\log)\text{Landings}_t + AR_t \qquad \text{(Equation A)}$$

where the dependent variable is the natural logarithm of average annual ex-vessel bluefish price[32] ($/lb.) and the dependent variable is the natural log of total annual bluefish landings, t is time (i.e., years) and AR is an autoregressive error term. The dependent and independent variables are logged because the relationship between ex-vessel prices and landings is not expected to be strictly linear such that the slope of the regression is not assumed to be constant. The logged GLS model was implemented in place of a logged OLS model as the error term is suggested to be serially correlated over time with a Durbin-Watson d statistic of 0.72. After the implementation of the Prais–Winsten GLS estimator, the Durbin-Watson statistic was transformed to 1.67. It should be noted that additional models were taken into consideration after autocorrelation was detected, including a Cochrane-Orcutt AR(1) regression, linear autoregressive integrated moving-average (ARIMA) specified models with AR(2-5), an OLS regression with the inclusion of a lagged ex-vessel price, and a separate OLS regression with a lagged landings variable. Given the dependence of the lagged OLS regression on the previous year's price, the lack of significance on the AR(n) coefficients when the lag is greater than one[33], along with the consideration of RMSE's, the Prais-Winsten GLS with an AR(1) error term was chosen. The Prais-Winsten was selected over the Cochrane-Orcutt given a lower RMSE and a Durbin-Watson statistic closer to 2. The Prais-Winsten GLS model parameters and results are shown in Table 41.

Table 41: Prais-Winsten Generalized Least Squares (GLS) logged ex-vessel bluefish price model results.

[31] Gordon (2020), Bloznelis (2018) and Tai (2017) offer thorough reviews of various price models and their respective methods.

[32] Prices were adjusted to 2020 constant dollars using the Annual, Seasonally Adjusted, Gross Domestic Implicit Price Deflator (2012=100) https://fred.stlouisfed.org/series/GDPDEF.

[33] $\alpha = 0.01$

Variable	Coefficient	Standard Error	t	P>t	95% Confidence Interval	
Ln Landings	-0.543	0.0951	-5.71	0	-0.74	-0.35
Constant	7.753	1.435	5.40	0	4.78	10.73
ρ	0.688		**Durbin-Watson Statistic (original)**			0.72
R-squared	0.68		**Durbin-Watson Statistic (transformed)**			1.67
Number of Obs.	24		**Root Mean Square Error**			0.08

Both price and landings data were retrieved from the Commercial Fisheries Database (CFDERS) from 1996 to 2019. About 68% of the variability in logged average ex-vessel bluefish prices are explained by logged total annual landings. Modeling the inverse relationship between prices and landings aids in more precisely estimating revenues given various expected landing quantities. The logged price variables are retransformed using Duan's smearing method to avoid inciting heteroskedastic errors. Average realized ex-vessel prices and estimated prices by year are shown in Figure 30. Average annual predicted ex-vessel prices range from $0.55 to $0.98 per lb with an average price of $0.66/lb. Average realized prices range from $0.46 to $1.03/lb and average $0.66/lb across the time series.

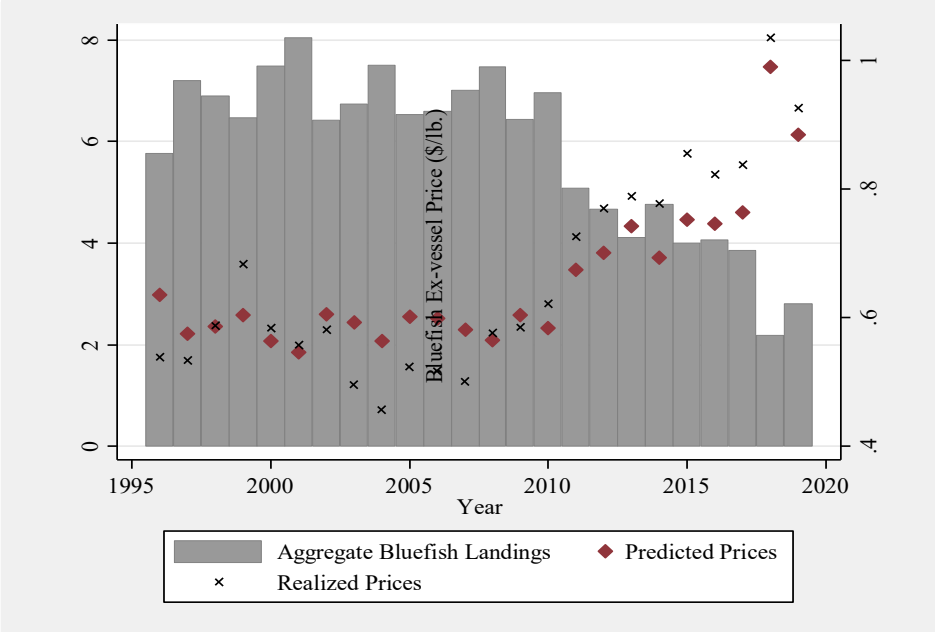

Figure 30: Realized and predicted ex-vessel bluefish prices and realized commercial bluefish landings by year (1996-2019).

APPENDIX II: SUPPLEMENTAL MINIMUM DEFAULT TABLES

Table 42: Bluefish state-by-state allocation percentage point shift along the U.S. Atlantic coast using different proposed time series and a minimum default allocation of 0.10% while incorporating a phase-in approach.

0.1% Minimum Default Allocation		Min. Def. Status quo			5 year (2014-2018) - 3a-2			10 year (2009-2018) - 3a-3			1/2 '81-'89 1/2 '09-'18 - 3a-4		
State	Current Allocations	4-year	5-year	7-year	4-year	5-year	7-year	4-year	5-year	7-year	4-year	5-year	7-year
ME	0.67%	0.02%	0.02%	0.01%	-0.14%	-0.11%	-0.08%	-0.14%	-0.11%	-0.08%	-0.02%	-0.02%	-0.01%
NH	0.41%	0.02%	0.02%	0.01%	-0.07%	-0.06%	-0.04%	-0.05%	-0.04%	-0.03%	0.00%	0.00%	0.00%
MA	6.72%	0.00%	0.00%	0.00%	0.97%	0.77%	0.55%	0.85%	0.68%	0.49%	0.23%	0.19%	0.13%
RI	6.81%	0.00%	0.00%	0.00%	1.23%	0.99%	0.70%	0.70%	0.56%	0.40%	0.19%	0.15%	0.11%
CT	1.27%	0.02%	0.02%	0.01%	0.00%	0.00%	0.00%	-0.05%	-0.04%	-0.03%	0.00%	0.00%	0.00%
NY	10.39%	-0.01%	-0.01%	-0.01%	2.43%	1.95%	1.39%	2.34%	1.87%	1.34%	0.63%	0.51%	0.36%
NJ	14.82%	-0.03%	-0.02%	-0.02%	-0.91%	-0.73%	-0.52%	-0.24%	-0.19%	-0.14%	-0.09%	-0.07%	-0.05%
DE	1.88%	0.02%	0.01%	0.01%	-0.30%	-0.24%	-0.17%	-0.35%	-0.28%	-0.20%	-0.08%	-0.07%	-0.05%
MD	3.00%	0.01%	0.01%	0.01%	-0.36%	-0.29%	-0.20%	-0.27%	-0.22%	-0.15%	-0.06%	-0.05%	-0.04%
VA	11.88%	-0.02%	-0.01%	-0.01%	-1.81%	-1.45%	-1.03%	-1.50%	-1.20%	-0.86%	-0.41%	-0.33%	-0.24%
NC	32.06%	-0.09%	-0.07%	-0.05%	-0.09%	-0.07%	-0.05%	-0.01%	-0.01%	0.00%	-0.07%	-0.06%	-0.04%
SC	0.04%	0.02%	0.02%	0.01%	0.02%	0.01%	0.01%	0.02%	0.01%	0.01%	0.02%	0.02%	0.01%
GA	0.01%	0.02%	0.02%	0.01%	0.02%	0.02%	0.01%	0.02%	0.02%	0.01%	0.02%	0.02%	0.01%
FL	10.06%	-0.01%	-0.01%	-0.01%	-0.99%	-0.80%	-0.57%	-1.32%	-1.06%	-0.75%	-0.37%	-0.30%	-0.21%

Table 43: Bluefish state-by-state allocation percentage point shift along the U.S. Atlantic coast using different proposed time series and a minimum default allocation of 0.25% while incorporating a phase-in approach.

0.25% Minimum Default Allocation		Min. Def. Status quo			5 year (2014-2018) - 3a-2			10 year (2009-2018) - 3a-3			1/2 '81-'89 1/2 '09-'18 - 3a-4		
State	Current Allocations	4-year	5-year	7-year	4-year	5-year	7-year	4-year	5-year	7-year	4-year	5-year	7-year
ME	0.67%	0.06%	0.05%	0.03%	-0.10%	-0.08%	-0.06%	-0.10%	-0.08%	-0.06%	0.01%	0.01%	0.01%
NH	0.41%	0.06%	0.05%	0.03%	-0.03%	-0.03%	-0.02%	-0.01%	-0.01%	-0.01%	0.04%	0.03%	0.02%
MA	6.72%	0.00%	0.00%	0.00%	0.95%	0.76%	0.54%	0.83%	0.67%	0.48%	0.23%	0.18%	0.13%
RI	6.81%	0.00%	0.00%	0.00%	1.21%	0.97%	0.69%	0.69%	0.55%	0.39%	0.19%	0.15%	0.11%
CT	1.27%	0.05%	0.04%	0.03%	0.03%	0.02%	0.02%	-0.01%	-0.01%	-0.01%	0.03%	0.03%	0.02%
NY	10.39%	-0.03%	-0.02%	-0.02%	2.36%	1.89%	1.35%	2.27%	1.82%	1.30%	0.60%	0.48%	0.34%
NJ	14.82%	-0.07%	-0.05%	-0.04%	-0.93%	-0.75%	-0.53%	-0.28%	-0.22%	-0.16%	-0.13%	-0.10%	-0.07%
DE	1.88%	0.05%	0.04%	0.03%	-0.27%	-0.21%	-0.15%	-0.31%	-0.25%	-0.18%	-0.05%	-0.04%	-0.03%
MD	3.00%	0.04%	0.03%	0.02%	-0.33%	-0.26%	-0.19%	-0.24%	-0.19%	-0.14%	-0.04%	-0.03%	-0.02%
VA	11.88%	-0.04%	-0.03%	-0.02%	-1.79%	-1.43%	-1.02%	-1.50%	-1.20%	-0.86%	-0.43%	-0.34%	-0.25%
NC	32.06%	-0.22%	-0.17%	-0.12%	-0.22%	-0.17%	-0.12%	-0.14%	-0.11%	-0.08%	-0.20%	-0.16%	-0.12%
SC	0.04%	0.06%	0.05%	0.04%	0.05%	0.04%	0.03%	0.05%	0.04%	0.03%	0.06%	0.05%	0.03%
GA	0.01%	0.06%	0.05%	0.04%	0.06%	0.05%	0.03%	0.06%	0.05%	0.03%	0.06%	0.05%	0.04%
FL	10.06%	-0.03%	-0.02%	-0.01%	-0.99%	-0.79%	-0.57%	-1.31%	-1.05%	-0.75%	-0.38%	-0.30%	-0.22%

Table 44: Bluefish state allocations above a trigger threshold for all commercial allocation time series and a minimum default allocation of 0.10%.

Allocation of additional quota beyond the trigger threshold with a Minimum Default Allocation of 0.10%.				
State	**Status quo (1981-1989)**	**5 year (2014-2018)**	**10 year (2009-2018)**	**1/2 '81-'89 1/2 '09-'18**
ME	0.10%	0.10%	0.10%	0.10%
NH	0.10%	0.10%	0.10%	0.10%
MA	7.50%	16.60%	18.88%	7.50%
RI	7.50%	16.60%	7.50%	7.50%
CT	3.00%	3.00%	3.00%	3.00%
NY	15.12%	16.60%	18.88%	17.03%
NJ	15.12%	16.60%	18.88%	17.03%
DE	3.00%	0.10%	0.10%	3.00%
MD	3.00%	3.00%	3.00%	3.00%
VA	15.12%	3.00%	7.50%	17.03%
NC	15.12%	16.60%	18.88%	17.03%
SC	0.10%	0.10%	0.10%	0.10%
GA	0.10%	0.10%	0.10%	0.10%
FL	15.12%	7.50%	3.00%	7.50%
Total	100%	100%	100%	100%

Table 45: Bluefish state allocations above a trigger threshold for all commercial allocation time series and a minimum default allocation of 0.25%.

Allocation of additional quota beyond the trigger threshold with a Minimum Default Allocation of 0.25%.				
State	**Status quo (1981-1989)**	**5 year (2014-2018)**	**10 year (2009-2018)**	**1/2 '81-'89 1/2 '09-'18**
ME	0.10%	0.10%	0.10%	0.10%
NH	0.10%	0.10%	0.10%	0.10%
MA	7.50%	16.60%	18.88%	7.50%
RI	7.50%	16.60%	7.50%	7.50%
CT	3.00%	3.00%	3.00%	3.00%
NY	17.03%	16.60%	18.88%	17.03%
NJ	17.03%	16.60%	18.88%	17.03%
DE	3.00%	0.10%	0.10%	3.00%
MD	3.00%	3.00%	3.00%	3.00%
VA	17.03%	3.00%	7.50%	17.03%
NC	17.03%	16.60%	18.88%	17.03%
SC	0.10%	0.10%	0.10%	0.10%
GA	0.10%	0.10%	0.10%	0.10%
FL	7.50%	7.50%	3.00%	7.50%

Total	100%	100%	100%	100%

APPENDIX III: ACRONYMS AND ABBREVIATIONS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ACS	American Community Survey
AM	Accountability Measure
AP	Advisory Panel
ASMFC	Atlantic States Marine Fisheries Commission
Board	The Commission's Bluefish Management Board
Commission	Atlantic States Marine Fisheries Commission
Council	Mid-Atlantic Fishery Management Council
CSVI	Community Social Vulnerability Index
EEZ	Economic Exclusive Zone
EFH	Essential Fish Habitat
FMAT	Fishery Management Action Team
FMP	Fishery Management Plan
MC	Monitoring Committee
MAB	Mid-Atlantic Bight
MRFSS	Marine Recreational Fishery Statistics Survey
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevenson Act
NEFSC	Northeast Fisheries Science Center
PCFA	Principle Components Factor Analysis
PDT	Plan Development Team
PRT	Plan Review Team
RHL	Recreational Harvest Limit
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
SFA	Sustainable Fisheries Act
TAL	Total Allowable Landings
VTR	Vessel Trip Report