



Chub Mackerel Amendment

Public Hearing Document

November 2018



How to Provide Comments

Written comments should be submitted by 11:59 pm on January 18, 2019, through one of the following methods:

- **Email** to Julia Beaty, Fishery Management Specialist, at jbeaty@mafmc.org
- Through an **online form** at: <http://www.mafmc.org/comments/chub-mackerel-amendment>
- **Mail** to Dr. Chris Moore, Executive Director, Mid-Atlantic Fishery Management Council, 800 North State Street, Suite 201, Dover, DE, 19901
- **Fax** to Dr. Chris Moore, Executive Director, Mid-Atlantic Fishery Management Council at 302-674-5399

Oral or written comments may be submitted at the following public hearings:

- **Virginia Beach, VA. December 3, 2018**, 6:00 - 7:30 pm. Hilton Garden Inn Virginia Beach Oceanfront. 3315 Atlantic Avenue, Virginia Beach, VA 23451.
- **Berlin, MD. December 4, 2018**, 6:00 - 7:30 pm. Worcester County Library - Ocean Pines Branch. 11107 Cathell Road, Berlin, MD 21811
- **Narragansett, RI. December 17, 2018**, 6:00 - 7:30 pm. URI Bay Campus Corless Auditorium. 215 South Ferry Road, Narragansett, RI 02882.
- **Cape May, NJ. December 18, 2018**, 6:00 - 7:30 pm. Congress Hall Hotel. 200 Congress Place, Cape May, NJ 08204.
- **Webinar. January 14, 2019**, 6:00 - 7:30 pm. Connection information is available at <http://www.mafmc.org/council-events/>

For more information and to sign up to receive email updates on this amendment, visit www.mafmc.org/actions/chub-mackerel-amendment

SUMMARY

The Mid-Atlantic Fishery Management Council (Council) is developing this amendment to consider adding Atlantic chub mackerel (*Scomber colias*) as “stock in the fishery” in the Mackerel, Squid, and Butterfish Fishery Management Plan (FMP).

Several types of management measures are required for stocks in the fishery, including:

- Acceptable biological catch limits (ABCs), which serve as the upper bound for total catch and are intended to prevent overfishing.
- Annual catch limits (ACLs), which cannot exceed the ABC and serve as the basis for triggering accountability measures.
- Accountability measures, which are measures intended to prevent ACLs from being exceeded and measures that correct or mitigate for ACL overages when they occur.

The Council must also define status determination criteria, essential fish habitat, and the management unit for stocks in the fishery. Additional alternatives related to commercial and recreational annual catch targets, permitting requirements, and the specifications process are also under consideration. All alternatives under consideration are summarized in Table 1 and described in more detail in section 8 of this document. The Council has determined that certain management measures will not be considered through this action, though they may be considered through future actions. These alternatives are listed in section 9.

A targeted chub mackerel fishery developed in the Mid-Atlantic and Southern New England in recent years. A small number of vessels are responsible for most chub mackerel landings. These vessels do not target chub mackerel every year. Availability of *Illex* squid appears to be the most influential determinant of commercial chub mackerel harvest in a given year. Section 5 describes commercial and recreational chub mackerel fisheries from Maine through Florida.

The Council implemented the first management measures for chub mackerel in U.S. Atlantic waters through the Unmanaged Forage Omnibus Amendment. These measures will expire after December 31, 2020 (section 6). The management measures developed through this action are meant to replace those measures.

The Council is seeking public input on all aspects of this amendment. The Council plans to consider public input and select preferred management alternatives in early 2019. The Council will recommend their preferred alternatives to the National Marine Fisheries Service (NMFS). NMFS will complete a rule-making process and implement the Council’s recommendations if they are approved. The rule-making process will be subject to an additional public comment period.

Table 1: Management alternatives considered through this amendment. “Required” indicates measures required under the Magnuson-Stevens Fishery Conservation and Management Act. “Discretionary” indicates measures that are not required.

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| <ul style="list-style-type: none"> • Alternative 1: No action • Alternative 2: Manage chub mackerel as a stock in the Mackerel, Squid, Butterfish FMP <ul style="list-style-type: none"> ○ Process for determining status determination criteria, MSY, OY, ABCs, and ACLs ○ EFH ○ Alternative set 2.A: Specifications process (<i>discretionary</i>) <ul style="list-style-type: none"> ▪ Alternative 2.A.i: No action on specifications ▪ Alternative 2.A.ii: Atlantic mackerel, squid, and butterfish specifications process ○ Alternative set 2.B: Management unit (<i>required</i>) <ul style="list-style-type: none"> ▪ Alternative 2.B.i: ME through east coast of FL ▪ Alternative 2.B.ii: ME - NC with expected catch from SC - FL subtracted from ABC ○ Alternative set 2.C: Separation of commercial and recreational catch limits (<i>discretionary</i>) <ul style="list-style-type: none"> ▪ Alternative 2.C.i: No separation of commercial and recreational catch limits ▪ Alternative 2.C.ii: Division of ACL into commercial and recreational ACTs ○ Alternative set 2.D: Accountability measures (AMs; <i>required</i>) <ul style="list-style-type: none"> ▪ Alternative set 2.D.i: Alternatives for in-season commercial fishery closures <ul style="list-style-type: none"> • Alternative 2.D.i.a: Closure when 100% of the quota is landed • Alternative 2.D.i.b: Closure when 95% of the quota is landed • Alternative 2.D.i.c: Closure when 90% of the quota is landed ▪ Alternative Set 2.D.ii: Possession limit when commercial fishery is closed due to an AM <ul style="list-style-type: none"> • Alternative 2.D.ii.a: No possession • Alternative 2.D.ii.b: 1,000 pound possession limit • Alternative 2.D.ii.c: 10,000 pound possession limit • Alternative 2.D.ii.d: 40,000 pound possession limit ▪ ACL overage payment requirements ○ Alternative set 2.E: Permitting requirements (<i>discretionary</i>) <ul style="list-style-type: none"> ▪ Alternative set 2.E.i: Commercial permit requirements <ul style="list-style-type: none"> • Alternative 2.E.i.a: No action on commercial permit requirements • Alternative 2.E.i.b: Require any GARFO commercial fishing permit • Alternative 2.E.i.c: Require any GARFO commercial mackerel, squid, butterfish permit • Alternative 2.E.i.d: Create a new commercial chub mackerel permit ▪ Alternative set 2.E.ii: Party/charter permit requirements <ul style="list-style-type: none"> • Alternative 2.E.ii.a: No action on party/charter permit requirements • Alternative 2.E.ii.b: Require any GARFO party/charter permit • Alternative 2.E.ii.c: Require a GARFO mackerel, squid, butterfish party/charter permit • Alternative set 3: Catch and landings limits for upcoming years <ul style="list-style-type: none"> ○ Alternative 3.A.: OY = ABC ○ Alternative 3.B: OY is less than ABC ○ Landings limit(s) = ACT(s) - expected discards • Management measures not under consideration in this action <ul style="list-style-type: none"> ○ Forage ABC risk policy ○ Recreational management measures ○ Commercial possession limit prior to in-season closure, minimum fish size, or gear restrictions ○ Limited access ○ Spatial/temporal management to benefit chub mackerel predators ○ Framework actions |
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Table of Contents

| | |
|--|----|
| SUMMARY | 2 |
| 1. INTRODUCTION | 5 |
| 2. CHUB MACKEREL BIOLOGY, LIFE HISTORY, AND STATUS OF THE STOCK..... | 6 |
| 3. DATA LIMITATIONS | 9 |
| 4. ECOSYSTEM CONSIDERATIONS | 9 |
| 5. U.S. ATLANTIC FISHERIES | 9 |
| 6. CURRENT CHUB MACKEREL MANAGEMENT MEASURES | 15 |
| 7. ACCEPTABLE BIOLOGICAL CATCH (ABC) FOR UPCOMING YEARS | 15 |
| 8. MANAGEMENT ALTERNATIVES CONSIDERED THROUGH THIS AMENDMENT | 15 |
| 9. MANAGEMENT MEASURES NOT CONSIDERED THROUGH THIS AMENDMENT | 27 |
| 10. POTENTIAL IMPACTS OF ALTERNATIVES | 30 |

LIST OF ACRONYMS

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|------------------|--|
| ABC | Acceptable Biological Catch |
| ACL | Annual Catch Limit |
| ACT | Annual Catch Target |
| AM | Accountability Measure |
| B | Biomass |
| B _{MSY} | Biomass at Maximum Sustainable Yield |
| CFR | Code of Federal Regulations |
| Council | Mid-Atlantic Fishery Management Council |
| EAFM | Ecosystem Approach to Fisheries Management |
| EEZ | Exclusive Economic Zone |
| EFH | Essential Fish Habitat |
| FMP | Fishery Management Plan |
| GARFO | NMFS Greater Atlantic Regional Fisheries Office |
| MAFMC | Mid-Atlantic Fishery Management Council |
| MRIP | Marine Recreational Information Program |
| MSA | Magnuson-Stevens Fishery Conservation and Management Act |
| MSY | Maximum Sustainable Yield |
| NEFSC | Northeast Fisheries Science Center |
| NMFS | National Marine Fisheries Service |
| OFL | Overfishing Limit |
| OY | Optimum Yield |
| RHL | Recreational Harvest Limit |
| SSC | Scientific and Statistical Committee |
| VTR | Vessel Trip Report |

1. INTRODUCTION

The Mid-Atlantic Fishery Management Council (Council) is developing this amendment to consider adding Atlantic chub mackerel (*Scomber colias*) as “stock in the fishery” in the Mackerel, Squid, and Butterfish Fishery Management Plan (FMP). The Council is seeking public input on all aspects of this amendment.

1.1. WHAT IS A “STOCK IN THE FISHERY”?

A “stock in the fishery” is a fish stock managed in an FMP in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requirements for stocks in need of “conservation and management”. These requirements include an evaluation and description of maximum sustainable yield (MSY), optimum yield (OY), “specific objective and measurable criteria for identifying when the fishery...is overfished” (also known as status determination criteria), a control rule for acceptable biological catch (ABC), mechanisms for specifying annual catch limits (ACLs) in relation to the ABC, accountability measures (AMs) for when the ACLs are exceeded, and descriptions of essential fish habitat (EFH) for all life stages. These measures are described in more detail in section 8 of this document.

The National Standard Guidelines list several considerations for determining if a stock is in need of conservation and management under the MSA (i.e., if the stock should be managed as a stock in the fishery). The guidelines state that “any stocks that are predominately caught in Federal waters and are overfished or subject to overfishing, or likely to become overfished or subject to overfishing, are considered to require conservation and management.” Councils may also determine that stocks which do not meet these criteria require conservation and management as stocks in an FMP. In such cases, the following list of 10 non-exhaustive factors should be considered. One or more of the factors, and any additional relevant considerations may provide the basis for determining that a stock requires conservation and management in an FMP (as described in the regulations at 50 CFR 600.305 (c)).

- (i) The stock is an important component of the marine environment*
- (ii) The stock is caught by the fishery.*
- (iii) Whether an FMP can improve or maintain the condition of the stock.*
- (iv) The stock is a target of a fishery.*
- (v) The stock is important to commercial, recreational, or subsistence users.*
- (vi) The fishery is important to the Nation or to the regional economy.*
- (vii) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.*
- (viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization.*
- (ix) The needs of a developing fishery, and whether an FMP can foster orderly growth.*
- (x) The extent to which the fishery is already adequately managed by states, by state/Federal programs, or by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law.*

Councils also have the option of managing stocks as ecosystem components. Councils may develop management measures for ecosystem components; however, they are not required to develop all the measures required for stocks in need of conservation and management. The Mid-Atlantic Council has determined that the ecosystem component designation is not appropriate for chub mackerel given the scale of the existing fishery (section 5).

1.2. AMENDMENT GOALS AND OBJECTIVES

The Council approved the following draft goals and objectives for this amendment:

- *Goal 1:* Maintain a sustainable chub mackerel stock.
 - *Objective 1.1:* Prevent overfishing and achieve and maintain sustainable biomass levels that achieve optimum yield in the fisheries and meet the needs of chub mackerel predators.
 - *Objective 1.2:* Consider and account for, to the extent practicable, the role of chub mackerel in the ecosystem, including its role as prey, as a predator, and as food for humans.
- *Goal 2:* Optimize economic and social benefits from utilization of chub mackerel, balancing the needs and priorities of different user groups.
 - *Objective 2.1:* Allow opportunities for commercial and recreational chub mackerel fishing, considering the opportunistic nature of the fisheries, changes in availability that may result from changes in climate and other factors, and the need for operational flexibility.
 - *Objective 2.2:* To the extent practicable, minimize additional limiting restrictions on the *Illex* squid fishery.
 - *Objective 2.3:* Balance social and economic needs of various sectors of the chub mackerel fisheries (e.g., commercial, recreational, regional) and other fisheries, including recreational fisheries for highly migratory species.
- *Goal 3:* Support science, monitoring, and data collection to enhance effective management of chub mackerel fisheries.
 - *Objective 3.1:* Improve data collection to better understand the status of the chub mackerel stock, the role of chub mackerel in the ecosystem, and the biological, ecological, and socioeconomic impacts of management measures, including impacts to other fisheries.
 - *Objective 3.2:* Promote opportunities for industry collaboration on research.

2. CHUB MACKEREL BIOLOGY, LIFE HISTORY, AND STATUS OF THE STOCK

Atlantic chub mackerel are a schooling pelagic species. They are found on the continental shelf to depths of about 250-300 meters throughout much of the western and eastern Atlantic Ocean. They can be found throughout U.S. Atlantic waters (Collette and Nauen 1983, Collette 2002). However, they are not commonly encountered in the Northeast Fisheries Science Center's (NEFSC's) bottom trawl survey. Most chub mackerel catches in this survey occur south of the Hudson Shelf Valley in warm water temperatures (i.e., generally higher than about 20°C or about 68°F; Figure 1; personal communication, John Manderson, Michele Traver, and Chris Tholke, NEFSC). State trawl surveys and recreational catch data suggest that chub mackerel are also found in inshore waters.

The stock structure of chub mackerel in the western Atlantic Ocean has not been well studied. Studies from other regions suggest, based on differences in morphology, spawning seasons, and/or sizes at maturity, that sub-stocks may exist (Hernández and Ortega 2000, Chen et al. 2009, Weber and McClatchie 2012, Cerna and Plaza 2014, Yasuda et al. 2014). However, chub mackerel are genetically uniform across wide areas (Scoles et al. 1998, Hernández and Ortega 2000, Zardoya et al. 2004). For example, Scoles et al. (1998) found no significant genetic differentiation between chub mackerel from the eastern Mediterranean Sea, the Ivory Coast, and South Africa; however, they did find significant genetic differentiation between chub mackerel from the western and eastern Atlantic.

Migratory patterns in the western North Atlantic are also not well understood. In the northern hemisphere, chub mackerel migrate between northern areas in warmer months and southern areas in cooler months (Collette and Nauen 1983). Adults prefer temperatures of 15-20°C (about 60-70°F; Collette and Nauen 1983, Perrotta et al. 2001). Some studies suggest that juveniles tend to be found closer inshore than adults (Hernández and Ortega 2000, Castro 1993).

Atlantic chub mackerel grow rapidly during the first year of life (Hernández and Ortega 2000, Perrotta et al. 2005, Velasco et al. 2011, Daley 2018). They can reach at least age 13 (Carvalho et al. 2002). Daley (2018) found that ages 2 - 4 were most common in commercial fishery catches off the northeast U.S.

Atlantic chub mackerel spawn in several batches (Collette and Nauen 1983). Spawning areas likely occur from North Carolina through the Gulf of Mexico (Figure 2; Houde et al. 1976, Berrien 1978, Houde et al. 1978, Richardson et al. 2010, Daley 2018). Daley (2018) suggested that chub mackerel reach maturity around age two, though other studies have published a range of ages at maturity (e.g., Hernández and Ortega 2000).

Chub mackerel are opportunistic predators with a seasonally-variable diet of small crustaceans (especially copepods), small fish, and squid (Collette and Nauen 1983, Castro and Del Pino 1995, Server et al. 2006). Adults tend to consume larger prey and more fish prey than juveniles (Castro 1993).

Limited quantitative estimates of the contribution of chub mackerel to the diets of any predator species are available. This is likely due in part to the difficulty of visually distinguish partially-digested chub mackerel from related species such as Atlantic mackerel (*Scomber scomber*), bullet mackerel (*Auxis rochei*), and frigate mackerel (*Auxis thazard*; Paine et al. 2007; personal communication with John Graves, Steve Poland, and Michelle Staudinger). Manooch et al. (1984) found that chub mackerel made up 0.2% (by frequency of occurrence) of the diets of dolphinfish sampled off North Carolina through Texas. Chub mackerel have also been documented as important prey for blue marlin at certain times of year off Portugal (Veiga et al. 2011) and Cabo San Lucas (Abitia-Cardenas et al. 1999).

The stock status of chub mackerel in the western Atlantic Ocean is unknown as there have been no quantitative assessments of this species in this region. Large fluctuations in abundance have been reported around the world, including in the mid-Atlantic and New England (Goode 1884, Hernández and Ortega 2000). These fluctuations may be partly the result of environmental influences such as temperature and upwelling strength on recruitment (Hernández and Ortega 2000). Given that chub mackerel are a fully pelagic species, ocean processes likely influence their availability in any given area, as well as their recruitment.

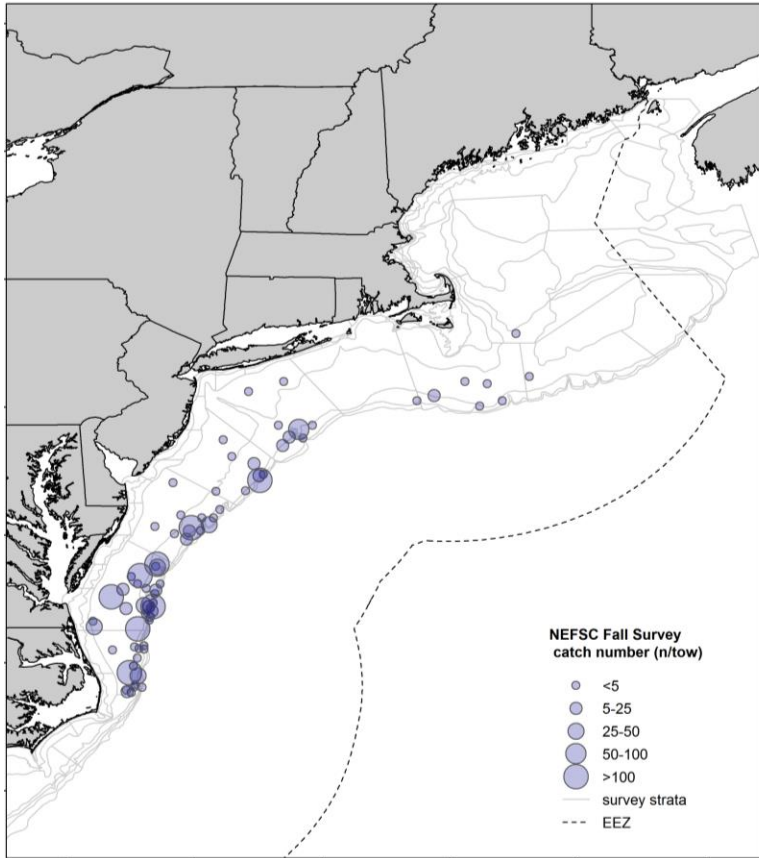


Figure 1: NEFSC fall survey chub mackerel catch in numbers per tow, 1963-2016 (source: Michele Traver and Chris Tholke, NEFSC, personal communication).

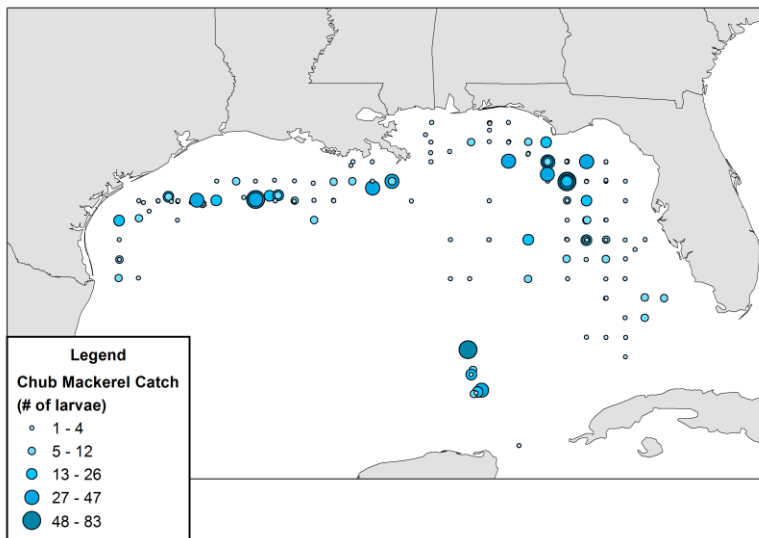


Figure 2: Southeast Area Monitoring and Assessment Program larval survey catches of chub mackerel larvae, 1983-2014.

3. DATA LIMITATIONS

Scientific experts on the Council’s Scientific and Statistical Committee (SSC) and the Chub Mackerel Fishery Management Action Team reviewed the available data and concluded that chub mackerel are so data poor that even stock assessment methods designed for data poor stocks would not be appropriate for this species. Major concerns regarding the ability to assess the status of the stock include low and sporadic catches in fisheries independent surveys; only a few years of directed fishing effort; the influence of factors other than abundance on fishery and survey catch per unit effort (e.g., temperature, price and availability of substitute species); limited data on age structure, growth, and maturity in U.S. Atlantic waters; and uncertainty regarding stock structure in U.S. waters. Fishery catch per unit effort has not been thoroughly analyzed and will be challenging to assess due to the significant overlap between the chub mackerel and *Illex* squid fisheries (section 5.1).

4. ECOSYSTEM CONSIDERATIONS

Physical, biological, ecological, social, and economic factors interact in complex ways to drive the dynamics of marine ecosystems. All these factors should be considered in an ecosystem approach to fisheries management (EAFM). EAFM attempts to manage fisheries to achieve optimum yield by taking these interactions into account. The goal of EAFM is to manage for ecologically sustainable utilization of living marine resources while maintaining ecosystem productivity, structure, and function (MAFMC 2016b).

In 2016, the Council adopted a policy of supporting the “maintenance of an adequate forage base in the mid-Atlantic to ensure ecosystem productivity, structure and function, and to support sustainable fishing communities” (MAFMC 2016b). Chub mackerel are both a forage species and a predator of other forage species (Okey et al. 2014). As previously stated, limited data are available to assess the role of chub mackerel as prey supporting the health of specific predators. Changes in prey aggregations may or may not result in significant changes in the vital rates of predators. Predator aggregations on specific prey can facilitate commercial and/or recreational fisheries for those predators. This can lead to human user group conflicts reflecting competing interests that may be independent of ecological impacts of the multispecies interactions. Thus, multispecies interactions can include ecological dimensions related to the health of marine populations and human dimensions related to competing human uses. These problems can be difficult to tease apart without a scientific evaluation of the ecological role of prey species, which may vary in importance by year, season, location, availability of other prey species, and other factors.

Optimal management of forage species ultimately depends on tradeoffs between their direct and indirect harvest value in economic markets and other ecosystem services they provide to “natural” and human dimensions of the ecosystem. Assessing these trade-offs requires consideration of factors such as the species ecology and uses of and substitutes for these species within the economy. Cultural and social preferences play a role in assessments of such tradeoffs.

5. U.S. ATLANTIC FISHERIES

This section summarizes commercial and recreational chub mackerel catches over the past 20 years (i.e., 1998 - 2017), with a focus on Maine through the east coast of Florida. Landings in the Gulf of Mexico are not insignificant, averaging 90,790 pounds of commercial landings and 88,615 pounds of recreational landings per year during 1998-2017 according to data from commercial fish dealers and the Marine Recreational Information Program (MRIP). However, given the SSC’s ABC recommendation

(section 7), this amendment does not consider management measures for chub mackerel in the Gulf of Mexico and focuses instead on fisheries along the Atlantic coast.

5.1. COMMERCIAL CHUB MACKEREL FISHERIES IN THE U.S. ATLANTIC

Chub mackerel have been caught as bycatch in the *Illex* squid fishery in the Mid-Atlantic for many years. In 2003, the National Marine Fisheries Service funded a study through the Saltonstall-Kennedy grant program to evaluate whether a sufficient abundance exists to sustain a chub mackerel fishery as an alternative to the *Illex* squid fishery in years when *Illex* are not available. The study concluded that a viable fishery is possible, though barriers exist, such as a mismatch between the horsepower of existing vessels and the fast swimming speed of the fish (Haskin Shellfish Research Laboratory 2004). Since that time, the fishery has become more established, though it remains an alternative to the *Illex* squid fishery.

Commercial chub mackerel landings increased notably in 2013 (Figure 3, Table 2). This increase is the result of a small number of trawl vessels targeting chub mackerel in some years. These vessels also participate in the *Illex* squid fishery. Some fishermen describe chub mackerel as a “bailout” species which they sometimes target when they are not able to harvest *Illex* squid. Chub mackerel tend to be harvested in the same areas and times of year when *Illex* squid are harvested; however, fishermen say they typically will not harvest both species at the same time because the quality of both species suffers when they are stored together.

According to public comments, a small number of vessels on the east coast are large and fast enough to harvest this fast-swimming, low-value (Table 3) species in profitable quantities. Some fishermen have also said that, due to their preference for warm water, chub mackerel need to be stored in refrigerated sea water or frozen at sea. Few vessels on the east coast currently have these capabilities. Landings data seem to support these statements.

During 1998-2017, a total of 64 dealers across five east coast states purchased chub mackerel. In any given year, a maximum of 12 dealers across four states purchased chub mackerel. Northeast dealer data indicate that as many as 29 vessels per year landed chub mackerel in the mid-Atlantic and southern New England. Southeast landings data are not compiled in a manner that allows for determination of the number of vessels which landed chub mackerel in that region.

According to dealer data, about 96% of the chub mackerel landed by commercial fishermen from Maine through the east coast of Florida from 1998 through 2017 were caught with bottom otter trawls. Bottom otter trawls accounted for at least 95% of the landings in each state, with the exception of Florida and New York. Trawl gear is banned in Florida state waters. About 38% of the landings in Florida were caught with cast nets, 28% with purse seines, and 25% with hand lines. About 37% of the landings in New York were caught with gillnets. New York is the only state with notable amounts of landings (40%) associated with an unknown gear type in the dealer data.

Nearly all commercial chub mackerel landings (>97%) from Maine through the east coast of Florida over the past 20 years occurred during June-October. The highest proportion of landings occurred in September (37%). June, July, August, and October contributed about equally to commercial landings (13-16%).

According to northeast observer data, during 1998-2017, about 93% of the observed chub mackerel catch was kept and about 7% was discarded. Vessel trip report (VTR) data show that 97% of the catch was kept and 3% was discarded. According to observer data, most chub mackerel discards (about 84%) occurred due to a lack of market.

According to VTR data, over 90% of the landings originated from statistical areas south of New York. Much of these landings came from statistical areas which overlap with the shelf break (Figure 4). About 80% of landings in the northeast (i.e., Maine through North Carolina) resulted from catch at about 50-100 fathoms depth according to VTR, NEFSC study fleet, and northeast observer data. The location of catches from South Carolina through Florida has not been thoroughly analyzed. Over the past 20 years (1998 - 2017), less than 1% of coast-wide commercial landings occurred in South Carolina through Florida.

Public comments suggest that most chub mackerel landed on the east coast are processed for use as human food, much of which is shipped overseas, and lesser amounts are used as bait in other fisheries (e.g., section 5.2).

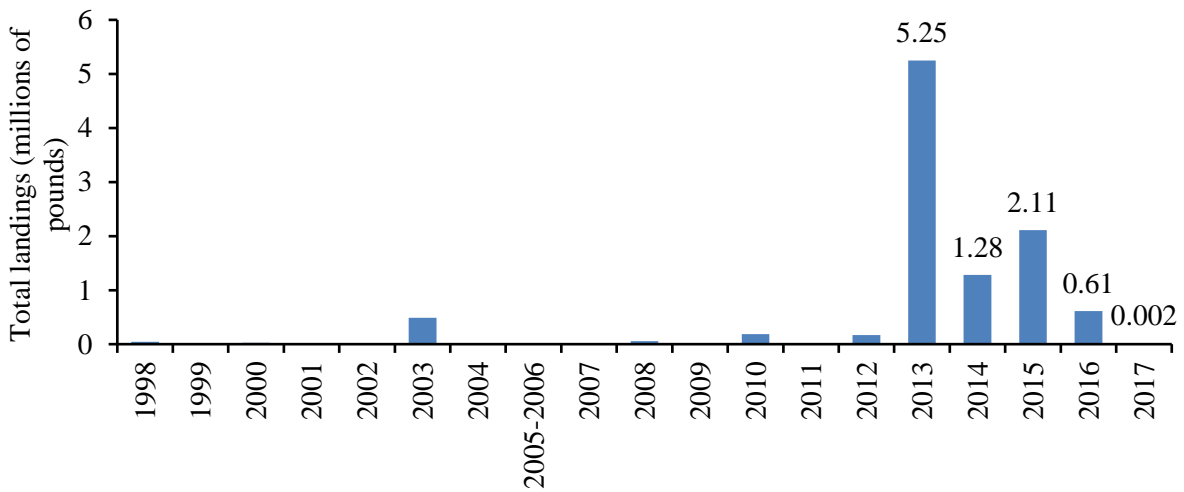


Figure 3: Annual commercial and recreational chub mackerel landings from Maine through the east coast of Florida, as shown in commercial dealer and MRIP data. Landings in some years are combined to protect confidential data representing fewer than three vessels and/or dealers.

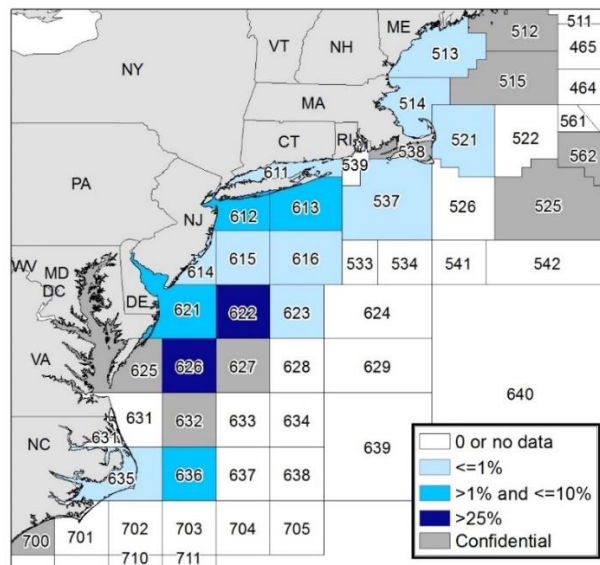


Figure 4: Percent of commercial chub mackerel landings (by weight) by statistical area, 1998-2017 as shown in northeast Vessel Trip Report data. Data associated with fewer than three vessels and/or dealers are confidential. Confidential landings collectively accounted for less than 10% of the total.

Table 2: Annual commercial and recreational chub mackerel landings from Maine through the east coast of Florida, in pounds. Landings in some years are combined to protect confidential data representing fewer than three vessels and/or dealers.

| Year | Commercial landings (dealer data) | MRIP-estimated recreational harvest¹ | Alternative recreational harvest estimate² | Total landings using MRIP recreational estimates | Total landings using alternative MRIP recreational estimates |
|-------------|--|--|--|---|---|
| 1998 | 43,569 | 3,170 | 3,170 | 46,739 | 46,739 |
| 1999 | 8,033 | 0 | 0 | 8,033 | 8,033 |
| 2000 | 16,254 | 6,991 | 6,991 | 23,245 | 23,245 |
| 2001 | 4,457 | 0 | 0 | 4,457 | 4,457 |
| 2002 | 705 | 0 | 42,046 | 705 | 42,751 |
| 2003 | 488,338 | 0 | 0 | 488,338 | 488,338 |
| 2004 | 168 | 0 | 1,978 | 168 | 2,146 |
| 2005-2006 | 202 | 0 | 0 | 202 | 202 |
| 2007 | 729 | 0 | 0 | 729 | 729 |
| 2008 | 54,855 | 0 | 0 | 54,855 | 54,855 |
| 2009 | 117 | 0 | 0 | 117 | 117 |
| 2010 | 186,666 | 0 | 388 | 186,666 | 187,054 |
| 2011 | 6,034 | 356 | 76,915 | 6,390 | 82,949 |
| 2012 | 165,402 | 0 | 0 | 165,402 | 165,402 |
| 2013 | 5,250,807 | 0 | 0 | 5,250,807 | 5,250,807 |
| 2014 | 1,230,953 | 48,087 | 48,087 | 1,279,040 | 1,279,040 |
| 2015 | 2,108,343 | 0 | 0 | 2,108,343 | 2,108,343 |
| 2016 | 610,825 | 2,092 | 2,092 | 612,917 | 612,917 |
| 2017 | 2,202 | 13,262 | 13,262 | 15,464 | 15,464 |

¹ MRIP-estimated annual harvest in weight should be considered minimum values which may not be reflective of the actual harvest in weight. For more information on MRIP estimates of harvest in weight, see: <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/glossary>

² The alternative harvest estimates were calculated by Council staff by multiplying the MRIP values for harvest in numbers of fish in Florida by the average weight per chub mackerel recorded by MRIP samplers across the Atlantic coast during 1998 - 2017 (i.e., 1.00178722 pounds per fish, based on 16 fish). Florida is the only state with MRIP-estimated harvest in numbers but not in weight during 1998-2017.

Table 3: Total commercial landings (in pounds) from Maine through the east coast of Florida and average price per pound for chub mackerel and *Illex* squid. Prices are adjusted to 2017 prices based on the gross domestic product deflator index. Landings in some years are combined to protect confidential data representing fewer than three vessels and/or dealers.

| Year | Chub mackerel landings | Avg. chub mackerel price per pound | <i>Illex</i> squid landings | Avg. <i>Illex</i> squid price per pound |
|-----------------------------|------------------------|------------------------------------|-----------------------------|---|
| 1998 | 43,569 | \$0.13 | 51,958,751 | \$0.13 |
| 1999 | 8,033 | \$0.24 | 16,289,021 | \$0.17 |
| 2000 | 16,254 | \$0.23 | 19,866,592 | \$0.13 |
| 2001 | 4,457 | \$0.72 | 8,837,567 | \$0.16 |
| 2002 | 705 | \$0.29 | 6,061,729 | \$0.18 |
| 2003 | 488,338 | \$0.04 | 14,090,521 | \$0.22 |
| 2004 | 168 | \$0.43 | 57,534,687 | \$0.23 |
| 2005-2006 | 202 | \$0.48 | 57,266,469 | \$0.24 |
| 2007 | 729 | \$0.32 | 19,889,858 | \$0.17 |
| 2008 | 54,855 | \$0.10 | 35,054,428 | \$0.21 |
| 2009 | 117 | \$0.87 | 40,605,638 | \$0.21 |
| 2010 | 186,666 | \$0.14 | 34,887,221 | \$0.29 |
| 2011 | 6,034 | \$0.55 | 41,439,330 | \$0.42 |
| 2012 | 165,402 | \$0.35 | 25,813,134 | \$0.38 |
| 2013 | 5,250,807 | \$0.18 | 8,359,998 | \$0.26 |
| 2014 | 1,230,953 | \$0.26 | 19,327,085 | \$0.29 |
| 2015 | 2,108,343 | \$0.22 | 5,339,292 | \$0.29 |
| 2016 | 610,825 | \$0.17 | 14,734,491 | \$0.48 |
| 2017 | 2,202 | \$1.20 | 49,640,092 | \$0.45 |
| 1998-2017 avg. ³ | 508,933 | \$0.20 | 26,349,795 | \$0.26 |

5.2. RECREATIONAL CHUB MACKEREL FISHERIES IN THE U.S. ATLANTIC

Data on recreational chub mackerel catch, landings, and effort are available from MRIP and the southeast region headboat survey. Both data sets show sporadic catches. MRIP data are more comprehensive than the southeast region headboat survey data and show an average of 11,630 chub mackerel caught and 9,650 chub mackerel harvested from 1998 - 2017 across the U.S. Atlantic coast. An average of 3,698 pounds of annual recreational harvest was estimated; however, this should be considered a minimum value which may not be reflective of the actual harvest in weight.⁴ In about half of those years, no recreational catch or harvest was estimated. To account for likely underestimates of recreational harvest in weight in some years, Council staff calculated alternative estimates, as shown in Table 4. About 31% of the harvest (in numbers of fish) was caught in state waters, with the remaining 69% caught in federal waters.

³ Average prices were calculated by dividing by the sum of the annual totals of ex-vessel value (adjusted to 2017 prices; not shown) by total landings during 1998-2017.

⁴ For more information on MRIP estimates of harvest in weight, see: <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/glossary>

Chub mackerel may be rarely encountered on recreational trips. There may also be instances of misreporting chub mackerel as Atlantic mackerel or other similar species, especially in datasets that rely on self-reported angler data (including some aspects of MRIP data). Recreational chub mackerel data should be considered uncertain and imprecise.

The Mid-Atlantic Fishery Management Council has heard anecdotal descriptions of recreational chub mackerel harvest, including reports of catch on for-hire vessels out of New York and New Jersey. There have also been reports of chub mackerel harvest for use as live bait on recreational trips out of Maryland and Virginia targeting white marlin, blue marlin, sailfish, spearfish, yellowfin tuna, bigeye tuna, and/or wahoo. According to public comments, this live bait fishery occurs on the edges of certain offshore canyons, especially Norfolk Canyon, where chub mackerel and their predators are concentrated in the late summer and early fall (see MAFMC 2016a and MAFMC 2017 for more details).

Table 4: MRIP-estimated recreational catch and harvest of chub mackerel from the Atlantic coast, 1998-2017.

| Year | MRIP catch (# of fish) | MRIP harvest (# of fish)⁵ | MRIP harvest (lb) | Alternative harvest estimate (lb)⁶ | MRIP percent retained |
|----------------|-----------------------------------|---|------------------------------|--|----------------------------------|
| 1998 | 2,193 | 2,193 | 3,170 | 3,170 | 100% |
| 1999 | 0 | 0 | 0 | 0 | -- |
| 2000 | 4,461 | 4,461 | 6,991 | 6,991 | 100% |
| 2001 | 821 | 0 | 0 | 0 | 0% |
| 2002 | 41,971 | 41,971 | 0 | 42,046 | 100% |
| 2003 | 0 | 0 | 0 | 0 | -- |
| 2004 | 1,974 | 1,974 | 0 | 1,978 | 100% |
| 2005 | 0 | 0 | 0 | 0 | -- |
| 2006 | 0 | 0 | 0 | 0 | -- |
| 2007 | 0 | 0 | 0 | 0 | -- |
| 2008 | 0 | 0 | 0 | 0 | -- |
| 2009 | 0 | 0 | 0 | 0 | -- |
| 2010 | 387 | 387 | 0 | 388 | 100% |
| 2011 | 78,036 | 78,036 | 356 | 76,915 | 100% |
| 2012 | 15,569 | 0 | 0 | 0 | 0% |
| 2013 | 0 | 0 | 0 | 0 | -- |
| 2014 | 60,191 | 49,813 | 48,087 | 48,087 | 83% |
| 2015 | 0 | 0 | 0 | 0 | -- |
| 2016 | 2,575 | 2,087 | 2,092 | 2,092 | 81% |
| 2017 | 24,417 | 12,083 | 13,262 | 13,262 | 49% |
| Average | 11,630 | 9,650 | 3,698 | 9,746 | 83% |

⁵ MRIP-estimated annual harvest in weight should be considered minimum values which may not be reflective of the actual harvest in weight. For more information on MRIP estimates of harvest in weight, see: <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/glossary>

⁶ The alternative harvest estimates were calculated by Council staff by multiplying the MRIP values for harvest in numbers of fish in Florida by the average weight per chub mackerel recorded by MRIP samplers across the Atlantic coast during 1998 - 2017 (i.e., 1.00178722 pounds per fish, based on 16 fish). Florida is the only state with MRIP-estimated harvest in numbers but not in weight during 1998-2017.

6. CURRENT CHUB MACKEREL MANAGEMENT MEASURES

The Council developed the first management measures for Atlantic chub mackerel in U.S. waters through the Unmanaged Forage Omnibus Amendment. These measures have been in effect since September 2017 and include the following:

- A 2.86 million pound annual landings limit for all chub mackerel landed by commercial fishermen in the mid-Atlantic and New England
- A 40,000 pound possession limit which applies only to commercial fishermen in the Mid-Atlantic after the annual landings limit is reached
- A requirement for all commercial vessels which possess chub mackerel in Mid-Atlantic federal waters to have a commercial fishing permit for any species from the NMFS Greater Atlantic Regional Fisheries Office (GARFO)

All these measures will expire after December 31, 2020. The Council intended for these measures to be replaced by longer-term management measures which will be developed through this amendment. If new management measures are not implemented or additional action is not taken, then Atlantic chub mackerel will be unmanaged in U.S. waters starting January 1, 2021.

The goal of the Unmanaged Forage Amendment was to prohibit development of new and expansion of existing directed commercial fisheries on unmanaged forage species in Mid-Atlantic federal waters until the Council has had an adequate opportunity to both assess the scientific information relating to any new or expanded directed fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem. The Council's goals and objectives for the Chub Mackerel Amendment are listed in section 1.2 and differ from those of the Unmanaged Forage Amendment.

7. ACCEPTABLE BIOLOGICAL CATCH (ABC) FOR UPCOMING YEARS

The SSC is responsible for recommending ABCs to the Council. The Council cannot set catch limits which exceed the ABCs recommended by the SSC.

The SSC recommended an ABC of 2,300 mt (5.07 million pounds) for 2021 - 2023 during their July 2018 meeting. The SSC concluded that insufficient information exists to assess the status and trends of chub mackerel in the northwest Atlantic and instead relied on expert judgment to derive their ABC recommendation. The SSC agreed that this level of catch is unlikely to result in overfishing given the general productivity of this species in fisheries throughout the world, combined with the relatively low fishery capacity in U.S. Atlantic waters. The SSC stated that this ABC should apply from Maine through the east coast of Florida (MAFMC 2018).⁷

Although the SSC recommended this ABC for 2021 - 2023, it may be possible to implement it for 2020, depending on the timing of final action, rule making, and implementation of this amendment.

8. MANAGEMENT ALTERNATIVES CONSIDERED THROUGH THIS AMENDMENT

The Council developed several management alternatives for public consideration. These alternatives are described in more detail in the following sections.

⁷ A summary of the SSC's recommendations is available at: <http://www.mafmc.org/s/July-2018-SSC-Report.pdf>

8.1. ALTERNATIVE 1: NO ACTION

If the Council takes no action through this amendment, the current chub mackerel management measures (section 6) would remain in place through December 31, 2020. Starting January 1, 2021, the chub mackerel fishery in U.S. Atlantic waters would be unmanaged.

8.2. ALTERNATIVE 2: MANAGE CHUB MACKEREL AS A STOCK IN THE MACKEREL, SQUID BUTTERFISH FMP

If the Council chooses this alternative, they must develop a number of required management measures. Other management measures are not required but may be considered. The following sections describe all alternatives under consideration.

8.2.1. PROCESS FOR DETERMINING STATUS DETERMINATION CRITERIA, MAXIMUM SUSTAINABLE YIELD, OPTIMUM YIELD, ACCEPTABLE BIOLOGICAL CATCH, AND ANNUAL CATCH LIMITS (REQUIRED)

The Magnuson-Stevens Fishery Conservation and Management Act requires Councils to define status determination criteria, maximum sustainable yield (MSY), optimum yield (OY), ABC, and annual catch limits (ACLs) for stocks in the fishery.

Status determination criteria are metrics for determining if a stock is overfished or experiencing overfishing. If the Council manages chub mackerel as a stock in the fishery, status determination criteria will be defined and automatically updated based on the latest stock assessment that is peer reviewed and accepted for use in management, consistent with the process used for all other stocks in the Council's FMPs. If a peer-reviewed and accepted stock assessment is not available, as is currently the case, the Council may use proxies for status determination criteria. In rare cases, appropriate proxies cannot be developed due to serious data limitations and status determination criteria are documented as unknown.

MSY is the largest average catch or yield that can continuously be taken from a stock. The Magnuson-Stevens Fishery Conservation and Management Act establishes MSY as the basis for fishery management. The act requires that fishing mortality not jeopardize the capacity of a stock to produce MSY and requires the abundance of an overfished stock be rebuilt to a level that is capable of producing MSY. MSY serves as the basis for status determination criteria, OY, and the ABC.

OY is MSY as reduced by social, economic, and ecological factors. In practice, OY takes the form of a reduction in the ABC. The ABC is the upper limit for total annual catch of a stock. The Council's SSC recommends ABCs, taking into account the Council's ABC control rule and risk policy. The ABC control rule contains provisions related to consideration of scientific uncertainty. The risk policy defines the acceptable risk of overfishing associated with the ABC, which varies based on stock size such that there is a lower tolerance for risk at lower stock sizes.

The Council cannot adopt a higher ABC than that recommended by the SSC. The Council may adopt a lower ABC based on social, economic, ecological, or other considerations (e.g., through the use of OY). The Council will adopt a chub mackerel ABC when they take final action on this amendment (tentatively scheduled for February 2019). As previously stated, the SSC recommended an ABC of 2,300 metric tons, or 5.07 million pounds for upcoming fishing years (section 7).

The ACL is the total annual catch of a stock, which cannot exceed the ABC. The ACL serves as the basis for invoking accountability measures (section 8.2.6). The ACL may be divided into sub-components, the sum of which cannot exceed the ABC.

8.2.2. ESSENTIAL FISH HABITAT (EFH) (REQUIRED)

EFH is defined as waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity. Councils are required to describe EFH in text and maps for all life stages of species managed as “stocks in the fishery.”

The Council is currently undertaking a multi-year effort to provide new and improved habitat science products (e.g., more comprehensive habitat use information, integrative habitat use modeling tools, and refined maps) that will allow the Council to review and potentially revise its existing EFH maps and text descriptions. When these improved habitat science products are available, the Council may consider initiating a separate action to revise the chub mackerel EFH text and maps adopted through this amendment.

Proposed Egg EFH

The Council proposes the following EFH text description for chub mackerel eggs:

EFH for chub mackerel eggs includes pelagic waters throughout the exclusive economic zone (EEZ) from North Carolina to Texas, including intertidal and subtidal areas, at temperatures of 15 - 25° C.

The Council proposes that all U.S. marine waters throughout the EEZ from North Carolina to Texas, including intertidal and subtidal areas, be identified in maps as EFH for chub mackerel eggs.

Berrien (1978) identified chub mackerel eggs in plankton survey catches from North Carolina through Florida. No documentation has been found to date of chub mackerel eggs in the Gulf of Mexico; however, chub mackerel larvae have been collected throughout the Gulf of Mexico, as shown in Figure 2 and summarized in various reports (e.g., Houde et al. 1976, Houde et al. 1979). It can be assumed that chub mackerel larvae collected in the Gulf of Mexico originated there.

A depth range of 1 to 75 meters is supported by Berrien (1978) and Hernández and Ortega (2000), the latter of which includes information from other regions and information on the closely related Pacific chub mackerel (*Scomber japonicus*). Berrien (1978) suggested that the distribution of chub mackerel eggs may extend beyond the continental shelf. Data from beyond the shelf edge are lacking due to a lack of sampling. It may be reasonable to assume that chub mackerel egg distribution extends beyond the shelf; therefore, the Council recommends an EFH description and map that encompass all waters in the EEZ (i.e., out to 200 nautical miles from shore) from Maine through Texas. The EEZ is the farthest possible reach of EFH under the Magnuson-Stevens Fishery Conservation and Management Act.

Berrien (1978) collected chub mackerel eggs at temperatures of 20 - 25° C from North Carolina through Florida. Other studies report spawning at temperatures of 15 - 20° C (Collette and Nauen 1983, Perrotta et al. 2001). Therefore, it can be assumed that eggs may be present at temperatures ranging from 15 to 25° C.

Proposed Larval EFH

The Council proposes the following EFH text description for chub mackerel larvae:

EFH for chub mackerel larvae includes pelagic waters from North Carolina to Texas from 25 meters depth to the EEZ and temperatures of 15 - 30 °C.

The Council proposes that all U.S. marine waters from 25 meters depth to the EEZ from North Carolina through Texas be identified in maps as EFH for chub mackerel larvae.

A depth range of 25 - 75 meters from North Carolina through Texas at temperatures of 15 - 30 °C is supported by several scientific reports, as well as catches in the Southeast Area Assessment and Monitoring Programs plankton survey (Figure 2, Houde et al. 1976, Berrien 1978, Houde et al. 1979, Hernández and Ortega 2000, Richardson 2010).

Berrien (1978) suggested that the distribution of chub mackerel larvae may extend beyond the continental shelf. As previously stated, data from beyond the shelf edge are lacking due to a lack of sampling. It may be reasonable to assume that chub mackerel larval distribution extends beyond the shelf; therefore, the Council recommends that larval EFH for chub mackerel extend from 25 meters depth to the EEZ (i.e., 200 nautical miles from shore). As previously stated, the EEZ is the farthest possible reach of EFH under the Magnuson-Stevens Fishery Conservation and Management Act.

Proposed juvenile and adult EFH

Due to similarities in juvenile and adult distributions and a lack of differentiation between the two life stages in many data sets, the Council proposes that juvenile and adult chub mackerel share the same EFH text description and map.

The Council proposes the following EFH text description for juvenile and adult chub mackerel:

EFH for chub mackerel juveniles and adults includes pelagic waters from Maine through Texas to 300 meters depth, including intertidal and subtidal areas, at temperatures of 15 - 30° C.

The Council proposes that all U.S. marine waters to 300 meters depth, including intertidal and subtidal areas, from Maine through Texas be identified in maps as EFH for juvenile and adult chub mackerel.

This corresponds with the entire known distribution of chub mackerel in U.S. waters based on state and federal trawl surveys,⁸ commercial and recreational fisheries-dependent data, and literature sources (e.g., Collette and Nauen 1983, Perrotta et al. 2001, Collette 2002). These sources suggest that adults and juveniles are commonly present in nearshore and offshore waters of Southern New England, the Mid Atlantic Bight, the South Atlantic, and Gulf of Mexico during the summer and early fall or year-round, depending on the area (Figure 1, Figure 2, and

Figure 4). Historical records and fisheries data indicate that chub mackerel are rarely caught in the Gulf of Maine; however, they may become more prevalent in that region as ocean waters continue to warm.

The temperature range referenced above is based on literature sources (Collette and Nauen 1983, Perrotta et al. 2001) and NEFSC fall bottom trawl survey data.

⁸ The NEFSC fall bottom trawl survey and the New Jersey Ocean Trawl Survey have collected juvenile and adult chub mackerel. Other state and federal trawl survey data sets were examined, but did not include records of adult or juvenile chub mackerel catch.

8.2.3. ALTERNATIVE SET 2.A: SPECIFICATIONS PROCESS (*DISCRETIONARY*)

8.2.3.1. ALTERNATIVE 2.A.I: NO ACTION ON SPECIFICATIONS

As described in more detail in the next section, the Council modifies certain management measures through an annual specifications process. If the Council takes no action to define which chub mackerel management measures may be modified through specifications, all changes would require an FMP amendment. As described in section 9.8, the Council agreed that no chub mackerel management measures should be implemented or modified through a framework action.

8.2.3.2. ALTERNATIVE 2.A.II: MACKEREL, SQUID, BUTTERFISH SPECIFICATIONS PROCESS

Under this alternative, the specifications process currently used for Atlantic mackerel, longfin and *Illex* squid, and butterfish would also apply to chub mackerel. Under this process, the Monitoring Committee recommends annual catch targets (ACTs) which are equal to or less than the ACLs to account for management uncertainty. Landings limits (e.g., commercial quotas and recreational harvest limits) are derived by subtracting expected discards from the ACTs (e.g., Figure 5 and Figure 6 in section 8.2.5). The level of expected discards is recommended by the Monitoring Committee.

The regulations specify a number of other management measures which may be modified through the specifications process. These include, but are not limited to possession limits, gear restrictions, minimum fish sizes, and fishing seasons.

Specifications for catch and landings limits may be set for up to three years at a time, with interim review by the Monitoring Committee and Council each year.

8.2.4. ALTERNATIVE SET 2.B: MANAGEMENT UNIT (*REQUIRED*)

As defined in the National Standards Guidelines, the management unit is “a fishery or that portion of a fishery identified in an FMP as relevant to the FMP’s management objectives”. In practice, the management unit defines the geographic area over which the management measures in an FMP apply. The Council is considering two alternatives for the chub mackerel management unit, as summarized below.

8.2.4.1. ALTERNATIVE 2.B.I: MANAGEMENT UNIT IS U.S. WATERS FROM MAINE THROUGH THE EAST COAST OF FLORIDA

Under this alternative the chub mackerel management unit would be all federal waters off the U.S. east coast. This alternative would align the management unit with the area over which the SSC’s ABC recommendation applies (section 7). This would allow the Council to regulate chub mackerel fisheries throughout that entire region. If this alternative is selected, there would be no differentiation of catch or landings limits among regions. The ABC, ACL, ACT, commercial quota, and recreational harvest limit (if used) would apply uniformly across Maine through Florida with no state or regional allocations.

8.2.4.2. ALTERNATIVE 2.B.II: MANAGEMENT UNIT IS U.S. WATERS FROM MAINE THROUGH NORTH CAROLINA, WITH EXPECTED CATCH FROM SOUTH CAROLINA THROUGH FLORIDA SUBTRACTED FROM THE ABC

Under this alternative, the chub mackerel management unit would be federal waters from Maine through North Carolina. The SSC recommended an ABC for Maine through the east coast of Florida (section 7). All catch throughout that region will count towards the ABC. If the management unit is Maine through

North Carolina, then the Council would not be able to regulate chub mackerel fisheries in South Carolina through Florida; however, catch in those states would still count towards the ABC.

If this alternative is selected, expected catch from South Carolina through Florida would be subtracted from the ABC to derive an ACL that applies to catch from Maine through North Carolina (e.g., Figure 5). The expected level of catch from South Carolina through Florida would be recommended by the Monitoring Committee through the specifications process (section 8.2.3). This is similar to how Canadian catch is accounted for in the specification of Atlantic mackerel catch and landings limits. The Atlantic mackerel ABC applies to both U.S. and Canadian catch; however, Canada is not included in the management unit for Council management.

The expected level of catch from South Carolina through Florida could be based on historical proportions of catch or landings from those states. For example, over the past 20 years (1998 - 2017), 0.3% of commercial and recreational landings from Maine through the east coast of Florida occurred in South Carolina through Florida.⁹ Discards have not yet been thoroughly analyzed. These proportions may be different when based on catch (i.e., landings and dead discards) rather than landings.

8.2.5. ALTERNATIVE SET 2.C: SEPARATION OF COMMERCIAL AND RECREATIONAL CATCH LIMITS (DISCRETIONARY)

The Council is considering dividing the ACT into commercial and recreational components. The Council is not considering separate commercial and recreational ACLs. As previously stated, the ACL serves as the basis for determining if accountability measures are triggered (section 8.2.6).

8.2.5.1. ALTERNATIVE 2.C.I: NO SEPARATION OF COMMERCIAL AND RECREATIONAL CATCH LIMITS

Under this alternative, there would be no separation of catch limits into commercial and recreational components. All catch would count towards one ACL and one ACT. All landings would count towards one landings limit (Figure 5).

8.2.5.2. ALTERNATIVE 2.C.II: DIVISION OF ACL INTO COMMERCIAL AND RECREATIONAL ACTS

Under this alternative, a single ACL would be divided into a commercial ACT and a recreational ACT. Because there would be a single ACL, accountability measures would only be triggered if total catch (commercial and recreational) exceeded the ACL, regardless of whether the commercial and/or recreational ACT was exceeded. As previously stated, the ACT is set equal to or less than the ACL to account for management uncertainty. A commercial quota and recreational harvest limit would be derived from the respective ACTs by subtracting expected discards (Figure 6).

Separation of the ACL into commercial and recreational ACTs could be based on historical catches or landings. Examples based on landings are provided below. As previously stated, discards have not yet been examined in detail. Discard mortality rates have also not been analyzed. Only dead discards count towards the ABC, ACL, and ACT. The proportions of commercial versus recreational catches (landings and discards) may differ from the landings proportions shown below.

Over the past 15, 10, and 5 years (through 2017), 99% of total chub mackerel landings occurred in commercial fisheries and 1% occurred in recreational fisheries (Table 2). These proportions are the same when considering landings from Maine through the east coast of Florida or Maine through North

⁹ Based on the alternative recreational harvest estimates for Florida described in Table 4 and the associated footnotes.

Carolina; therefore, this basis for establishing commercial and recreational ACTs would be appropriate regardless of which management unit alternative is chosen (section 8.2.3). These proportions are also the same whether using the MRIP harvest estimates or the alternative recreational harvest estimates shown in Table 4. If the Council adopts the ABC recommended by the SSC (section 7) and does not instead adopt a lower ABC, this would result in a 5,019,926 pound commercial ACT and a 50,706 pound recreational ACT.

Historical averages may undercount the contribution of recreational fisheries to total chub mackerel landings. Estimated recreational harvest may increase in the future due to improved reporting. MRIP data rely partly on self-reported angler data, as well as information collected from trained field samplers. Due to similarities in appearance, some anglers may have reported chub mackerel as Atlantic mackerel. To address this concern, the Council and partners at the NMFS developed a species identification guide which will be distributed to recreational party/charter permit holders and other interested individuals.¹⁰ In addition, in 2017 chub mackerel were added to the core list of species for trainings of MRIP field samplers from Maine through Virginia. For these reasons, MRIP data may show an increase in catch over the next few years due to improved reporting rather than an actual increase in catch.

The basis for separation of the ACL into commercial and recreational ACTs may be revisited in the future and may be modified through future specifications (section 8.2.3).

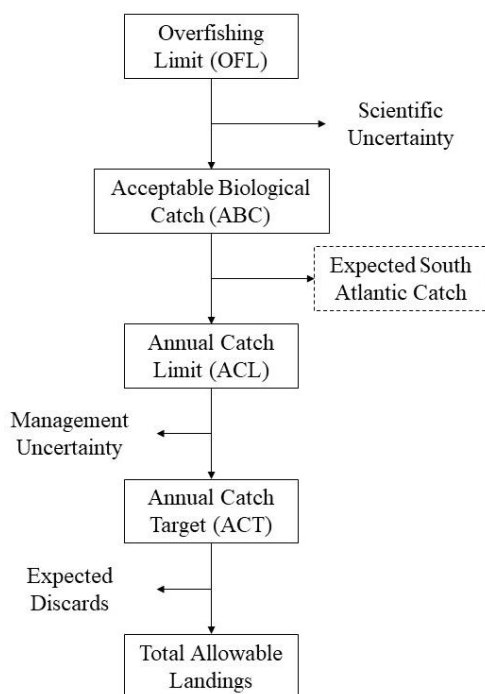


Figure 5: Example process for deriving chub mackerel catch and landings limits, with no separation of commercial and recreational catch and landings limits. Expected South Atlantic catch would be subtracted from the ABC if the management unit is Maine through North Carolina. If the management unit covers the entire east coast, then expected South Atlantic catch would not be subtracted from the ABC (section 8.2.4). Based on application of the Council’s ABC control rules, an OFL was not specified for upcoming years (section 7); however, it may be used in the future.

¹⁰ A digital copy is available at: <http://www.mafmc.org/s/small-scombrid-ID-guide.pdf>

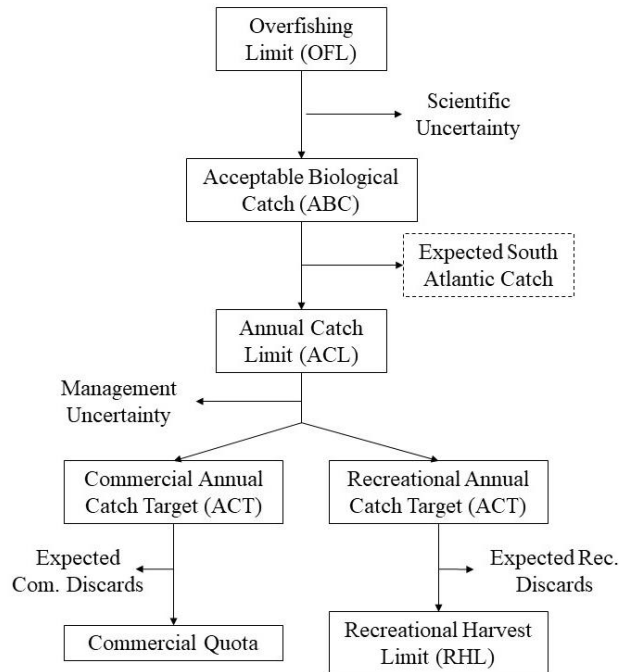


Figure 6: Example process for deriving commercial and recreational catch and landings limits. Expected South Atlantic catch would be subtracted from the ABC if the management unit is Maine through North Carolina. If the management unit covers the entire east coast, then expected South Atlantic catch would not be subtracted from the ABC (section 8.2.4). Based on application of the Council’s ABC control rules, an OFL was not specified for upcoming years (section 7); however, it may be used in the future.

8.2.6. ALTERNATIVE SET 2.D: ACCOUNTABILITY MEASURES (AMs; REQUIRED)

AMs are measures that are intended to prevent the ACL from being exceeded and measures that correct or mitigate for ACL overages when they occur. A variety of AM alternatives are being considered for chub mackerel. Under all alternatives, ACL overages would be evaluated by comparing a single-year of total catch (landings and dead discards) to the ACL. As previously stated, the Council is not considering using multiple chub mackerel ACLs (e.g., a commercial ACL and a recreational ACL). Under all alternatives, AMs would only be triggered if the single ACL is exceeded or if an in-season commercial fishery closure is triggered, as described in the next section.

8.2.6.1. ALTERNATIVE SET 2.D.I: ALTERNATIVES FOR IN-SEASON COMMERCIAL FISHERY CLOSURES

A range of alternatives are being considered for commercial fishery closures prior to the end of the year. For consistency with other Council-managed species, in-season closure alternatives are not considered for the recreational fishery. MRIP provides the most comprehensive recreational catch and landings data. These data are aggregated into two-month “waves”. Preliminary data are generally not available until two months after the end of each wave. Final estimates are typically available in April of the following year. Given this time lag in data availability, in-season closure authority is not used for any Council-managed recreational fisheries.

8.2.6.1.1. ALTERNATIVE 2.D.I.A: COMMERCIAL FISHERY CLOSURE WHEN 100% OF THE COMMERCIAL QUOTA IS LANDED

Under this alternative, NMFS would close the commercial fishery for chub mackerel when 100% of the total allowable landings limit is landed or 100% of the commercial quota is landed, depending on which alternative is selected from alternative set 2.C (section 8.2.5). After the fishery is closed, some level of possession may be allowed, depending on the other alternatives selected (see below).

8.2.6.1.2. ALTERNATIVE 2.D.I.B: COMMERCIAL FISHERY CLOSURE WHEN 95% OF THE COMMERCIAL QUOTA IS LANDED

Under this alternative, NMFS would close the commercial fishery for chub mackerel when 95% of the total allowable landings limit is landed or 95% of the commercial quota is landed, depending on which alternative is selected from alternative set 2.C (section 8.2.5). After the fishery is closed, some level of possession may be allowed, depending on the other alternatives selected (see below). The Council may decide that some level of possession is allowed until 100% of the quota is landed, after which a lower possession limit or no possession would be allowed.

8.2.6.1.3. ALTERNATIVE 2.D.I.C: COMMERCIAL FISHERY CLOSURE WHEN 90% OF THE COMMERCIAL QUOTA IS LANDED

Under this alternative, NMFS would close the commercial fishery for chub mackerel when 90% of the total allowable landings limit is landed or 90% of the commercial quota is landed, depending on which alternative is selected from alternative set 2.C (section 8.2.5). After the fishery is closed, some level of possession may be allowed, depending on the other alternatives selected (see below). The Council may decide that some level of possession is allowed until 100% of the quota is landed, after which a lower possession limit or no possession would be allowed.

8.2.6.2. ALTERNATIVE SET 2.D.II: POSSESSION LIMIT WHEN THE COMMERCIAL FISHERY IS CLOSED DUE TO AN AM

Under all alternatives in this alternative set, any chub mackerel catch above the possession limit, including unintentional catch, would need to be discarded. The amount of chub mackerel which are caught incidentally while targeting other species has not been thoroughly analyzed and likely varies by target species, gear type, vessel speed, location of fishing, and other factors. In general, higher possession limits are expected to result in fewer discards, though they could increase the likelihood of exceeding the ACL and ABC.

8.2.6.2.1. ALTERNATIVE 2.D.II.A: NO POSSESSION AFTER COMMERCIAL FISHERY IS CLOSED

Under this alternative, commercial vessels would not be allowed to retain chub mackerel after the commercial fishery is closed due to an AM.

8.2.6.2.2. ALTERNATIVE 2.D.II.B: 1,000 POUND POSSESSION LIMIT AFTER THE COMMERCIAL FISHERY IS CLOSED

Under this alternative, commercial vessels would be restricted to a 1,000 pound chub mackerel possession limit after the commercial fishery is closed due to an AM. As previously stated, a small number of vessels are responsible for most chub mackerel landings. If those vessels are excluded from the calculation, 96% of the trips which landed chub mackerel during 1998-2017 landed less than 1,000 pounds, based on commercial northeast dealer data.

8.2.6.2.3. ALTERNATIVE 2.D.II.C: 10,000 POUND POSSESSION LIMIT AFTER THE COMMERCIAL FISHERY IS CLOSED

Under this alternative, commercial vessels would be restricted to a 10,000 pound chub mackerel possession limit after the commercial fishery is closed due to an AM. This is approximately the average trip-level landings of chub mackerel based on northeast commercial fishery data for 1998-2017. As previously stated, a small number of vessels are responsible for most chub mackerel landings. If those vessels are excluded from the calculation, about 99% of the trips which landed chub mackerel during 1998-2017 landed less than 10,000 pounds.

8.2.6.2.4. ALTERNATIVE 2.D.II.D: 40,000 POUND POSSESSION LIMIT AFTER THE COMMERCIAL FISHERY IS CLOSED

Under this alternative, commercial vessels would be restricted to a 40,000 pound chub mackerel possession limit after the commercial fishery is closed due to an AM. This is similar to the current management measures (section 6). When the current management measures were developed by the Council, 40,000 pounds was chosen as the possession limit to be enforced after the annual landings limit is reached because it is approximately the amount of chub mackerel needed to fill a bait truck. Given the low value of chub mackerel (Table 3), fishermen may not target chub mackerel when restricted to a 40,000-pound possession limit; however, they would have an incentive to land chub mackerel caught incidentally. A 40,000 pound possession limit could, therefore, discourage discards. The number of trips which landed more than 40,000 pounds of chub mackerel over the past 20 years is confidential as it is associated with fewer than three vessels and/or dealers.

8.2.6.3. ACL OVERAGE PAYBACKS

The Council proposes the following process for ACL overage paybacks. As previously stated, the Council proposes using a single ACL, but may use separate commercial and recreational ACTs (section 8.2.5). The ACL overage payback requirements will vary if a single ACT is used or if commercial and recreational ACTs are used. The Council is not considering using separate commercial and recreational ACLs.

If a single ACT is used (Figure 5), when the ACL is exceeded, catch in excess of the ACT will be deducted from the ACT in a following year as a single-year adjustment. This may require adjustments to management measures (e.g., possession limits, minimum fish sizes, open and closed seasons) to prevent the following year's reduced ACT from being exceeded. Any such adjustments to management measures would be made through the specifications process. The conditions which resulted in the overage and expected catch in the future year would be considered when determining if adjustments are needed and, if so, what specific adjustments should be made.

If separate commercial and recreational ACTs are used (Figure 6) and there is an ACL overage, then adjustments to the commercial and/or recreational ACTs will be made in a following year, depending on which sector (commercial or recreational) was responsible for the ACL overage. Whichever sector exceeded their ACT would be deemed responsible for the ACL overage, either entirely or in part and would be required to take a reduction in their ACT for a following year. The exact amount in pounds of the commercial or recreational fishery contribution to the ACL overage would be deducted from the commercial or recreational ACT in a following year. For example, if the commercial fishery was entirely responsible for the overage and exceeded the commercial ACT by 3 million pounds, but the ACL was only exceeded by 1 million pounds, then the commercial ACT in a following year would be reduced by 1 million pounds, not 3 million pounds. This may require adjustments to management

measures (e.g., possession limits, minimum fish sizes, open and closed seasons) to prevent the following year's reduced ACT from being exceeded. Any such adjustments to management measures would be made through the specifications process. The conditions which resulted in the overage and expected catch in the future year would be considered when determining if adjustments are needed and, if so, what specific adjustments should be made.

8.2.7. ALTERNATIVE SET 2.E: PERMIT REQUIREMENTS (DISCRETIONARY)

The Council is considering a range of alternatives for permit requirements, as described below. All permit requirements would apply throughout the management unit (section 8.2.3).

Data collection and reporting requirements associated with each permit type are also summarized below. For example, all existing GARFO commercial and party/charter permits require submission of vessel trip reports (VTRs) for every trip. Fishermen are required to report all catch (i.e., landings and discards) of all species on VTRs. VTRs also include other information, such as areas fished, target species, and gear used.

The NMFS Greater Atlantic Regional Administrator may request that any vessel carrying one of the existing GARFO commercial permit types carry a fisheries observer. Fisheries observers collect information on catch, discards, fishing effort, and biological data such as length, weight, maturity, and age.

An approved vessel monitoring system (VMS) is a condition of some existing permits, as noted in the following sections. VMS can provide information such as vessel location, gear type, trip type, catch, and other information.

8.2.7.1. ALTERNATIVE SET 2.E.I: COMMERCIAL PERMIT REQUIREMENTS

8.2.7.1.1. ALTERNATIVE 2.E.I.A: NO ACTION ON COMMERCIAL PERMIT REQUIREMENTS

Under this alternative, the chub mackerel permit requirements implemented through the Unmanaged Forage Omnibus Amendment would remain in place through 2020. Starting on January 1, 2021, commercial vessels retaining chub mackerel would not be subject to any permit requirements.

Under the current requirements, all commercial vessels which retain any chub mackerel in Mid-Atlantic federal waters must have a GARFO commercial fishing permit for any species. There are currently 62 different permit categories which meet this requirement, all of which require weekly or monthly submission of VTRs (depending on the permit) for every trip. The regional administrator may request that vessels with any of these permits carry fisheries observers. An approved VMS is required as a condition of 25 of these permit categories.

8.2.7.1.2. ALTERNATIVE 2.E.I.B: REQUIRE ANY GARFO COMMERCIAL FISHING PERMIT

Under this alternative, all commercial vessels which retain any chub mackerel in the management unit (section 8.2.3) must have a GARFO commercial fishing permit for any species. As previously stated, 62 permit categories currently meet this requirement, all of which require submission, either on a weekly or monthly basis, of VTRs for every trip. The regional administrator may request that vessels with any of these permits carry fisheries observers. An approved VMS is required as a condition of 25 of these permit types.

8.2.7.1.3. ALTERNATIVE 2.E.I.C: REQUIRE ANY GARFO COMMERCIAL MACKEREL, SQUID, BUTTERFISH PERMIT

Under this alternative, all commercial vessels which retain any chub mackerel in the management unit (section 8.2.3) must have a federal commercial permit for Atlantic mackerel, *Illex* or longfin squid, or butterfish. This includes 5 limited access permits for longfin squid/butterfish, *Illex* squid, and Atlantic mackerel (qualification criteria apply), as well as open access incidental permits for squid/butterfish and Atlantic mackerel (no qualification criteria with the exception of vessel size restrictions).

Four of the limited access permits require VMS. The open access permits do not require VMS. All 7 permit types require submission, on a weekly basis, of VTRs for every trip. The regional administrator may request that vessels with any of these permit types carry a fisheries observer.

8.2.7.1.4. ALTERNATIVE 2.E.I.D: CREATE A NEW COMMERCIAL CHUB MACKEREL PERMIT

Under this alternative, a new federal open access commercial permit category would be created for chub mackerel. Any commercial vessels retaining chub mackerel in the management unit (section 8.2.3) would be required to have this permit. Vessels with this permit would be required to submit a VTR for every trip on a weekly basis, consistent with the regulations for other mackerel, squid, and butterfish commercial permits. The regional administrator could request that these vessels carry fisheries observers. The Council has not specified any additional requirements for this new permit category (e.g., VMS would not be required). This alternative would create a single permit category for chub mackerel; it would not create different permit types for different levels of harvest.

8.2.7.2. ALTERNATIVE SET 2.E.II: PARTY/CHARTER PERMIT REQUIREMENTS

The Council is considering a range of alternatives for party/charter vessel permit requirements. No permit requirements are considered for private anglers because private angler permits are not currently required for other species managed by the Council.¹¹

8.2.7.2.1. ALTERNATIVE 2.E.II.A: NO ACTION ON PARTY/CHARTER PERMIT REQUIREMENTS

Under this alternative, no permit would be required for party or charter vessels to retain chub mackerel in the management unit (section 8.2.3).

8.2.7.2.2. ALTERNATIVE 2.E.II.B: REQUIRE ANY GARFO PARTY/CHARTER PERMIT

Under this alternative, party and charter vessels would be required to have any existing federal party/charter permit through GARFO in order to retain chub mackerel in the management unit (section 8.2.3). This includes 7 different party/charter permit categories (i.e., summer flounder, scup, black sea bass, mackerel/squid/butterfish, bluefish, tilefish, and northeast multispecies). All federal party/charter permits are currently open access and require submission of VTRs for each trip. VTRs for all but one of these 7 permit categories (i.e., northeast multispecies) must be submitted electronically within 48 hours of reaching port following the end of a fishing trip.

¹¹ The Council approved private angler permitting requirements for golden and blueline tilefish in 2016 through Amendment 6 to the Tilefish FMP. These requirements have not yet been fully developed and implemented.

8.2.7.2.3. ALTERNATIVE 2.E.II.C: REQUIRE A MACKEREL, SQUID, BUTTERFISH PARTY/CHARTER PERMIT

Under this alternative, party and charter vessels would be required to have a mackerel, squid, butterfish party/charter permit through GARFO in order to retain chub mackerel in the management unit (section 8.2.3). This is an open access permit which requires submission of electronic VTRs for every fishing trip within 48 hours of reach port following the end of the trip

8.3. ALTERNATIVE SET 3: CATCH AND LANDINGS LIMITS FOR UPCOMING YEARS

The previous section summarizes the process which may be used to determine various chub mackerel management measures. This section includes alternatives for how this process could be used to determine catch and landings limits for upcoming years. These alternatives assume the Council does not select alternative 1 (no action, section 8.1).

As previously stated, the SSC recommended an ABC for upcoming fishing years (section 7); however, the Council has not yet adopted this ABC. The Council has the option of adopting a lower ABC than that recommended by the SSC. One option for adopting a lower ABC is through the specification of optimum yield (OY). As previously stated, OY is MSY as reduced by social, economic, and ecological factors, which in practice takes the form of a reduction in the ABC.

8.3.1. ALTERNATIVE 3.A: OY = ABC

Under this alternative, the Council would adopt the ABC recommended by the SSC for upcoming fishing years (i.e., 2,300 mt or 5.07 million pounds; section 7). OY would be equal to the ABC.

8.3.2. ALTERNATIVE 3.B: OY IS LESS THAN ABC

Under this alternative, the Council would adopt an OY value that is less than the ABC recommended by the SSC for upcoming fishing years (section 7). The Council may consider doing this to address ecosystem considerations, which could include biological, ecological, and/or economic considerations. The Council has not yet considered specific alternatives for a reduced ABC. If you wish to recommend a lower ABC than that recommended by the SSC, please provide a specific value and the basis for the recommendation.

8.3.3. LANDINGS LIMITS FOR UPCOMING YEARS

Alternatives for specific landings limits are not presented here because under all alternatives they would be calculated by subtracting expected discards from the ACT. If commercial and recreational ACTs are adopted (section 8.2.5), discards would be estimated separately for the commercial and recreational fisheries to derive a commercial quota and recreational harvest limit.

The value of the total allowable landings or commercial quota and recreational harvest limit would depend on the value of expected discards, as well as the alternatives selected for management unit (section 8.2.3), OY (see above), and division of the ACT into commercial and recreational components (section 8.2.5).

9. MANAGEMENT MEASURES NOT CONSIDERED THROUGH THIS AMENDMENT

The Council agreed that certain management measures are not appropriate for the chub mackerel fishery at this point in time. These measures, and the rationale for not considering them, are listed below. Although these measures are not being considered through this amendment, the Council may develop them through future actions.

9.1. FORAGE ABC RISK POLICY

As previously stated, the Council's risk policy defines the acceptable level of risk of overfishing associated with the ABC. The Council has discussed the idea of developing a separate risk policy for forage species such that the acceptable risk of overfishing would be lower for a forage species than for a non-forage species (e.g., see figure 1 in MAFMC 2016b). Given data limitations, it is not currently possible to use either a forage risk policy or the Council's current risk policy for chub mackerel. If new data become available to support use of a forage policy for chub mackerel, the Council could implement this through a future action.

9.2. RECREATIONAL MANAGEMENT MEASURES

The Council is not considering recreational management measures such as possession limits, minimum fish sizes, and open seasons for chub mackerel through this amendment. As described in section 5.2, recreational catch of chub mackerel appears to be low, but the data are limited. There are no federal possession limits, minimum fish sizes, or season restrictions for recreational Atlantic mackerel fisheries.

9.3. COMMERCIAL POSSESSION LIMIT PRIOR TO FISHERY CLOSURE

The Council is not considering commercial possession limits prior to fishery closure due to an AM (section 8.2.6). As previously stated, most chub mackerel landings over the past 20 years are from a small number of trawl vessels (section 5.1). Dealer data show that these vessels have occasionally landed a few hundred thousand pounds of chub mackerel at a time.¹² As previously stated, it is believed that 40,000 pounds is the lowest amount of chub mackerel which may be landed by these vessels based on market factors (section 8.2.6.2.4).

Directed fishery possession limits are not currently used for *Illex* squid, longfin squid, butterfish, or Atlantic mackerel tier 1 permit holders.

9.4. COMMERCIAL MINIMUM FISH SIZE LIMITS

Minimum fish size limits are typically used to reduce fishing mortality on immature fish; however, a minimum size limit for chub mackerel may provide little additional biological benefits beyond current fishery selectivity. Northeast fisheries observer data suggest that about 88% of the chub mackerel caught in bottom otter trawls are at least 20 cm in length. As suggested in Daley (2018) and supported by comments from fishermen, it is possible that chub mackerel's fast swimming speed reduces the potential for capture of larger individuals. Several scientific studies have documented the length at maturity for chub mackerel in various regions. The length at maturity varies by study. Daley (2018) examined chub mackerel caught in commercial fisheries in the Mid-Atlantic and Southern New England and found that 50% of females reached maturity at about 27 cm. According to observer data, about 73% of the chub mackerel caught in bottom trawls are at least 27 cm.

Minimum fish size limits require discarding of all fish below that size limit. Given that chub mackerel are predominantly caught with bottom otter trawls off the U.S. east coast (section 5.1), it can be assumed that most discarded chub mackerel would not survive.

¹² More details on chub mackerel landings from these vessels are not provided to protect confidential data representing fewer than three vessels and/or dealers.

9.5. COMMERCIAL GEAR RESTRICTIONS

As previously described, most chub mackerel landed on the U.S. east coast over the past 20 years were caught on bottom trawl vessels which also participate in the *Illex* squid fishery. It appears that very few vessels on the east coast are capable of catching high volumes of chub mackerel (section 5.1). At this point, the Council does not see a need to develop additional gear restrictions for chub mackerel beyond what these vessels are currently subject to in other fisheries.

9.6. LIMITED ACCESS

As previously described, a small number of vessels are responsible for most chub mackerel landings over the past 20 years. It appears that vessels need to be large (by Mid-Atlantic standards), fast, and able to freeze or store catch in refrigerated sea water to harvest profitable volumes of these warm-water fish. These factors seem to be limiting participation to a handful of vessels which also participate in the *Illex* squid fishery. For this reason, the Council agreed that it is not necessary to develop management measures to restrict participation in chub mackerel fisheries at this time.

9.7. SPATIAL/TEMPORAL MANAGEMENT TO BENEFIT CHUB MACKEREL PREDATORS

Some recreational tuna and marlin fishermen have expressed concerns that the commercial chub mackerel fishery could reduce the abundance of chub mackerel in specific areas, even at levels of harvest that do not negatively impact the stock as a whole. Specifically, these stakeholders are concerned that commercial chub mackerel fishing may cause negative socioeconomic impacts for recreational fisheries for tunas and marlins, including fishing tournaments. They say the presence of chub mackerel in certain offshore canyon areas in the late summer and early fall attracts tunas and marlins and if commercial fishing reduces the local abundance of chub mackerel, then the tuna and marlin will not come to those areas. Based on public comments and recreational catch data, this is not believed to have occurred to date; however, if it were to occur, it could negatively impact recreational fisheries that rely on the presence of tunas and/or billfish in certain areas at certain times of year. This could be especially problematic for recreational fishing tournaments.

Some recreational fishermen have requested consideration of spatial and/or seasonal closures of the commercial chub mackerel fishery to address these concerns. Commercial fishery stakeholders are strongly opposed to such closures, arguing that they could effectively eliminate the directed commercial chub mackerel fishery given that it only occurs in certain areas at certain times of year and could also negatively impact the *Illex* squid fishery (section 5.1).

If such management measures are considered, the tradeoffs between potential negative impacts to the commercial chub mackerel and *Illex* squid fisheries should be weighed against potential benefits to predators and associated recreational fisheries. The concerns raised by recreational and commercial fishing stakeholders represent not only the competing interests of the two sectors, but also differing opinions regarding the relative importance of human uses of chub mackerel (e.g., as a source of revenue, as a human food source, and as bait in other fisheries) compared to leaving chub mackerel in the ecosystem to serve as prey for recreationally-important predators.

In 2018, the Council funded a study to assess the contribution of chub mackerel to the diets of white and blue marlins and bigeye and yellowfin tunas. These predators were identified as priority species by stakeholders. Sampling will occur in commercial and recreational fisheries from New Jersey through North Carolina during 2018 and 2019. This study will use a combination of traditional stomach content

analysis, genetic barcoding techniques, and stable isotope analysis. The Council plans to postpone consideration of any spatial/temporal management measures for the chub mackerel fishery until after consideration of final results of this study.

9.8. FRAMEWORK ACTIONS

The Council's FMPs identify certain management measures which can be modified through framework adjustments, rather than FMP amendments. Framework adjustments are typically completed in less time than amendments because, unlike with FMP amendments, the Council does not hold scoping or public hearings for framework adjustments and due to differences in the rulemaking process.

Only measures which have been previously considered and analyzed in an FMP or FMP amendment may be modified through framework adjustments. If the measures proposed through a framework adjustment represent significant departures from previously analyzed measures, or if they could have significant impacts, then an FMP amendment may be required, even if the action was previously identified as a frameworkable item.

After much debate at their October 2018 meeting, the Council agreed that no chub mackerel management measures should be modified or implemented through a framework action. All changes which cannot be made through specifications (section 8.2.3) must be made through an FMP amendment. Based on the Council's October 2018 decision, the current Mackerel, Squid, Butterfish FMP regulations for framework actions would not apply to chub mackerel.

10. POTENTIAL IMPACTS OF ALTERNATIVES

This section summarizes the potential impacts of the alternatives on the chub mackerel stock and on human communities (i.e., socio-economic impacts). These impacts, as well as potential impacts to habitat and protected species, will be analyzed in more detail in an environmental assessment which will be prepared in accordance with the National Environmental Policy Act after the Council selects preferred alternatives (tentatively scheduled for February 2019). This environmental assessment will be subject to an additional public comment period.

10.1. IMPACTS OF TAKING NO ACTION

The current chub mackerel management measures were implemented in September 2017 and will expire after December 31, 2020 (section 6). If the Council takes no additional action, there will be no regulations on chub mackerel harvest in U.S. Atlantic waters as of January 1, 2021.

As described in section 5, chub mackerel harvest is limited by factors other than regulations. Specifically, a small number of bottom trawl vessels are responsible for most landings. It appears that only a few relatively large (by Mid-Atlantic standards), fast vessels with refrigerated sea water or freezing capabilities can harvest chub mackerel in profitable quantities. These vessels do not target chub mackerel every year. Availability of *Illex* squid appears to be the strongest determinant of the amount of directed chub mackerel fishing effort in a given year. Thus, if no action is taken and the current management measures expire, chub mackerel landings may not exceed recent levels in the near future.

As previously described, the stock status of chub mackerel in U.S. Atlantic waters is unknown as there is no quantitative stock assessment. Historic levels of harvest, including the historic high of 5.25 million pounds landed in 2013 (Table 2), are assumed to have a low risk of overfishing (MAFMC 2018). Thus, if the Council takes no action and the chub mackerel fishery becomes unregulated, there may be little risk of negative impacts to the chub mackerel stock in the near future. Chub mackerel harvest over the

longer term is uncertain. If the fishery expands beyond recent levels, then the risk of overfishing would increase and negative impacts could occur, depending on the scale of the increase.

The no action alternative is expected to have positive socio-economic impacts because it will remove the existing regulations for commercial chub mackerel harvest after December 31, 2020. Constraints due to market factors, fishery capacity, and regulations in other fisheries will remain. If harvest increases beyond recent levels, commercial revenues could increase. If harvest increases to the extent that overfishing occurs, then negative socio-economic impacts could occur over the long term due to decreased availability resulting in decreased harvest, decreased revenues, and decreased commercial and recreational fishing opportunities. As previously stated, this is unlikely in the short-term given existing constraints on the fishery which are unrelated to the current chub mackerel management measures.

10.2. IMPACTS OF MANAGING CHUB MACKEREL AS A STOCK IN AN FMP

If the Council adds chub mackerel as a stock in the Mackerel, Squid, Butterfish FMP, then the stock will be managed with an ABC, an ACL, an ACT, and other catch and landings limits. These measures will account for scientific and management uncertainty and will help ensure that overfishing does not occur and that the fishery achieves optimum yield. This should result in both positive impacts on the chub mackerel stock and positive socio-economic impacts.

Based on the SSC's ABC recommendation, 5.07 million pounds will be the upper bound for the overall catch limit for upcoming years (section 7). The landings limits resulting from this ABC will depend on decisions related to the management unit (section 8.2.4), commercial and recreational ACTs (section 8.2.5), and the expected level of discards. This ABC will prevent expansion of the fishery beyond its historic high in 2013 (Table 2); however, it is not expected to restrict commercial and recreational fisheries compared to all other past years. For this reason, it is expected to have generally neutral socio-economic impacts. However, prevention of growth of the fishery beyond historic levels could be considered a negative economic impact.

Establishing EFH is expected to benefit chub mackerel. Federal agencies are required to consult with NMFS if they authorize, fund, or undertake actions that may adversely affect EFH. Through these consultations, NMFS advises on how to avoid, reduce, or mitigate for adverse effects to EFH. If chub mackerel is not managed as a stock in the fishery, then EFH would not be established and would not be considered during these consultations.

Accountability measures (AMs) will be required if chub mackerel is managed as a stock in the fishery (section 8.2.6). In general, AMs should have positive impacts on the chub mackerel stock as they are intended to reduce the potential for overfishing and mitigate for overfishing when it occurs. AMs are generally expected to have short-term negative socio-economic impacts in years when they are implemented due to reduced fishing opportunities and reduced revenues. The impacts will vary depending on the specific alternatives selected. For example, lower possession limits and earlier fishery closures are expected to have greater negative socio-economic impacts than alternatives with higher possession limits and later fishery closures.

The alternatives which would require a GARFO permit in order to possess chub mackerel could lead to improved data collection because GARFO permits are typically associated with a variety of catch and effort reporting requirements, as described in section 8.2.7.

The specifications process (section 8.2.3) allows the Council to modify management measures in a timely manner in response to new information. This could benefit both the chub mackerel stock and

human communities by helping to ensure that the fishery is managed to prevent overfishing and achieve optimum yield.

The two management unit alternatives (section 8.2.4) are not expected to have notable differences in their impacts in the near future. Under one alternative, South Carolina through Florida would be excluded from the management unit and the Council would not be able to manage chub mackerel fisheries in those states; however, catch in those states would still count towards the ABC. Given that, on average, 0.3% of total chub mackerel catch came from those states during 1998-2017¹³, this may be of little consequence. However, if the fisheries in those states were to expand, it could be more difficult for the Council to ensure that overfishing does not occur if those states are not in the management unit.

If the Council sets OY at a lower level than the ABC, this could result in negative socio-economic impacts due to the potential for reduced revenues and reduced commercial and recreational fishing opportunities, depending on the scale of the reduction from the ABC. Such a reduction could have some ecological benefits; however, as previously stated, the ABC recommended by the SSC is expected to have a low risk of overfishing. Therefore, any reduction from that ABC may not have notable additional benefits for the chub mackerel stock.

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¹³ Based on the alternative recreational harvest estimates for Florida described in Table 4 and the associated footnotes.

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