



## Mid-Atlantic Fishery Management Council

800 North State Street, Suite 201, Dover, DE 19901

Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org

Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman

Christopher M. Moore, Ph.D., Executive Director

# MEMORANDUM

**Date:** May 26, 2023  
**To:** Council  
**From:** Julia Beaty, staff  
**Subject:** 2024 chub mackerel specifications review

On June 7, 2023, the Mid-Atlantic Fishery Management Council (Council) will review the previously set 2024 specifications for Atlantic chub mackerel and consider if revisions are needed. Council staff, the Advisory Panel, the Scientific and Statistical Committee (SSC), and the Monitoring Committee all recommend no changes.

The following materials are provided behind this tab (unless otherwise noted) for the Council's consideration. Materials are listed in reverse chronological order.

There is no Monitoring Committee meeting summary because the Monitoring Committee agreed over email that no changes are needed to the previously approved 2024 specifications after considering the recommendations of the SSC, the AP, and staff.

- 1) May 2023 SSC report (*behind Tab 14*)
- 2) April 28, 2023 staff memo on 2024 Atlantic chub mackerel specifications review
- 3) 2023 Advisory Panel Fishery Performance Report
- 4) 2023 Chub Mackerel Fishery Information Document



## Mid-Atlantic Fishery Management Council

800 North State Street, Suite 201, Dover, DE 19901

Phone: 302-674-2331 | FAX: 302-674-5399 | [www.mafmc.org](http://www.mafmc.org)

Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman

Christopher M. Moore, Ph.D., Executive Director

# MEMORANDUM

**Date:** April 28, 2023  
**To:** Chris Moore, Executive Director  
**From:** Julia Beaty, staff  
**Subject:** 2024 Atlantic chub mackerel specifications review

## Executive Summary

This memorandum includes information to assist the Mid-Atlantic Fishery Management Council's (Council's) Scientific and Statistical Committee (SSC) and Mackerel, Squid, and Butterfish (MSB) Monitoring Committee in reviewing 2024 catch and landings limits for Atlantic chub mackerel (*Scomber colias*), as well as the other management measures which can be modified through the annual specifications process.

Additional information on fishery performance and past management measures can be found in the 2023 Chub Mackerel Fishery Information Document and the 2023 Chub Mackerel Fishery Performance Report developed by advisors.<sup>1</sup>

The Council approved 2023-2025 catch and landings limits for Atlantic chub mackerel in June 2022. All catch and landings limits and other management measures have been unchanged since 2020, when Amendment 21 added chub mackerel to the MSB Fishery Management Plan (FMP). The SSC, Monitoring Committee, and Council reviewed these measures in 2020, 2021, and 2022 and recommended no changes.

During their May 2023 meeting, the SSC will consider whether revisions are needed to the previously adopted 2024 acceptable biological catch (ABC) limit. The Monitoring Committee will then meet to consider if changes are needed to the previously adopted 2024 annual catch limit (ACL), annual catch target (ACT), and total allowable landings limit (TAL), and other management measures which can be modified through the annual specifications process.

The Council will meet in June 2023 to review the recommendations of the SSC, Monitoring Committee, and staff, as well as input from advisors. They will then determine if revisions are needed to the previously implemented catch and landings limits and other management measures for 2024.

Council staff recommend no changes to the previously adopted catch and landings limits and other management measures for 2024. There is no new information to suggest that these measures should be modified. In addition, advisors recommended no changes.

---

<sup>1</sup> Both documents will be posted to <https://www.mafmc.org/fishery-performance-reports>.

**Table 1.** 2020-2025 catch and landings limits for Atlantic chub mackerel.

Measure	mil lb	mt	Basis
ABC	5.07	2,300	SSC recommendation
Expected SC-FL catch	0.08	38	Highest annual SC-FL landings shown in commercial dealer and MRIP data, increased by about 10% to account for discards, which are not well quantified.
ACL	4.99	2,262	ABC minus expected SC-FL catch.
ACT	4.79	2,171	ACL reduced by a 4% management uncertainty buffer.
Expected dead discards	0.29	130	6% of ACT based on based on the commercial discard rate during 2003-2017 from northeast observer data.
TAL	4.50	2,041	ACT minus expected total dead discards.

### **Recent Catch and Landings**

After remaining below 0.5 million pounds per year for many years, commercial chub mackerel landings spiked to 5.25 million pounds in 2013, but decreased to pre-2013 levels by 2016. In 2022, 18,015 pounds of chub mackerel were landed by commercial fishermen from Maine through North Carolina. Recreational chub mackerel landings are variable and averaged 121,998 pounds per year during 2018-2022. In 2022, recreational fishermen from Maine through North Carolina harvested an estimated 62,232 pounds of chub mackerel (Table 2).

Over the past 20 years, commercial and recreational landings were less than half the 2020-2025 TAL of 4.50 million pounds in every year except 2013. During 2017-2022, commercial and recreational landings did not exceed 7% of the TAL in any year (Table 2).

**Table 2.** Commercial and recreational chub mackerel landings, in pounds, 2003-2022, from Maine through North Carolina. Landings in some years are combined to protect confidential data associated with fewer than three vessels and/or dealers.

Year	Commercial Landings	Recreational Landings	Total Landings
2003	493,368	0	493,368
2004-2005	138	0	138
2006	0	0	0
2007-2009	21,040	0	21,040
2010-2011	197,020	355	197,375
2012	644,153	0	644,153
2013	5,250,139	0	5,250,139
2014	1,231,646	48,087	1,279,733
2015	2,110,707	0	2,110,707
2016	611,199	2,092	613,291
2017	4,309	14,831	19,140
2018	35,308	128,946	164,254
2019	87,942	74,459	162,401
2020	141,728	149,578	291,306
2021	39,245	194,773	234,018
2022	18,015	62,232	80,247

## **Stock Status and Biological Reference Points**

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. Since July 2018, the SSC has assumed that biomass is currently at or above biomass at maximum sustainable yield, as described in more detail in the following section.

## **Review of Prior SSC Recommendations**

The SSC recommended the first chub mackerel ABC during their July 2018 meeting. They concluded that insufficient information exists to assess the status and trends of chub mackerel in the northwest Atlantic. They concluded that an overfishing limit could not be specified and recommended an ABC of 2,300 mt (5.07 million pounds) based on expert judgement. Their ABC recommendation is based loosely on the historic high for commercial and recreational landings (around 5.25 million pounds in 2013) and assumptions about discards. This level of ABC will prevent the fishery from achieving its historic high, but will allow landings to exceed those in every other year over at least the past 20 years (Table 2). 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. Based on their recommendations, the ABC applies to total dead catch (i.e., commercial and recreational landings and dead discards) from Maine through the east coast of Florida.

The SSC determined the following to be the most significant sources of scientific uncertainty associated with the ABC:

- Stock size and productivity cannot be determined, there is no information to determine reference points for stock biomass levels, and little information exists to determine reference points for fishing mortality rates.
- There is no information on the source of recruits; it is unknown whether chub mackerel are episodic in the Mid-Atlantic, whether this is a range expansion with localized spawning, or neither.
- There is no information on predation mortality, or on the role of chub mackerel in predator diets.
- There is very high uncertainty in recreational landings and discards. Observer coverage on fisheries likely to catch chub mackerel may be low (*Illex* fleet, Mid-Atlantic small mesh bottom trawl).

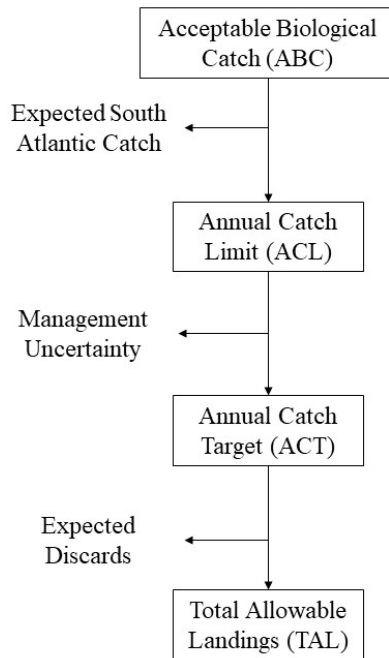
The SSC reviewed their recommendations in September 2020, September 2021, and May 2022 and recommended no changes.

## **Annual Catch Limit**

The ACL for chub mackerel is derived by subtracting expected catch in the South Atlantic (in this case, referring to South Carolina through the east coast of Florida) from the ABC (Figure 1). An 84,500 pound buffer for expected South Atlantic catch was used when setting the chub mackerel ACL for 2020-2025. This represents about 2% of the ABC and was intended to be a conservatively high estimate based on the highest annual South Atlantic landings through 2017 as shown in commercial dealer and Marine Recreational Information Program (MRIP) data (i.e., 76,835 pounds of landings in 2011, the vast majority of which were recreational landings), increased by about 10% to account for dead discards. Chub mackerel discards in the South Atlantic are highly uncertain.

Commercial and recreational fishery data through 2022 suggest that 84,500 pounds remains higher than past annual South Atlantic catch. For example, MRIP data for 2018-2022 show no estimated recreational chub mackerel catch from South Carolina through the east coast of Florida. Atlantic Coastal Cooperative Statistics Program data show commercial landings amounts that are confidential in some years, but less than 400 pounds in total across 2018-2022 combined.

Staff recommend no changes to the previous rationale and methodology for setting this buffer and no changes to the 2024 ACL of 4.99 million pounds (2,262 mt).



**Figure 1.** Flowchart summarizing chub mackerel catch and landings limits.

### **Annual Catch Target**

As defined in the FMP, the ACT can be set less than or equal to the ACL to account for management uncertainty (Figure 1). The Council adopted a 4% management uncertainty buffer when they set the 2020-2022 specifications in March 2019. The Council agreed to maintain this same buffer for 2023-2025 specifications. They did not recommend this buffer based on a quantitative methodology. This buffer was assumed to be sufficient to prevent ACL overages when used in combination with the in-season commercial fishery closure regulations described on the next page. Landings have remained well below the TAL. The 4% management uncertainty buffer has not been problematic for the fishery as catch has been very low due to other factors (e.g., a focus on other commercial target species).

Staff recommend no changes to the previously implemented management uncertainty buffer of 4% and no changes to the previously adopted 2024 ACT.

### **Discards**

Expected commercial and recreational discards in weight are subtracted from the ACT to derive the TAL (Figure 1). There are currently no expanded estimates of total chub mackerel commercial dead discards. MRIP provides estimates of recreational discards in numbers of fish.

When setting 2020-2022 specifications in March 2019, the Council agreed to reduce the ACT by 6% to account for expected discards. This was based on the commercial discard rate during 2003-2017 according to northeast observer data. The discard rate was defined as the total amount of observed chub mackerel discards compared to the total amount of observed chub mackerel catch across all trips combined during this time period. Given that the analysis combined data across multiple years, the years with the highest catch have the greatest influence in the resulting percentage.

This analysis does not account for recreational data; however, based on information available at the time, the volume of recreational chub mackerel discards was assumed to be low compared to commercial discards, especially in years with targeted commercial fishing effort.

An update of this analysis with data through 2020 (Table 3) shows higher discard percentages in more recent years; however, this does not account for the few years with much higher landings and higher levels of targeted fishing effort (Table 2). As previously stated, the ABC is loosely based on the historic high for chub mackerel catch (2013). The Monitoring Committee and Council reviewed this information in 2022 and did not recommend a change to the buffer between the ACT and the TAL to account for discards for 2023-2025 specifications.

Although this analysis has not been updated with 2021 or 2022 data, given the very low commercial landings in those years (Table 2), and given the rationale behind using multiple years that incorporate the years of highest landings, staff recommend no changes to the 2024 discards buffer or the previously implemented 2024 TAL of 4.50 million pounds (2,041 mt).

**Table 3.** Percent of total commercial chub mackerel catch that was discarded, based on northeast fisheries observer data, 2007-2021, with associated number of trips.

<b>Years</b>	<b>Observer Discard %</b>
<b>2006-2020</b> (15 years)	7% (337 trips)
<b>2011-2020</b> (10 years)	6% (301 trips)
<b>2016-2020</b> (5 years)	43% (193 trips)
<b>2013-2015</b> (top 3 years for landings)	4% (95 trips)
<b>2013</b> (historic high for landings)	3% (27 trips)

### **Possession Limits**

Currently, there is no commercial possession limit until 90% of the TAL is projected to be landed. At that point, a 40,000 pound (18 mt) possession limit would be in effect. Once 100% of the TAL is projected to be landed, a 10,000 pound (4.5 mt) possession limit would be in effect. The Council agreed that these in-season AMs are likely sufficient to prevent ACL overages and, therefore, no possession limits are needed prior to 90% of the TAL being landed. As previously stated, commercial and recreational landings, and presumably dead discards, have been well below the ACL, ACT, and TAL since they were first implemented in 2020.

According to stakeholder input provided during development of the Unmanaged Forage Omnibus Amendment, 40,000 pounds is approximately the amount of chub mackerel needed to fill a bait truck. Given the low value of chub mackerel (e.g., \$0.51 per pound in 2022 dollars on average during 2003-2022), 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.

Ten thousand pounds is approximately the average trip-level landings of chub mackerel based on northeast commercial fishery data for 1998-2017. During 2020-2022, 99.8% of commercial trips which landed any amount of chub mackerel landed less than 10,000 pounds of chub mackerel.

Under the previously approved 2024 TAL of 4.50 million pounds (2,041 mt), a commercial possession limit would be triggered once 4.05 million pounds (1,837 mt) of chub mackerel are projected to be landed by commercial and recreational fishermen. This level of landings has been reached only once over the past 20 years (i.e., in 2013, Table 2).

To date, the Council has not implemented a recreational chub mackerel possession limit.

Council staff recommend no changes to the commercial or recreational chub mackerel possession limits for 2024.

### **Other Management Measures**

There are no commercial or recreational minimum fish size limits for chub mackerel in federal waters. Minimum fish size limits are typically used to reduce fishing mortality on immature fish; however, the Council agreed that a commercial minimum size limit for chub mackerel may provide little additional biological benefits considering current fishery selectivity. According to an analysis of observer data for Amendment 21, about 88% of the chub mackerel caught in bottom otter trawls are at least 20 cm in length. As suggested in Daley and Leaf (2019)<sup>2</sup> and supported by comments from fishermen, it is possible that chub mackerel's fast swimming speed reduces the potential for capture of larger individuals in the commercial fishery. Several scientific studies have documented the length at maturity for chub mackerel in various regions. The length at maturity varies by study. Daley (2018)<sup>3</sup> 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.

Given that chub mackerel are predominantly caught with bottom otter trawls in commercial fisheries off the U.S. east coast, it can be assumed that most discarded chub mackerel would not survive. Therefore, a minimum fish size likely would increase mortality on this species without notable benefits of protecting immature fish.

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. Regulations for that fishery specify gear requirements (see 50 CFR 648.23), including gear restrictions for specific regulated mesh areas (50 CFR 648.80). The Council did not see a need to develop additional gear restrictions for chub mackerel beyond what vessels are currently subject to in other fisheries. There are also no recreational gear restrictions for chub mackerel in federal waters.

Staff do not recommend that the Council implement new chub mackerel management measures such as minimum fish sizes, closed seasons, or gear restrictions for 2024. These measures have not been used in the past and catch has remained well below the ABC.

---

<sup>2</sup> Daley, T. T. and R. T. Leaf. 2019. Age and growth of Atlantic chub mackerel (*Scomber colias*) in the Northwest Atlantic. *Journal of Northwest Atlantic Fisheries Science*. 50: 1-12.

<sup>3</sup> Daley, T. 2018. Growth and reproduction of Atlantic chub mackerel (*Scomber colias*) in the Northwest Atlantic. Master's thesis. University of Southern Mississippi.



## Chub Mackerel Fishery Performance Report

April 2023

The Mid-Atlantic Fishery Management Council's Mackerel, Squid, and Butterfish Advisory Panel met via webinar on April 26, 2023 to review the 2023 Chub Mackerel Fishery Information Document and develop the following Fishery Performance Report. The meeting also addressed butterfish. A separate report was generated for butterfish.

The primary purpose of this Fishery Performance Report is to contextualize catch histories for the Scientific and Statistical Committee by providing information about fishing effort, market trends, environmental changes, and other factors.

Advisor comments described below are not consensus or majority statements unless otherwise indicated.

**Advisory Panel members present:** Katie Almeida, Greg DiDomenico, Emerson Hasbrouck, Meghan Lapp, Pam Lyons Gromen, Gerry O'Neill

**Others present:** Carly Bari (GARFO), Julia Beaty (MAFMC staff), Jason Didden (MAFMC staff), Maria Fenton (GARFO), Melanie Griffin (Mass DMF), Mark Holliday (SSC member)

### Discussion questions:

1. What factors influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

### Summary of Advisor Comments

Advisors agreed that no changes are needed to the specifications currently in place for 2024.

Advisors said commercial landings remain very low because the vessels that have landed notable amounts of chub mackerel in the past have been focusing on other species, namely *Illex* squid. One advisor said some of these vessels have been focusing on loligo squid in the summer, which makes them even less likely to catch chub mackerel than when they are fishing for *Illex*.

Advisors recommended no changes to the current research recommendations.

One advisor asked whether the ongoing [Omnibus Essential Fish Habitat Amendment](#) would provide more information on chub mackerel. Staff noted that the amendment will at a minimum consider fisheries-independent trawl survey data, including more recent years of data than were previously analyzed for chub mackerel.





## Chub Mackerel Fishery Information Document

April 2023

This document provides a brief overview of the biology, stock condition, management system, and fishery performance for Atlantic chub mackerel (*Scomber colias*) with an emphasis on the most recent few years. Data sources include commercial dealer reports, vessel trip reports (VTRs), and Marine Recreational Information Program (MRIP) data and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit <https://www.mafmc.org/msb>.

### Key Facts

- The Mid-Atlantic Fishery Management Council developed the first management measures for Atlantic chub mackerel in U.S. waters. These measures became effective in 2017 and were modified in 2020. They have not been revised since 2020.
- The stock status of chub mackerel in this region is unknown as there has been no quantitative stock assessment. The Scientific and Statistical Committee assumes that biomass is currently at a sustainable level.
- After spiking at 5.25 million pounds in 2013, commercial landings have been below 150,000 pounds since 2017. In 2022, commercial fishermen landed 18,015 pounds of chub mackerel from Maine through North Carolina.
- Recreational catch and harvest has generally been increasing since 2016. It is estimated that recreational fishermen from Maine through North Carolina harvested 67,683 pounds of chub mackerel in 2022 (preliminary estimate).

### Basic Biology

Atlantic chub mackerel are a schooling pelagic species. They migrate seasonally and can be found throughout U.S. Atlantic waters in both inshore areas and to depths of about 250-300 meters.<sup>1</sup> Adults prefer temperatures of 15-20°C (about 60-70°F).<sup>1,2</sup> Some studies suggest that juveniles tend to be found closer inshore than adults.<sup>3,4</sup>

Atlantic chub mackerel grow rapidly during the first year of life.<sup>2,3,5,6</sup> They can reach at least age 13.<sup>7</sup> Daley and Leaf (2019) found that most fish sampled from commercial fishery catches off the northeast U.S. were age 3.<sup>6</sup>

Atlantic chub mackerel spawn in several batches. Spawning areas likely occur from North Carolina through the Gulf of Mexico.<sup>8,9</sup> Daley (2018) suggested that chub mackerel reach maturity around age two in the Northwest Atlantic, though other studies from various locations have published a range of ages at maturity.<sup>3,9</sup>

Chub mackerel are opportunistic predators with a seasonally variable diet of small crustaceans (especially copepods), small fish, and squid.<sup>1,10</sup> Adults tend to consume larger prey and more fish prey than juveniles.<sup>4</sup>

Very few quantitative estimates are available of the contribution of chub mackerel to the diets of predators in the western North Atlantic. To address this data gap, the Council funded a study with the goal of better delineating the role of chub mackerel in the diets of tunas and marlins, which were identified by stakeholders as predators of key interest. For this study, 758 non-empty stomachs from yellowfin and bigeye tunas were obtained from commercial and recreational fisheries, including recreational fishing tournaments, throughout the Mid-Atlantic and Southern New England, primarily in 2018 and 2019. Thirty-six white marlin and 17 blue marlin stomachs were also obtained. The marlin sample sizes were limited by regulations on landings. Chub mackerel were determined to be an exceptionally small component of the diets of tunas and marlins. Specifically, only two chub mackerel were identified in yellowfin tuna stomachs and eight chub mackerel were identified in two white marlin stomachs.<sup>11</sup>

### **Status of the Stock**

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. The SSC has assumed that biomass is currently at or above biomass at maximum sustainable yield.<sup>12</sup>

Large fluctuations in abundance have been reported around the world, including in the mid-Atlantic and New England.<sup>3, 13</sup> These fluctuations may be partly the result of environmental influences such as temperature and upwelling strength on recruitment.<sup>3</sup> Given that chub mackerel are a fully pelagic species, ocean processes likely influence their availability in any given area, as well as their recruitment.

### **Management System and Fishery Performance**

#### *Management*

The Mid-Atlantic Fishery Management Council manages Atlantic chub mackerel fisheries in federal waters from Maine through North Carolina. An increase in commercial landings during 2013-2015, as well as concerns about the potential role of chub mackerel as prey for tunas and marlins, prompted the Council to adopt an annual commercial landings limit and a commercial possession limit for chub mackerel as part of the Unmanaged Forage Omnibus Amendment. These measures were implemented in September 2017 and were the first regulations for chub mackerel fisheries off the U.S. east coast. They were intended to be temporary measures and were replaced by longer-term measures developed through Amendment 21 to the Mackerel, Squid, and Butterfish Fishery Management Plan, which became effective in September 2020.<sup>14</sup> All chub mackerel management measures have remained unchanged since that time.

The Council's SSC recommends annual acceptable biological catch (ABC) limits for chub mackerel. The Council must either approve the ABC recommended by the SSC or approve a lower ABC. Total catch (i.e., commercial and recreational landings and dead discards) from Maine through the east coast of Florida count against the ABC. Expected South Carolina through Florida catch is subtracted from the ABC to derive the annual catch limit (ACL). An annual catch target (ACT) is set less than or equal to the ACL to account for management uncertainty. Expected dead discards are subtracted from the ACT to derive a total allowable landings limit

(TAL). The commercial and recreational fisheries do not have separate annual catch or landings limits (Figure 1).

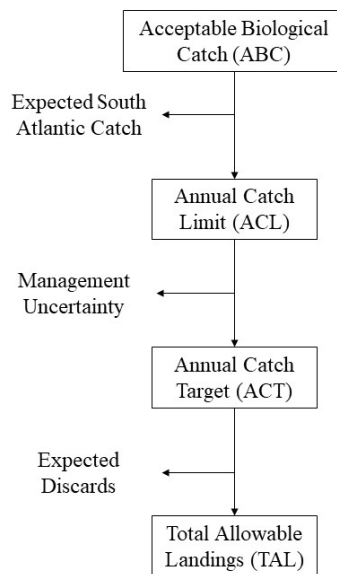
The catch and landings limits for 2020 - 2025 (unless otherwise modified) include an ABC of 5.07 million pounds, an ACL of 4.99 million pounds, an ACT of 4.79 million pounds, and a TAL of 4.50 million pounds. Catch and landings remained well below these limits in 2020-2022.

Although total catch from Maine through the east coast of Florida counts against the ABC, the ACL, ACT, and TAL apply to Maine through North Carolina. Based on past landings trends, the Council agreed that catch from South Carolina through Florida is immaterial to proper management. Therefore, commercial and recreational fisheries in South Carolina through Florida are not subject to the permit and possession limit requirements described below.

A commercial mackerel, squid, or butterfish fishing permit is required of vessels which retain chub mackerel for sale in federal waters from Maine through North Carolina. Ten permit types meet this requirement. The owner of any party or charter vessel that fishes for, possesses, or retains chub mackerel while carrying passengers for hire must have the federal mackerel/squid/butterfish for-hire permit. There is no federal permit type specific to Atlantic chub mackerel in either the commercial or recreational fisheries.

There is no commercial possession limit for chub mackerel until 90% of the TAL is projected to be landed. At that point, a 40,000 pound possession limit is in effect. Once 100% of the TAL is projected to be landed, commercially-permitted vessels are limited to a 10,000 pound possession limit. There are no federal waters recreational possession limits for chub mackerel.

There are no commercial or recreational gear restrictions, fish size requirements, or closed seasons for Atlantic chub mackerel in federal waters.



**Figure 1.** Flowchart summarizing chub mackerel catch and landings limits.

### *Commercial Fishery Trends*

After remaining below 0.5 million pounds per year for several years, commercial chub mackerel landings spiked to 5.25 million pounds in 2013, but decreased to pre-2013 levels by 2016 (Table

1).<sup>15</sup> This temporary increase was the result of a small number of trawl vessels targeting chub mackerel. These vessels also participate in the *Illex* squid fishery. Some fishermen have described 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 have said 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 capable of harvesting chub mackerel in profitable quantities because vessels need to be large, fast, and have refrigerated sea water or freezing capabilities in order to harvest this fast-swimming, low-value, warm water species. Landings data seem to support these statements.

Fewer than 5 vessels accounted for more than 95% of chub mackerel landings over the last 20 years (2003-2022). The chub mackerel landings from these vessels were sold to fewer than three dealers; therefore, much of the data associated with these vessels and dealers are confidential.<sup>15</sup>

Dealers in six states purchased at least 100 pounds of chub mackerel over the past 20 years combined (2003-2022): Rhode Island, Connecticut, New York, New Jersey, Virginia, and North Carolina. During this time period, an average of 8 vessels, with a maximum of 20 vessels, landed at least 100 pounds of chub mackerel per year from Maine through North Carolina.<sup>15</sup>

The annual average ex-vessel price per pound varied during 2003-2022, averaging \$0.51 per pound (adjusted to 2022 dollars). There appears to be a relationship between price and volume landed; however, this relationship is neither linear nor consistent across time. In general, years with higher landings had lower average annual prices per pound, and vice versa (Table 1).<sup>15</sup>

According to VTR data, about 90% of the chub mackerel landed by commercial fishermen from Maine through North Carolina from 2003 through 2022 were caught with bottom otter trawls. About 9% of landings were caught with midwater trawls. All other gear types collectively accounted for less than 1% of total landings.<sup>16</sup>

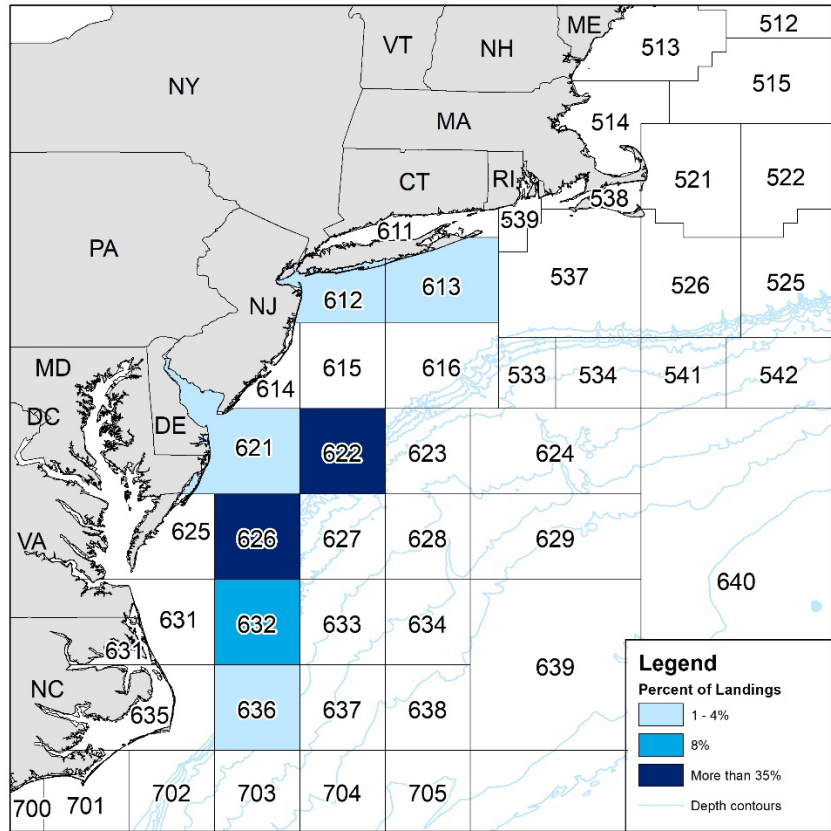
Most commercial chub mackerel landings (about 92%) from Maine through North Carolina over the past 20 years occurred during June-October. The highest proportion of landings occurred in September (35%). June, July, August, and October contributed about equally to commercial landings (12-16%).<sup>15</sup>

According to VTR data, nearly all commercial chub mackerel landings from 2002-2021 originated from statistical areas south of New York. Much of these landings came from statistical areas which overlap with the shelf break (Figure 2).<sup>16</sup>

Public comments received during development of Amendment 21 suggest that most chub mackerel landed on the east coast are processed for use as human food, much of which is sent overseas, and lesser amounts are used as bait in other fisheries.

**Table 1.** Commercial chub mackerel landings, ex-vessel value, and average price per pound, Maine through North Carolina, 2003-2022. Value and price are adjusted to 2022 dollars using the Gross Domestic Product Price Deflator. Landings in some years are combined to protect confidential data representing fewer than 3 vessels and/or dealers.<sup>15</sup>

<b>Year</b>	<b>Landings (pounds)</b>	<b>Ex-vessel value (2022 dollars)</b>	<b>Avg. price/pound (2022 dollars)</b>
2003	493,368	\$37,592	\$0.08
2004-2005	138	\$97	\$0.78
2006	0	\$0	\$0.00
2007-2009	21,040	\$8,381	\$0.39
2010-2011	197,020	\$43,487	\$0.22
2012	644,153	\$79,957	\$0.48
2013	5,250,139	\$1,246,707	\$0.24
2014	1,231,646	\$409,988	\$0.33
2015	2,110,707	\$589,778	\$0.28
2016	611,199	\$122,177	\$0.20
2017	4,309	\$3,132	\$1.42
2018	35,308	\$13,125	\$0.59
2019	87,942	\$45,040	\$0.75
2020	141,728	\$33,089	\$0.58
2021	39,245	\$26,241	\$0.70
2022	18,015	\$8,016	\$0.51
<b>2003-2022 avg</b>	<b>544,298</b>	<b>\$133,340</b>	<b>\$0.51</b>



**Figure 2.** Percent of commercial chub mackerel landings by statistical area, 2003-2022, as shown in federal VTR data. Only areas accounting for at least 1% of the total are shown. Confidential data associated with fewer than three vessels and/or dealers collectively account for less than 1% of landings and are not shown.<sup>16</sup>

*Recreational Fishery Trends*

MRIP data from Maine through North Carolina show increasing recreational catch of chub mackerel nearly year from 2015 through 2022 (Table 2). Estimates for 2022 were preliminary at the time of writing this document and showed an estimated 260,517 chub mackerel caught in recreational fisheries from Maine through North Carolina, with 46,669 chub mackerel harvested, corresponding to an estimated 67,683 pounds of harvest.<sup>17</sup>

During 2018-2022, about 52% of the recreational chub mackerel harvest from Maine through North Carolina (in numbers of fish) was caught in state waters, with the remaining 48% caught in federal waters. During this same time period, the proportion of harvest by mode averaged 56% from private and rental boats, 39% from party and charter boats, and 5% from shore (Table 3). MRIP data are no longer available by wave (i.e., two-month sampling increment) except by request. Most recreational catch and harvest occurred in New York, Rhode Island, New Jersey, and Connecticut (Table 4).<sup>17</sup> Previously available MRIP data for 2017-2021 suggested that over 90% of chub mackerel catch and harvest occurred during waves 4 (July-August) and 5 (September-October).<sup>18</sup>

Through development of Amendment 21, the Council 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.<sup>19</sup>

**Table 2.** MRIP-estimated recreational catch and harvest of chub mackerel from Maine through North Carolina, 2003-2022.<sup>17</sup>

<b>Year</b>	<b>Recreational catch (# of fish)</b>	<b>Recreational harvest (# of fish)</b>	<b>Recreational harvest (pounds)</b>	<b>% retained</b>
2003-2010	0	0	0	--
2011	1,613	1,613	355	100%
2012	15,569	0	0	0%
2013	0	0	0	--
2014	60,191	49,813	48,087	83%
2015	0	0	0	--
2016	2,575	2,087	2,092	81%
2017	26,062	13,310	14,831	51%
2018	157,471	104,830	128,949	67%
2019	139,282	49,894	74,462	36%
2020*	199,921	125,758	149,578	63%
2021	215,633	137,469	194,771	64%
2022 - <i>preliminary</i>	260,517	46,669	67,683	18%
<b>2018-2022 Avg.</b>	<b>194,565</b>	<b>92,924</b>	<b>123,089</b>	<b>50%</b>

\* Contribution of imputed data to total values for 2020: 19% for catch, 28% for harvest in numbers of fish, and 25% for harvest in pounds. This imputation method was only needed in 2020 due to COVID-related disruptions to the Access Point Angler Intercept Survey (APAIS) and subsequent data gaps. The methods filled gaps in 2020 catch data with data collected in 2018 and 2019. These proxy data match the time, place, and fishing mode combinations that would have been sampled had the APAIS continued uninterrupted. Proxy data were combined with observed data to produce catch estimates using the standard estimation methodology.

**Table 3.** Chub mackerel harvest by recreational fishing mode in numbers of fish, 2003-2022, Maine through North Carolina.<sup>17</sup>

Year	Party/charter	Private/rental boat	Shore
2003-2010	0	0	0
2011	0	0	1,613
2012-2013	0	0	0
2014	49,813	0	49,813
2015	0	0	0
2016	1,889	198	2,087
2017	2,422	10,888	13,310
2018	43,424	58,817	104,830
2019	17,150	32,744	49,894
2020	35,901	70,677	125,758
2021	65,414	72,055	137,469
2022- preliminary	21,159	25,101	46,669
<b>2018-2022 Avg.</b>	<b>36,610 (39%)</b>	<b>51,879 (56%)</b>	<b>4,436 (5%)</b>

**Table 4.** Proportion of total chub mackerel catch and harvest in numbers of fish by state, 2018-2022 (2022 data are preliminary).<sup>17</sup>

State	Recreational catch	Recreational harvest
<b>ME</b>	0%	0%
<b>NH</b>	2%	4%
<b>MA</b>	1%	0%
<b>RI</b>	26%	28%
<b>CT</b>	8%	5%
<b>NY</b>	33%	41%
<b>NJ</b>	30%	21%
<b>DE</b>	0%	0%
<b>MD</b>	Less than 1%	Less than 1%
<b>VA</b>	Less than 1%	Less than 1%
<b>NC</b>	0%	0%
<b>Total</b>	100%	100%

## References

- <sup>1</sup> Collette, B. B. and C. E. Nauen. 1983. FAO species catalogue. Vol. 2 Scombrids of the word: An annotated and illustrated catalogue of tunas, mackerels, bonitos, and related species known to date. Available at: <http://www.fao.org/docrep/009/ac478e/ac478e00.htm>
- <sup>2</sup> Perrotta, R. G., M. D. Viñas, D. R. Hernandez, and L. Tringali. 2001. Temperature conditions in the Argentine chub mackerel (*Scomber japonicus*) fishing ground: implications for fishery management. *Fisheries Oceanography*. 10(3):275-283.
- <sup>3</sup> Hernández, J. J. C. and A. T. S. Ortega. 2000. Synopsis of biological data on the chub mackerel (*Scomber japonicus* Houttuyn, 1782). FAO Fisheries Synopsis No. 157.



- <sup>4</sup> Castro, J. J. 1993. Feeding ecology of chub mackerel *Scomber japonicus* in the Canary Islands area. *South African Journal of Marine Science*. 13(1): 323-328.
- <sup>5</sup> Velasco, E. M., J. D. Arbol, J. Baro, and I. Sobrino. 2011. Age and growth of the Spanish chub mackerel *Scomber colias* off southern Spain: a comparison between samples from the NE Atlantic and the SW Mediterranean. *Revista de Biología Marina y Oceanografía*. 46(1):27-34.
- <sup>6</sup> Daley, T. T. and R. T. Leaf. 2019. Age and growth of Atlantic chub mackerel (*Scomber colias*) in the Northwest Atlantic. *Journal of Northwest Atlantic Fisheries Science*. 50: 1-12.
- <sup>7</sup> Carvalho, N., R. G. Perrotta, and E. Isidro. 2002. Age, growth and maturity in the chub mackerel (*Scomber japonicus* Houuttuyn, 1782) from the Azores. *Arquipélago Life and Marine Sciences*. 19A: 93-99.
- <sup>8</sup> Houde, E. D., S. A. Berkeley, J. J. Klinovsky, and C.E. Dowd. 1976. Ichthyoplankton survey data report: summary of egg and larvae data used to determine abundance of clupeid fishes in the eastern Gulf of Mexico. University of Miami Sea Grant Technical Bulletin Number 32. Available at: <https://repository.library.noaa.gov/view/noaa/10888>
- Houde, E. D., J. C. Leak, C. E. Dowd, S. A. Berkeley, and W. J. Richards. 1979. Ichthyoplankton abundance and diversity in the eastern Gulf of Mexico - a report to the Bureau of Land Management prepared under contract number AA550-CT7-28. Available at: <https://www.boem.gov/ESPIS/3/4042.pdf>
- Berrien, P. L. 1978. Eggs and larvae of *Scomber scombrus* and *Scomber japonicus* in continental shelf waters between Massachusetts and Florida. *Fishery Bulletin*. 76(1):95-115.
- Richardson, D. E., J. K. Llopiz, C. M. Guignard, and R. K. Cowen. 2010. Larval assemblages of large and medium-sized pelagic species in the Straits of Florida. *Progress in Oceanography*. 86(2010):8-20.
- Southeast Area Monitoring and Assessment Program (SEAMAP) larval survey catches from 1983-2014.
- <sup>9</sup> Daley, T. 2018. Growth and reproduction of Atlantic chub mackerel (*Scomber colias*) in the Northwest Atlantic. Master's thesis. University of Southern Mississippi.
- <sup>10</sup> Castro, J. J. and A. S. Del Pino. 1995. Feeding preferences of *Scomber japonicus* in the Canary Islands area. *Scientia Marina*. 59(3-4):352-333.
- Sever, T. M., B. Bayhan, M. Bilecenoglu, and S. Mavili. 2006. Diet composition of the juvenile chub mackerel (*Scomber japonicus*) in the Aegean Sea (Izmir Bay, Turkey). *Journal of Applied Ichthyology*. 22(2006):145-148.
- <sup>11</sup> Golet, W., J. Logan, L. Kerr, J. Quattro. 2021. Evaluating the importance of Atlantic chub mackerel (*Scomber colias*) in the diet of highly migratory species in the northwest Atlantic. Report to the Mid-Atlantic Fishery Management Council. Available at <https://www.mafmc.org/actions/chub-mackerel-amendment>.
- <sup>12</sup> Report of the July 2018 SSC meeting. Available at: <http://www.mafmc.org/ssc>
- <sup>13</sup> Goode, G. B. 1884. The food fishes of the U.S. part 3: natural history of useful aquatic animals. In: *The Fisheries and Fishery Industries of the United States*. U.S. Government Printing Office. Washington, D.C. Available at: <http://celebrating200years.noaa.gov/rarebooks/fisheries/welcome.html>
- <sup>14</sup> More information on the Chub Mackerel Amendment (Amendment 21 to the Mackerel, Squid, and Butterfish Fishery Management Plan) is available at: <https://www.mafmc.org/actions/chub-mackerel-amendment>.
- <sup>15</sup> Commercial fish dealer data provided by the NOAA Fisheries Greater Atlantic Regional Fisheries Office (includes state and federal dealers).
- <sup>16</sup> Commercial vessel trip report data provided by the NOAA Fisheries Greater Atlantic Regional Fisheries Office.
- <sup>17</sup> Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division. Accessed April 20, 2023. Available at: <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index>
- <sup>18</sup> See the 2022 chub mackerel Fishery Information Document available at <https://www.mafmc.org/msb>.
- <sup>19</sup> Summary of November 9, 2017 webinar on chub mackerel in HMS diets. Available at: <http://www.mafmc.org/actions/chub-mackerel-amendment>