



Chub Mackerel Fishery Information Document

April 2024

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 remained unchanged since 2020.
- There is no quantitative stock assessment of chub mackerel in this region. The Scientific and Statistical Committee assumes biomass is currently at a sustainable level based on the general productivity of this species in fisheries throughout the world and the relatively low fishery capacity in this region.
- After spiking at 5.25 million pounds in 2013, commercial landings have been below 150,000 pounds since 2017. In 2023, commercial fishermen landed 69,739 pounds of chub mackerel from Maine through North Carolina.
- Recreational catch and harvest have generally increased since 2016. Recreational fishermen from Maine through North Carolina harvested an estimated 135,711 pounds of chub mackerel in 2023 (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.¹ Adults prefer temperatures of 15-20°C (about 60-70°F).^{1,2} Some studies suggest that juveniles tend to be found closer inshore than adults.^{3,4}

Atlantic chub mackerel grow rapidly during the first year of life.^{2,3,5,6} They can reach at least age 13.⁷ Daley and Leaf (2019) found that most fish sampled from commercial fishery catches off the northeast U.S. were age 3.⁶

Atlantic chub mackerel spawn in several batches. Spawning areas likely occur from North Carolina through the Gulf of Mexico.^{8,9} 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.^{3,9}

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

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 to better delineate 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.¹¹

Status of the Stock

There has been no quantitative stock assessment of chub mackerel in the western Atlantic Ocean. The SSC has assumed that biomass is currently at or above biomass at maximum sustainable yield based on the general productivity of this species in fisheries throughout the world, combined with relatively low fishery capacity to target this species in this region.¹²

Large fluctuations in abundance have been reported around the world, including in the mid-Atlantic and New England.^{3, 13} These fluctuations may be partly the result of environmental influences such as temperature and upwelling strength on recruitment.³ 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 2020.¹⁴ The Council reviews the chub mackerel management measures each year but has determined that no changes have been necessary since implementation of Amendment 21.

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. As shown in the next sections, landings have been well below the TAL for several years. Although expanded estimates of commercial dead discards are not available and assumptions about the weight of fish are needed to convert recreational dead discards in numbers of fish to weight, it is presumed that total dead catch has also been far below the ACT, ACL, and ABC.

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.

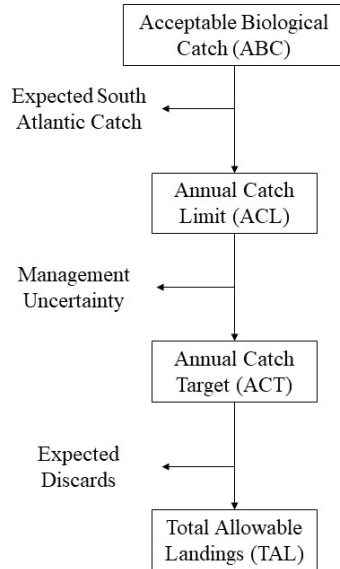


Figure 1. Flowchart summarizing chub mackerel catch and landings limits.

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).¹⁵ This temporary increase was the result of a small number of trawl vessels targeting chub mackerel. These vessels also participate in the *Illlex* squid fishery. Some fishermen have described chub mackerel as a “bailout” species which they sometimes target when they are not able to harvest *Illlex* squid. Chub mackerel tend to be harvested in the same areas and times of year when *Illlex* 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 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 (2004-2023). 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.¹⁵

Dealers in five states in Southern New England and the Mid-Atlantic purchased at least 100 pounds of chub mackerel over the past 20 years combined (2004-2023). During this time period, an average of 12 vessels, with a maximum of 23 vessels, landed at least 100 pounds of chub mackerel per year from Maine through North Carolina.¹⁵

The annual average ex-vessel price per pound varied during 2004-2023, averaging \$0.57 per pound (adjusted to 2023 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).¹⁵

According to VTR data, about 94% of the chub mackerel landed by commercial fishermen from Maine through North Carolina from 2004 through 2023 were caught with bottom otter trawls. About 5% of landings were caught with midwater trawls. All other gear types collectively accounted for less than 1% of total landings.¹⁶

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 (36%). June, July, August, and October contributed about equally to commercial landings (12-15%).¹⁵

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).¹⁶

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 revenue, and average price per pound, Maine through North Carolina, 2004-2023. The average price per pound excludes landings records where no dollar amount was reported as paid by the dealer (e.g., fish were landed but unmarketable). Revenue and price are adjusted to 2023 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.¹⁵

Year	Landings (pounds)	Ex-vessel revenue (2023 dollars)	Avg. price/pound (2023 dollars)
2004-2005	138	\$101	\$0.80
2006	0	0	0
2007-2009	21,040	\$8,811	\$0.77
2010-2011	197,020	\$45,436	\$0.51
2012	644,153	\$84,025	\$0.51
2013	5,250,139	\$1,308,648	\$0.25
2014	1,231,646	\$431,071	\$0.35
2015	2,110,707	\$615,622	\$0.29
2016	611,199	\$127,618	\$0.21
2017	4,309	\$3,302	\$1.47
2018	35,308	\$13,922	\$0.62
2019	87,942	\$47,543	\$0.79
2020	141,728	\$34,796	\$0.61
2021	39,245	\$28,458	\$0.75
2022	18,046	\$8,923	\$0.57
2023	69,739	\$13,194	\$0.36
2004-2023 avg	550,650	\$145,867	\$0.57

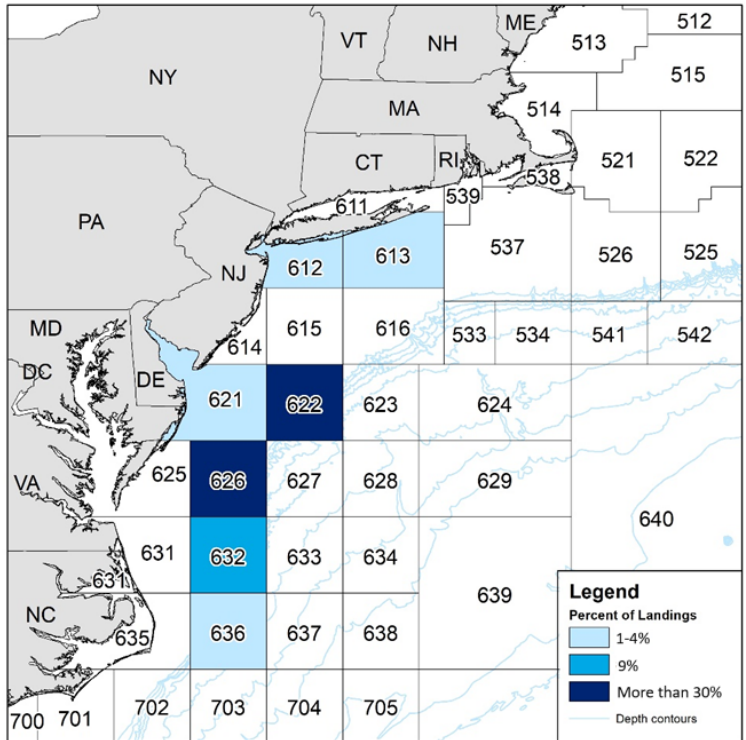


Figure 2. Percent of commercial chub mackerel landings by statistical area, 2004-2023, as shown in federal VTR data. Only areas accounting for at least 1% of the total are shown. Confidential data associated with fewer than three vessels and/or dealers collectively account for less than 1% of landings and are not shown.¹⁶

Recreational Fishery Trends

MRIP data from Maine through North Carolina show increasing recreational catch of chub mackerel nearly year from 2015 through 2023 (Table 2). Estimates for 2023 were preliminary at the time of writing this document and showed an estimated 201,329 chub mackerel caught in recreational fisheries from Maine through North Carolina, with 89,207 chub mackerel harvested, corresponding to an estimated 123,351 pounds of harvest.¹⁷

During 2019-2023, about 57% of the recreational chub mackerel harvest from Maine through North Carolina (in numbers of fish) was caught in state waters, with the remaining 43% caught in federal waters. During this same time period, the proportion of harvest by mode averaged 53% from private and rental boats, 34% from party and charter boats, and 13% from shore. Most recreational catch and harvest occurred in Rhode Island, New York, New Jersey, and Connecticut (Table 3).¹⁷ MRIP data are currently not available by wave (i.e., two-month sampling increment) except by request. 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).¹⁸

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.¹⁹

Table 2. MRIP-estimated recreational catch and harvest of chub mackerel from Maine through North Carolina, 2004-2023.¹⁷

Year	Recreational catch (# of fish)	Recreational harvest (# of fish)	Recreational harvest (pounds)	% retained
2004-2010	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	253,062*	43,825	62,231	17%
2023 - <i>preliminary</i>	201,329	89,089	135,711	44%
2019-2023 Avg.	201,845	89,207	123,351	45%

* The percent standard error (PSE) for this estimate is greater than 50, indicating high uncertainty. Estimates with a PSE exceeding 50 are not statistically different from zero using a standard 95% confidence interval. MRIP does not support the use of estimates with a PSE above 50 and in those instances, recommends considering higher levels of aggregation (e.g., across states, geographic regions, or fishing modes).

** 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. Gaps in 2020 data were filled 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 estimates using the standard estimation methodology.

Table 3. Proportion of total chub mackerel catch and harvest in numbers of fish by state, 2019-2023 (2023 data are preliminary).¹⁷

State	Recreational catch	Recreational harvest
ME	0%	0%
NH	1%	2%
MA	1%	0%
RI	34%	41%
CT	13%	9%
NY	25%	29%
NJ	26%	18%
DE	0%	0%
MD	Less than 1%	Less than 1%
VA	Less than 1%	Less than 1%
NC	0%	0%
Total	100%	100%

References

- ¹ 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>
 - ² 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.
 - ³ 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.
 - ⁴ 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.
 - ⁵ 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.
 - ⁶ 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.
 - ⁷ Carvalho, N., R. G. Perrotta, and E. Isidro. 2002. Age, growth and maturity in the chub mackerel (*Scomber japonicus* Houttuyn, 1782) from the Azores. *Arquipélago Life and Marine Sciences*. 19A: 93-99.
 - ⁸ 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.

- ⁹ Daley, T. 2018. Growth and reproduction of Atlantic chub mackerel (*Scomber colias*) in the Northwest Atlantic. Master's thesis. University of Southern Mississippi.
- ¹⁰ 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.
- ¹¹ 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>.
- ¹² Report of the July 2018 SSC meeting. Available at: <http://www.mafmc.org/ssc>
- ¹³ 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>
- ¹⁴ 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>.
- ¹⁵ Commercial fish dealer data provided by the NOAA Fisheries Greater Atlantic Regional Fisheries Office (includes state and federal dealers).
- ¹⁶ Commercial vessel trip report data provided by the NOAA Fisheries Greater Atlantic Regional Fisheries Office.
- ¹⁷ Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division. Data accessed March 13, 2024. Available at: <https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries>
- ¹⁸ See the 2022 chub mackerel Fishery Information Document available at <https://www.mafmc.org/msb>.
- ¹⁹ Summary of November 9, 2017 webinar on chub mackerel in HMS diets. Available at: <http://www.mafmc.org/actions/chub-mackerel-amendment>