FISHERY MANAGEMENT PLAN UPDATE
STRIPED MULLET
AUGUST 2025

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	April 2006	
Amendments:	Amendment 1	November 2015
	Amendment 2	May 2024
Revisions:	None	
Supplements:	Supplement A	May 2023
Information Updates:	None	
Schedule Changes:	None	
Comprehensive Review:	2029	

The North Carolina Striped Mullet Fishery Management Plan (FMP) was adopted in April 2006. The management plan established minimum and maximum commercial landings triggers of 1.3 and 3.1 million pounds (NCDMF 2006). If annual landings fall below the minimum trigger, the North Carolina Division of Marine Fisheries (DMF) would determine whether the decrease in landings is attributed to stock decline, decreased fishing effort, or both. If annual landings exceed the maximum trigger, DMF would determine whether harvest is sustainable and what factors are driving the increase in harvest. The striped mullet FMP established a daily possession limit of 200 mullets (white and striped in aggregate) per person per day in the recreational fishery.

Amendment 1 to the FMP was adopted in November 2015, and the subsequent rules were implemented in April 2016. Amendment 1 resolved issues with Newport River gill net attendance, mitigated known user group conflicts, updated the management framework, and updated minimum and maximum commercial landings triggers to 1.13 and 2.76 million pounds (NCDMF 2015). Amendment 1 maintains the 200-mullet possession limit per person in the recreational fishery.

Commercial landings in 2016 were 965,198 pounds, which is below the minimum landings trigger of 1.13 million pounds. As required by the FMP, the DMF initiated data analysis in July 2017 to determine whether the decrease was attributed to a stock decline, decreased fishing effort, or both. The DMF presented preliminary findings and recommendations to the North Carolina Marine Fisheries Commission (MFC) during its November 2017 business meeting. It was determined by the DMF that no management actions were necessary at that time, but a more comprehensive analysis with data through 2017 was needed.

The DMF presented results of their comprehensive analysis at the February 2018 MFC business meeting and concluded the stock had likely declined since completion of the 2013 stock assessment, which had a terminal year of 2011. The DMF recommended updating the stock assessment model to include data through 2017 prior to taking management action. As an assessment update, there were no changes to model parameters and peer review was not required, as the configuration of the peer reviewed model was maintained. Results of the stock assessment indicated overfishing was not occurring through 2017 but could not determine if the stock was overfished (NCDMF 2018).

Subsequent management options were developed by the DMF and presented to the Finfish, Southern, and Northern advisory committees in July 2018 to receive input prior to finalizing the DMF recommendation. Recommendations were then presented to the MFC at its August 2018 business meeting. The DMF and the advisory committees recommended no management action be taken since the stock assessment update

indicated overfishing was not occurring. The DMF would, however, continue to monitor trends in the commercial fishery and fishery-independent indices. The recommendation was approved by the MFC.

The 2022 North Carolina striped mullet stock assessment indicated the North Carolina striped mullet stock is overfished and overfishing is occurring in the terminal year of 2019 (NCDMF 2022). In response to stock assessment results, the MFC adopted Supplement A to Amendment 1 to the Striped Mullet FMP in May 2023 to end overfishing (NCDMF 2023). Supplement A established season closures for the striped mullet commercial and recreational fisheries that occurred from November 7 through December 31, 2023, north of the Highway 58 Bridge and from November 10 through December 31, 2023, south of the Highway 58 Bridge. Supplement A management remained in place until adoption of Amendment 2 to the Striped Mullet FMP in May 2024. With the adoption of Supplement A, the commercial landings triggers established by Amendment 1 were no longer used to monitor the stock.

Amendment 2 to the Striped Mullet FMP was adopted in May 2024. The plan implemented day of week closures projected to achieve a 34.9% reduction in commercial harvest relative to 2019 landings, to end overfishing and achieve sustainable harvest within 10 years. Commercial harvest is closed Saturday and Sunday for January through September, and Saturday through Monday for October through December. The plan also implemented a 100-fish recreational individual bag limit, a 400-fish recreational vessel limit, and provided an exception for For-Hire Operations to possess a bag limit for the number of anglers fishing up to the 400-fish maximum, including in advance of a trip. Finally, the plan implements an adaptive management framework that allows the Director to use proclamation authority to specifically adjust season closures, day of week closures, trip limits and gill net yardage or mesh size restrictions to help ensure management targets are being met, based on results of stock assessment updates or in response to concerning stock conditions or fishery trends observed outside of a stock assessment update.

Management Unit

Coastal and joint waters of North Carolina.

Goal and Objectives

The goal of Amendment 2 is to manage the striped mullet fishery to achieve a self-sustaining population that provides sustainable harvest using science-based decision-making processes. The following objectives will be used to achieve this goal:

- Implement management strategies within North Carolina that sustain and/or restore the striped mullet spawning stock with adequate age structure abundance to maintain recruitment potential and prevent overfishing.
- Promote the restoration, enhancement, and protection of critical habitat and environmental quality in a manner consistent with the Coastal Habitat Protection Plan, to maintain or increase growth, survival, and reproduction of the striped mullet stock.
- Use biological, social, economic, fishery, habitat, and environmental data to effectively monitor and manage the fishery and its ecosystem impacts.
- Advance stewardship of the North Carolina striped mullet stock by promoting practices that minimize bycatch and discard mortality.

DESCRIPTION OF THE STOCK

Biological Profile

Striped mullet are found in a wide range of depths and habitats but primarily inhabit freshwater to estuarine environments until migrating to the ocean to spawn in the fall (Able and Fahay 1998; Pattillo et al. 1999; Cardona 2000; Whitfield et al. 2012). Striped mullet serve as an ecological link between some of the smallest aquatic organisms and the highest-level predators in the marine food chain. Striped mullet feed on

microorganisms such as bacteria and single-celled algae found on aquatic plants and in mud, silt, sand, and decaying plant material (Odum 1968; Moore 1974; Collins 1985a; Larson and Shanks 1996; Torras et al. 2000). In turn, striped mullet are prey to predators such as birds, fish, sharks, and porpoises (Breuer 1957; Thomson 1963; Collins 1985a; Barros and Odell 1995; Fertl and Wilson 1997).

The male and female maximum ages for striped mullet in North Carolina are 14 and 13 years old respectively and a 15-year-old striped mullet of unknown sex was observed in 2017 by the DMF (NCDMF 2022). The maximum size of striped mullet in North Carolina is recorded at 27.5 inches total length (NCDMF 2022).

Striped mullet are highly fecund (upwards of 4 million eggs for a large female: Bichy 2000) and spawn in large aggregations near inlets to offshore areas (Collins and Stender 1989). Spawning individuals have been reported from September to March; however, peak spawning activity occurs from October to early December (Bichy 2000). Skipped spawning has been exhibited by striped mullet on the east coast of Florida (Myers et al. 2020) and on the eastern coast of Australia (Fowler et al. 2016). Striped mullet in North Carolina appear to mature at a younger age and larger size than other striped mullet populations (Bichy 2000). Length at 50 percent maturity occurs at 11.1 inches fork length (FL) for males (Bichy 2000) and 12.6 inches FL for females (NCDMF 2021a).

Stock Status

The 2022 North Carolina striped mullet stock assessment (NCDMF 2022) indicated the striped mullet stock in North Carolina is overfished and overfishing is occurring.

Stock Assessment

The North Carolina striped mullet stock was modeled using stock synthesis version 3.30, an integrated statistical catch-at-age, forward-projecting, length based, age-structured model using data from 1950 to 2019. Input data included commercial landings, recreational harvest estimates, fisheries-independent survey indices (Program 915), and biological data collected.

Both the observed data and model predictions suggest a decreased presence of larger, older striped mullet in the population. The model has estimated declining trends in age-0 recruitment and female spawning stock biomass (SSB) over the last several decades. Estimates of fishing mortality (F) exhibit an increasing trend. Model results also indicate consistent overestimation of biomass and the highest risk for overfishing.

A fishing mortality threshold of $F_{25\%}$ and a fishing mortality target of $F_{35\%}$ were maintained from the prior assessment since the fishery continues to target mature female fish during the spawning season and because of the ecological importance of striped mullet. Complementary reference points for stock size were adopted based on female SSB, $SSB_{25\%}$ and $SSB_{35\%}$. The stock assessment model estimated a value of 0.37 for $F_{25\%}$ and a value of 0.26 for $F_{35\%}$. These estimates represent numbers-weighted values for ages 1 through 5. Predicated F in 2019 is 0.42, which is larger than the $F_{25\%}$ threshold and so suggests that overfishing is occurring (Figure 1). The model estimated a value of 1,364,895 (619 metric tons) for the $SSB_{25\%}$ threshold and a value of 2,238,075 (1,015 metric tons) for the $SSB_{35\%}$ target. Female SSB in 2019 was estimated at 579,915 pounds (263 metric tons), which is smaller than the $SSB_{25\%}$ threshold and so suggests the stock is overfished (Figure 2).

An external peer review was held in April 2022. The panel concluded the assessment model and results are suitable for providing management advice for at least the next five years. The Panel considers the current model a substantial improvement from the previous assessment, representing the best scientific information available for the stock.

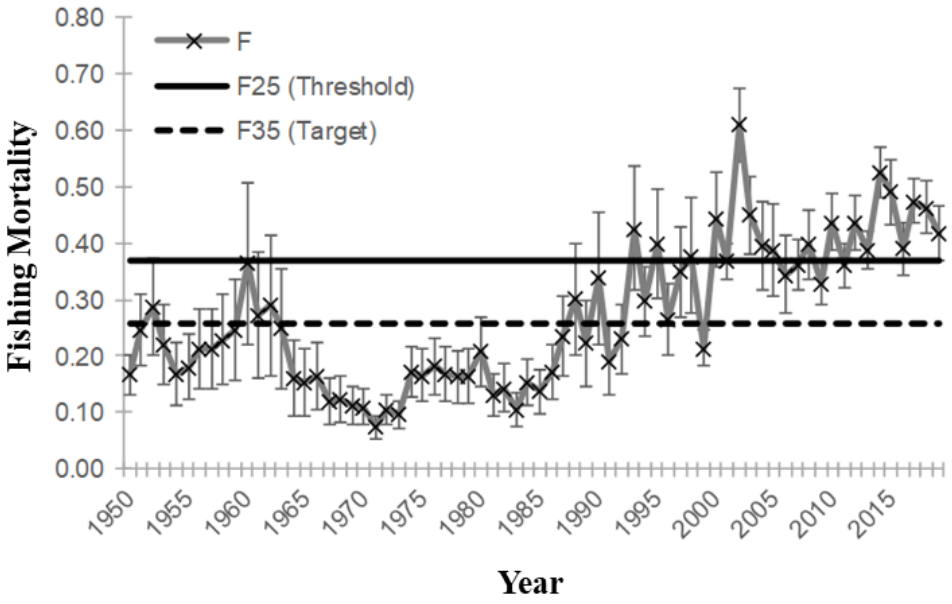

Figure 1. Annual predicted fishing mortality rates (numbers-weighted, ages 1–5) compared to estimated FThreshold (F25%) and FTarget (F35%), 1950–2019. 2019 is the terminal year for the most recent striped mullet stock assessment (NCDMF 2022).

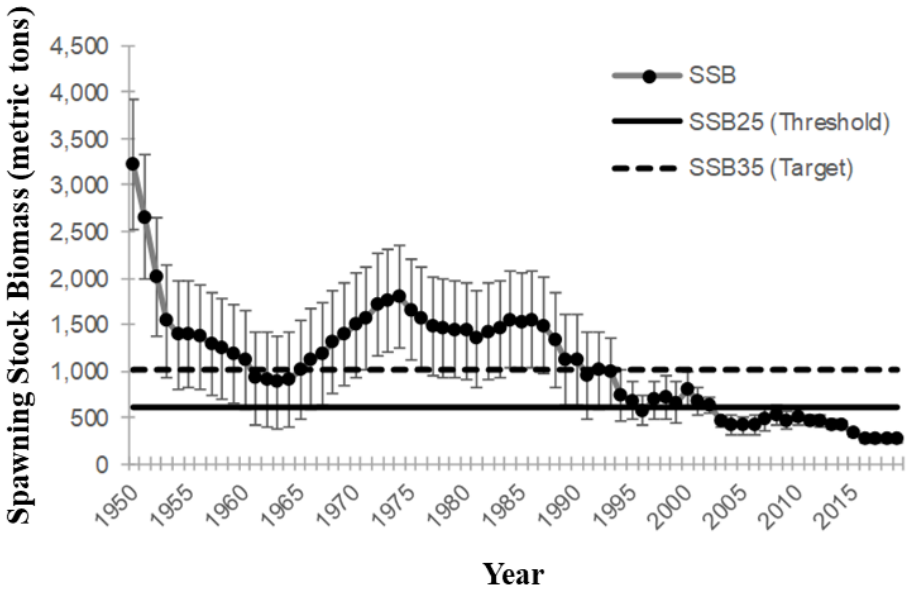

Figure 2. Annual predicted spawning stock biomass in metric tons, compared to estimated SSBThreshold (SSB25%) and SSBTarget (SSB35%), 1950–2019. 2019 is the terminal year for the most recent striped mullet stock assessment (NCDMF 2022).

DESCRIPTION OF THE FISHERY

Current Regulations

Amendment 2 was adopted in May of 2024 and implemented commercial harvest closures on Saturday and Sunday for January through September and on Saturday through Monday for October through December.

The plan also implemented a 100-fish recreational individual bag limit, a 400-fish recreational vessel limit, and provided an exception for For-Hire Operations to possess a bag limit for the number of anglers fishing up to the 400-fish maximum, including in advance of a trip. Striped mullet are exempt from the Mutilated Finfish Rule (15A NCAC 03M .0101).

Commercial Fishery

Historically, beach seines and gill nets are the two primary gear types used in the striped mullet commercial fishery, with most commercial landings prior to 1978 coming from the beach seine fishery. Gill nets (runaround, set, and drift) replaced seines as the dominant commercial gear type in 1979. Because the commercial fishery primarily targets striped mullet for roe, the fishery is seasonal with the highest demand and landings occurring in the fall when large schools form during their spawning migration to the ocean and females are ripe with eggs. Striped mullet are primarily targeted commercially using runaround gill nets in the estuarine and ocean waters of North Carolina. The striped mullet beach seine fishery primarily occurs in conjunction with the Bogue Banks stop net fishery. The stop net fishery has operated under fixed seasons and net and area restrictions since 1993. Stop nets are limited in number (four), length (400 yards), and mesh sizes (minimum eight inches outside panels, six inches middle section). Typically, stop nets have only been permitted along Bogue Banks (Carteret County) in the Atlantic Ocean from October 1 to November 30. However, the stop net season was extended to include December 3 to December 17 in 2015 due to minimal landings of striped mullet (Proclamation M-28-2015). In 2020, 2021, and 2022, and 2024 the stop net fishery was open from October 15 through December 31 (Proclamations M-17-2020, M-21-2021, M-23-2022, M-17-2024). In 2023, the stop net fishery opened on October 15 and closed on November 7 as part of Supplement A management (Proclamations M-19-2023, FF-36-2023). Due to the schooling nature of striped mullet, the beach seine fishery has the potential to be, and historically has been, a high-volume fishery with thousands of pounds landed during a single trip. In addition, the use of cast nets in the striped mullet commercial fishery has been increasing since around 2003.

Since 1994, commercial landings have ranged from a low of 965,198 pounds in 2016 to a high of 2,829,086 pounds in 2000 (Table 1; Figure 3). From 2003 to 2009, landings were stable between 1,598,617 and 1,728,607 pounds before increasing to 2,082,832 pounds in 2010. Landings fluctuated annually between 1.5 and 2.0 million pounds from 2010 to 2014 before declining in 2015 and again in 2016, dropping below the minimum commercial landings trigger established by Amendment 1 and to lowest value in the time series (965,337 pounds). Commercial landings remained around 1.3 million pounds per year from 2017 to 2020, then increased in 2021 to 2,140,620 pounds and again in 2022 to 2,720,440 pounds. Landings in 2023 fell to 1,863,337 pounds, a 31.5% reduction from 2022 landings. This drop in landings was likely a result of Supplement A management that implemented harvest closures in November and December of 2023. In 2024, landings increased to 2,357,880 pounds, a 27% increase over 2023. This increase occurred despite day of week closures for commercial harvest implemented as part of Amendment 2 to the striped mullet FMP in May of 2024. It is possible that the fish that escaped harvest in 2023 due to Supplement A harvest restrictions contributed to increased abundance and availability to the fishery in 2024.

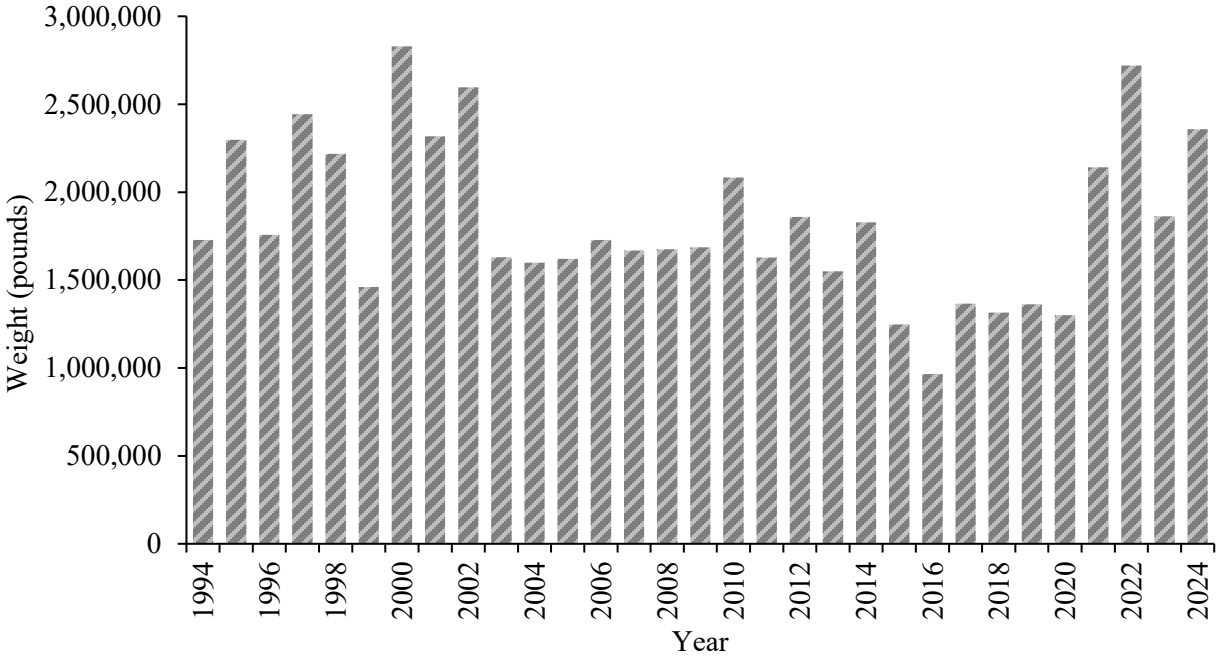

Figure 3. Striped mullet commercial landings (pounds) reported through the North Carolina Trip Ticket Program, 1994–2024.

Table 1. Recreational harvest (number of fish landed and weight in pounds) and releases (number of fish), 2002–2024, and commercial harvest (weight in pounds) of striped mullet from North Carolina, 1994–2024. Number released and weight landed cannot be determined because of uncertainty in reported species identification.

Year	Recreational			Commercial	
	Number Landed	Number Released	Weight Landed (lb)	Weight Landed (lb)	Total Weight(lb)
1994	-	-	-	1,728,551	1,728,551
1995	-	-	-	2,298,446	2,298,446
1996	-	-	-	1,756,863	1,756,863
1997	-	-	-	2,442,657	2,442,657
1998	-	-	-	2,218,108	2,218,108
1999	-	-	-	1,460,850	1,460,850
2000	-	-	-	2,829,086	2,829,086
2001	-	-	-	2,317,655	2,317,655
2002	5,967,684	-	-	2,596,304	2,596,304
2003	4,090,368	-	-	1,629,314	1,629,314
2004	1,394,707	-	-	1,598,617	1,598,617
2005	1,312,234	-	-	1,620,394	1,620,394
2006	1,059,444	-	-	1,728,607	1,728,607
2007	1,766,373	-	-	1,668,804	1,668,804
2008	1,191,633	-	-	1,675,859	1,675,859
2009	1,167,086	-	-	1,685,615	1,685,615
2010	1,319,070	-	-	2,082,832	2,082,832
2011	1,139,786	-	-	1,627,894	1,627,894
2012	1,369,975	-	-	1,859,587	1,859,587
2013	1,453,038	-	-	1,549,083	1,549,083
2014	1,352,690	-	-	1,828,351	1,828,351
2015	1,420,378	-	-	1,247,129	1,247,129
2016	1,491,533	-	-	965,337	965,337
2017	1,537,183	-	-	1,366,351	1,366,351
2018	489,321	-	-	1,314,431	1,314,431
2019	562,089	-	-	1,362,227	1,362,227
2020	531,875	-	-	1,299,500	1,299,500
2021	1,484,850	-	-	2,140,620	2,140,620
2022	292,708	-	-	2,720,440	2,720,440
2023	124,559	-	-	1,863,337	1,863,337
2024	194,619	-	-	2,357,880	2,357,880
Mean	1,422,313	-	-	1,833,572	1,833,572

Recreational Fishery

The federal Marine Recreational Information Program (MRIP) is primarily designed to sample anglers who use rod and reel as the mode of capture. Since most striped mullet are caught with cast nets for bait, striped mullet recreational harvest data are imprecise. In addition, angler misidentification between striped mullet and white mullet is common, and bait mullet are usually released by anglers before visual verification by creel clerks is possible. As such, mullets are not identified to the species level in the MRIP data (Catch Type B). Beginning in 2002, MRIP began deferring to mullet genus to classify unobserved type B1 (harvested/unavailable catch) and B2 (released/unavailable catch) catch. As a result, the magnitude of recreational harvest for mullet genus in units of numbers far exceeds that of both striped mullet and white

mullet. This methodological improvement served to greatly increase the precision of estimates albeit without species level resolution. As such, estimates of recreational harvest for mullet prior to 2002 are considered unreliable.

The 2022 striped mullet stock assessment used the sum of recreational striped mullet harvest and a proportion of the recreational harvest of mullet genus for removals by the recreational fleet (NCDMF 2022). The proportion of mullet genus assumed to be striped mullet in the recreational harvest was 29%, a value derived from a study by the DMF of cast net recreational harvest for striped mullet (NCDMF 2006).

Recreational harvest peaked in 2002 and 2003 at greater than four million fish harvested (Table 1; Figure 4). From 2004 to 2017 recreational harvest remained stable at around one million fish before declining in 2018, 2019 and 2020 to around 500,000 fish. This decline was likely related to decreased abundance of striped mullet and regulations that drastically shortened the recreational fishing season for southern flounder, a fishery where live mullet is a popular bait. Recreational harvest increased in 2021 to 1,484,850 fish before declining in 2022 to 292,708 fish, and in 2023 to 124,559 fish which was the lowest value in the time series. This decrease may be the result of a short recreational flounder fishing season and Supplement A management that implemented harvest closures in November and December of 2023. Recreational harvest remained low in 2024 at 194,619 fish, the second lowest value in the time series.

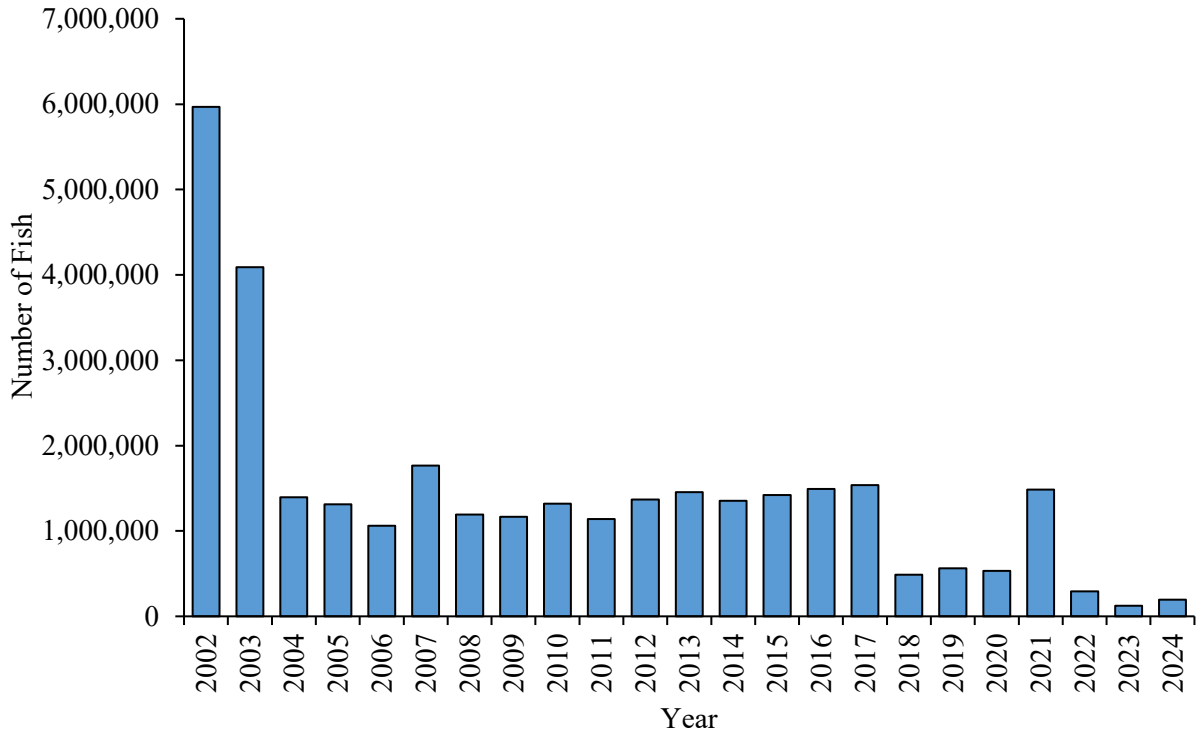

Figure 4. Recreational landings (Type A + B1; numbers of fish) includes estimates of striped mullet plus 29% of the mullet genus harvest from the Marine Recreational Information Program survey for North Carolina, 2002–2024.

Length-frequency distributions collected in North Carolina's MRIP survey are considered an inaccurate representation of the recreational fishery. This is due to biases in the methodology of the program and angler behavior. Lengths collected in North Carolina's MRIP survey are recorded at the dock and therefore only represent fish brought back to be kept by the angler. Anglers typically only keep the largest mullet, whether it be for personal consumption, or to be saved for use as cut bait. This bias toward keeping only the largest striped mullet has caused them to be disproportionately represented in the MRIP data. The vast majority of

striped mullet harvested in the recreational fishery are used as live bait for other fisheries. For this type of fishing, “finger mullet”, or age-0 fish, approximately four inches in total length are used.

Striped mullet harvest data from the Recreational Commercial Gear License (RCGL) were collected from 2002 to 2008. The program was discontinued in 2009 due to a lack of funding and the minimal contributions from RCGL to overall harvest. From 2002 through 2008, an average of 41,512 pounds of striped mullet were harvested per year using a RCGL (NCDMF 2021b).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

The number of striped mullet measured per year in fishery-dependent programs between 1994 and 2024 ranged from 124 to 13,263 with the lowest number measured in 1996 (124; Table 2). In 2024, 8,183 striped mullet were measured from commercial catches. Variation in mean length was low, usually falling between 13.0- and 14.5-inches FL, with the lowest mean length occurring in 1997 (12.8 inches FL). In 2024, mean FL was 15.4-inches FL, the highest value in the time series. Mean fork lengths in 2023 (14.9-inches) and 2022 (15.1-inches) were the second and third highest values in the time series. Minimum and fork lengths generally fell within a small range and maximum lengths ranged from 19.1 to 27.5 inches FL, though in 1994 and 1996, maximum length was below 20.0 inches (Table 2).

From 1994 through 2024 the size range of striped mullet captured in the commercial fishery as determined from commercial fish house samples ranged from 5.9 to 25.4 inches FL (Figure 5). Modal length generally falls between 12.0 and 15.0 inches. In all years there are few striped mullet over 18.0 inches present in the catch. Since 2022, there has been a noticeable shift toward higher percentages of larger fish captured in the commercial fishery.

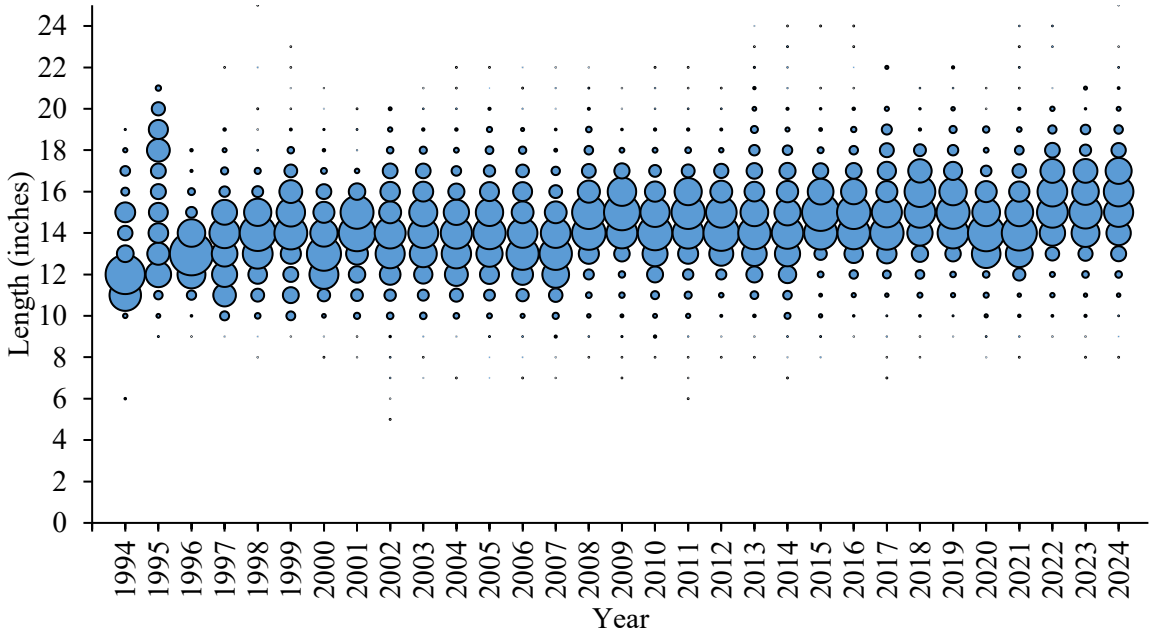

Figure 5. Commercial length frequency (fork length, inches) of striped mullet harvested, 1994–2024. Bubbles represent fish at length and the bubble size is proportional to the number of fish at that length (n=211,234). Bait samples are not included.

Table 2. Mean, minimum, and maximum lengths (fork length, inches) of striped mullet measured from the commercial fisheries, 1994–2024. Bait samples are not included.

Year	Mean Length	Minimum Length	Maximum Length	Number Measured
1994	13.0	6.1	19.1	302
1995	14.5	9.3	21.6	256
1996	13.5	9.2	18.5	124
1997	12.8	8.5	22.8	2,049
1998	12.9	8.6	25.4	1,705
1999	13.3	7.0	23.9	1,823
2000	13.4	6.1	23.5	7,582
2001	14.1	8.1	20.9	5,726
2002	13.2	5.9	21.3	10,990
2003	12.9	6.3	24.5	7,170
2004	13.1	7.6	24.4	12,778
2005	13.5	7.8	22.6	10,270
2006	13.7	7.8	22.2	12,108
2007	13.5	7.1	27.5	12,188
2008	14.1	8.2	24.1	13,263
2009	14.1	8.0	22.4	8,241
2010	13.9	8.1	22.7	10,991
2011	13.9	6.5	22.1	7,751
2012	14.0	7.9	22.2	12,833
2013	14.2	8.3	24.3	8,535
2014	13.8	7.7	24.0	6,527
2015	14.2	8.1	24.9	5,923
2016	14.3	8.9	24.1	5,661
2017	14.2	7.8	22.4	4,480
2018	14.5	8.3	22.5	4,111
2019	14.6	8.7	22.8	4,922
2020	13.8	8.3	21.9	4,246
2021	14.3	8.8	24.7	7,241
2022	15.1	9.1	24.7	7,774
2023	14.9	8.1	22.0	5,481
2024	15.4	8.6	25.4	8,183

Fishery-Independent Monitoring

The Fishery-Independent Gill-Net Survey (Program 915), began in 2001 and included sampling in the Pamlico Sound along the Hyde and Dare County shorelines. In July 2003, sampling was expanded to include the Neuse, Pamlico, and Pungo rivers. Additional areas in the Southern District including the New and Cape Fear rivers were added in April 2008. A stratified random sampling design is used based on area and water depth. Sampling occurs from mid-February to mid-December using an array of gill nets with stretched mesh sizes ranging from 3.0 inches to 6.5 inches.

To provide the most relevant indices for use in the 2022 stock assessment, Program 915 data were limited to those collected from shallow water during August through December. A combined index, with a starting year of 2008 and data collected from the Pamlico Sound, Pamlico River, Pungo River, Neuse River, and New River was calculated. Relative abundance increased through 2011, then declined until 2015 (Figure 6). From 2015 through 2021 abundance increased, peaking in 2021. Abundance declined substantially in

2022 to the lowest value in the time series but increased again in 2023 and 2024 to values close to those observed in 2017 and 2018. Greater abundance of adult striped mullet in 2024 may have contributed to the increase in commercial landings in 2024 relative to 2023.

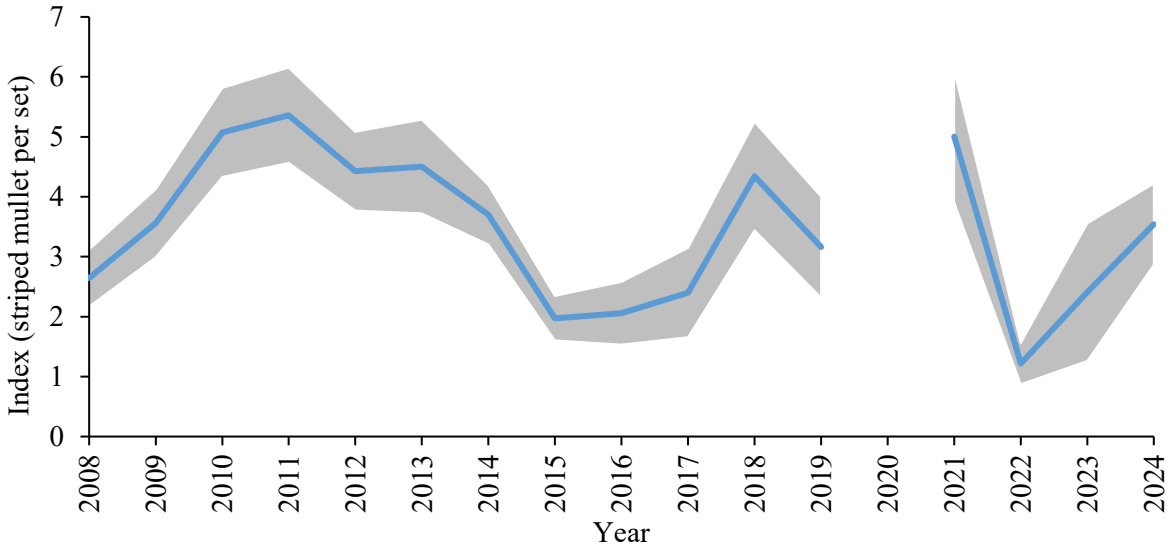

Figure 6. Relative Abundance index (fish per set) of striped mullet collected from Program 915 in Pamlico Sound, Pamlico, Pungo, Neuse and New rivers from August–December 2008–2024. Gray shading represent ± 1 standard error. Sampling was not conducted in 2020.

From 2008 to 2024, the size of striped mullet captured during the August to December portion of Program 915 in the Pamlico Sound, Pamlico River, Pungo River, Neuse River, and New River ranged from 7 to 26 inches FL (juveniles excluded, see NCDMF 2022 for juvenile length cut offs; Figure 7). Modal length ranged from 11 to 13 inches FL. Few striped mullet less than 10 inches FL and greater than 15 inches FL are captured in this survey. In 2024, more striped mullet in the 13 inch and 14 inch size classes were observed relative to recent years, but fewer were observed in size classes over 15 inches.

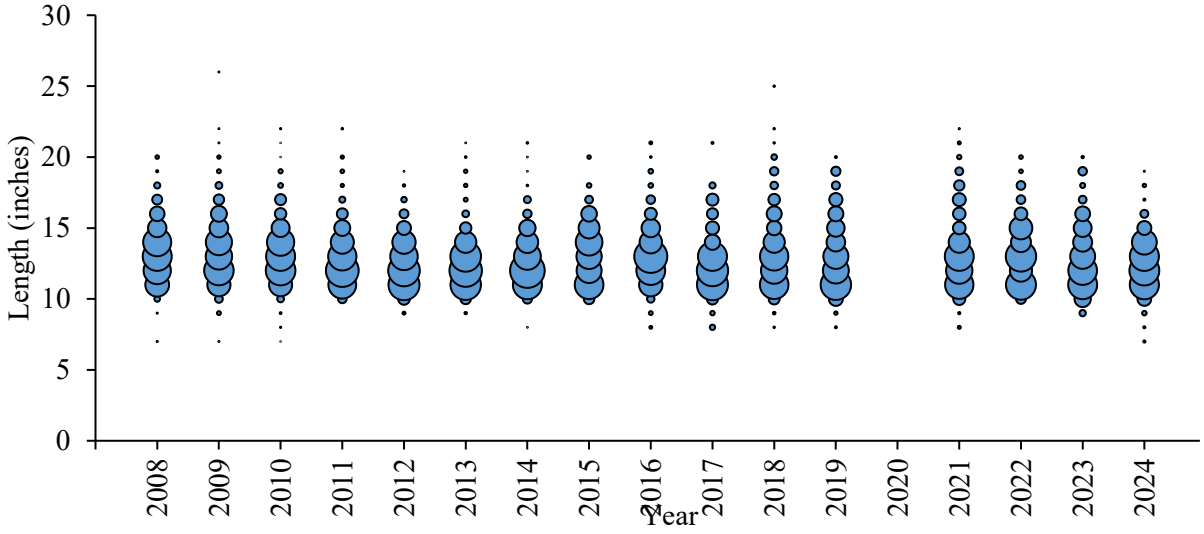

Figure 7. Length frequency (fork length, inches) of striped mullet collected from Program 915 in Pamlico Sound, Pamlico, Pungo, Neuse and New rivers from August–December (juveniles excluded), 2008–2024. Sampling was not conducted in 2020. Bubbles represent fish at length and the bubble size is proportional to the number of fish at that length.

During 2020 no indices of abundance are available for striped mullet from Program 915. Sampling in this program was suspended in February 2020 due to COVID-19 restrictions and protected species interactions but resumed July 2021.

Striped mullet age samples are collected from numerous DMF fishery independent and dependent sources. Modal age was two in all years except 1996, 1999, 2001, 2003 and 2005 when modal age was one, and 2017 when modal age was one and two (Table 3). Minimum age was zero in every year except 2010 when the minimum age was one. Maximum age ranged from six in 1996, 2012, 2014, and 2015 to 15 in 2017. There is substantial overlap in length at age for striped mullet (Figure 8). Striped mullet grow quickly from age zero to age four before growth slows after age four.

Table 3. Modal age, minimum age, maximum age, and number aged for striped mullet collected through DMF sampling programs, 1996–2024. Only ages taken from otoliths and samples for which a length was also recorded were included.

Modal Age	Minimum Age	Maximum Age	Total Number
1	0	6	163
2	0	7	344
2	0	7	717
1	0	8	753
2	0	10	1122
1	0	11	705
2	0	7	625
1	0	13	765
2	0	9	1142
1	0	10	654
2	0	10	685
2	0	10	699
2	0	10	771
2	0	13	349
2	1	8	748
2	0	14	633
2	0	6	873
2	0	7	850
2	0	6	855
2	0	6	769
2	0	8	956
1-2	0	15	695
2	0	10	770
2	0	13	827
2	0	7	269
2	0	11	940
2	0	9	843
2	0	9	781
2	0	10	936

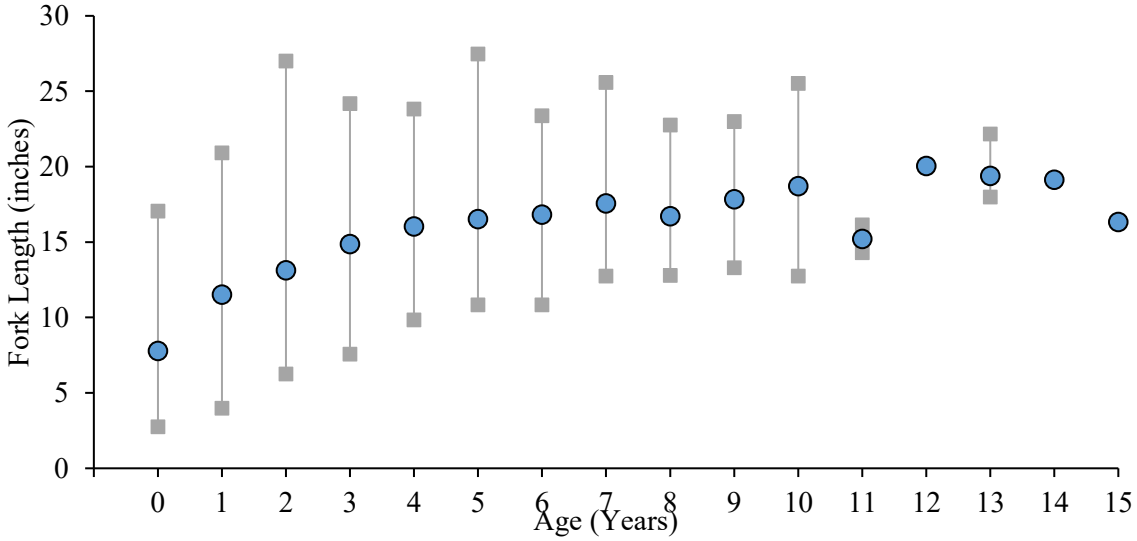

Figure 8. Striped mullet length at age based on all age samples collected, 1996–2024 (n = 21,035). Blue circles represent the mean size at a given age while the grey squares represent the minimum and maximum observed size for each age. Only ages taken from otoliths are included.

RESEARCH NEEDS

The following research needs were compiled from those listed in the 2022 Striped Mullet Stock Assessment (NCDMF 2022). Improved assessment and management of striped mullet is dependent upon research needs being met. Research needs are broken into high, medium, and low priority.

High

- Increase sampling of recreational mullet catches to determine the proportion of striped versus white mullet and improve estimates of recreational landings.
- Improve characterization of the length and age structure of recreational fisheries removals by increasing the number of age samples and number of trips sampled for lengths and ages from fisheries-dependent sources.
- Develop a reliable fisheries-independent abundance index for larger juveniles to characterize trends in recruitment.
- Consider expanding Program 915 to include the northern part of the state (Albemarle sound and major tributaries).
- Evaluate the current sampling methodology of Program 146 and effectiveness for sampling striped mullet; since this survey was not considered useful for the assessment of striped mullet, consider dropping this survey and focusing effort elsewhere if it is not contributing to management of other species.
- Consider running a simpler, single-sex version of the stock assessment model.

Medium

- Consider a tagging program to provide estimates of stock size, *F*, and M.
- Consider genetic and/or tagging studies to examine extent of the unit stock and explore movement patterns on a regional basis for the south Atlantic as well as the Gulf of Mexico.
- Expand ichthyoplankton survey to other inlets throughout the state.

- Conduct an age validation study of known age fish to provide estimates of ageing error.
- Consider alternative weighting of data sources in future stock assessments.
- Develop estimates of fecundity for North Carolina striped mullet.

Low

- Perform an acoustic tagging study to evaluate spatial and temporal variation in habitat use to more effectively design and conduct fisheries-independent surveys.
- Investigate the predation impact on striped mullet; striped mullet is widely believed to be an important forage species but there is little evidence to support this claim in the North Carolina stock.
- Investigate environmental factors that influence the spatial and temporal distribution of larval striped mullet.

MANAGEMENT

Striped mullet are managed under Amendment 2 to the North Carolina Striped Mullet FMP which was adopted in May 2024. The plan implemented day of week closures projected to achieve a 34.9% reduction in commercial harvest relative to 2019 landings, to end overfishing and achieve sustainable harvest within 10 years. Commercial harvest is closed Saturday and Sunday for January through September, and Saturday through Monday for October through December. The plan also implemented a 100-fish recreational individual bag limit, a 400-fish recreational vessel limit, and provided an exception for For Hire Operations to possess a bag limit for the number of anglers fishing up to the 400-fish maximum, including in advance of a trip. Finally, the plan implements an adaptive management framework that allows the director to use proclamation authority to specifically adjust season closures, day of week closures, trip limits and gill net yardage or mesh restrictions to help ensure management targets are being met, based on results of stock assessment updates or in response to concerning stock conditions or fishery trends observed outside of a stock assessment update. The commercial landings triggers established by Amendment 1 are no longer used to monitor the stock.

FISHERY MANAGEMENT PLAN SCHEDULE RECOMMENDATIONS

Amendment 2 to the Striped Mullet FMP was adopted in May 2024 to end overfishing and rebuild the spawning stock. The next plan review is scheduled to begin in July 2029.

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