FISHERY MANAGEMENT PLAN UPDATE
WEAKFISH
AUGUST 2025

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

FMP Documentation:	ASMFC	October 1985
	Amendment 1	March 1992
	Amendment 2	October 1994
	Amendment 3	May 1996
	Addendum I	October 2000
	Amendment 4	November 2002
	Technical Addendum 1	March 2003
	Addendum I	December 2005
	Addendum II	February 2007
	Addendum III	May 2007
	Addendum IV	November 2009
Comprehensive Review:	No comprehensive review scheduled. ASMFC Stock Assessment Update currently underway and scheduled for completion in mid-2025.	

Weakfish *(Cynoscion regalis)* are managed under Amendment 4 to the Interstate Fishery Management Plan (FMP) for Weakfish [Atlantic States Marine Fisheries Commission (ASMFC) 2002] and the subsequent addenda to Amendment 4 (ASMFC 2002, 2003). ASMFC adopted its first FMP for weakfish in 1985 (ASMFC 1985). Amendment 1 to the FMP (ASMFC 1992) unsuccessfully aimed to improve the status of weakfish. Amendment 2 (ASMFC 1994) resulted in some improvement to the stock, but several signs indicated further improvement was necessary leading to the implementations of Amendment 3 (ASMFC 1996) to increase the sustainability of the fishery. Addendum I to Amendment 3 was approved in 2000 to extend the existing management program until the Weakfish Management Board could approve Amendment 4 (ASMFC 2000). Addendum I to Amendment 4 (ASMFC 2005) was adopted to replace the biological sampling program. The Weakfish Management Board approved Addendum II to Amendment 4 (ASMFC 2007a) in response to a significant decline in stock abundance and increasing total mortality since 1999. Addendum II reduced the recreational creel limit and commercial bycatch limit, and set landings levels that, when met, will trigger the Board to re-evaluate management measures. Addendum III to Amendment 4 (ASMFC 2007b) altered the bycatch reduction device certification requirements of Amendment 4 for consistency with the South Atlantic Fishery Management Council's (SAFMC) Shrimp FMP. The findings of the 2009 weakfish stock assessment indicated weakfish were in a severely depleted state (NEFSC 2009a and 2009b) with natural mortality (M) rather than fishing mortality (F) believed to be the primary culprit in the decline (ASMFC 2016) prompting the ASMFC Weakfish Management Board to pass Addendum IV to Amendment 4 (2009).

Addendum IV required all states along the east coast to implement severe harvest restrictions on weakfish. The Weakfish Management Board, as part of Addendum IV, noted that reductions in harvest would not be adequate to rebuild the depleted weakfish stocks until other confounding factors (i.e. natural mortality) become more favorable for weakfish survival; however, the Board opted to reduce harvest and poise weakfish for a recovery in the event of a change in confounding factors. Harvest restrictions in Addendum IV included a one fish daily recreational bag limit and a 100 pound daily commercial trip limit. North Carolina requested to implement a 10% bycatch allowance for weakfish in lieu of the 100 pound daily trip limit. This request was considered conservationally equivalent to the 100 pound daily trip limit and was approved by the Weakfish Management Board in August of 2010. The alternate management action allowed landing of weakfish provided they make up less than 10% of the weight of all finfish landed up to 1,000

pounds per trip or day, whichever is larger. In November of 2012, based on the recommendation of the North Carolina Marine Fisheires Commission (MFC), the alternate management was halted and North Carolina reverted back to the 100 pound daily trip limit consistent with Addendum IV.

A benchmark stock assessment for weakfish was completed in 2016 (ASMFC 2016) and approved for management by the Weakfish Management Board at the 2016 Spring Meeting of the ASMFC. Results from the 2016 assessment indicate weakfish are depleted and identified continued high levels of M rather than F the cause of the decline. F has decreased substantially since 2010 and overfishing on the stock is not occuring. The Board reviewed the results of the assessment at their May 2016 meeting and decided no new management action was warranted.

An update to the peer-reviewed 2016 assessment was completed in 2019 (ASMFC 2019) and presented at the 2019 ASMFC Fall Meeting. Results of the assessment update show the weakfish stock is depleted and has been since 2003. Estimates of recruitment, spawning stock biomass, and total abundance remain low in recent years. Estimates of F were moderately high in recent years, although lower than the time-series highs of the mid- to late-2000's or the earliest years, and M remained high. The Board reviewed the results of the assessment update at their October 2019 meeting and decided no new management action was warrented. The management program implemented under Addendum IV remains in effect. An additional update to the 2016 assessment is expected in 2025 with the bulk of the work completed in 2024.

To ensure compliance with interstate requirements, North Carolina also manages this species under the North Carolina Fishery Management Plan for Interjurisdictional Fisheries (IJ FMP). The goal of the IJ FMP is to adopt fishery management plans, consistent with N.C. law, approved by the Mid-Atlantic Fishery Management Council, SAFMC, or the ASMFC by reference and implement corresponding fishery regulations in North Carolina to provide compliance or compatibility with approved fishery management plans and amendments, now and in the future. The goal of these plans, established under the Magnuson-Stevens Fishery Conservation and Management Act (federal council plans) and the Atlantic Coastal Fisheries Cooperative Management Act (ASMFC plans) are similar to the goals of the Fisheries Reform Act of 1997 to "ensure long-term viability" of these fisheries (NCDMF 2022).

Management Unit

Weakfish are managed under this plan as a single stock throughout their coastal range. All Atlantic coast states from Massachusetts through Florida and the Potomac River Fisheries Commission have a declared interest in weakfish. Responsibility for the FMP is assigned to the ASMFC Weakfish Management Board, Plan Review Team, Technical Committee, Stock Assessment Sub-Committee, and Advisory Panel.

Goal and Objectives

The goal of Amendment 4 of the ASMFC FMP is to utilize interstate management so that Atlantic coastal weakfish recover to healthy levels that will maintain commercial and recreational harvest consistent with a self-sustaining spawning stock and to provide for restoration and maintenance of essential habitat (ASMFC 2002). The management objectives are to:

- Establish and maintain an overfishing definition that includes target and threshold fishing mortality rates and a threshold spawning stock biomass to prevent overfishing and maintain a sustainable weakfish population.
- Restore the weakfish age and size structure to that necessary for the restoration of the fishery.
- Return weakfish to their previous geographic range.
- Achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit, including states' waters and the federal EEZ.
- Promote cooperative interstate research, monitoring and law enforcement necessary to support management of weakfish.

- Promote identification and conservation of habitat essential for the long-term stability in the population of weakfish.
- Establish standards and procedures for both the implementation of Amendment 4 and for determination of states' compliance with provisions of the management plan

DESCRIPTION OF THE STOCK

Biological Profile

Weakfish, also called gray trout, are known to inhabit waters of the Atlantic from southern Florida to Nova Scotia, Canada but are most prevalent from North Carolina to New York (Wilk 1979). They are members of the drum family and are closely related to spotted seatrout. Compared to spotted seatrout, weakfish occur in higher salinity areas of the estuary and are seasonally encountered around coastal inlets and in offshore waters. Weakfish migrate into more inshore environments and north along the U.S. Atlantic Coast in the spring and summer as water temperatures rise (Bigelow and Schroeder 1953; Wilk 1979). Spawning occurs during this time in higher salinity environments around the coastal inlets (Luczkovich et al. 1999; Luczkovich et al. 2008). Males drum to attract females and spawning activity usually occurs around dusk. Juvenile weakfish use the estuarine waters as a nursery area until the fall when water temperatures drop, and they move into the offshore environment (Wilk 1979). Peak spawning in North Carolina is typically around April or May but females are batch spawners and will spawn multiple times throughout the spring and summer months (Lowerre-Barbieri et al. 1996; Merriner 1976). Most weakfish are sexually mature by age 1 and at 11 to 12 inches in length (Lowerre-Barbieri et al. 1996; Nye et al. 2008). Juvenile weakfish are opportunistic feeders, feeding on invertebrates and microscopic animals early in their life, then switching to mostly piscivorous feeding on small to moderately sized fish, depending on their size (Merriner 1975).

Stock Status

According to the 2019 stock assessment update, spawning stock biomass (SSB) in 2017 was 4.24 million pounds, well below the SSB threshold of 30% (13.6 million pounds), indicating the stock is depleted (Figure 1; ASMFC 2019). The weakfish Technical Committee recommended total mortality (Z) benchmarks, which includes fishing and natural mortality. Total mortality in 2017 was 1.45, which was above both the 20% target (1.03) and the 30% threshold (1.43), indicating total mortality was too high (Figure 2). However, fishing mortality in 2017 (0.62) was above the 20% target but below the 30% threshold (0.97), indicating the stock is not experiencing overfishing.

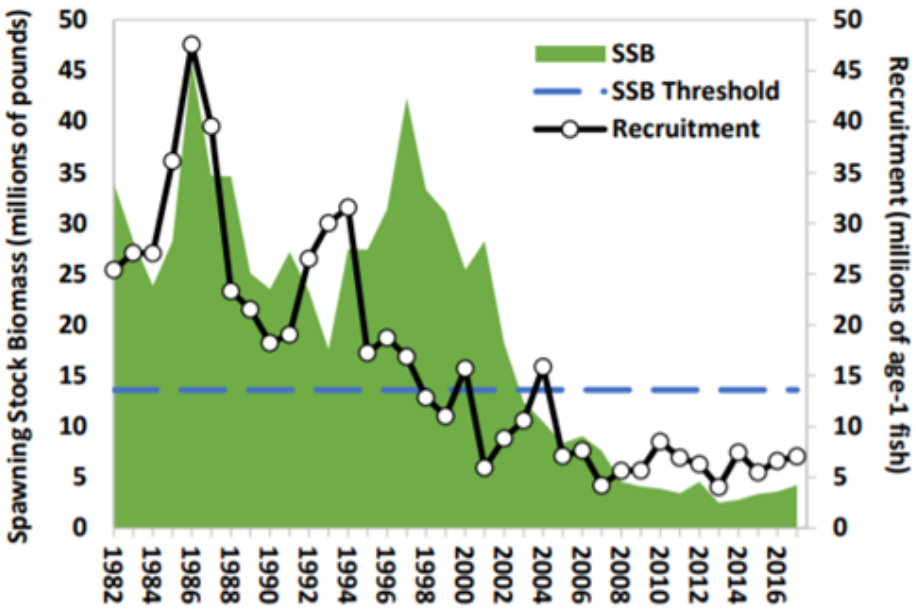

Figure 1. Spawning stock biomass (SSB) and recruitment of age-1 weakfish estimated along the U.S. Atlantic coast from 1982 to 2017 (ASMFC 2019). Dashed line represents the 30% spawning stock biomass (SSB) threshold of 13.6 million pounds.

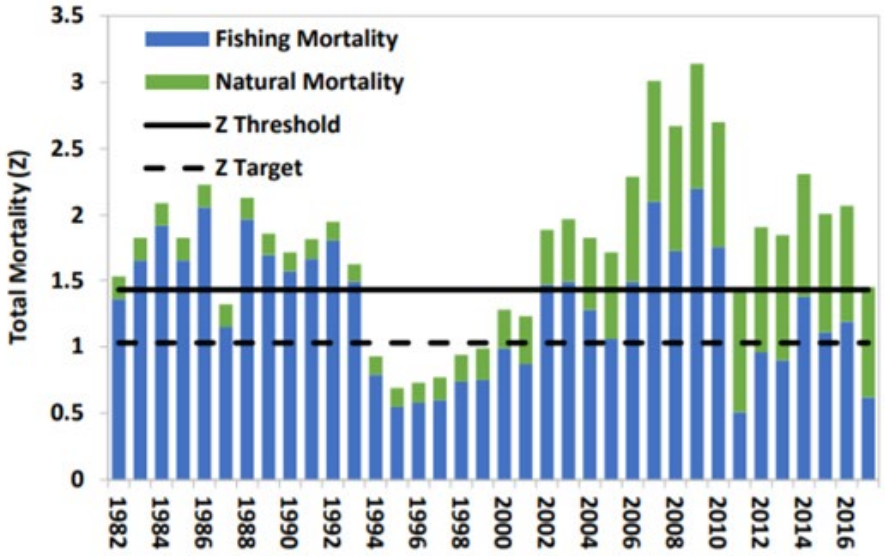

Figure 2. Natural mortality (M) and fishing mortality (F) estimated for all weakfish along the U.S. Atlantic east coast, 1982 to 2017 (ASMFC 2019). Solid and dashed lines represent total mortality target (Z30% = 1.03) and threshold (Z20% = 1.43) used to determine if the stock is being overfished.

Stock Assessment

The assessment completed in 2016 and updated in 2019 employed a spatially structured forward projecting statistical catch at age model with time-varying natural mortality, with a terminal year of 2017. This model accounts for varying population spatial distribution and changing natural mortality through time. Results

of the assessment show the weakfish stock is depleted and has been for the past 15 years. Under conditions of time-varying natural mortality, there is no long-term stable equilibrium population size, so an SSB target is not informative for management. After reviewing the assessment results, the Weakfish Technical Committee (TC) recommended an SSB threshold of 13.6 million pounds that is equivalent to 30% of the projected SSB under average natural mortality and no fishing (SSB30%). When SSB is below the threshold, the stock is considered depleted. Despite SSB showing a slight increasing trend in recent years, SSB was 4.24 million pounds in 2017 (Figure 1), which is well below the threshold. The model indicated natural mortality has been increasing since the mid-1990s, from approximately 0.17 at the beginning of the time-series to an average of 0.92 from 2007–2017 (Figure 2). The weakfish population has been experiencing very high levels of total mortality which has prevented the stock from recovering. Fishing mortality has increased in recent years but was below the threshold in 2017.

DESCRIPTION OF THE FISHERY

Current Regulations

The DMF allows the recreational harvest of weakfish year-round with a 12-inch total length minimum size and a one fish per day bag limit. The commercial harvest of weakfish is limited to a 100 pound daily limit and 12-inches total length minimum size with the following exceptions: from April 1 through November 15, weakfish 10 inches total length or more may lawfully be taken in North Carolina internal waters by use of long haul seines or pound nets only and commercial flounder trawl and flynet operations are allowed to land a tolerance of no more than 100 undersized (less than 12 inch total length) weakfish per day or trip, whichever is longer and it is unlawful to sell undersized weakfish.

Commercial Fishery

Commercial landings of weakfish peaked in 1988 at 15,091,878 pounds and have steadily dropped since. In 2009 Addendum IV reduced commercial harvest to 100 pounds per trip achieving an estimated reduction of 61% from the 2005–2008 harvest levels. Recent years have shown little increase due to low abundance and commercial harvest restrictions. Landings stayed approximately the same in 2024 (106,571 pounds) compared to the previous year (106,131 pounds; Table 1; Figure 3).

Table 1. Recreational harvest (number of fish landed and weight in pounds) and releases (number of fish) and commercial harvest (weight in pounds) of weakfish from North Carolina for the period 1982–2024.

Year	Recreational			Commercial	
	Number Landed	Number Released	Weight Landed (lb)	Weight Landed (lb)	Total Weight Landed (lb)
1982	255,080	61,048	348,645	12,052,232	12,400,877
1983	596,354	16,387	749,910	10,233,738	10,983,644
1984	555,640	35,101	252,873	12,990,726	13,243,599
1985	1,010,772	2,638	796,974	9,825,498	10,594,708
1986	2,049,746	694,759	1,455,912	14,309,372	15,765,284
1987	2,403,361	250,581	3,442,746	11,882,362	14,951,135
1988	650,224	175,284	175,178	15,091,878	15,267,056
1989	456,191	65,500	331,840	10,115,747	10,447,587
1990	149,508	30,295	104,761	5,802,159	5,906,920
1991	358,273	32,083	286,349	5,308,647	5,594,923
1992	72,064	69,585	53,214	4,862,551	4,915,765
1993	293,966	157,478	230,010	4,309,249	4,247,275
1994	336,188	477,521	276,435	3,489,930	3,766,364
1995	103,190	225,976	118,177	4,113,260	4,231,437
1996	138,577	361,153	121,291	3,977,641	4,098,924
1997	333,852	506,509	313,767	3,561,060	3,874,827
1998	450,645	669,125	487,884	3,354,008	3,841,892
1999	313,427	687,884	420,706	2,617,582	3,038,286
2000	147,397	852,262	179,599	1,869,043	2,048,641
2001	317,974	2,831,044	325,447	1,960,324	2,285,771
2002	214,040	917,803	215,402	1,828,150	2,043,552
2003	291,168	422,294	309,412	848,822	1,158,234
2004	395,268	614,762	428,627	685,463	1,114,090
2005	297,605	702,685	281,710	421,984	703,694
2006	343,092	1,047,135	302,775	363,087	665,861
2007	191,192	600,987	202,583	175,593	378,176
2008	203,779	470,805	209,470	162,516	371,986
2009	204,814	626,742	245,358	163,148	408,506
2010	110,770	914,004	103,903	106,328	210,231
2011	48,727	380,366	62,543	65,998	128,541
2012	96,947	396,620	95,952	91,384	187,336
2013	63,090	257,367	66,720	120,191	186,911
2014	71,912	1,067,344	70,988	105,247	176,235
2015	143,543	1,652,582	157,269	80,272	237,511
2016	77,341	1,097,615	83,702	79,667	163,369
2017	51,795	351,613	55,944	85,462	141,406
2018	30,935	300,195	29,924	35,142	65,058
2019	39,061	366,518	43,252	115,665	158,917
2020	82,124	386,364	105,729	87,645	197,103
2021	91,032	1,030,829	103,449	59,534	162,983
2022	112,095	1,921,985	105,060	62,201	167,256
2023	75,329	833,559	89,115	106,131	195,235
2024	87,273	717,139	115,496	106,571	222,067
Mean+	78,798	778,273	85,936	87,163	173,344

+ Mean value is from 2010–2024 reflecting the current weakfish management period.

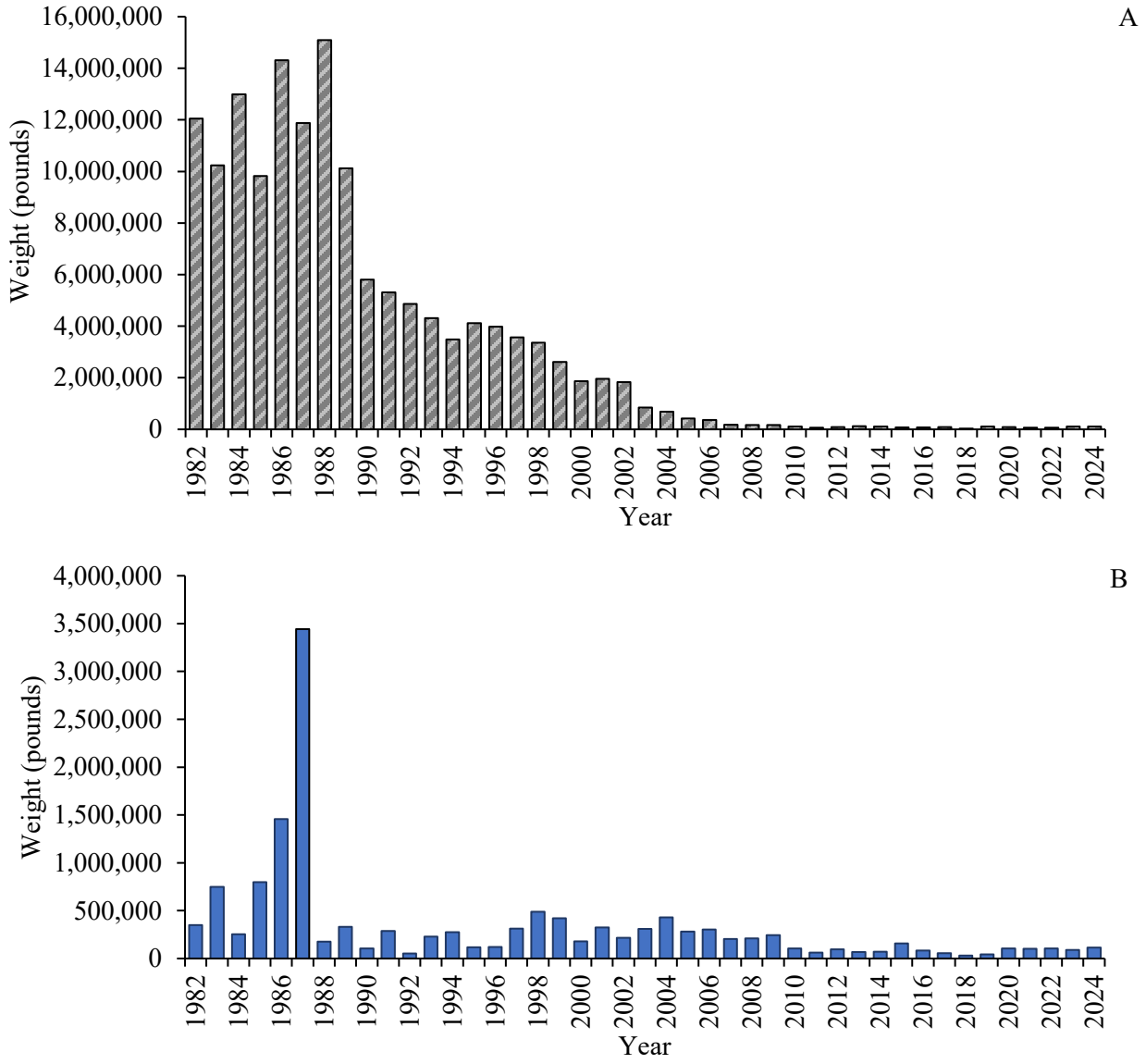

Figure 3. Annual commercial (A) and recreational (B) landings in pounds for weakfish in North Carolina from 1982 to 2024.

Recreational Fishery

Recreational landings of weakfish are estimated from the Marine Recreational Information Program (MRIP). Recreational estimates across all years have been updated and are now based on the MRIP's new Fishing Effort Survey-based calibrated estimates. For more information on MRIP see https://www.fisheries.noaa.gov/topic/recreational-fishing-data.

Estimated recreational harvest has been variable since 1982 with a peak in 1987 at 3,442,746 pounds. Harvest since 2009 has decreased considerably due to the implementation of a one-fish bag limit in November 2009 as part of the harvest reductions from Addendum IV, which was estimated to reduce recreational harvest by 53% for North Carolina. The average harvest since 2010 is 85,936 pounds and has varied from a high of 157,269 pounds in 2015 to a low of 29,924 in 2018. Recreational harvest remained relatively consistent around 104,000 pounds in 2020, 2021, and 2022, decreased to 89,115 pounds in 2023, and increased to the highest values since 2015 in 2024 (115,496 pounds; Table 1; Figure 3). The number

of weakfish released remained relatively stable from 2017–2020, varying between a low of 300,195 fish in 2018 and a high of 386,364 fish in 2020 but increased dramatically in 2021 to 1,030,829 fish and increased again in 2022 to 1,921,985 fish, the highest since 2001 (2,831,044 fish). Recreational releases decreased in 2023 (833,559 fish) and 2024 (717,139 fish) but remained well above the 2017–2019 period (Table 1).

The North Carolina Saltwater Fishing Tournament recognizes anglers for landing and/or releasing fish of exceptional size or rarity by issuing citations that document the capture for the angler. A total of 30 citations were handed out for weakfish in 2024 including 17 release citations (greater than 24 inches total length released) and 13 harvest citations (greater than five pounds landed) (Table 2; Figure 4). Saltwater Fishing Tournament citations decreased in 2024 but remained well above the number of citations in most years throughout the time series (1991–2024).

Table 2. Total number of awarded citations for weakfish (>24-inches total length for release or > 5 pounds landed) from the North Carolina Saltwater Fishing Tournament from 1991–2024.

Year	Total Citations	Release Citations[+]	Percent Release
1991	1	-	0
1992	2	-	0
1993	10	-	0
1994	2	-	0
1995	3	-	0
1996	2	-	0
1997	0	-	0
1998	6	-	0
1999	6	-	0
2000	8	-	0
2001	8	-	0
2002	0	-	0
2003	124	-	0
2004	9	-	0
2005	3	-	0
2006	1	-	0
2007	2	-	0
2008	4	0	0
2009	3	0	0
2010	1	0	0
2011	1	0	0
2012	2	1	50
2013	4	0	0
2014	3	0	0
2015	2	0	0
2016	7	0	0
2017	16	16	100
2018	3	0	0
2019	8	3	38
2020	10	3	30
2021	49	30	61
2022	59	37	63
2023	50	29	58
2024	30	17	57

[+] Weakfish release citations (fish released greater than 24 inches total length) began in 2008.

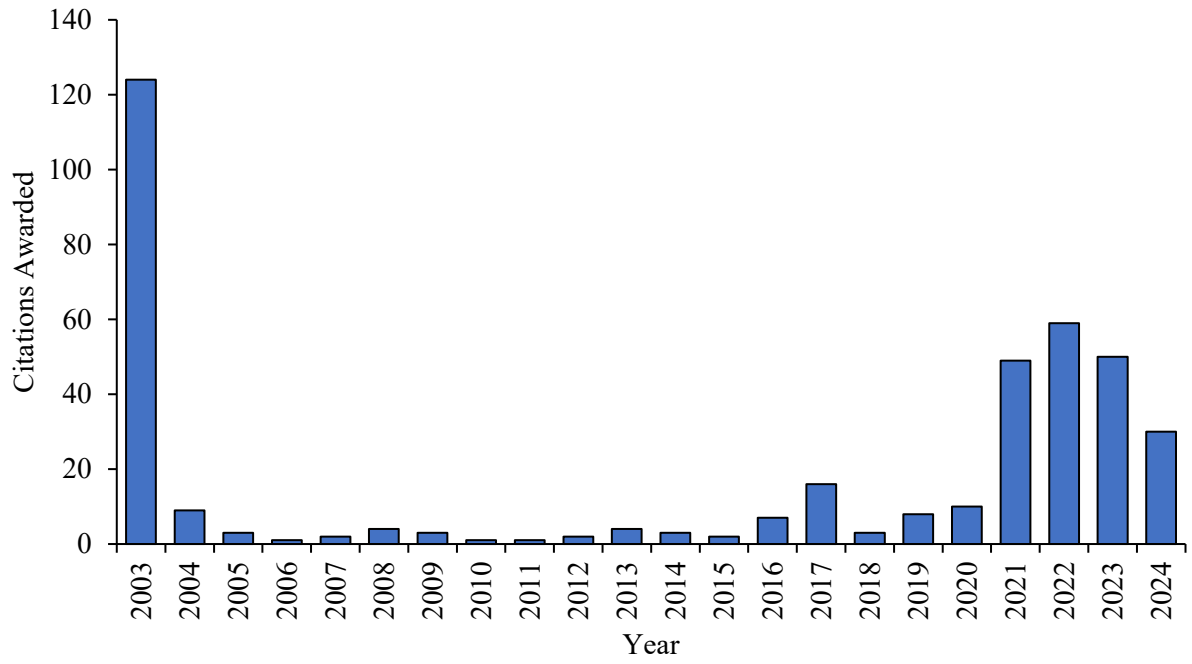

Figure 4. North Carolina Saltwater Fishing Tournament citations awarded for weakfish from 1991 to 2024. Citations are awarded for weakfish greater than 24 inches total length released or greater than 5 pounds landed.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fish houses are sampled monthly to provide length, weight, and age data to describe the commercial fisheries. The number of weakfish samples from commercial fish houses has generally declined since 2000, following a similar trend to commercial landings (Tables 1 and 3). Samples are collected from ocean fisheries as well as estuarine fisheries. The ocean sink net fishery and estuarine gill net fishery land the majority of weakfish accounting for more than 84% of the overall commercial catch in 2024.

Mean and minimum lengths of fish harvested in the commercial fishery have remained relatively consistent throughout the time series (Table 3; Figure 5). Since 2012, the mean length has been approximately 14 inches fork length. However, since 2010, there has been a noticeable decline in maximum lengths, from an average of 33 inches (1982–2010) to an average of approximately 26 inches (2011–2024).

Table 3. Mean, minimum, and maximum lengths (fork length, inches) of weakfish sampled from the commercial and recreational fisheries of North Carolina from 1982–2024. Commercial lengths include both marketable and scrap finfish.

Year	Commercial				Recreational			
	Mean Length	Minimum Length	Maximum Length	Total Number Measured	Mean Length	Minimum Length	Maximum Length	Total Number Measured
1982	13.8	4.4	34.1	4,485	13.9	7.8	22.8	55
1983	13.8	4.6	33.7	10,357	13.9	7.7	25.6	29
1984	14.2	5.1	36.6	14,952	10.9	4.7	18.9	90
1985	12.9	4.7	34.4	15,310	12.0	7.7	22.4	34
1986	13.9	5.4	34.9	17,446	13.0	8.7	20.1	164
1987	12.9	4.4	34.2	22,943	15.1	7.9	22.4	253
1988	13.8	5.3	33.7	18,116	12.7	8.3	20.5	208
1989	14.8	4.8	35.2	14,853	12.0	7.5	23.2	182
1990	12.2	4.1	35.4	18,613	12.2	7.1	21.7	181
1991	11.1	4.2	26.1	24,772	12.0	7.3	18.6	136
1992	12.1	5.2	29.8	21,050	12.3	7.6	17.2	64
1993	11.9	4.0	29.2	23,679	12.6	8.6	16.0	196
1994	13.2	4.6	28.0	15,011	13.2	6.2	20.8	573
1995	12.7	4.4	29.5	18,526	15.2	10.0	20.2	231
1996	13.1	4.6	28.1	18,906	14.0	9.9	19.2	336
1997	13.1	4.1	29.7	20,583	13.7	8.3	20.7	602
1998	13.5	6.5	27.4	13,963	14.3	9.9	27.0	518
1999	13.2	5.1	29.1	16,490	15.4	10.6	26.0	258
2000	13.2	4.1	29.8	19,382	14.8	9.8	22.4	122
2001	14.0	6.5	31.5	15,182	14.1	10.6	19.9	180
2002	13.7	6.1	31.5	13,531	13.9	9.4	19.1	106
2003	12.7	4.2	33.3	9,721	14.1	8.6	27.5	131
2004	13.2	5.8	33.5	10,500	14.4	11.1	25.5	164
2005	13.2	5.6	34.4	9,893	14.0	11.7	19.8	104
2006	12.7	5.6	32.5	11,649	13.6	9.8	20.1	240
2007	12.3	4.8	26.1	6,817	14.2	10.5	20.7	76
2008	12.3	5.0	26.3	3,851	13.8	11.7	20.4	145
2009	12.8	6.3	33.7	3,318	14.8	9.7	21.9	132
2010	12.3	5.1	34.6	2,568	13.6	9.3	17.3	96
2011	12.7	7.8	25.1	2,044	14.6	11.6	30.7	41
2012	13.5	5.0	23.3	2,754	13.8	10.2	20.8	81
2013	14.0	8.0	28.3	3,466	14.2	7.6	22.8	74
2014	14.0	5.0	24.4	3,348	13.8	10.9	20.3	72
2015	14.0	5.4	27.7	2,212	14.0	12.2	19.0	34
2016	14.1	8.7	23.6	2,743	14.0	10.3	18.0	76
2017	14.3	8.5	28.2	1,240	14.2	8.7	17.0	51
2018	13.7	7.0	26.9	770	13.4	8.6	18.5	34
2019	14.1	8.7	26.3	1,923	14.5	9.8	18.1	62
2020	14.0	9.0	26.0	1,004	15.0	9.8	22.9	65
2021	13.9	10.2	24.3	870	14.4	8.7	22.7	70
2022	13.6	8.0	23.7	850	13.3	9.3	19.8	73
2023	13.4	6.0	25.0	375	14.6	11.4	20.8	66
2024	14.2	8.5	27.9	851	15.0	10.7	21.8	43

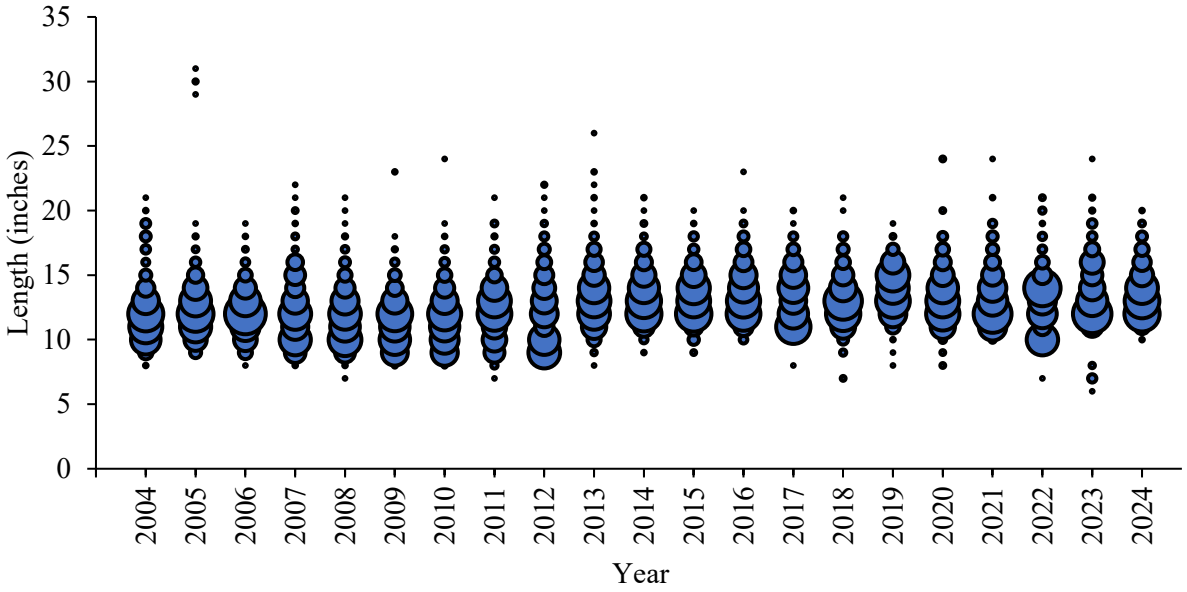

Figure 5. Commercial length frequency (fork length, inches) of weakfish harvested from 2004–2024. Bubbles represent fish at length and the bubble size is proportional to the number of fish at that length.

Recreational lengths and weights are collected as part of the MRIP by recreational port agents. While the mean lengths of weakfish sampled from the recreational fishery are similar to those sampled from the commercial fishery in recent years, the average maximum observed length is smaller in the recreational fishery by approximately 9 inches (Table 3; Figure 6). The maximum observed length in the recreational fishery in 2024 (22 inches) was similar to the previous year (21 inches).

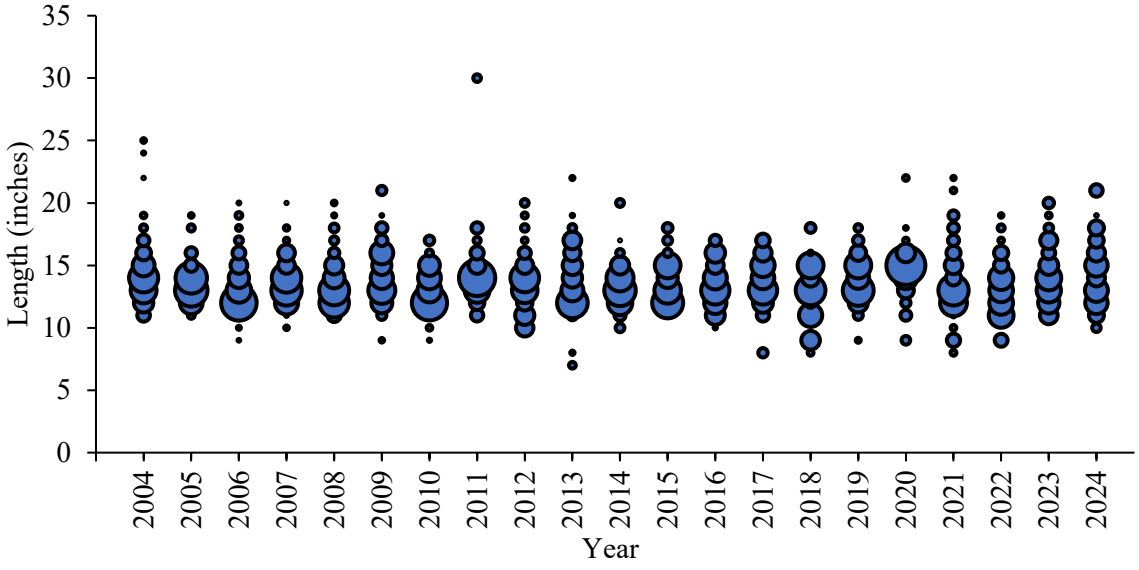

Figure 6. Recreational length frequency (fork length, inches) of weakfish harvested from 2004–2024. Bubbles represent fish at length and the bubble size is proportional to the number of fish at that length.

The recreational modal length was 13 inches and the commercial modal length was12 inches in 2024. Most harvest in both sectors was between 12 and 16 inches in 2023 (Figure 7).

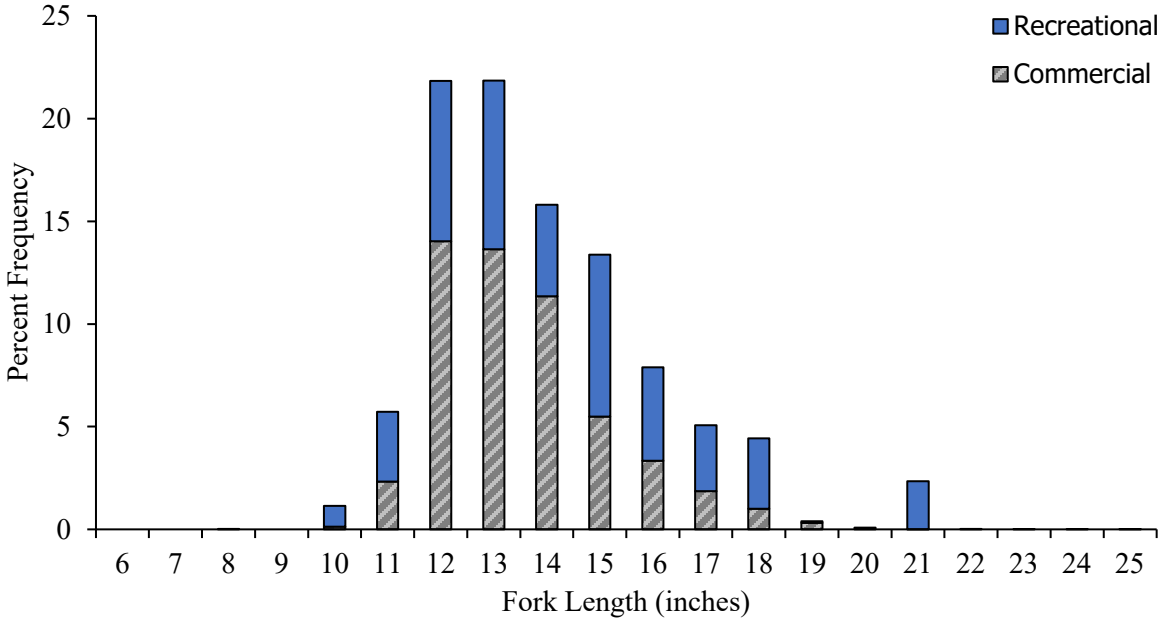

Figure 7. Commercial and recreational length frequency distribution from weakfish harvested in 2024.

Fishery-Independent Monitoring

Fishery independent data are collected through both the Program 195 Pamlico Sound Survey and Program 915 Independent Gill Net Survey. The Pamlico Sound Survey provides an age-0 relative abundance index calculated from the September stations and an age-1+ index calculated from the June stations. Although the ASMFC stock assessment only uses the age-0 index, both are provided here to assess overall trends in both groups. The Pamlico Sound Survey indices show a variable trend over the years (Figures 8 and 9). During 2021, sampling was impacted during June and September due to the COVID pandemic. Not all stations were able to be sampled as only day trips were permitted. In June, only 35 of the 54 stations were sampled, and in September, only 33 of the 54 stations were sampled. Thus, the relative abundance indices from 2021 should be viewed with caution. The 2024 age-0 relative abundance index (25.30 fish per tow) decreased from 2023 (51.62 fish per tow). The 2024 age-1+ relative abundance index (31.42 fish per tow) also decreased from the previous year (43.11 fish per tow). However, the 2023 age-0 relative abundance index and age-1+ relative abundance index were both the highest values since 2013 and 2014 respectively.

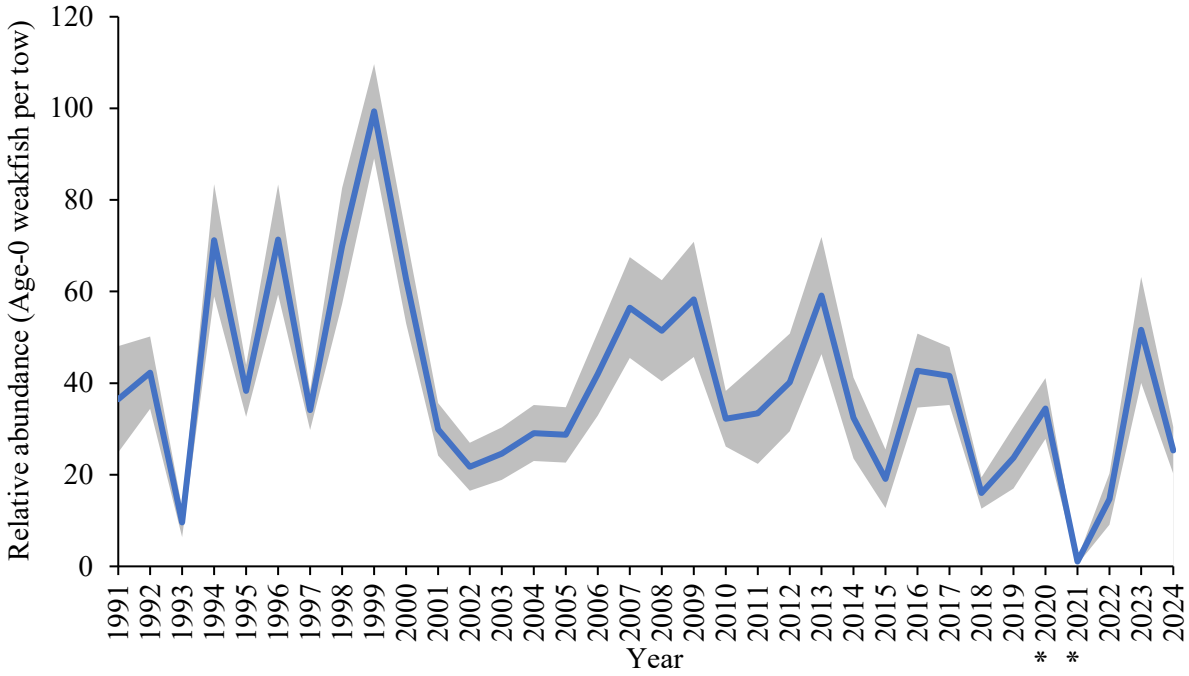

Figure 8. Relative abundance index (fish per tow) from the Pamlico Sound Survey (Program 195) in North Carolina of Age-0 weakfish collected during September with a total length less than 200 mm from 1991 through 2024. Shading represents ± one standard error (SE). *Not all samples were completed in 2020 and 2021.

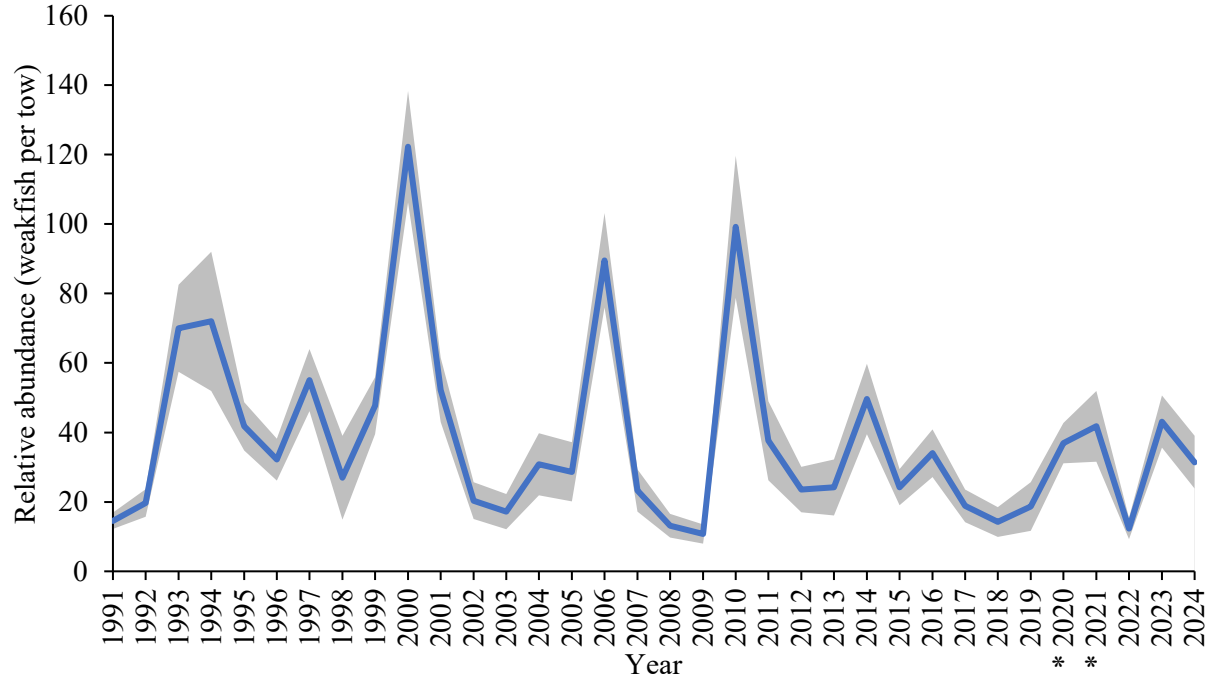

Figure 9. Relative abundance index (fish per tow) from the Pamlico Sound Survey (Program 195) in North Carolina of Age-1+ weakfish collected during June with a total length of 140 mm and greater from 1991 through 2024. Shading represents ± one standard error (SE). *Not all samples were completed in 2020 and 2021.

The Independent Gill Net Survey collects size, age, and abundance data for commercially and recreationally important species in the Pamlico Sound, Pamlico, Pungo, and Neuse rivers, and the Cape Fear and New rivers using multi-mesh gill nets. The relative abundance index from the Pamlico Sound portion is used in the ASMFC stock assessment and had been showing a declining trend with occasional peaks in abundance since the beginning of the time series, but it has remained relatively stable since 2015 (Figure 10). The data from the Pamlico, Pungo, and Neuse rivers and the Cape Fear and New rivers are not used in the assessment as these regions have minimal catches of weakfish. During 2020 no index of relative abundance was available for weakfish from the Independent Gill Net Survey. Sampling in this program was suspended in February 2020 due to COVID-19 restrictions and protected species interactions but resumed July 2021. The 2021 relative abundance index should be used with caution as just over 50% of the samples were completed for the year. The relative abundance index for 2024 was 0.6 fish per set and was an decrease from 2023.

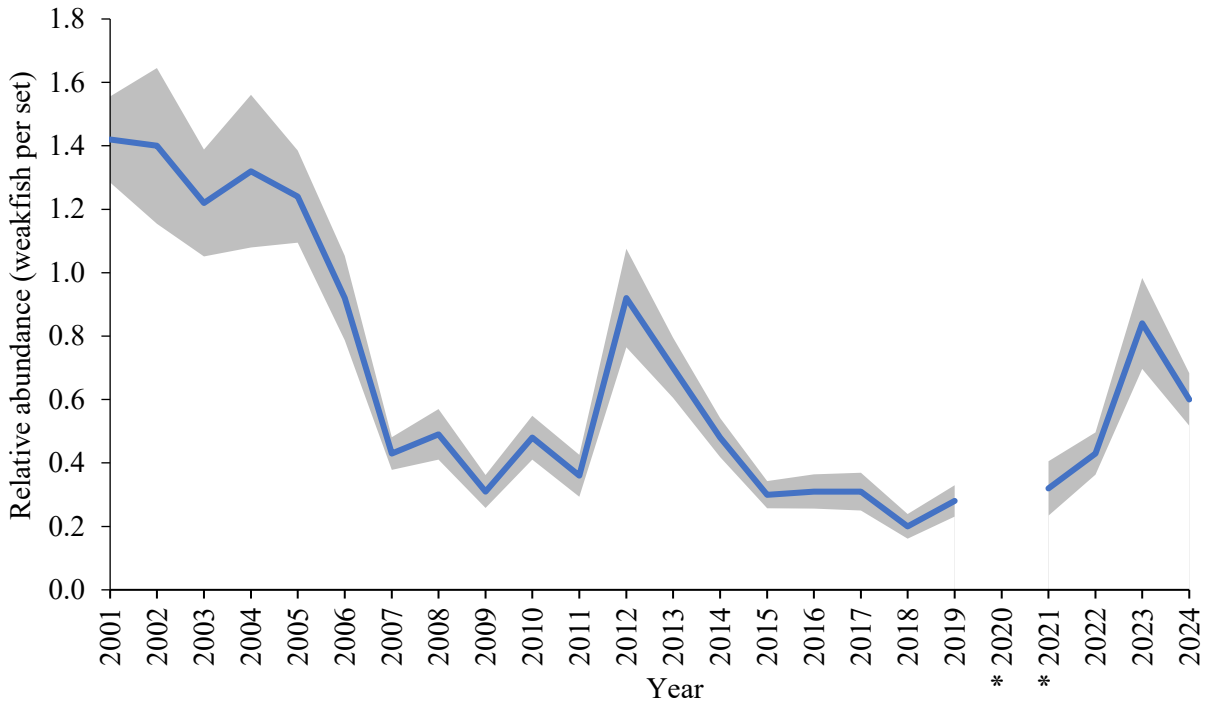

Figure 10. Relative abundance index (fish per station set) from the Pamlico Sound portion of the Independent Gill Net Survey (Program 915) in North Carolina, 2001–2024. Shading represents ± one standard error (SE). *Sampling not conducted in 2020 and not all samples completed in 2021.

Weakfish age samples (otoliths) are collected through both fishery dependent and independent sampling. Sampling for weakfish has been ongoing since 1991. Age samples are collected from all possible gears and during all months. The number of samples collected yearly has ranged from 170 to 1,319, with a total of 19,726 otoliths aged to date. Ages have ranged from 0 to 15 years with a mean modal age of two years (Table 4; Figure 11). Based on average age-at-lengths, weakfish growth likely does not plateau until age-10 (Figure 11). The maximum age of the weakfish sampled in 2024 was age 6 (Table 4). Since 2007, the maximum age of weakfish has fluctuated between four and six with the exception of 2009 (age 15).

Table 4. Modal age, minimum age, maximum age, and number aged for weakfish collected through DMF sampling programs from 1995 through 2024.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
1995	1	0	5	898
1996	4	0	6	1,319
1997	3	0	7	1,059
1998	3	0	7	703
1999	3	0	8	659
2000	1	0	9	616
2001	2	0	10	630
2002	3	0	10	512
2003	4	0	8	491
2004	2	0	11	589
2005	2	0	12	561
2006	3	0	7	752
2007	2	0	6	560
2008	1	0	5	480
2009	1	0	15	263
2010	2	0	5	507
2011	2	0	4	378
2012	3	0	4	497
2013	2	0	5	546
2014	1	0	4	508
2015	3	0	4	425
2016	1	0	5	570
2017	1	0	5	353
2018	2	0	4	170
2019	2	0	6	551
2020	2	0	4	724
2021	1	0	6	426
2022	2	0	5	521
2023	1	0	6	664
2024	2	0	6	489

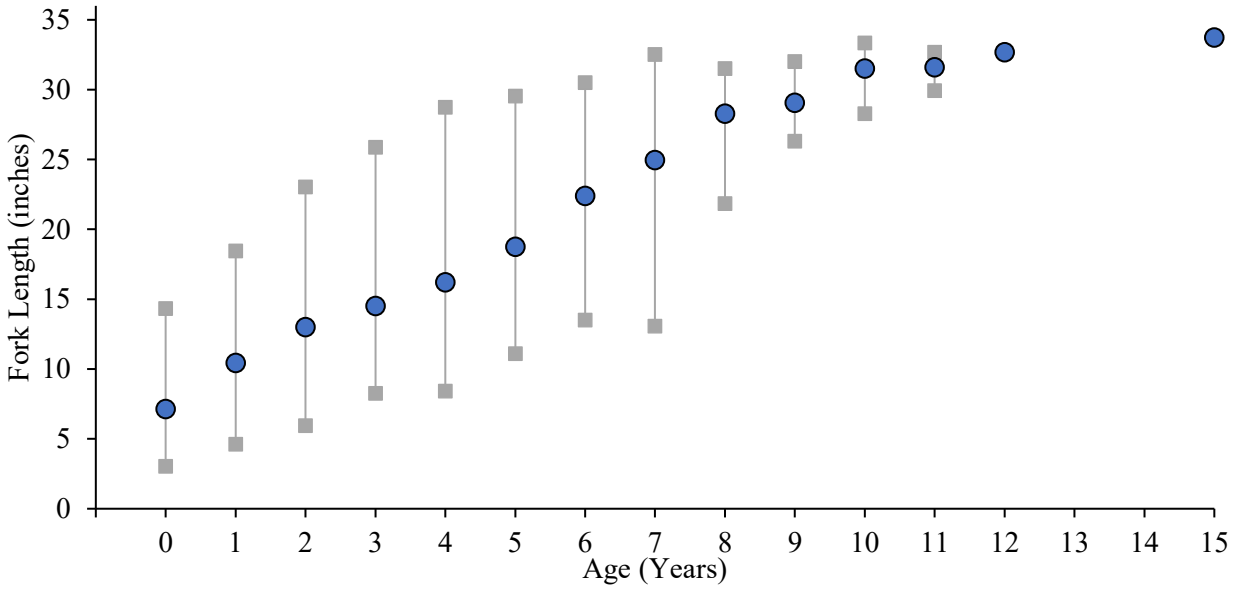

Figure 11. Weakfish length at age based on all age samples collected from 1995 to 2024. Blue circles represent the mean size at a given age while the grey squares represent the minimum and maximum observed size for each age.

RESEARCH NEEDS

High

- Increase observer coverage to identify the magnitude of discards for all commercial gear types from both directed and non-directed fisheries.
- Continue studies on temperature, size, and depth specific recreational hook and release mortality rates, particularly catches from warm, deep waters. Investigate methods to increase survival of released fish.
- Continue studies on mesh size selectivity, particularly trawl fisheries.
- Improve methods to estimate commercial bycatch. Refine estimates of discard mortality based on factors such as distance from shore and other geographical differences for all sizes including below minimum size.
- Evaluate predation of weakfish with a more advanced multispecies model (e.g., the ASMFC MSVPA or Ecopath with Ecosim).
- Develop a bioenergetics model that encompasses a broader range of ages than Hartman and Brandt (1995) and use it to evaluate diet and growth data.
- Analyze the spawner-recruit relationship and examine the effects of the relationship between adult stock size and environmental factors on year class strength.
- Develop a coast-wide tagging program to identify stocks and determine migration, stock mixing, and characteristics of stocks in over wintering grounds. Determine the relationship between migratory aspects and the observed trend in weight-at-age.
- Monitor weakfish diets over a broad regional and spatial scale, with emphasis on new studies within estuaries.
- Continue to investigate the geographical extent of weakfish hybridization.

- Estimate weakfish mortality through independent approaches (e.g., alternative models, tagging) to corroborate trends in mortality from the assessment model.
- Conduct a meta-analysis of all factors likely to influence changes in natural mortality to see if the aggregate effect shows stronger statistical likelihood of occurrence than the significance shown by each individual driver effect on its own.
- Improve implementation of the process for organizing and collecting data from different agencies and sources to assure timely and high-quality data input into the model.

Moderate

- Identify and delineate weakfish spawning habitat locations and environmental preferences to quantify spawning habitat.
- Compile data on larval and juvenile distribution from existing databases to obtain preliminary indications of spawning and nursery habitat location and extant.
- Examine geographical and temporal differences in growth rate (length and weight-at-age).
- Determine the impact of power plants and other water intakes on larval, post larval, and juvenile weakfish mortality in spawning and nursery areas. Calculate the resulting impact on adult stock size.
- Monitor predation on weakfish from both fish and marine mammal species.
- Determine the impact of scientific monitoring surveys on juvenile weakfish mortality. Calculate the resulting impact on adult stock size.
- Assemble socioeconomic data as it becomes available from ACCSP.

Low

- Determine the onshore versus offshore components of the weakfish fishery.
- Collect catch and effort data including size and age composition of the catch, determine stock mortality throughout the range, and define gear characteristics. In particular, increase length frequency sampling in fisheries from Maryland and further north.
- Develop latitudinal, seasonal, and gear specific age length keys coast wide. Increase sample sizes for gear specific keys.
- Define restrictions necessary for implementation of projects in spawning and over wintering areas and develop policies on limiting development projects seasonally or spatially.

MANAGEMENT

Weakfish are currently managed under Addendum IV to Amendment 4 of the Weakfish FMP and requires all the Atlantic States to implement a one fish per person bag limit, a 100-pound commercial bycatch trip limit, and a 100 fish undersized trip limit allowance for the trawl fishery. Based on results from the 2016 assessment, the Weakfish Technical Committee (TC) recommended a 30% SSB threshold be used as a reference point to determine whether the stock is depleted. The TC noted there is no long-term stable equilibrium population of weakfish due to time varying natural mortality and recommended managing the stock using Z-based (total mortality) targets and thresholds of 20% and 30%. In addition, total mortality (Z) benchmarks are used to prevent an increase in fishing pressure when F is low, but M is high. Z was above both the Z_{Target} and $Z_{Threshold}$ in the terminal year of the 2017 stock assessment update; however, the TC recommended – and the Weakfish Board approved – no new management measures given the restrictive weakfish management program currently in place.

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