

**Atlantic States Marine Fisheries Commission
Atlantic Croaker Technical Committee**

**Annual Review of Assessment Triggers
2010**

Introduction

Amendment 1 to the Interstate Fishery Management Plan for Atlantic Croaker directs the Atlantic Croaker Stock Assessment Subcommittee (SASC) to conduct a benchmark stock assessment every five years (ASMFC 2005). In each non-assessment year, the Atlantic Croaker Technical Committee (TC) is required to conduct a set of “trigger” exercises to review Atlantic croaker data. The first trigger is the only hard trigger which, if activated, initiates an assessment in a non-assessment year. If the TC notices substantial changes in one or more of the remaining triggers, the TC can request that a stock assessment be conducted.

Prior to 2010, the triggers were evaluated on a management area basis, using the mid- and south Atlantic management regions as defined in Amendment 1. The 2010 ASMFC assessment assumed a single, coast-wide stock for Atlantic croaker, which was supported by the SEDAR review panel (ASMFC 2010). During its June 2010 meeting, the TC decided that the triggers should now be evaluated on a coast-wide basis to reflect the results of the 2010 stock assessment.

Evaluation of Assessment Triggers

1. Relative percent change in landings

- a. A stock assessment will be triggered if the most recent year’s commercial landings are less than 70% of the previous two years' average landings.

Commercial landings data were obtained from the ACCSP Data Warehouse. Annual commercial landings of Atlantic croaker along the U.S. east coast have been variable since at least 1950 (Figure 1). Over the last decade, commercial landings have generally declined. In 2009, approximately 15.7 million pounds were landed by commercial fisheries (Table 1). This value represents 80.3% of the average of the previous two years' commercial landings (Average, 2007–2008 = 19,611,646 pounds). Therefore, the trigger is not activated.

- b. A stock assessment will be triggered if the most recent year’s recreational landings are less than 70% of the previous two years' average landings.

Estimates of recreational fisheries statistics were provided by the MRFSS. Recreational harvest of Atlantic croaker (Type A + B1) from New Jersey to the east coast of Florida ranged from a low of 1.35 million pounds in 1982 to a high of 11.1 million pounds in 2001 during 1981 through 2009 (Figure 2). The recreational harvest totaled 5,443,249 million pounds in 2009 (Table 1). This value represents 80.2% of

the average of the previous two years' recreational harvest (Average, 2007–2008 = 6,783,387 pounds). As such, the trigger is not activated.

2. Biological Data Monitoring

- a. The technical committee will compare the most recent year's mean length data from the recreational fishery to the average of the previous two years' mean lengths.

The report for the 2008 Atlantic croaker trigger exercise recommended that the calculation of recreational fishery average lengths should be based on the raw length data. For the 2010 trigger exercise, the recreational fishery average lengths were computed from the raw biological data collected from New Jersey to the east coast of Florida during the MRFSS angler-intercept survey and represent harvested (Type A + B1) fish. Additionally, the data were weighted to account for the effects of non-random sampling of the catch across strata (see ASMFC 1994 for details).

The average total length of Atlantic croaker harvested by recreational anglers in 2009 was 10.95 inches (Table 2). The average of the 2007–2008 recreational harvest average lengths was 10.94 inches. The average total length in 2009 increased by a little more than 0.10% relative to the 2007–2008 average.

- b. The technical committee will compare the most recent year's mean size (length and weight) data from the commercial fishery to the average of the previous two years' mean size (length and weight) data.

The average total length of Atlantic croaker observed in 2009 was compared to the average of the 2007 and 2008 average lengths for major commercial gears using data provided by New Jersey, Maryland, Virginia, and North Carolina. The average length of Atlantic croaker samples from the commercial fisheries decreased in 2009 relative to the 2007–2008 average for all state-gear combinations evaluated except for the Virginia haul seine fishery, in which samples exhibited an increase of less than half an inch (Table 2). The observed decreases in average length ranged from 0.018 to 0.54 inches.

A similar comparison was performed for average weights. The average weight of Atlantic croaker sampled from Virginia's commercial haul seine and pound-net fisheries increased in 2009 relative to the 2007–2008 average by 0.11 and 0.024 pounds, respectively (Table 3). Average weight decreased in New Jersey's gill-net (0.10 pounds), Maryland pound-net (0.26 pounds), Virginia's sink/anchor gill-net (0.10 pounds), North Carolina's ocean gill-net (0.12 pounds), and North Carolina's fly net (0.051 pounds) commercial fisheries.

- c. The technical committee will monitor the overall age composition (proportion at age) and calculate the mean size at age for the age groups that are present in the state samples.

The proportion, mean length, and mean weight of commercial landings at age for Atlantic croaker was calculated for 2007–2009 using data provided by New Jersey, Maryland, Virginia, and North Carolina. The number of age samples collected is

summarized by state and year in Table 4. Note that lengths and weights were not always available for every aged fish. The majority of Atlantic croaker commercial landings in these states have been comprised of fish age 1 and older (Figure 3–Figure 6). There is evidence of a strong 2002 year-class in the New Jersey (Figure 3), Maryland (Figure 4), and Virginia (Figure 5) age compositions.

The average length and average weight at age of Atlantic croaker sampled from the commercial fisheries was variable during 2007–2009 within each state (Figure 7–Figure 14). The majority of the differences in average length at age within each state were less than 0.75 inches when comparing 2007, 2008, and 2009. In comparisons of average weight at age within states among 2007, 2008, and 2009, most of the differences were less than 0.15 pounds. Larger differences in average length and average weight at age among these years are often attributable to variation in sample sizes at age among years.

3. Commercial Fisheries Effort vs. Landings

- a. The technical committee will monitor annual commercial fisheries effort and landings by state and gear to evaluate trends. As the reliability of the effort data improves, monitoring of annual effort and landings will be replaced by monitoring of CPUE (by state and gear).

The SASC for the 2010 assessment reviewed the available commercial fisheries effort data from the states and determined the data were insufficient to calculate a CPUE series for the commercial fisheries (ASMFC 2010). That SASC also noted that supplementary information needed to standardize effort data among the states is either unavailable or not consistently provided. The SASC concluded the effort data were unreliable.

Annual commercial landings and associated effort for major gears in Virginia, North Carolina, and Florida were evaluated. Effort is measured as the number of trips and was only available for positive trips; that is, only trips that landed Atlantic croaker were included. Virginia's commercial landings of Atlantic croaker in the anchor and drift gill-net fisheries decreased from 2008 to 2009 while haul seine and pound-net landings increased over these years (Figure 15). An increase in commercial fisheries effort occurred in the anchor gill-net, haul seine, and pound-net fisheries from 2008 to 2009. Effort decreased over the last two years in Virginia's drift gill-net fishery. Virginia's pound-net landings and effort steadily declined from peaks observed in the late 1990s, though there was a slight increase in both landings and effort in this fishery from 2008 to 2009.

Commercial landings and effort demonstrate an overall decline in North Carolina's ocean gill-net fishery over the past several years (Figure 16). North Carolina's fly-net fishery exhibited an increase in landings and effort from 2008 to 2009.

Effort in Florida's commercial cast-net fishery has shown an overall increase over the available time series (Figure 17). Commercial landings of Atlantic croaker in the cast-net fishery have been variable with an observed decline from 2008 to 2009. Both effort and landings in Florida's commercial hook-and-line fishery generally increased

from the beginning of the time series to a peak in 2000; hook-and-line effort and landings have since shown a general decline.

4. Recreational Catch Rates

Amendment 1 specifies that the recreational fishery CPUE index will be calculated based on directed trips (ASMFC 2005). In the 2010 stock assessment, recreational fishery CPUE was calculated using the directed trips method and the method of Stephens and MacCall (2004; ASMFC 2010). The SASC and SEDAR review panel for that assessment were concerned about the reliability of the directed trips-based methods as it may under represent trips that did not catch Atlantic croaker. The SASC was concerned that the Stephens and MacCall method resulted in unrealistic species associations. The SEDAR review panel recommended that stratifying the data into subareas based on expected species associations would alleviate this problem.

The language in Amendment 1 also states that recreational fishery CPUE indices will be calculated for each state (ASMFC 2005); however, the TC feels the MRFSS data are insufficient for calculating state-specific catch rates.

For the 2010 trigger exercise, recreational fishery catch rates were calculated using both the directed trips approach and a modification of the Stephens and MacCall method (K. Drew, ASMFC, pers. comm.). The TC evaluated both methods but was not comfortable presenting a recreational CPUE index that was not endorsed by a peer review panel.

5. Surveys

The SASC for the 2010 assessment carried out a thorough evaluation of fisheries-independent surveys along the U.S. Atlantic Coast that have encountered Atlantic croaker (ASMFC 2010). The purpose was to evaluate how each survey represents and characterizes the Atlantic croaker population. For each survey, the SASC considered the length of the time series, sample timing and spatial coverage, catchability/availability to the survey gear, changes in sampling methodology, and survey design. Out of thirty-one surveys examined, four were selected for use in the assessment model. The surveys chosen were the NMFS Bottom Trawl Survey, VIMS Juvenile Fish and Blue Crab Trawl Survey, SEAMAP-South Atlantic Coastal Survey, and the North Carolina Pamlico Sound Survey, also known as Program 195 (P195). These surveys cover a large area or sample the core area, have demonstrated regular encounters with Atlantic croaker, and have collected sufficient sample sizes to develop frequency distributions. Table 5 provides a brief description of these surveys and how they were used to develop indices for Atlantic croaker.

All indices were calculated using the same methods and data subsets that were used for the 2010 ASMFC assessment, with the exception of the NMFS index. A number of changes were implemented in the NMFS Bottom Trawl Survey in 2009 which will affect the calculation of the index (Miller et al. 2010; NEFSC 2010). For the 2010 assessment, which considered data through 2008, the NMFS index was calculated using data collected in the fall (inshore) component of the survey and was based on stratification by depth and latitude (ASMFC 2010). Based on a recommendation by the review panel, only observations from the mid- and deep-depth strata were included in the calculations. The

modifications to the NMFS Bottom Trawl Survey in 2009 included changes to the survey vessel, trawling gear, tow speed and duration, station allocation, and fishing protocols (NEFSC 2010). The shallow and mid-depth strata of the inshore series are no longer sampled and so data collected in 2009 and later can not be stratified by depth using the NMFS strata designations. Species-specific calibration factors were estimated to allow conversion of catch rates between the new and old survey vessels (Miller et al. 2010). For this trigger exercise, the 2009 NMFS fall index was calculated based on stratification by latitude only and the recommended calibration factor for Atlantic croaker (1.134) was applied to convert the 2009 index into units of measure equivalent to data collected prior to 2009. Even with the application of the calibration factor, the pre-2009 index values may not be directly comparable to the 2009 index value.

The fall components of the NMFS and SEAMAP surveys have primarily encountered age-1 Atlantic croaker. The NMFS index varied from year to year with no obvious trend from 1972 to 1993 (Figure 18). After 1993, the index has remained variable but with an overall increasing trend through the end of the time series. During the last eight years of the time series (2002–2009), the NMFS index exceeded the time-series average. The SEAMAP index has been variable and without trend over the survey time series (Figure 19). This index was below the time-series average in two of the three most recent years available.

Data from the VIMS and NC P195 surveys were used to develop young-of-year indices for Atlantic croaker. The VIMS index varied without trend from the beginning of the time series through 2002 (Figure 20). From 2003 to 2007, the VIMS index exhibited a variable but overall increasing trend. In 2008, the VIMS index sharply increased to the time-series peak in 2008, which was followed by a sharp decline in the index in 2009. The VIMS index exceeded the time-series average during the last two years of the time series. The young-of-year index derived from the NC P195 survey was variable and without trend over the survey time series (Figure 21). A small peak in 2008 is consistent with the peak observed in the VIMS young-of-year index. The NC P195 index has been below the time-series average in four of the five most recent years in the time series.

Summary

Based on an evaluation of landings, effort, and biological sampling data from the commercial and recreational fisheries as well as indices derived from fisheries-independent surveys, the TC concluded that an assessment update for Atlantic croaker is not warranted at this time.

References

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- _____. 2005. Amendment 1 to the interstate fisheries management plan for Atlantic Croaker. ASMFC, Washington, D.C. 92 p.
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Table 1. Comparison of Atlantic croaker commercial landings and recreational harvest estimates from the most recent year, 2009, to the average of the estimates from the previous two years, 2007 and 2008.

Fisheries Data	Pounds		2009 as % of
	Avg., 2007–2008	2009	2007–2008 Avg.
Commercial Landings	19,611,646	15,741,562	80.3
Recreational Harvest	6,783,387	5,443,249	80.2

Table 2. Comparison of the average total length (inches) of Atlantic croaker observed in the most recent year, 2009, to the average of the average lengths of the previous two years, 2007 and 2008, by fishery, state, and gear.

Fishery	State	Gear	Average Length (in)		Percent Change (%)
			Avg., 2007–2008	2009	
Recreational	NJ–East FL	All	10.94	10.95	0.101
Commercial	New Jersey	Gill Net	13.25	12.80	-3.40
Commercial	Maryland	Pound Net	11.91	11.85	-0.505
Commercial	Virginia	Haul Seine	10.62	11.00	3.60
Commercial	Virginia	Pound Net	12.78	12.77	-0.142
Commercial	Virginia	Sink/Anchor Gill Net	12.78	12.27	-3.99
Commercial	North Carolina	Ocean Gill Net	12.49	11.95	-4.31
Commercial	North Carolina	Fly Net	11.55	11.33	-1.89

Table 3. Comparison of the average weight (pounds) of Atlantic croaker observed in the most recent year, 2009, to the average of the average lengths of the previous two years, 2007 and 2008, by fishery, state, and gear.

Fishery	State	Gear	Average Weight (lb)		Percent Change (%)
			Avg., 2007–2008	2009	
Commercial	New Jersey	Gill Net	1.10	1.00	-9.09
Commercial	Maryland	Pound Net	1.09	0.829	-24.1
Commercial	Virginia	Haul Seine	0.553	0.663	19.9
Commercial	Virginia	Pound Net	0.972	1.00	2.43
Commercial	Virginia	Sink/Anchor Gill Net	0.952	0.848	-11.0
Commercial	North Carolina	Ocean Gill Net	0.826	0.703	-14.9
Commercial	North Carolina	Fly Net	0.666	0.615	-7.66

Table 4. Number of Atlantic croaker age samples collected from commercial landings, by state, 2007–2009.

State	Number Age Samples		
	2007	2008	2009
New Jersey	96	994	138
Maryland	277	306	222
Virginia	343	541	512
North Carolina	336	739	709

Table 5. Summary of information describing the fisheries-independent surveys and how their data were subset to develop indices for Atlantic croaker.

Index	Agency	Program	Survey Design	Sampling Area	Subset Used for Index		
					Season	Area	Size/Age
NMFS	NEFSC	Bottom Trawl Survey	Stratified random	Cape Hatteras to Cape Cod, inshore (fall)	Fall	strata 3180–3440, excluding shallow strata	
SEAMAP	SCDNR	South Atlantic Coastal Survey (trawl)	Stratified random	Cape Hatteras to Cape Canaveral, coastal waters	Fall		
VIMS	VIMS	Juvenile Fish and Blue Crab Trawl Survey	Mixed	Chesapeake Bay and tributaries	Spring		YOY
NC P195	NCDMF	Pamlico Sound Survey (Program 195)	Stratified random	Pamlico Sound, eastern Albemarle Sound, and lower Neuse and Pamlico rivers	Spring	excludes Pungo R. stratum	YOY

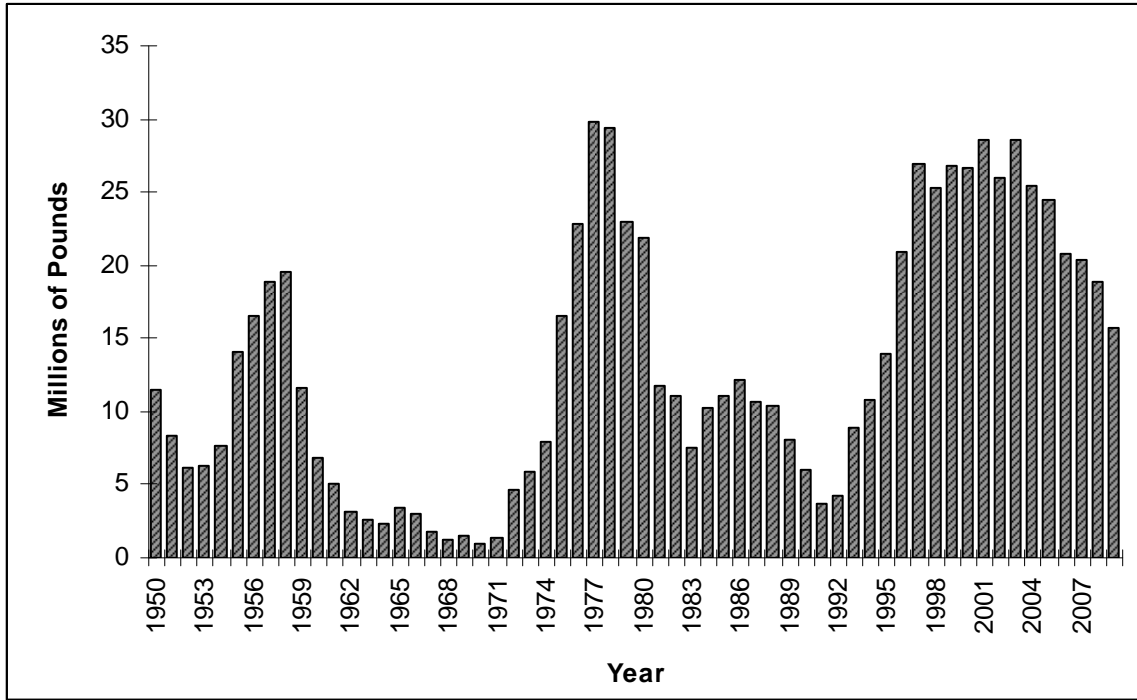


Figure 1. Annual commercial landings (pounds) of Atlantic croaker along the U.S. east coast, 1950–2009.

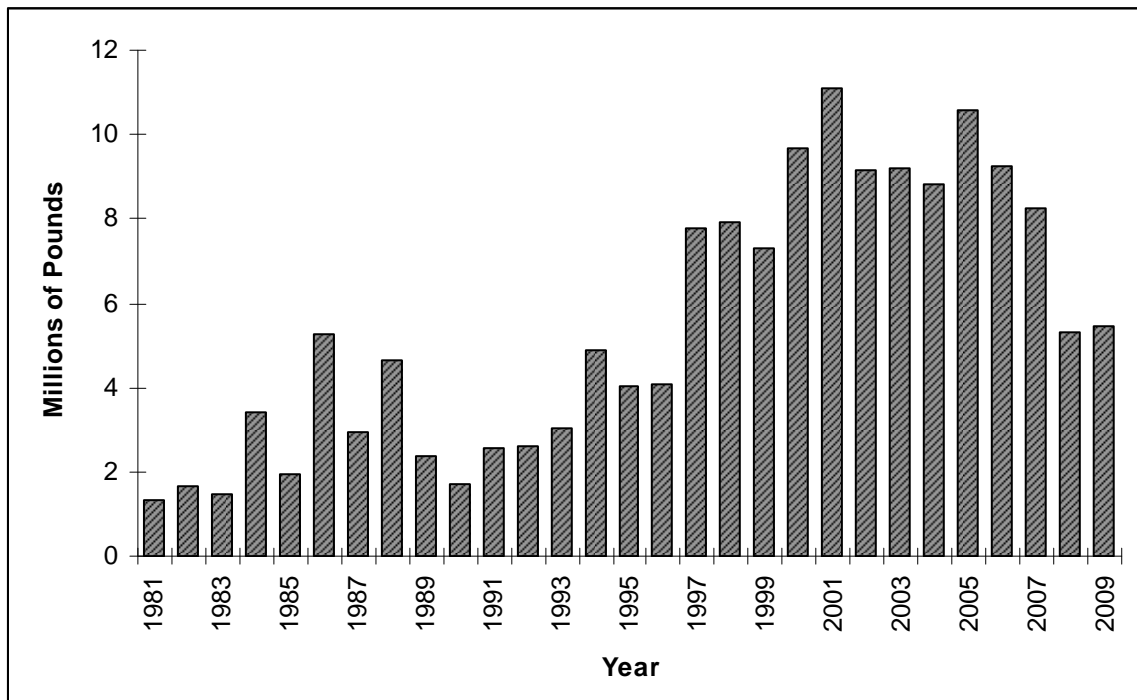


Figure 2. Annual recreational harvest (pounds; Type A + B1) of Atlantic croaker along the U.S. east coast, 1981–2009.

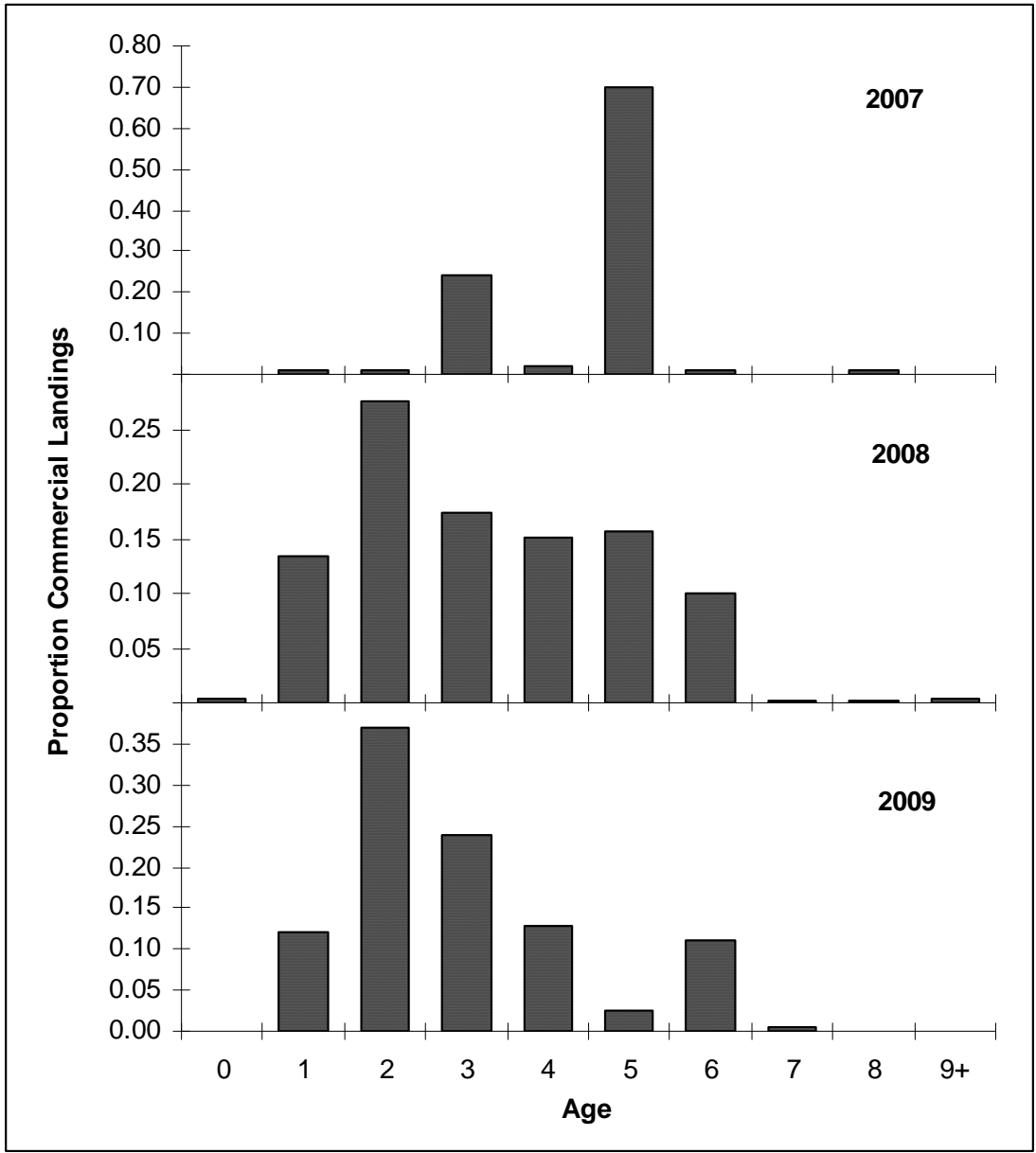


Figure 3. Proportion of Atlantic croaker commercial landings (pounds) at age for New Jersey pooled over all gears, 2007–2009.

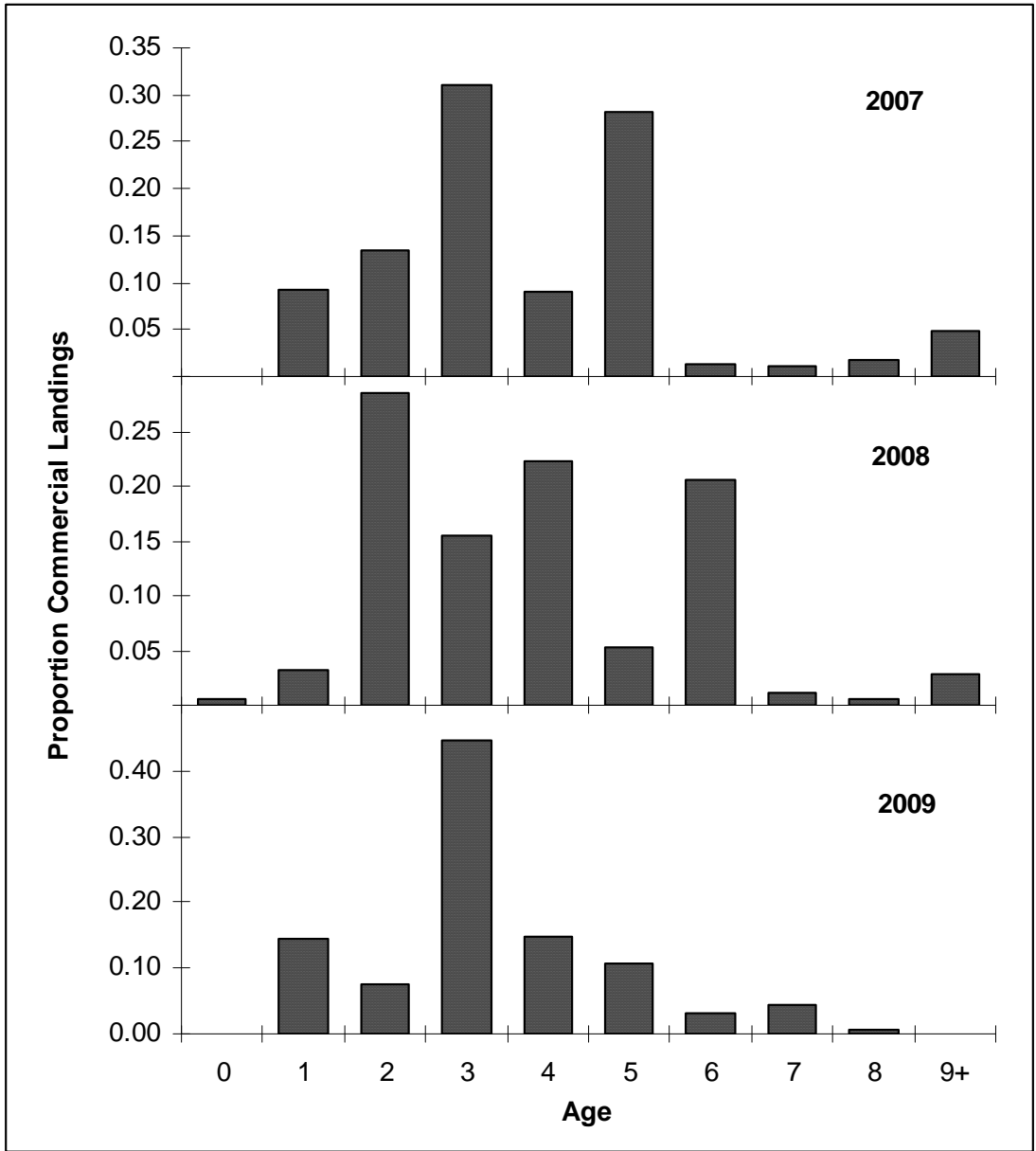


Figure 4. Proportion of Atlantic croaker commercial landings (pounds) at age for Maryland pooled over all gears, 2007–2009.

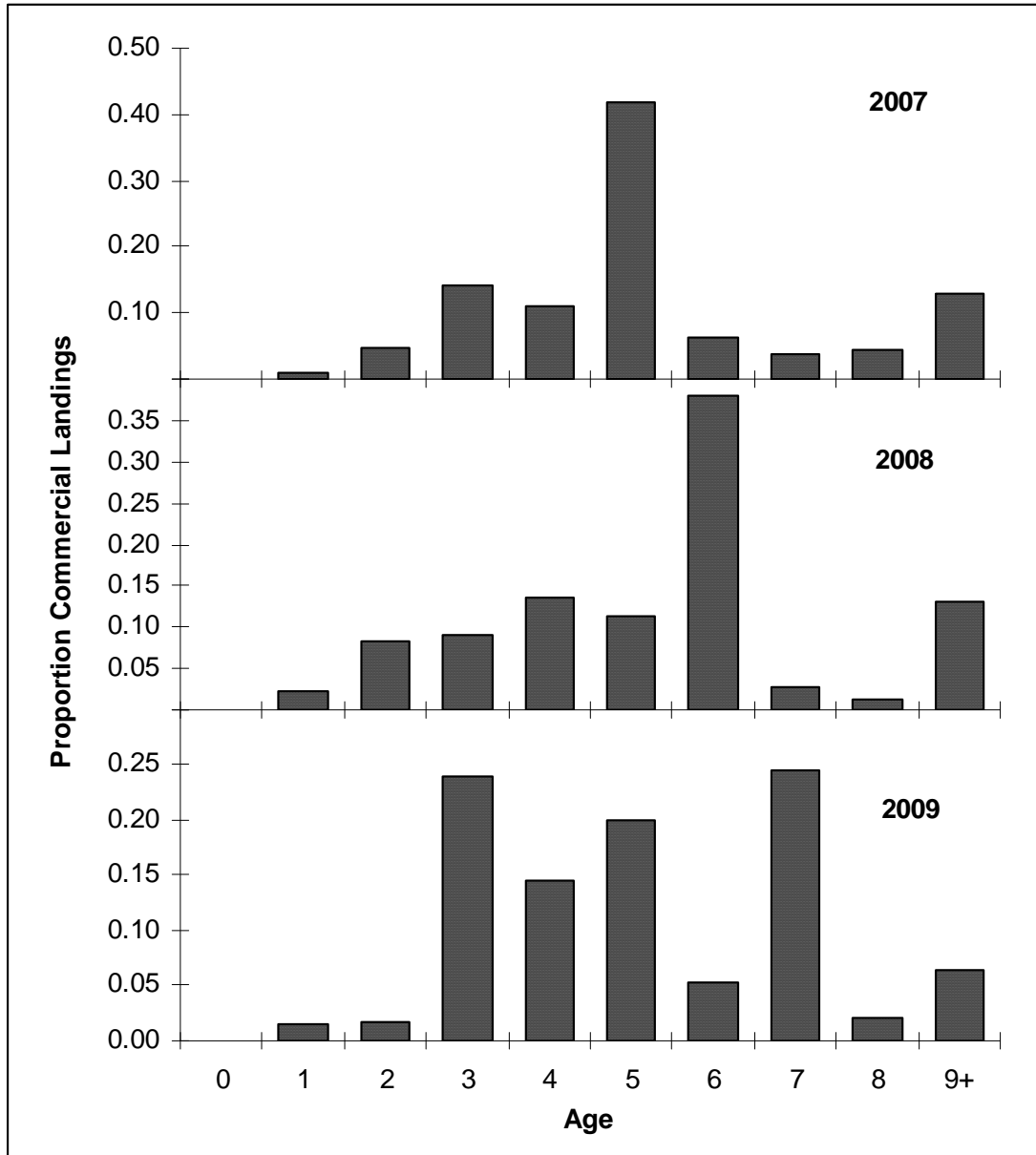


Figure 5. Proportion of Atlantic croaker commercial landings (pounds) at age for Virginia pooled over all gears, 2007–2009.

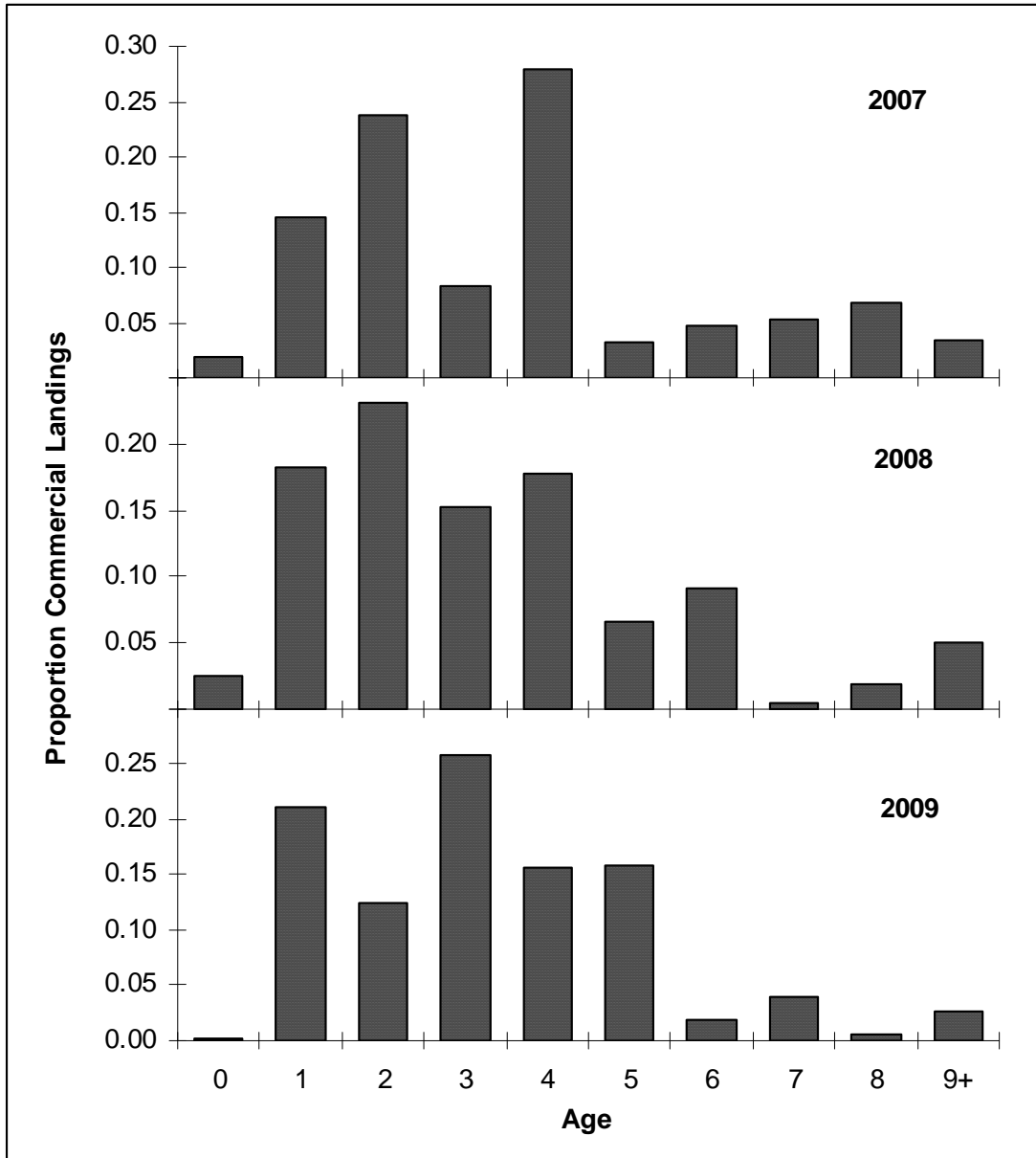


Figure 6. Proportion of Atlantic croaker commercial landings (pounds) at age for North Carolina pooled over all gears, 2007–2009.

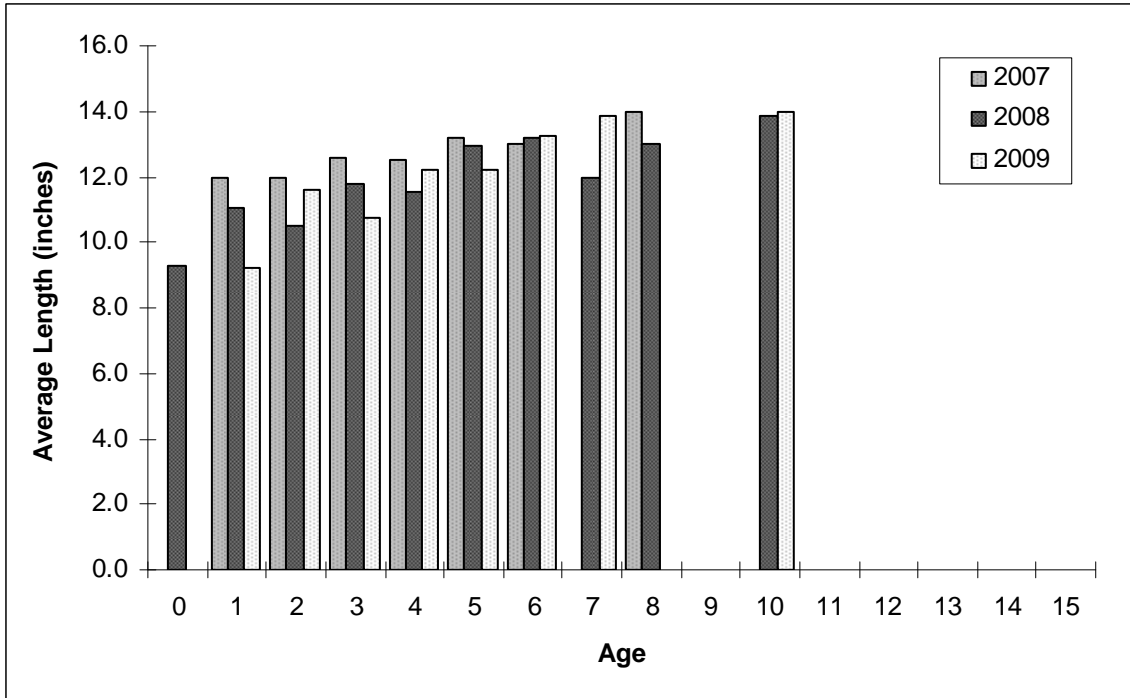


Figure 7. Average total length (inches) at age of Atlantic croaker sampled from New Jersey's commercial landings pooled over all gears, 2007–2009.

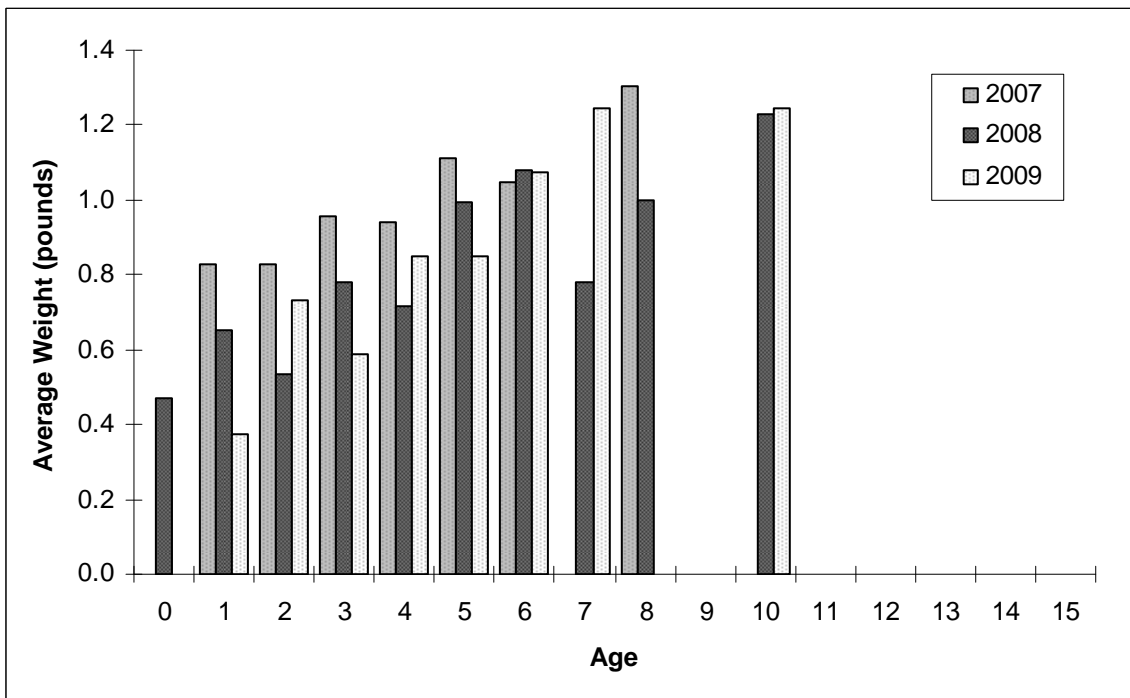


Figure 8. Average weight (pounds) at age of Atlantic croaker sampled from New Jersey's commercial landings pooled over all gears, 2007–2009.

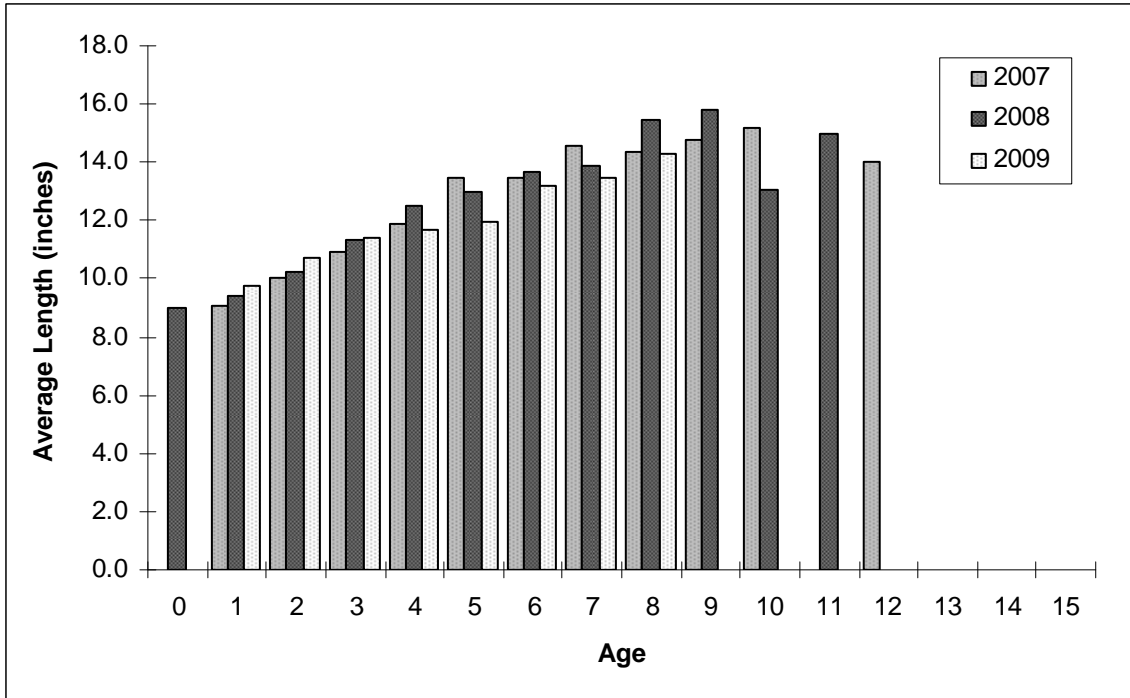


Figure 9. Average total length (inches) at age of Atlantic croaker sampled from Maryland's commercial pound-net landings, 2007–2009.

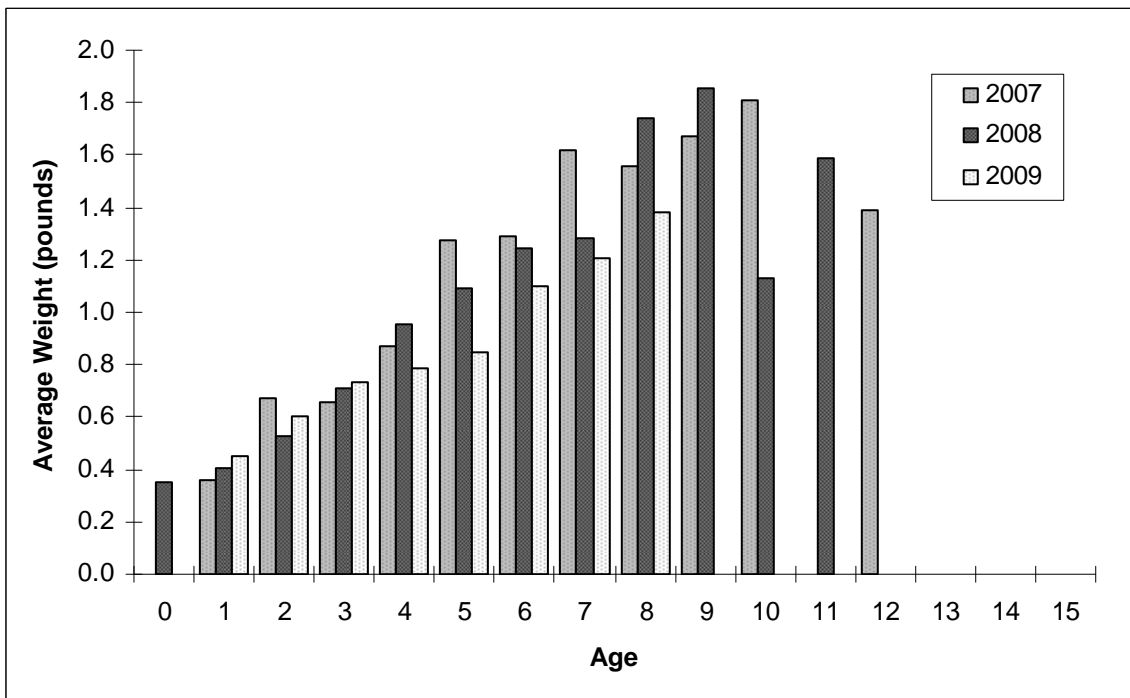


Figure 10. Average weight (pounds) at age of Atlantic croaker sampled from Maryland's commercial pound-net landings, 2007–2009.

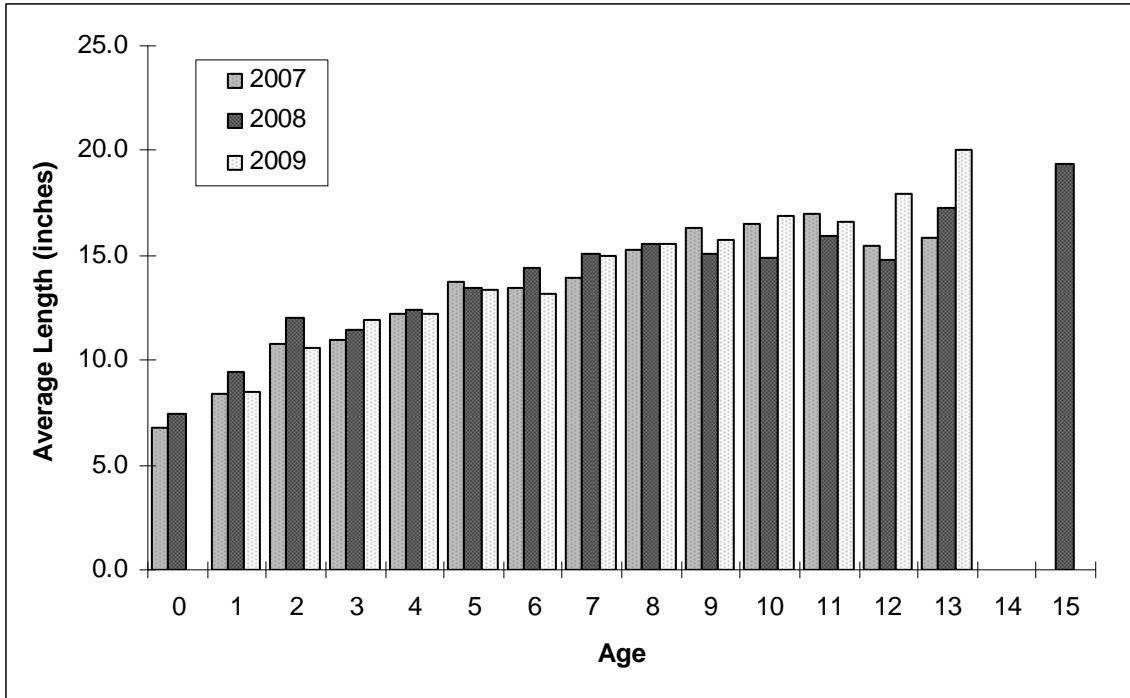


Figure 11. Average total length (inches) at age of Atlantic croaker sampled from Virginia's commercial landings pooled over all gears, 2007–2009.

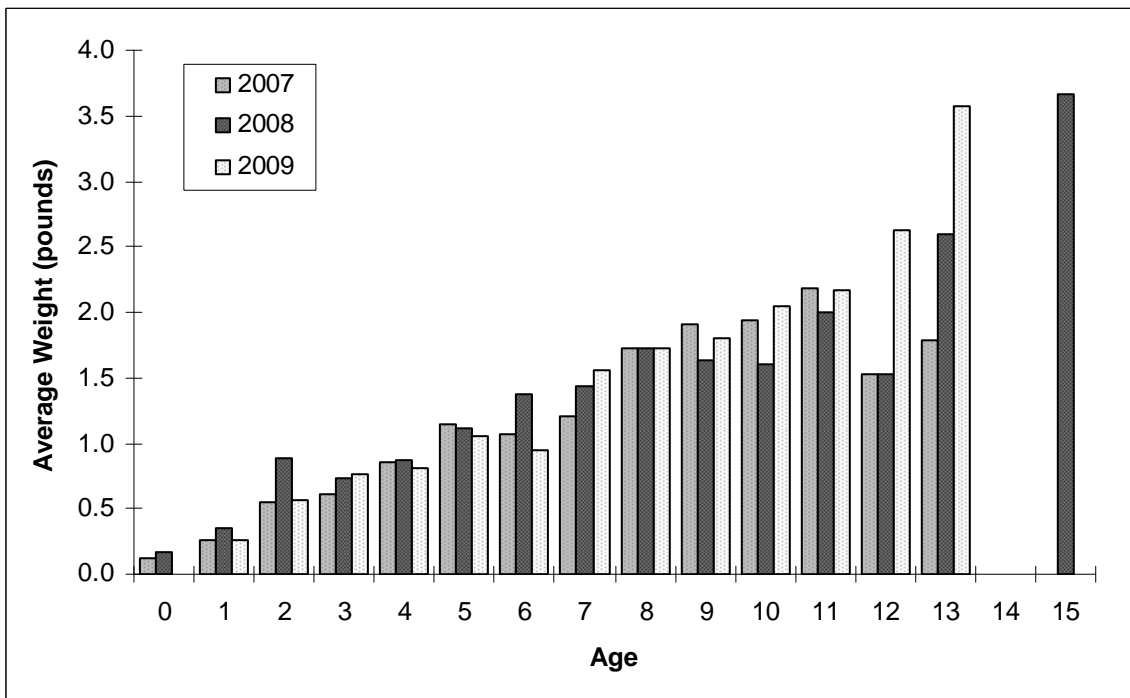


Figure 12. Average weight (pounds) at age of Atlantic croaker sampled from Virginia's commercial landings pooled over all gears, 2007–2009.

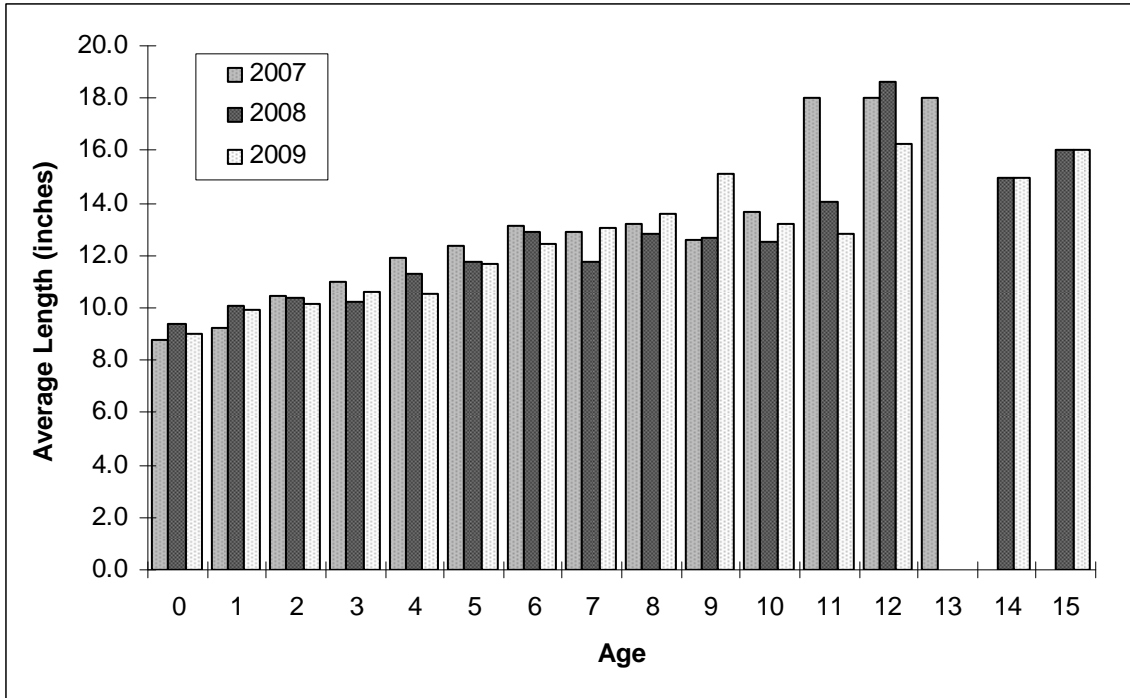


Figure 13. Average total length (inches) at age of Atlantic croaker sampled from North Carolina's commercial landings pooled over all gears, 2007–2009.

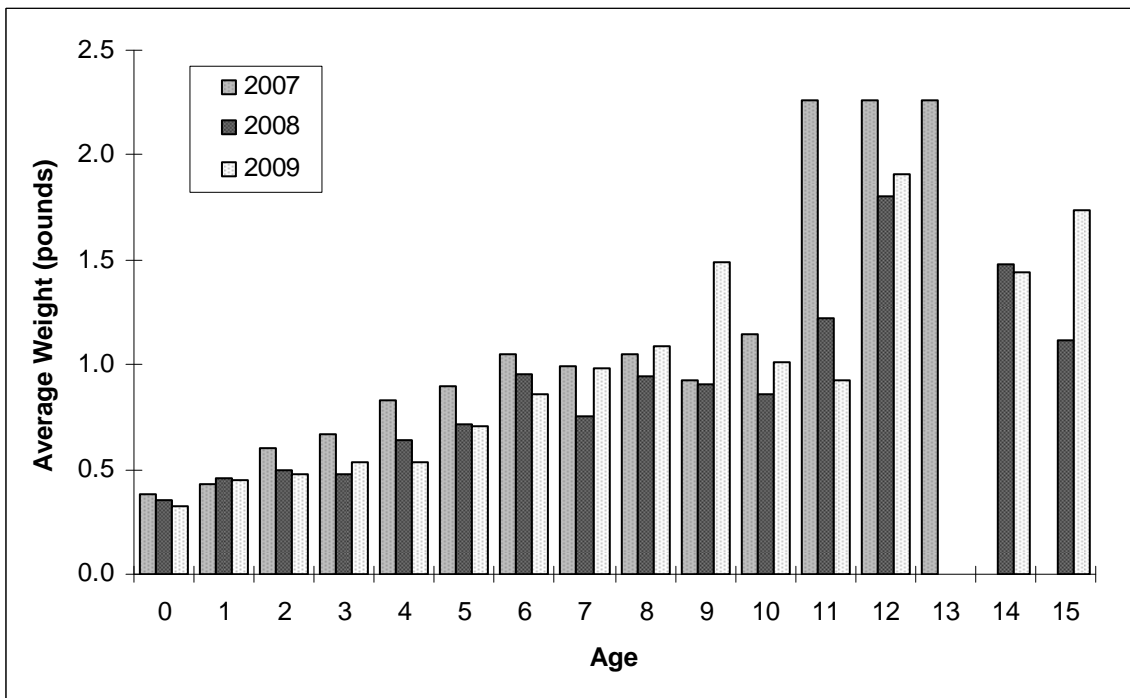


Figure 14. Average weight (pounds) at age of Atlantic croaker sampled from North Carolina's commercial landings pooled over all gears, 2007–2009.

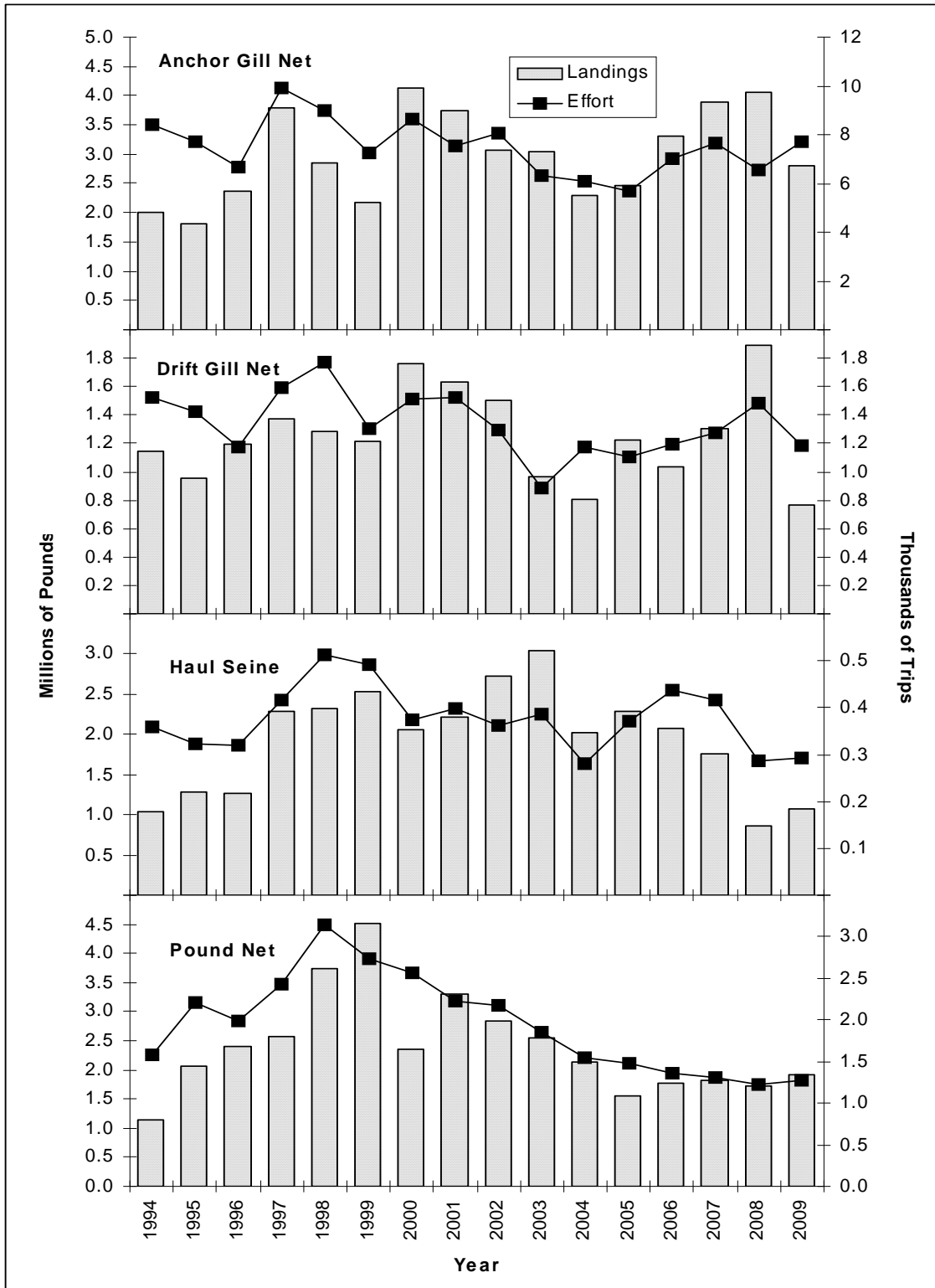


Figure 15. Annual landings (pounds) and effort (trips) in Virginia's Atlantic croaker commercial fisheries, by gear, 1994–2009.

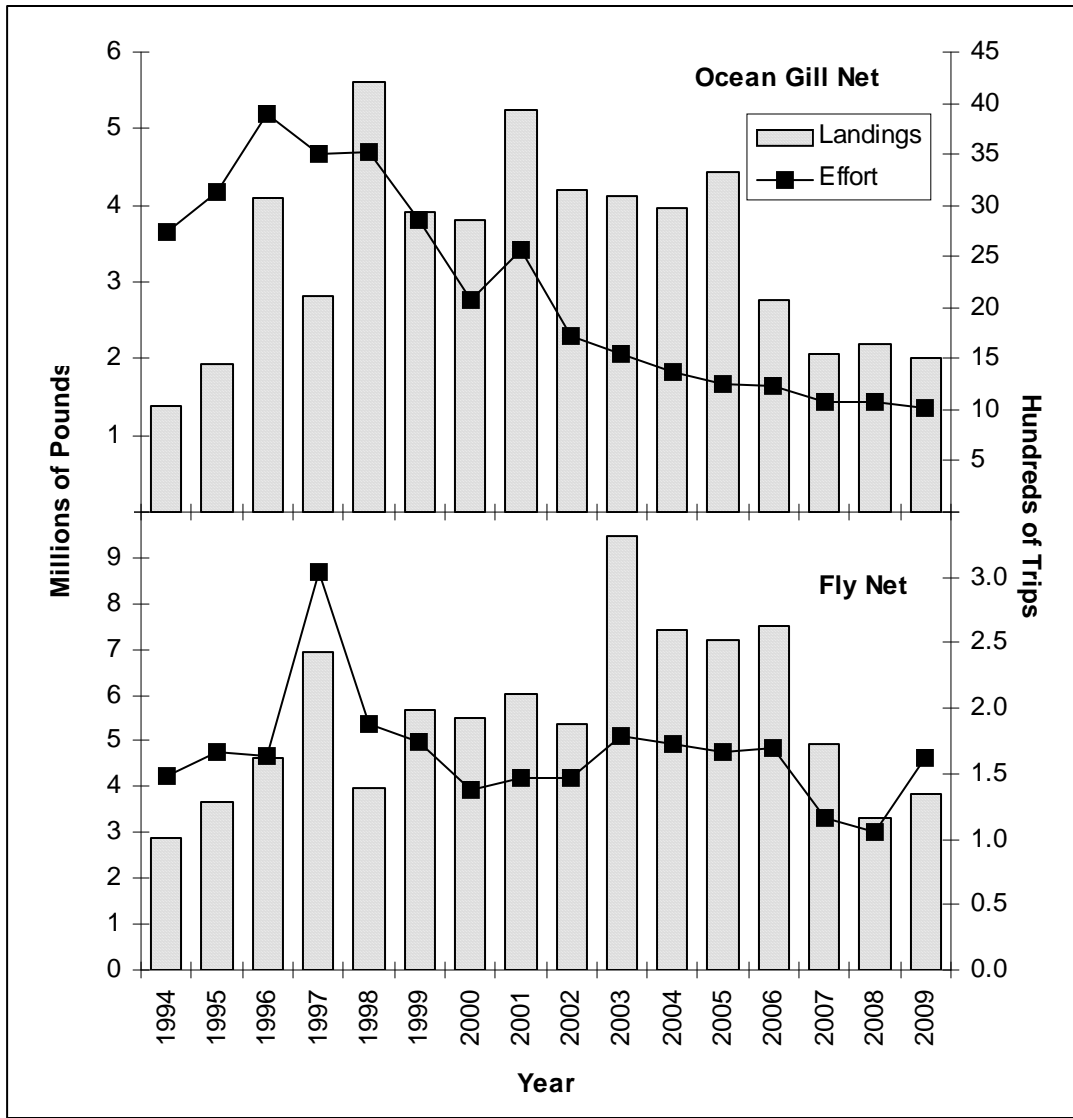


Figure 16. Annual landings (pounds) and effort (trips) in North Carolina's Atlantic croaker commercial fisheries, by gear, 1994–2009.

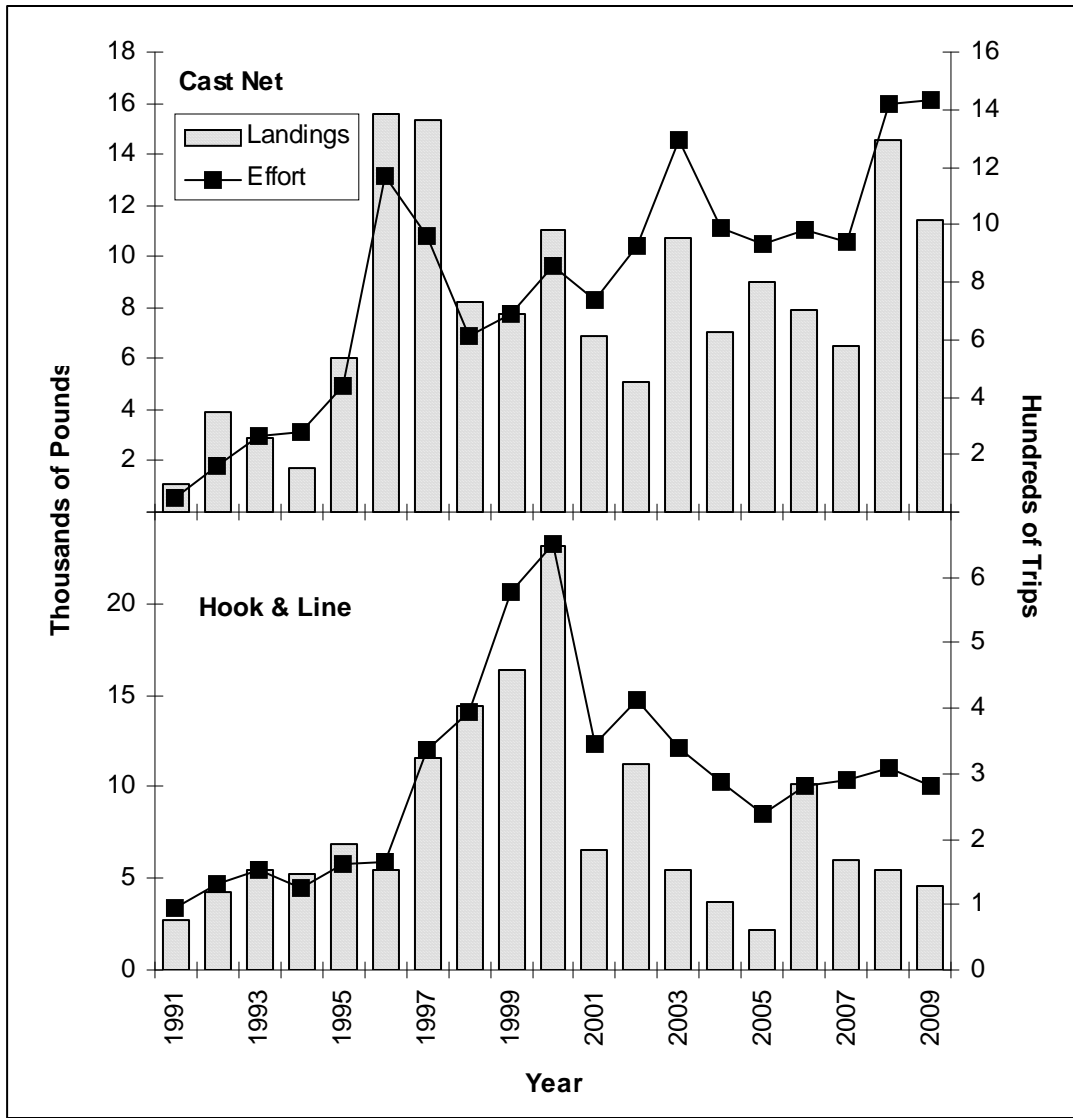


Figure 17. Annual landings (pounds) and effort (trips) in Florida's Atlantic croaker commercial fisheries, by gear, 1991–2009.

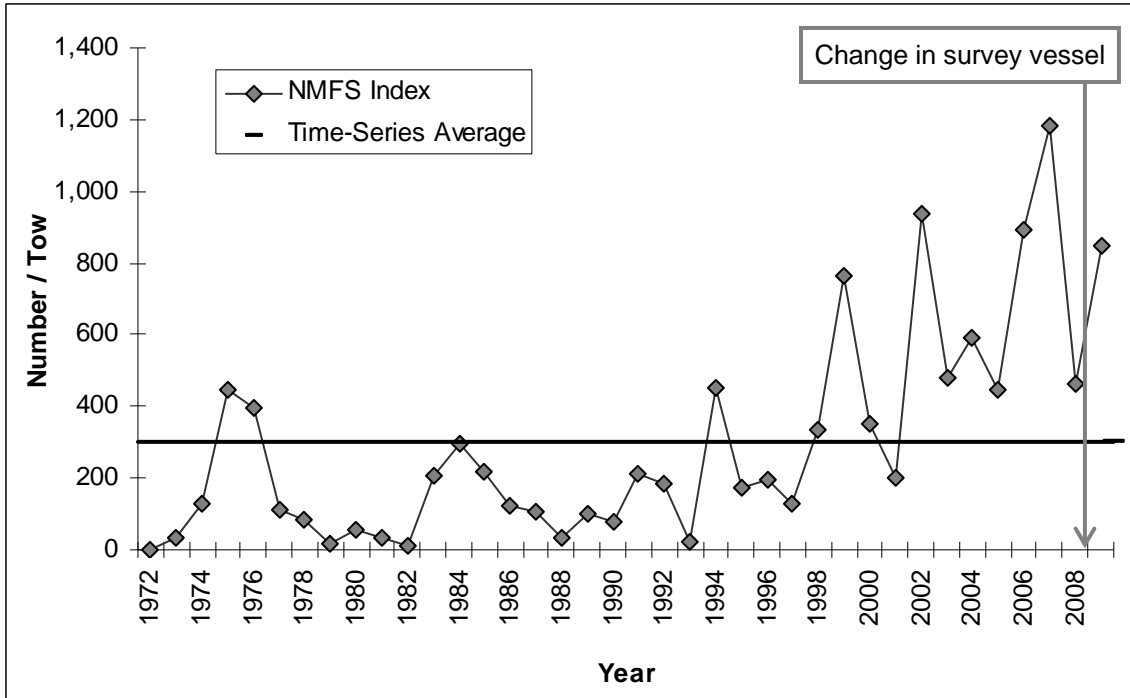


Figure 18. Annual index of relative abundance for Atlantic croaker derived from the NMFS Bottom Trawl Survey, 1972–2009.

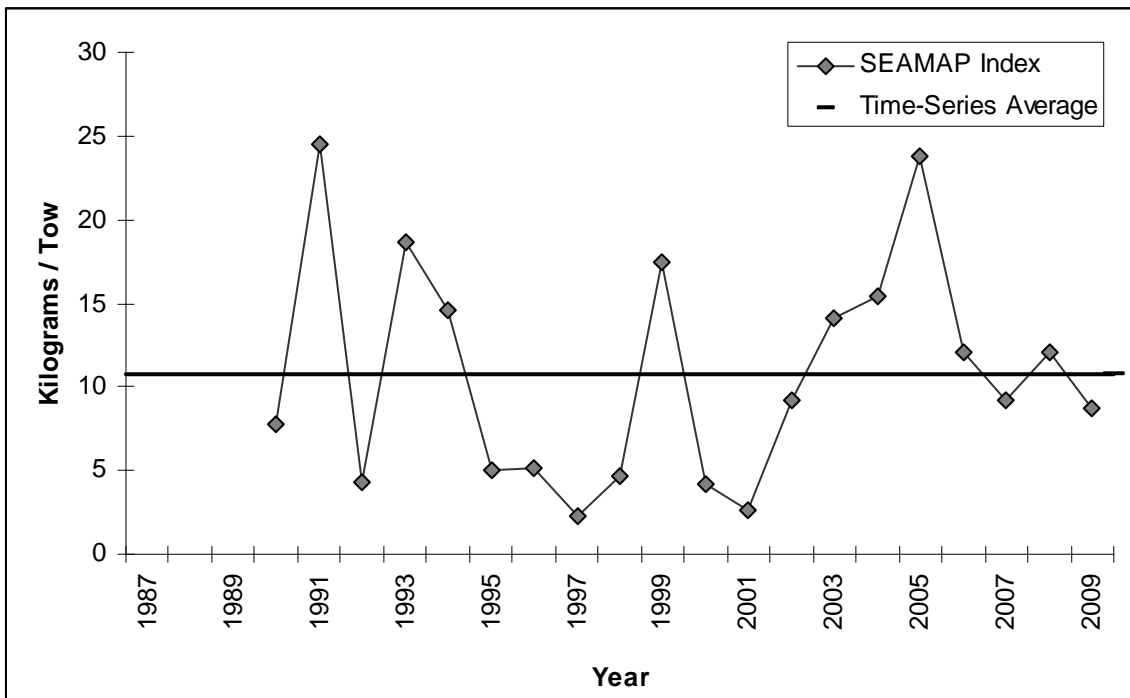


Figure 19. Annual index of relative abundance for Atlantic croaker derived from the SEAMAP-South Atlantic Coastal Survey, 1990–2009.

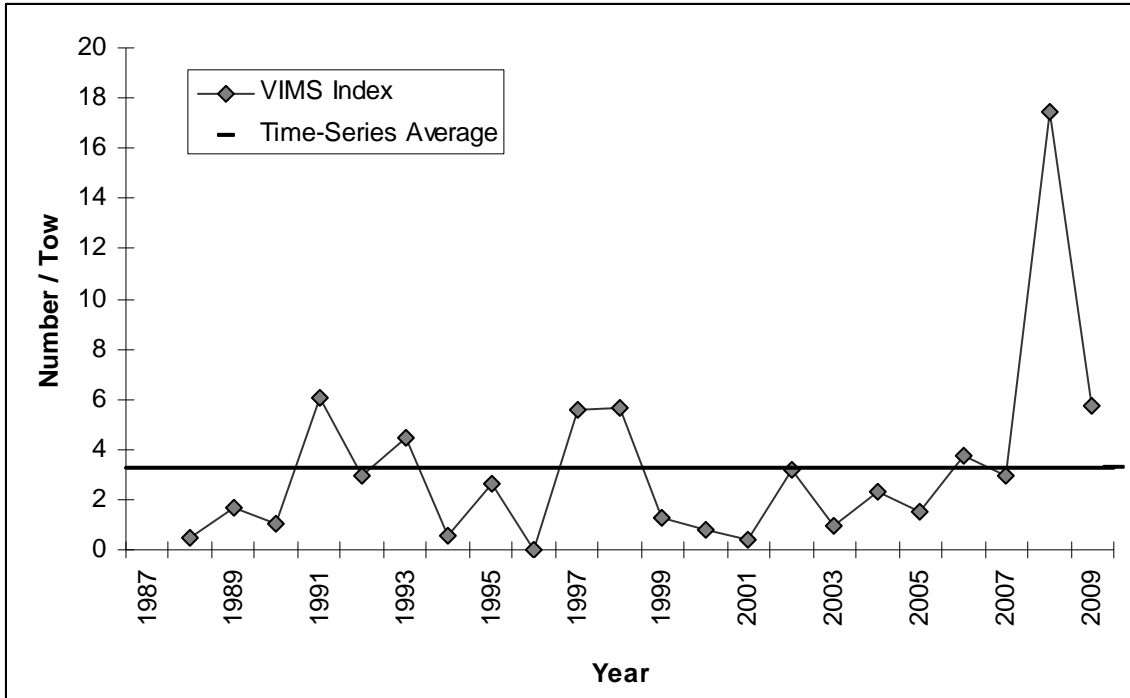


Figure 20. Annual young-of-year index for Atlantic croaker derived from the VIMS Juvenile Fish and Blue Crab Trawl Survey, 1988–2009.

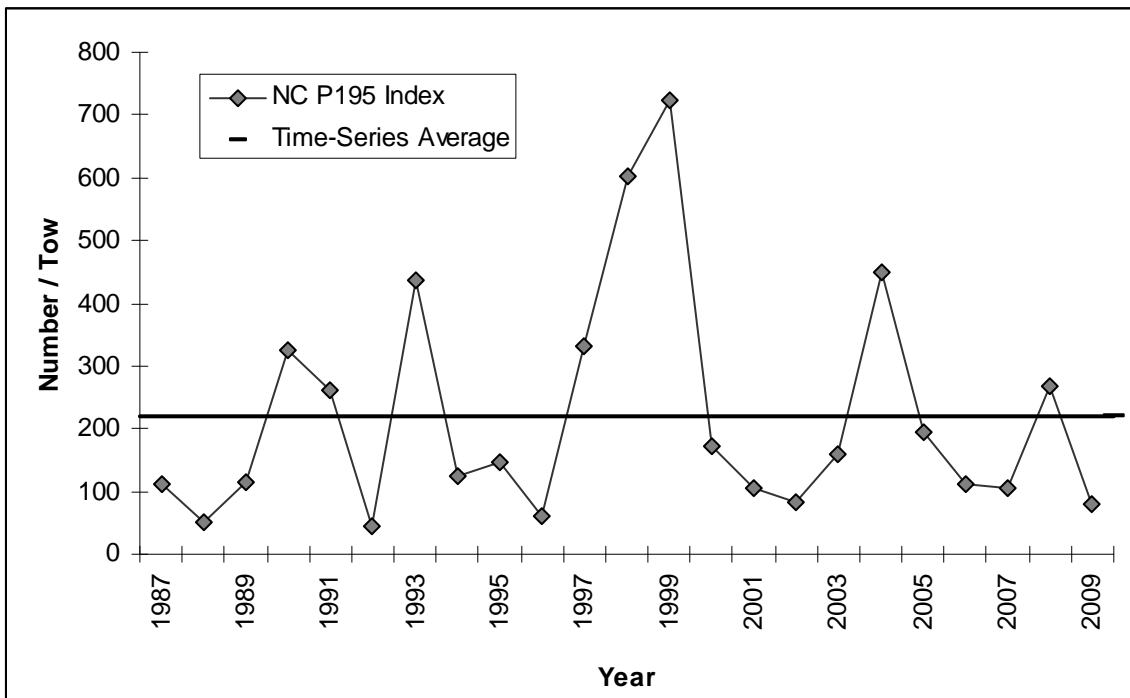


Figure 21. Annual young-of-year index for Atlantic croaker derived from the North Carolina Pamlico Sound Survey (Program 195), 1987–2009.