

**FISHERY MANAGEMENT PLAN UPDATE
SPOT
AUGUST 2020**

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	October 1987
Amendments:	Omnibus Amendment – August 2012 Addendum II – August 2014 Addendum III – February 2020
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	2022

The original interstate Fishery Management Plan (FMP) for spot was adopted in 1987 with recommendations to improve data collection to produce a stock assessment and improve information for management (ASMFC 1987). The original FMP was adopted prior to passage of the Atlantic Coastal Fisheries Cooperative Management Act (1993) and the Atlantic States Marine Fisheries Commission (ASMFC) Interstate Fishery Management Program (ISFMP) Charter (1995). After passage of the Act, the ASMFC adopted the Charter to establish standards and procedures for the preparation and adoption of FMPs. Once an FMP was amended to incorporate the standards and procedures in the ISFMP Charter, the Commission could adopt management requirements that can be enforced through the Act. The Omnibus Amendment updated the FMP with the Act and Charter requirements and initiated annual trigger exercises to monitor the status of the spot resource while also directing the board to consider management action depending on the results of the trigger exercise (ASMFC 2012). Without coast-wide minimum management measures, the trigger exercises did little to provide effective management between stock assessments. Addendum II to the Amendment established the use of the Traffic Light Approach (TLA; Caddy and Mahon 1995; Caddy 1998; Caddy 1999; Caddy 2002) as a precautionary management framework. The TLA is preferred because with fast-growing, early maturing species like spot, it is more important to respond to multi-year trends rather than annual changes. The TLA more effectively illustrates long term trends than the triggers established by the Omnibus Amendment. The management framework utilizing the TLA (ASMFC 2014) replaced the management triggers established in the Omnibus Amendment.

In February 2020, the South Atlantic State/Federal Fisheries Management Board (hereafter referred to as the Board) approved Addendum III to the Omnibus Amendment, which revised the TLA’s trigger mechanism and management response for the recreational and commercial fisheries (ASMFC 2020a). Under Addendum III, management action is triggered if harvest and abundance thresholds within a regional or coastwide TLA analysis are met or exceeded for any two of the three terminal years. If management action is triggered, the coastwide response includes recreational bag limits and quantifiable measures to achieve percent reductions in commercial harvest. Response requirements vary depending on which threshold is exceeded. Addendum III also defines the mechanism by which triggered management actions may be removed after abundance characteristics are no longer triggering management action.

The North Carolina Wildlife Federation submitted a petition for rulemaking on November 2, 2016, and a modification to the petition on January 12, 2017. The petitioner put forth seven rules to designate nursery areas, restrict gear and seasonality in the shrimp trawl fishery to reduce bycatch of fish (including spot, Atlantic croaker, and weakfish), and establish an eight-inch minimum size limit for spot and a 10-inch minimum size limit for Atlantic croaker. At its February 2017 business meeting, the North Carolina Marine Fisheries Commission passed a motion to approve the petitioned rules and begin the rulemaking process. Upon review by the Office of State Budget and Management, it was determined that sufficient state funds are not available to implement the proposed rule changes without undue detriment to the agency’s existing activities, and the rules were never adopted.

To ensure compliance with interstate requirements, North Carolina also manages spot 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, South Atlantic Fishery Management Council, 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) and the Atlantic Coastal Fisheries Cooperative Management Act (ASMFC), are similar to the goals of the N.C. Fisheries Reform Act of 1997 to “ensure long-term viability” of these fisheries (NCDMF 2015).

Management Unit

Delaware through the east coast of Florida.

Goal and Objectives

The primary goal of the Omnibus Amendment is to bring the FMPs for Spanish mackerel, spot, and spotted seatrout under the authority of the Act, providing for more efficient and effective management and changes to management in the future. The objectives for spot under this amendment are to:

- Increase the level of research and monitoring of spot bycatch in other fisheries, to complete a coast-wide stock assessment.

- Manage the spot fishery to encourage reduced mortality on spot stocks until age-1.
- Develop research priorities that will further refine the spot management program to maximize the biological, social, and economic benefits derived from the spot population. The Omnibus Amendment does not require specific fishery management measures in either the recreational or commercial fisheries for states within the management unit range.

STATUS OF THE STOCK

Life History

Spot (*Leiostomus xanthurus*) are short-lived, estuarine dependent members of the drum family, ranging from the Gulf of Maine to Florida but are most abundant from the Chesapeake Bay to South Carolina (ASMFC 2010). Spot generally reach maturity by age one or two (ASMFC 2010) and spawn in the ocean from late fall to early spring (Hildebrand and Schroeder 1928; Roelofs 1951; Dawson 1958; Hoese 1973). Length at 50 percent maturity is generally between seven and 11 inches total length (ASMFC 2010). Wind and currents carry the young into the upper reaches of the estuaries where they remain throughout the spring (Warlen and Chester 1985; Govoni and Spach 1999; Hare et al. 1999; Odell et al. 2017). Adult spot migrate seasonally between estuarine and nearshore ocean waters but are rarely found in the upper reaches of the estuary (Hildebrand and Schroeder 1928; Dawson 1958; Hoese 1973; Odell et al. 2017). Spot are bottom feeders, eating mostly worms, small crustaceans, and mollusks (ASMFC 2010). Spot are most susceptible to commercial and recreational fishing activity during the fall when schools migrate from estuarine to oceanic waters (Pacheco 1962).

Stock Status

The first benchmark stock assessment for spot was completed in 2017 but was not recommended for use in management by a peer review panel (ASMFC 2017). However, the review panel did not identify any major problems in the fishery that would require immediate management action. Because there is no currently approved stock assessment, the stock status for spot with relation to overfishing or overfished is unknown.

To evaluate the status of the stock between stock assessments, the TLA established under Addendum II and revised under Addendum III, is reviewed annually in years when an assessment is not already being conducted. The name comes from assigning a color (red, yellow, green) to categorize relative levels of indicators on the condition of the population (abundance metric) or fishery (harvest metric). For example, as harvest or abundance decrease, the amount of red in that year becomes more predominant.

Under the TLA configuration established under Addendum II (ASMFC 2014), management was not triggered in 2018 since the proportion red in both the harvest and adult abundance indices were not above the 30 percent threshold for the 2017 to 2018 time period (ASMFC 2020b; Figures 1-2). The updated TLA indicates a general decline in the harvest composite index since 2004, with the decline mostly driven by declining commercial landings (Figure 1; ASMFC

2020b). The harvest composite index did not trigger in 2017 to 2018 because the proportion red was not greater than 30 percent in both years. The abundance composite index for adult spot (Northeast Fishery Science Center (NEFSC) and Southeast Area Monitoring and Assessment Program (SEAMAP) surveys) did not trigger in 2018 because the proportion red was not above the 30 percent threshold in 2017 and 2018 (Figure 2: ASMFC 2020b). The proportion red in the abundance composite index has been minimal in most years since 2007. The TLA for the 2019 fishing year will be reviewed later in 2020.

Stock Assessment

A benchmark stock assessment, completed in 2017, did not pass peer review and will not be used for management (ASMFC 2017, 2020). Uncertainty in assessment results was due to disagreement between trends in harvest and abundance. Abundance in fishery-independent surveys has generally been increasing whereas commercial and recreational harvest has been declining. The review panel noted that the discard estimates from the shrimp trawl fishery were an improvement, and recommended shrimp trawl discard estimates be incorporated into annual monitoring using the TLA.

STATUS OF THE FISHERY

Current Regulations

There are no commercial or recreational regulations on spot in North Carolina.

Commercial Landings

Two gear types (gill nets and haul seines) are used in directed commercial trips and harvest of spot. Other gear types, including sciaenid pound nets, contribute minimally to commercial landings. The North Carolina Trip Ticket Program (NCTTP) has collected data on commercial harvest since 1994. Commercial landings have fluctuated but generally declined since 2001, and have averaged 1,744,258 pounds since 1989 (Table 1; Figure 3). In 2019, commercial landings were 392,067 pounds, a decrease of 224,393 pounds from 2018. Spot are a component of the scrap or bait fishery in North Carolina, but this component generally makes up a small percentage of landings.

Recreational Landings

Spot are targeted recreationally by shore-based anglers and those fishing from private vessels during the fall. Recreational estimates across all years have been updated and are now based on the Marine Recreational Information Program (MRIP) Fishing Effort Survey-based calibrated estimates. For more information on MRIP see <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>. Recreational harvest averaged 2,474,965 pounds from 1989 through 2019 (Table 1). Recreational harvest fluctuated but was generally steady from 1989 through 2007 before declining in 2008 and fluctuating little since except for a peak in 2014 (Table 1; Figure 3). In 2019, recreational harvest was 851,998 pounds, an increase of 254,487 pounds from 2018.

Number of releases averaged 3,050,002 individuals from 1989 through 2019. The number of releases in 2019 was 2,356,120, an increase from 2018 releases.

The number of spot measured during MRIP sampling has generally declined since 2011, and the number measured in 2019 was among the lowest in the time series (Table 2). Mean fork length (FL) in 2019 was the smallest mean across years at 7.7 inches but there has been little fluctuation since 1989. Similarly, minimum and maximum FL have remained consistent, though in 2017, 2018, and 2019 maximum FL was smaller than in other years. In 2019, modal length in the recreational harvest was 7.0 inches with 56.2 percent of the recreational catch within this size bin (Figure 4). The recreational fishery harvests similar size classes to the commercial fishery; however, the commercial fishery harvests a narrower range of sizes and very few fish over 8.0 inches. Most of the recreational catch consists of spot from 6.0 to 9.0 inches FL with little change in length composition since 1989 (Figure 5). However, in the '90s and early 2000s, a wider range of lengths was harvested in the recreational fishery.

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. From 2002 to 2008, an average of 203,383 pounds was harvested per year, ranging from 97,753 to 339,077 pounds (Table 3).

MONITORING PROGRAM DATA

Fishery Dependent Monitoring

The number of spot lengths obtained from commercial fish house sampling has generally decreased since 1994 (Table 4). Mean, minimum, and maximum FL has fluctuated but generally been stable. Mean FL ranged from 6.7 to 8.8 inches. In 2019, 2,090 spot were measured from commercial fisheries with a mean FL of 8.0 inches, a minimum of 3.7 inches, and a maximum of 12.9 inches. Bait samples are included in minimum, maximum, and mean length calculations.

In 2019, modal length in the commercial fishery was 7.0 inches FL, with few spot over 8.0 inches (Figure 4). In general, the commercial fishery harvested a narrower range of sizes compared to the recreational fishery. The length composition and modal length of spot caught in the commercial fishery (excluding bait samples) increased slightly from 1994 through the early 2000s (Figure 6). The range of lengths harvested narrowed in the late 2000s with little change since.

Fishery Independent Monitoring

The number of spot aged in North Carolina from 1996 through 2019 has ranged from 230 to 728 (Table 5). Modal age was one in every year except 1996 and 2004 when modal age was two and in 2016 when modal age was zero. Minimum age was zero in every year, while maximum age ranged from two to six. There is substantial overlap in length at age for ages zero through three with length at age becoming less variable after age four (Figure 7)

The Pamlico Sound Survey (Program 195) samples 54 randomly selected stations (grids) in June and September. Stations are randomly selected from strata based upon depth and geographic location. Tow duration is 20 minutes, using double rigged demersal mongoose trawls (9.1 m headrope, 1.0 X 0.6 m doors, 2.2-cm bar mesh body, 1.9-cm bar mesh cod end, and a 100-mesh tailbag extension). Data from this survey are used to produce juvenile abundance indices (JAI) that are incorporated into ASMFC stock assessments and reported annually to ASMFC as part of compliance reports and for incorporation into the TLA. Length cutoffs for juvenile spot are fish <120 mm FL (4.7 inches) in June, and fish <140 mm FL (5.5 inches) in September. The spot JAI from the Pamlico Sound Survey (June only, fish <120 mm, 4.7 inches) is highly variable with a peak of 1,347.4 individuals per tow in 2008 (Figure 8). Throughout the time series large peaks tend to be followed by years or large declines. The 2019 JAI was 542.4 individuals per tow, a 33 percent decrease from the 2018 JAI and above the time series average of 435.2 individuals per tow. While variable, JAI has generally increased since 2006.

Most spot captured in the Pamlico Sound Survey are juveniles (age-0), but a number of age one or greater fish are captured in some years producing two distinct length modes, particularly in June. One mode is around 3.0 inches FL (age-0), and the other is around 6.0 inches FL (age-1 or greater; Figure 9). Modal length from the September portion of the Pamlico Sound Survey is more variable than June ranging from 2.0 to 5.0 inches FL with a wider range of lengths captured.

MANAGEMENT STRATEGY

Per Addendum II to the Omnibus Amendment, the TLA is used as a precautionary management framework for spot. The TLA provides guidance in lieu of a current stock assessment. Under this management program, if the amount of red in the Traffic Light for both population characteristics (adult abundance and harvest) meet or exceed the threshold for the specified two-year period, then management action is required. Since both population characteristics were not above the 30 percent threshold for 2017-2018, management triggers were not tripped. In February 2020, the Board approved Addendum III, which revises the TLA and requires coastwide management action if harvest and abundance thresholds are exceeded in two of the three most recent years (ASMFC 2020a). See Table 6 for a summary of management strategies.

RESEARCH NEEDS

There are no research or monitoring programs required of the states except for the submission of an annual compliance report. However, several coastwide and state-specific research recommendations have been identified through the FMP process, and the stock assessment peer review and include (ASMFC 2017):

- Expand collection of life history data for examination of lengths and age, especially fishery-dependent data sources – HIGH (Ongoing in North Carolina)
- Organize an otolith exchange and develop an ageing protocol between ageing labs – HIGH (Needed)
- Increase observer coverage for commercial discards, particularly the shrimp trawl fishery – HIGH (Ongoing in North Carolina)
- Develop a standardized, representative sampling protocol and pursue collection of

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- individual lengths and ages of discarded finfish – HIGH (Ongoing in North Carolina)
- Continue state and multi-state fishery-independent surveys throughout the species range and subsample for individual lengths and ages. Ensure NEFSC trawl survey continues to take lengths and ages. Examine potential factors affecting catchability in long-term fishery-independent surveys – HIGH (Ongoing in North Carolina)
 - Continue to develop estimates of length-at-maturity and year-round reproductive dynamics throughout the species range. Assess whether temporal and/or density-dependent shifts in reproductive dynamics have occurred – HIGH (Needed)
 - Re-examine historical ichthyoplankton studies for an indication of the magnitude of estuarine and coastal spawning, as well as for potential inclusion as indices of spawning stock biomass in future assessments. Pursue specific estuarine data sets from the states (NJ, VA, NC, SC, DE, ME) and coastal data sets (MARMAP, EcoMon) – HIGH (Needed)
 - Develop and implement sampling programs for state-specific commercial scrap and bait fisheries in order to monitor the relative importance of spot. Incorporate biological data collection into program – MEDIUM (Ongoing in North Carolina)
 - Conduct studies of discard mortality for commercial fisheries. Ask commercial fishermen about catch processing behavior for spot when trawl/gill nets brought over the rail to determine if the discard mortality rate used in the assessment is reasonable – MEDIUM (Needed)
 - Conduct studies of discard mortality for recreational fisheries – MEDIUM (Needed)
 - Collect data to develop gear-specific fishing effort estimates and investigate methods to develop historical estimates of effort – MEDIUM (Needed)
 - Identify stocks and determine coastal movements and the extent of stock mixing, via genetic and tagging studies – MEDIUM (Needed)
 - Investigate environmental and recruitment/ natural mortality covariates and develop a time series of potential covariates to be used in stock assessment models – MEDIUM (Needed)
 - Investigate environmental covariates in stock assessment models, including climate cycles (e.g., Atlantic Multi-decadal Oscillation, AMO, and El Niño Southern Oscillation, El Niño) and recruitment and/or year class strength, spawning stock biomass, stock distribution, maturity schedules, and habitat degradation – MEDIUM (Needed)
 - Investigate the effects of environmental changes (especially climate change) on maturity schedules for spot, particularly because this is an early maturing species, and because the sSPR estimates are sensitive to changes in the proportion mature – MEDIUM (Needed)
 - Investigate environmental and oceanic processes in order to develop better understanding of larval migration patterns into nursery grounds – MEDIUM (Needed)
 - Investigate the relationship between estuarine nursery areas and their proportional contribution to adult biomass (i.e., are select nursery areas along Atlantic coast contributing more to SSB than others, reflecting better juvenile habitat quality?) – MEDIUM (Needed)
 - Develop estimates of gear-specific selectivity – MEDIUM (Needed)

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TABLES

Table 1. Spot recreational harvest and number released (Marine Recreational Information Program), commercial harvest (North Carolina Trip Ticket Program), and total harvest, 1989-2019. All weights are in pounds.

Year	Recreational		Commercial Weight (lb)	Total Weight (lb)
	Landed	Released		
1989	10,246,429	1,995,653	3,566,280	6,820,744
1990	7,920,697	2,868,842	2,453,645	5,909,105
1991	9,894,562	3,454,466	3,066,857	6,114,153
1992	5,043,969	2,908,974	1,431,733	4,257,861
1993	6,877,688	1,445,961	2,879,162	5,551,319
1994	14,032,650	2,365,031	4,571,386	7,508,697
1995	8,199,743	2,214,819	3,214,061	6,220,906
1996	6,729,366	2,234,354	2,461,892	4,751,892
1997	4,529,620	1,110,650	2,129,481	4,757,406
1998	11,797,824	2,379,578	4,596,119	6,993,098
1999	5,736,185	2,343,795	2,565,546	4,827,721
2000	6,121,384	1,366,746	2,598,813	5,428,631
2001	10,043,845	2,804,349	4,519,545	7,613,417
2002	8,456,981	1,569,579	3,017,466	5,201,498
2003	9,717,824	2,970,990	4,220,534	6,263,921
2004	7,845,322	2,899,319	3,682,623	5,999,792
2005	10,105,205	4,407,100	3,652,186	5,366,783
2006	11,109,551	8,196,592	3,995,432	5,360,175
2007	8,728,295	4,049,250	2,737,144	3,616,235
2008	3,970,431	3,817,529	1,382,428	2,118,912
2009	4,197,640	4,847,202	1,427,956	2,434,456
2010	3,830,384	3,615,808	1,173,173	1,745,488
2011	6,480,714	4,993,544	2,201,947	3,138,917
2012	2,677,082	2,995,879	760,276	1,249,954
2013	6,120,985	5,513,732	1,789,251	2,557,843
2014	8,343,467	4,043,710	2,877,483	3,643,707
2015	2,572,738	2,984,629	833,390	1,210,384
2016	1,928,716	1,831,415	558,799	799,838
2017	2,418,331	1,902,281	909,796	1,323,795
2018	2,068,865	2,062,163	597,511	765,207
2019	2,822,884	2,356,120	851,998	1,244,065
Mean	6,792,561	3,050,002	2,474,965	4,219,223

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Table 2. Total number measured, mean, minimum, and maximum fork length (inches) of spot measured by Marine Recreational Information Program (MRIP) sampling in North Carolina, 1989-2019.

Year	Number Measured	Mean Length	Minimum Length	Maximum Length
1989	1,513	7.9	4.5	13.6
1990	1,167	7.6	4.3	12.6
1991	3,022	7.6	4.0	13.3
1992	1,193	7.6	3.2	11.7
1993	1,385	8.4	4.9	13.5
1994	2,632	8.2	5.7	14.9
1995	2,028	8.5	4.3	15.3
1996	2,376	8.5	4.9	11.6
1997	1,762	8.7	5.7	15.6
1998	1,632	8.6	6.3	12.4
1999	1,159	9.1	5.5	11.5
2000	1,221	8.6	5.5	13.2
2001	1,627	8.8	5.4	13.9
2002	860	8.3	6.3	12.0
2003	1,403	8.7	4.6	14.2
2004	2,034	9.2	4.8	12.8
2005	1,282	8.4	5.2	15.2
2006	1,216	8.9	4.8	13.5
2007	1,243	9.1	5.7	12.0
2008	1,344	8.3	5.0	12.2
2009	682	8.4	5.0	10.8
2010	1,096	8.1	5.8	12.1
2011	1,534	8.2	5.9	11.1
2012	611	7.9	5.6	11.7
2013	484	7.9	4.5	11.5
2014	344	8.2	4.8	11.9
2015	214	8.1	6.1	11.9
2016	107	8.0	6.3	11.0
2017	98	8.1	6.3	10.6
2018	125	8.4	5.7	10.9
2019	276	7.7	5.0	10.1

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Table 3. North Carolina Recreational Commercial Gear License (RCGL) harvest of spot 2002-2008, with number of trips and landings in pounds. Estimates of trips and landings are from a RCGL survey conducted from 2002 to 2008; funding was discontinued in 2009.

Year	Trips	Harvest (lb)
2002	16,731	339,077
2003	11,799	255,060
2004	12,610	252,291
2005	9,703	193,769
2006	10,511	180,342
2007	7,399	97,753
2008	7,664	105,392
Average	10,917	203,383

Table 4. Mean, minimum, maximum fork length (inches), and total number of spot measured from North Carolina commercial fish house samples, 1994-2019. Bait samples are included in calculation of mean, minimum and maximum length.

Year	Mean Length	Minimum Length	Maximum Length	Number Measured
1994	6.7	3.3	11.9	9,109
1995	6.8	3.2	15.4	11,182
1996	7.3	3.2	11.8	14,112
1997	7.4	3.2	13.3	15,378
1998	7.6	3.3	12.2	11,757
1999	7.8	3.1	11.7	9,256
2000	7.9	3.3	17.6	15,651
2001	8.5	3.3	12.4	15,603
2002	8.4	3.6	17.8	13,034
2003	8.5	3.1	13.9	12,919
2004	8.8	3.3	15.0	12,386
2005	8.8	3.1	13.1	15,535
2006	8.3	4.1	13.2	13,503
2007	7.9	3.9	12.0	13,889
2008	8.0	3.1	13.3	10,768
2009	8.1	3.9	11.7	9,087
2010	8.1	3.6	11.6	7,494
2011	8.2	4.3	13.1	8,906
2012	8.0	4.1	17.8	4,458
2013	8.3	4.2	13.3	4,699
2014	8.1	4.1	13.1	6,650
2015	8.2	4.3	12.8	4,543
2016	8.1	4.9	17.8	2,255
2017	8.3	4.4	11.7	2,643
2018	7.9	4.2	10.9	2,241
2019	8.0	3.7	12.9	2,090

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Table 5. Total number aged, modal, minimum, and maximum age of spot in North Carolina, 1996-2019. Age data from 2014 and 2019 are preliminary.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
1996	2	0	4	728
1997	1	0	3	629
1998	1	0	3	603
1999	1	0	2	522
2000	1	0	3	551
2001	1	0	4	555
2002	1	0	5	603
2003	1	0	4	354
2004	2	0	6	455
2005	1	0	6	529
2006	1	0	5	501
2007	1	0	3	284
2008	1	0	3	408
2009	1	0	3	364
2010	1	0	3	268
2011	1	0	3	413
2012	1	0	4	230
2013	1	0	3	360
2014	1	0	3	684
2015	1	0	3	505
2016	0	0	3	373
2017	1	0	3	528
2018	1	0	3	518
2019	1	0	3	444

ASMFC- AND FEDERALLY-MANAGED SPECIES WITH N.C. INDICES – SPOT

Table 6. Summary of management strategies and needs.

Management Strategy	Implementation Status
Revise Traffic Light to better reflect trends in the spot population	Addendum III to the Omnibus Amendment , approved February 2020.
Establish Traffic Light method for monitoring the stock in non-assessment years	Addendum II to the Omnibus Amendment, 2014. Replaced triggers established by the Omnibus Amendment
<p>Update FMP with Atlantic Coastal Fisheries Cooperative Management Act and Interstate Fishery Management Program requirements</p> <p>ASMFC annual state compliance reports submitted in November each year</p> <p>Establish triggers to be used in monitoring stock in non-assessment years</p>	Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout, 2012
<p>Promote the development and use of trawl efficiency devices (TEDs) through demonstration in the southern shrimp fishery, and fish separators in the finfish trawl fishery</p> <p>Promote increases in yield per recruit through delaying entry to spot fisheries to ages greater than one</p> <p>Improve data collection to produce a stock assessment and improve management</p>	<p>Fishery Management Plan for Spot, 1987</p> <p>Ongoing</p>

FIGURES

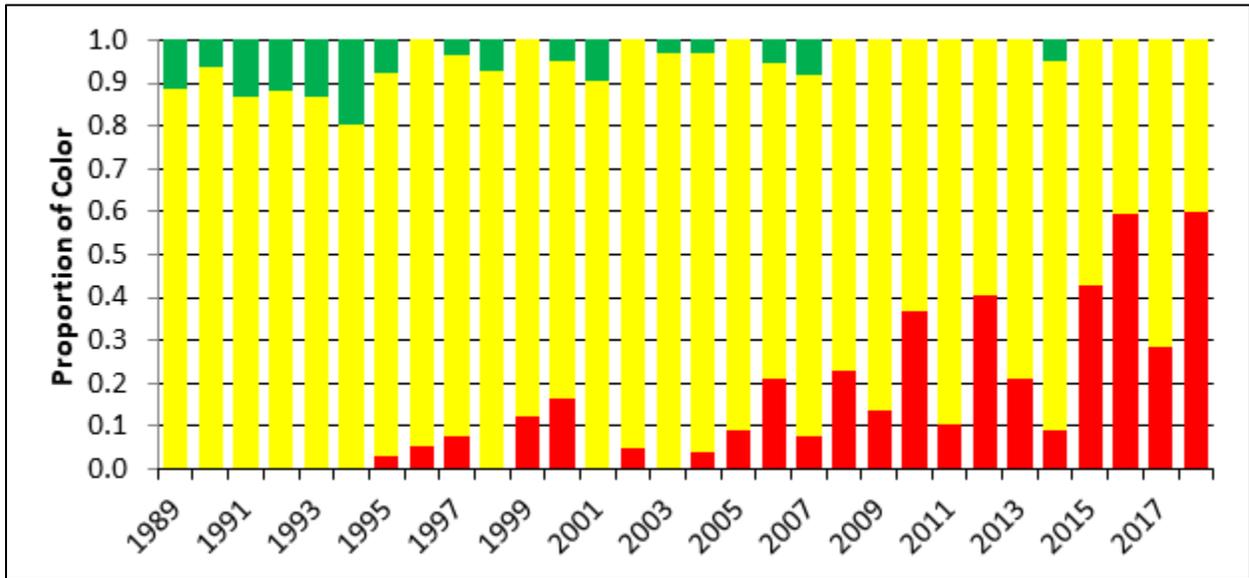


Figure 1. Annual color proportions for the harvest composite Traffic Light Analysis (using a 1989-2012 reference period) of spot recreational and commercial landings, 1989-2018 (ASMFC 2020b).

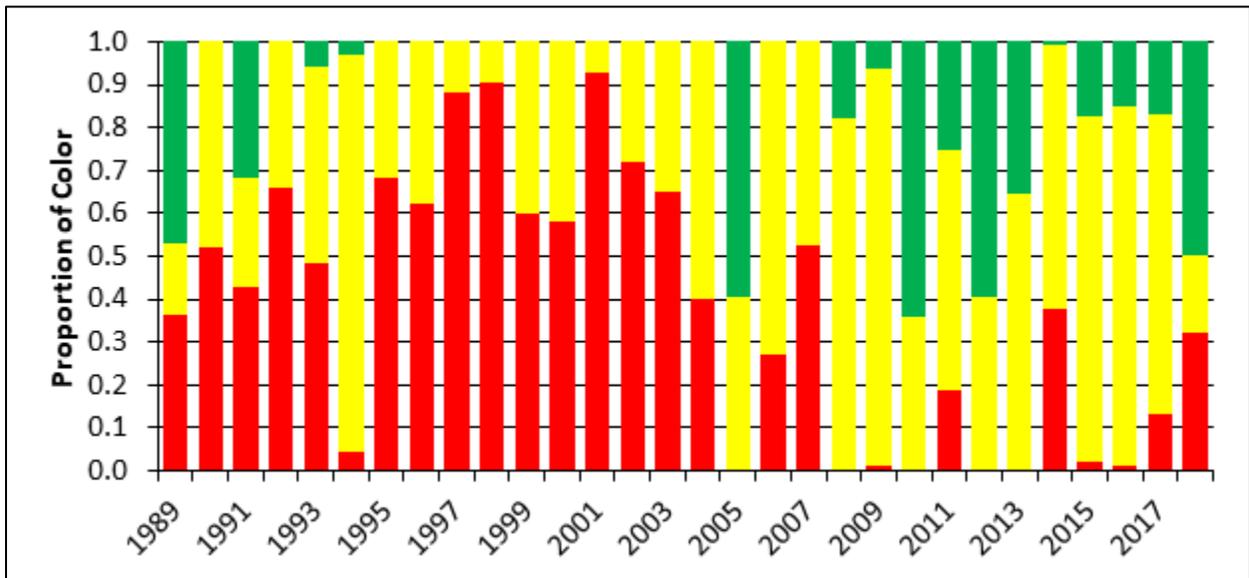


Figure 2. Annual color proportions for the abundance composite Traffic Light Analysis (using a 1989-2012 reference period), using NEFSC and SEAMAP surveys, 1989-2018 (ASMFC 2020b).

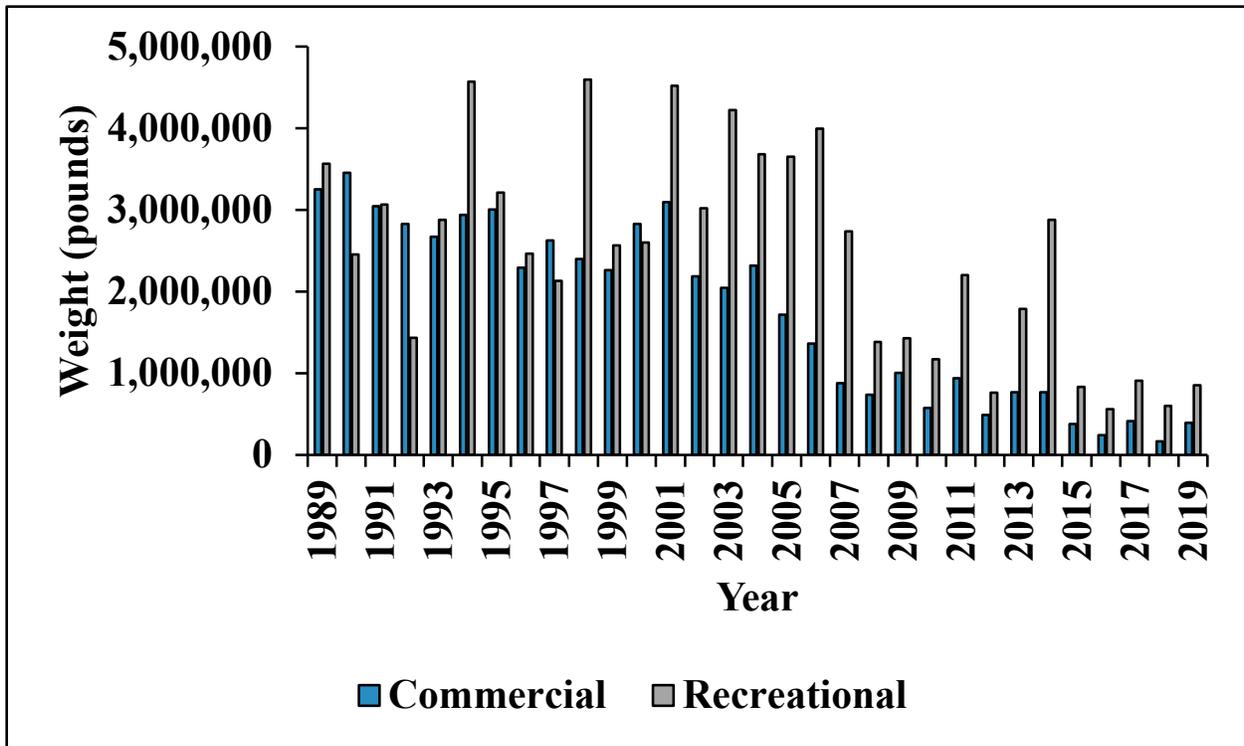


Figure 3. Annual commercial and recreational landings in pounds for spot in North Carolina, 1989-2019.

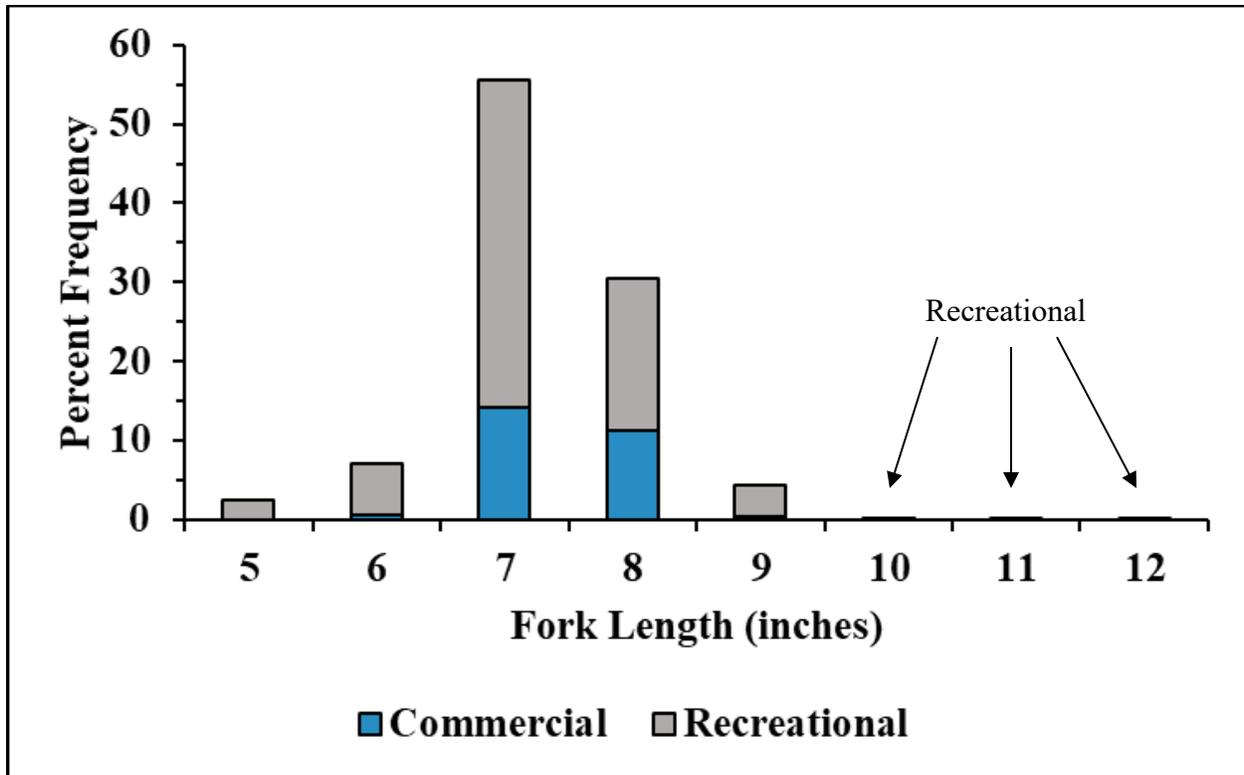


Figure 4. Commercial and recreational length frequency distribution from spot harvested in 2019.

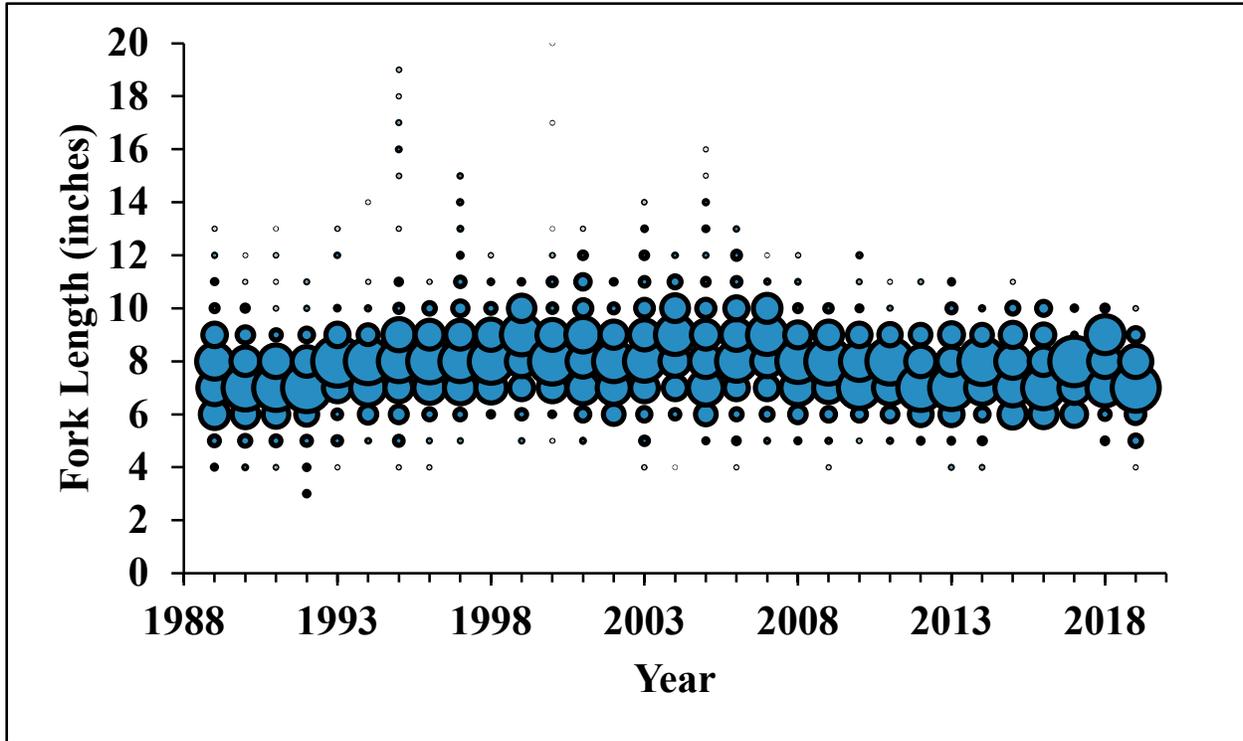


Figure 5. Recreational length frequency (fork length, inches) of spot harvested from 1989 to 2019. Bubble represents the proportion of fish at length.

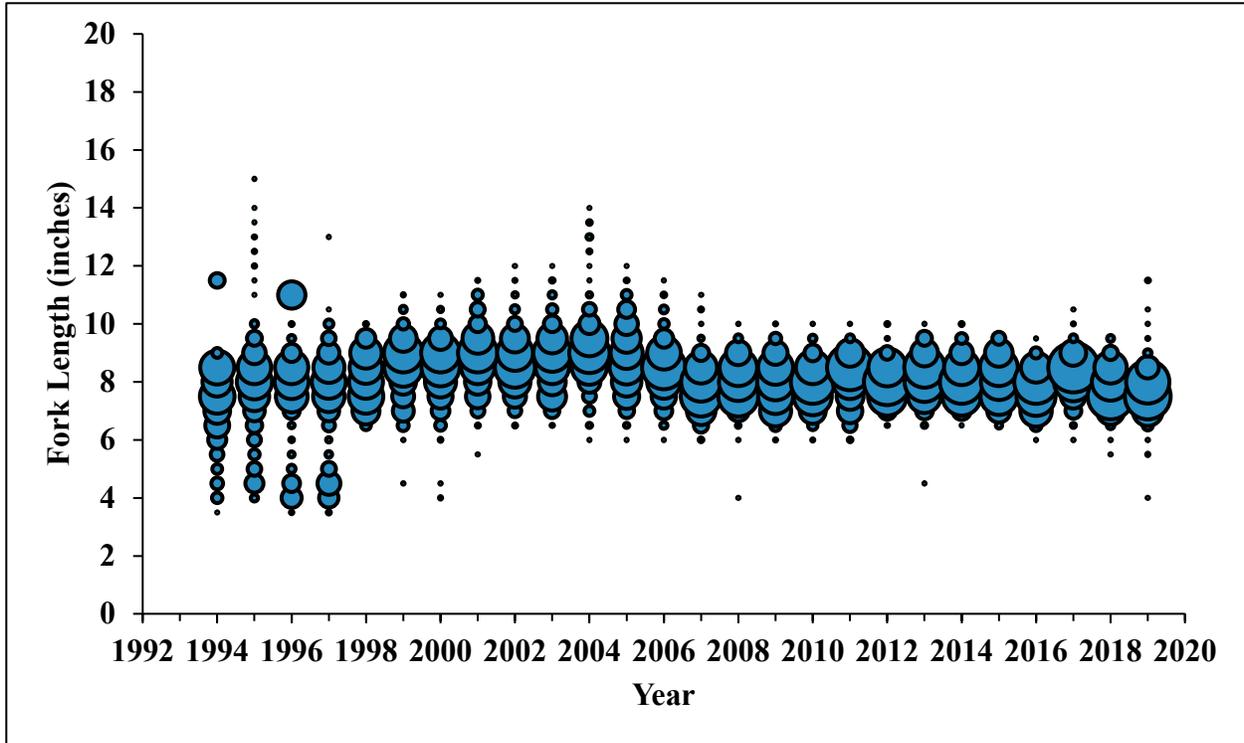


Figure 6. Commercial length frequency (fork length, inches) of spot harvested from 1994 to 2019. Bubble represents the proportion of fish at length. Bait samples not included.

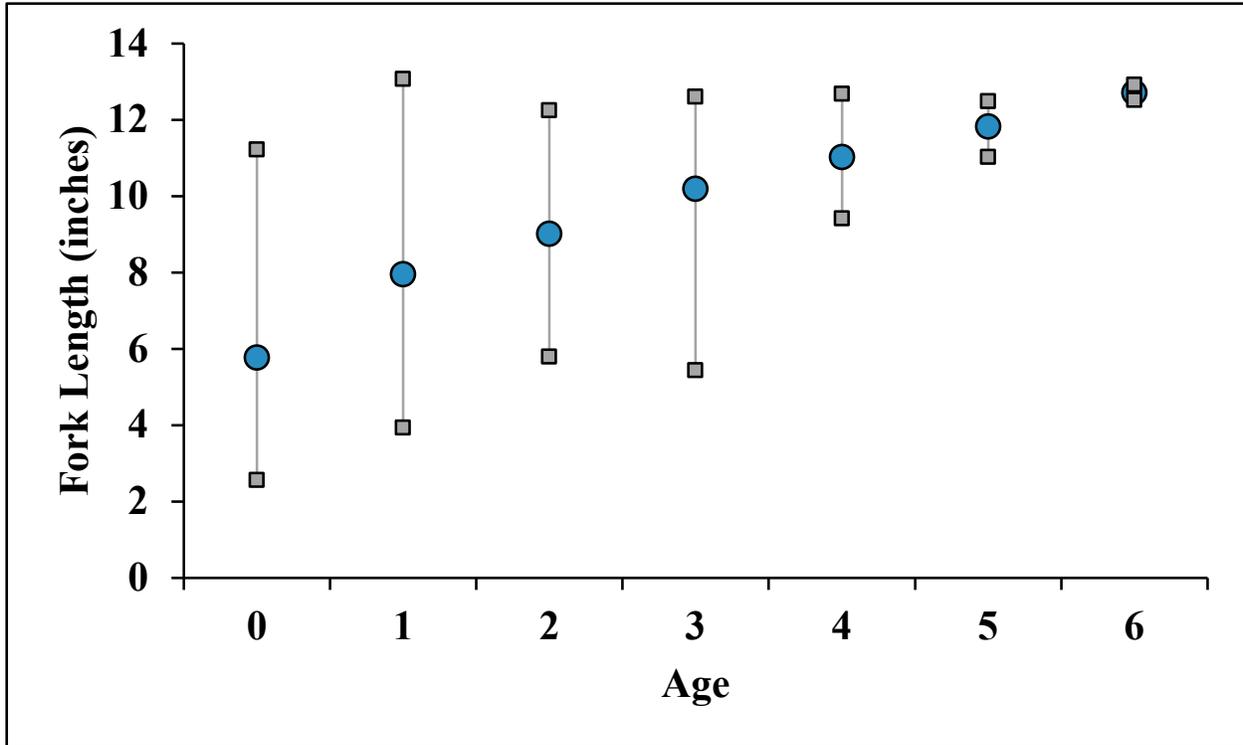


Figure 7. Spot length at age based on all age samples collected from 1996 to 2019. Blue circles represent the mean size at a given age while the grey squares represent the minimum and maximum observed size at age. Age data from 2014 and 2019 are preliminary.

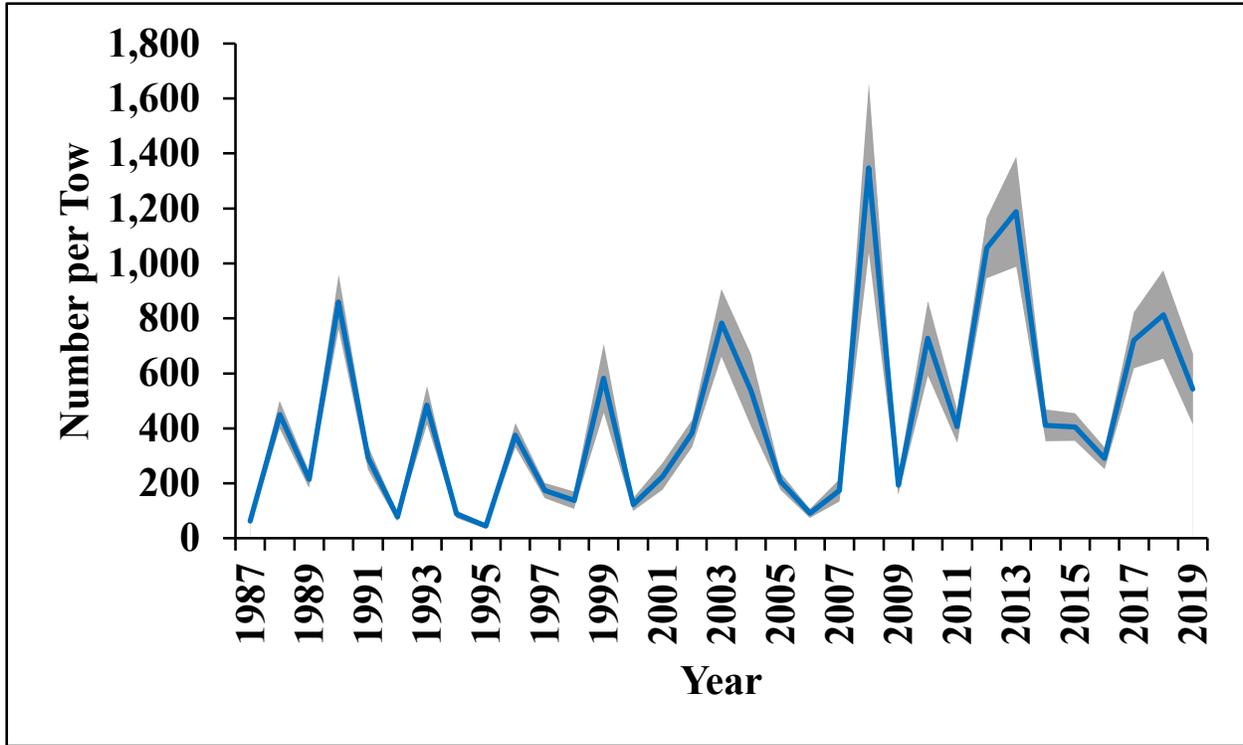


Figure 8. Spot juvenile (<120 mm; 4.7 inches) abundance index (number per tow) for June from the Pamlico Sound Survey, 1987 to 2019. Shaded area represents standard error.

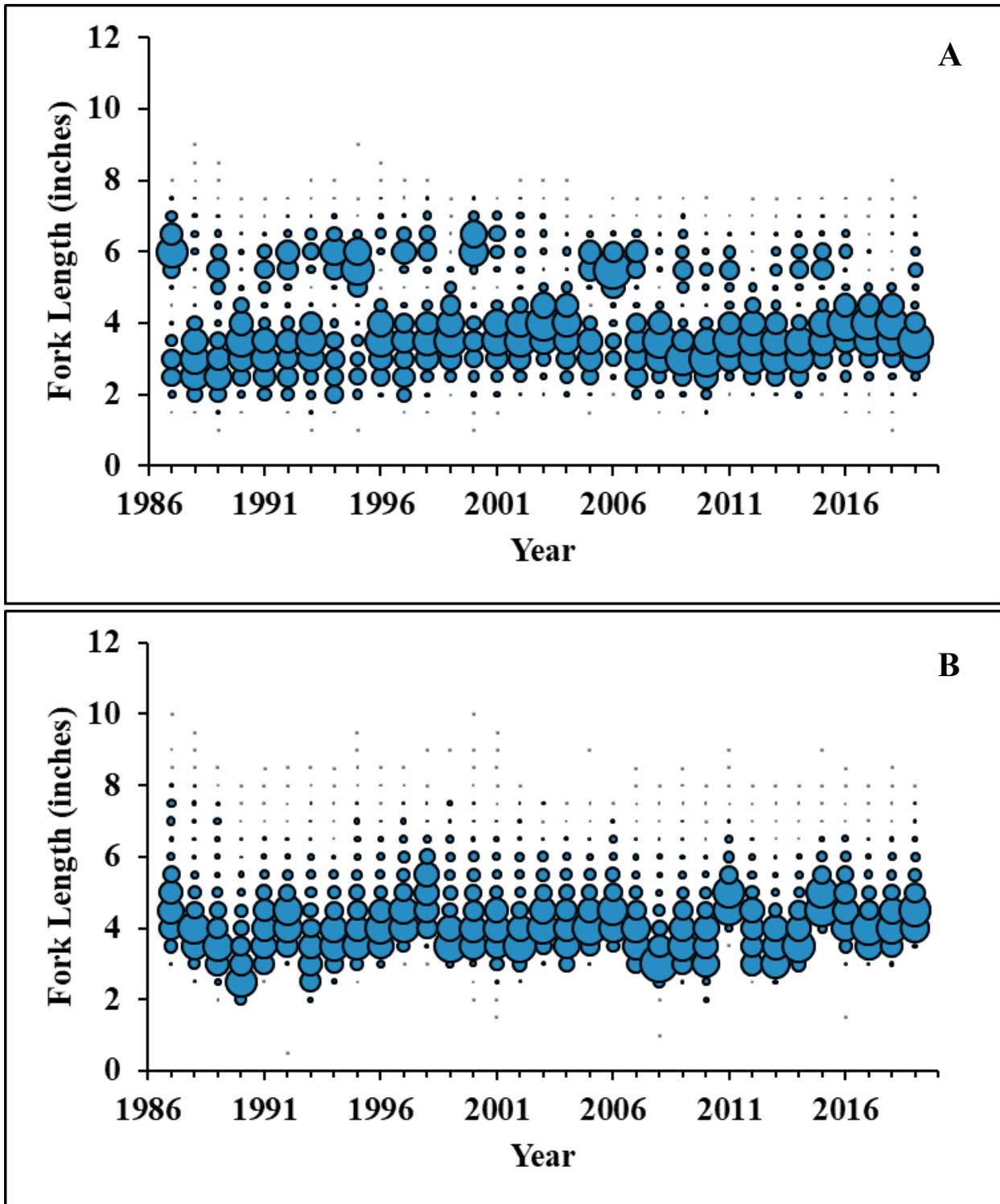


Figure 9. Length frequency of spot captured in Pamlico Sound Survey sampling during June (A) and September (B), 1987 to 2019. Bubble represents the proportion of fish at length.