SURVEY SUMMARY

NCWRC – Inland Fish Division – Coastal Region

Roanoke River Striped Bass Spawning Stock Assessment, 2023

NEED

The Albemarle-Roanoke (A-R) stock of Striped Bass is jointly managed by the North Carolina Wildlife Resources Commission (NCWRC) and the North Carolina Division of Marine Fisheries (NCDMF). The NCWRC is responsible for Striped Bass management in the Roanoke River Management Area (RRMA), while NCDMF manages Striped Bass in the Albemarle Sound Management Area (ASMA). Data from both agencies are combined with long term population trends to calculate benchmark values for fishing mortality (F) and spawning stock biomass (SSB). The annual survey conducted by the NCWRC allows for the assessment of the spawning portion of the A-R stock at both the agency, and multi-agency levels.

OBJECTIVES

1. Characterize the spawning portion of the A-R stock in the RRMA by estimating relative abundance, age-structure, and size-structure of Striped Bass collected on the spawning grounds.
2. Update long-term data sets that are used to analyze trends and provide management recommendations.

METHODS

Personnel: Christopher Smith and Deon Kerr, District 1 Fisheries Biologists; Jeremy McCargo, Anadromous Research Coordinator

Waterbody: Striped Bass were collected from their historic spawning grounds near Weldon, NC. Sampling stations were located on main and secondary river channel habitats. Three of the five strata were sampled each day, and strata selection was dependent on flow conditions. Two sites were selected within each stratum, for a total of six sampling sites per day.

Fish Sampling Gear: Smith-Root APEX Boat-Mounted Electrofishing, High Frequency (60 Hz), approximately 4,500 W output.

Other Gear Utilized: YSI 2030 PRO water quality meter for water temperature (°C), dissolved oxygen (mg/L and % saturation), conductivity (µS/cm), and salinity (ppt).

Species of Primary Interest: Striped Bass

Sample Date(s): April 03, 10, 18, 24 and May 01, 08, 15, 2023.

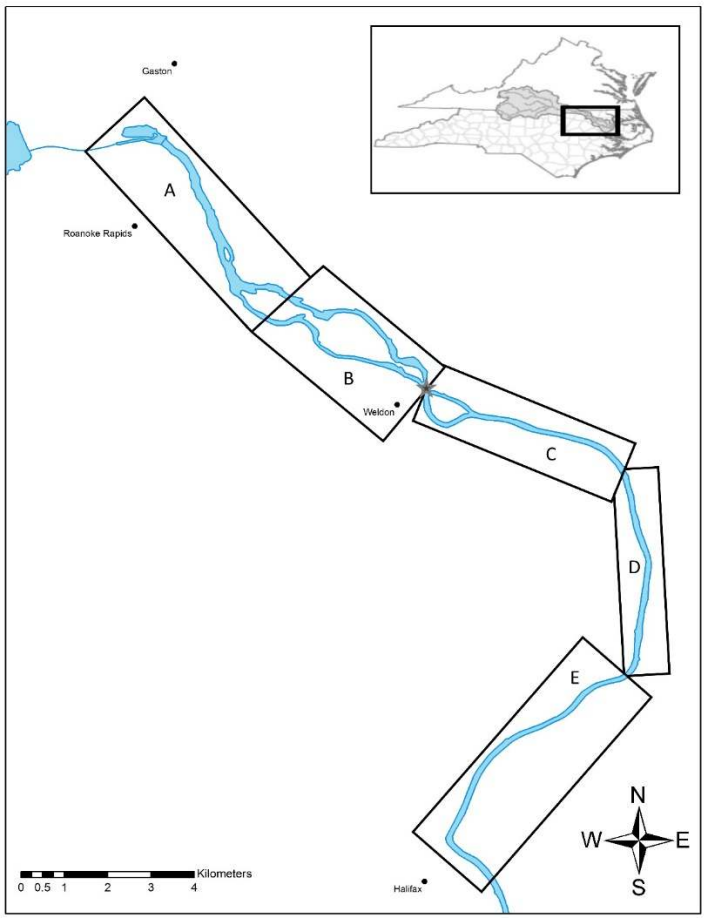
Funding Source: Federal Aid in Sport Fish Restoration and agency license receipts.

Project Name in BIODE Fish: Roanoke River Anadromous Fish Stock Assessment

Citation:

Smith, C. A., D. K. Kerr., and J. W. McCargo. 2023. Roanoke River Striped Bass Spawning Stock Assessment, 2023. North Carolina Wildlife Resources Commission, Federal Aid in Sport Fish Restoration, survey summary, Raleigh.

STUDY AREA



BIOLOGICAL OBSERVATIONS

In 2023, a total of 331 Striped Bass were collected in 13.6 hours of electrofishing over 7 days of sampling (Table 1). Relative abundance of 24.3 fish/h was the lowest CPUE since 1991 (Figure 1). The low relative abundance is fueled by the poor year-class production since 2017. Males accounted for 54.4% (180 individuals) of the total catch while females comprised the remaining 45.6% (151 individuals). Age distribution ranged from 1 to 13 years (Figure 2). The 2020 year-class (age 3) was the largest age-class seen in 2023 (8.1 fish/h; Figure 3), and it made up 55% of the total catch. Age-3 fish had a mean total length of 444 mm and 452 mm for males and females, respectively (Table 2). Relative abundance of Striped Bass nine years and older was 0.8 fish/h (11 fish in 13.6 h; Figure 4). The relative abundance of this age group is similar to the 1990s when the stock was overfished. Length distributions for both males and females were unimodal, with the peak at 425 mm for males. Females peak occurred at 500 mm and 525 mm (Figure 5). The length distribution was truncated; however, some expansion seems to be occurring as about 23% of the total catch was over 600 mm.

MANAGEMENT RECOMMENDATIONS

1. Continue annual spawning stock surveys of Roanoke River Striped Bass.
2. Collect otoliths from a subsample of Striped Bass in 2025.
3. Develop electrofishing target and threshold values for management decisions.
4. Explore potential drivers of the Striped Bass population decline and poor recruitment.
5. Write a comprehensive final report in 2025.

TABLE 1. Daily pooled CPUE (daily catch/daily effort) of Striped Bass collected by electrofishing on the Roanoke River spawning grounds during 2023. Mean daily discharge was reported from the US Geological Survey gaging station (02080500) at Roanoke Rapids, NC.

Date	Effort (h)	Catch	Daily CPUE	Average Discharge (cfs)	Average Water Temp (^{o}C)
04/03/2023	1.6	25	15.2	4,090	14.6
04/10/2023	1.9	30	15.3	7,880	15.2
04/18/2023	1.8	33	17.6	7,630	17.1
04/24/2023	1.9	71	36.5	8,070	18.3
05/01/2023	2.1	113	51.4	11,200	18.1
05/08/2023	1.9	32	16.1	12,100	16.6
05/15/2023	2.0	27	13.4	7,330	20.3
Total	13.6	331			

TABLE 2. Mean length (mm) at age and standard error for male and female Striped Bass collected in 2023. Otoliths were used as aging structures in 2023. Caution should be used when comparing mean lengths to previous years when scales were used as ageing structures.

Age (year-class)	Male				Female			
	Number aged	Number estimated	Mean length	SE	Number aged	Number estimated	Mean length	SE
1 (2022)	1	0	237	0				
2 (2021)	10	0	350	9				
3 (2020)	66	22	444	4	19	3	452	7
4 (2019)	27	10	510	5	43	19	535	4
5 (2018)	6	2	575	19	6	3	594	10
6 (2017)	10	5	591	5	11	3	635	15
7 (2016)	10	3	590	10	12	3	690	17
8 (2015)	5	2	635	16	17	2	685	16
9 (2014)	2	0	825	112	4	1	859	70
10 (2013)					1	0	962	0
11 (2012)					1	0	962	0
12 (2011)					1	0	912	0
13 (2010)					1	0	1187	0

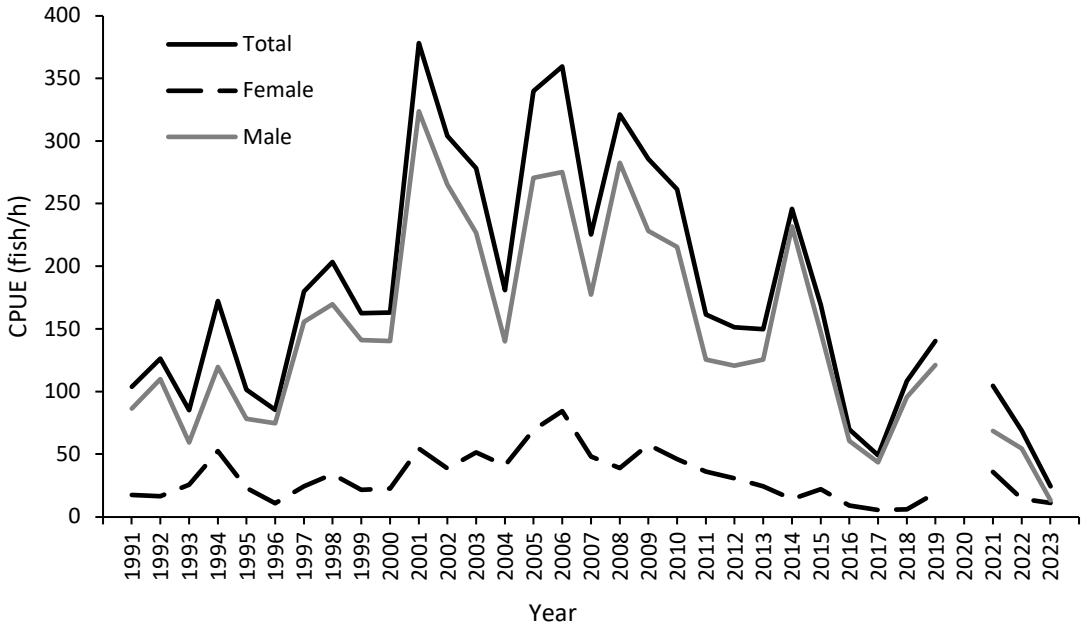


FIGURE 1. Relative abundance (CPUE; fish/h) of male and female Striped Bass from the Roanoke River from 1991 to 2023. No sampling occurred in 2020 due to COVID-19 restrictions.

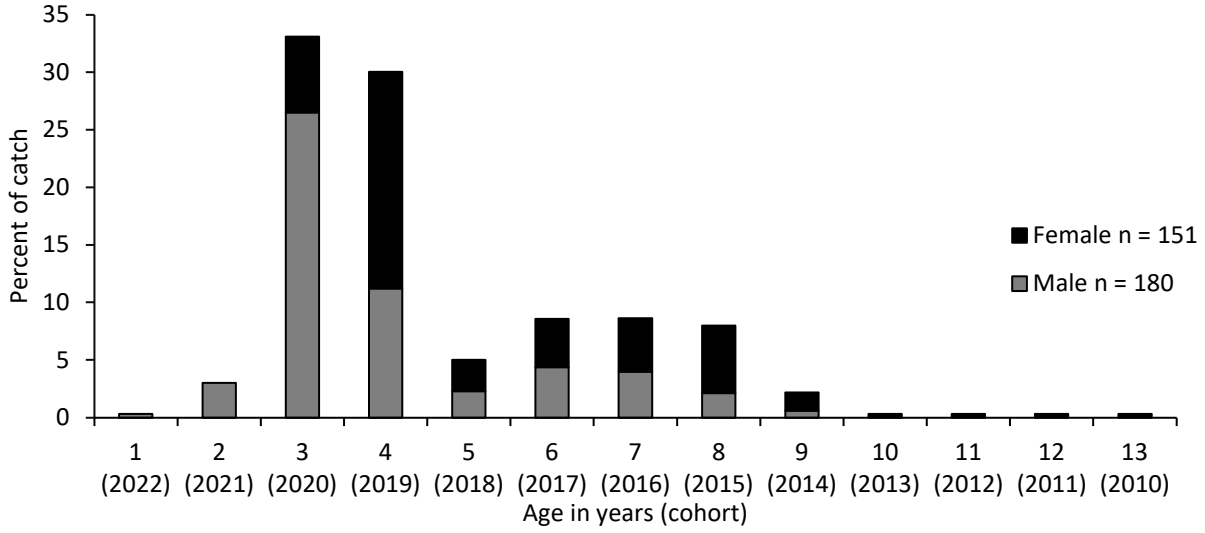


FIGURE 2. Age distribution for Striped Bass collected from the Roanoke River, spring 2023. Ages 1, and 10–13, each account for less than one percent of total catch.

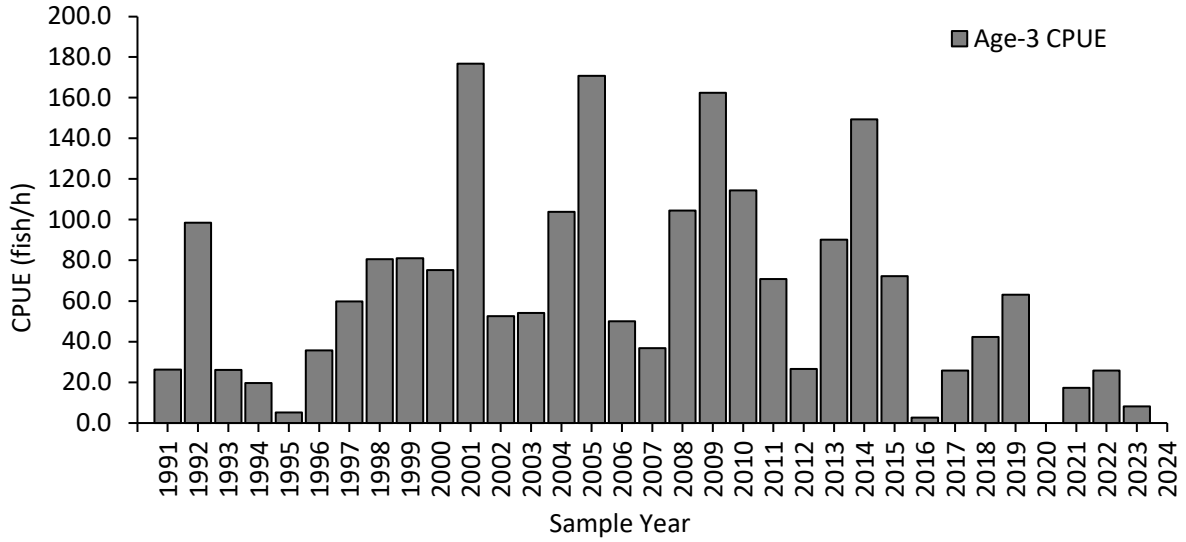


FIGURE 3. Relative abundance (CPUE) of age-3 Striped Bass. No sampling occurred in 2020 due to COVID-19 restrictions.

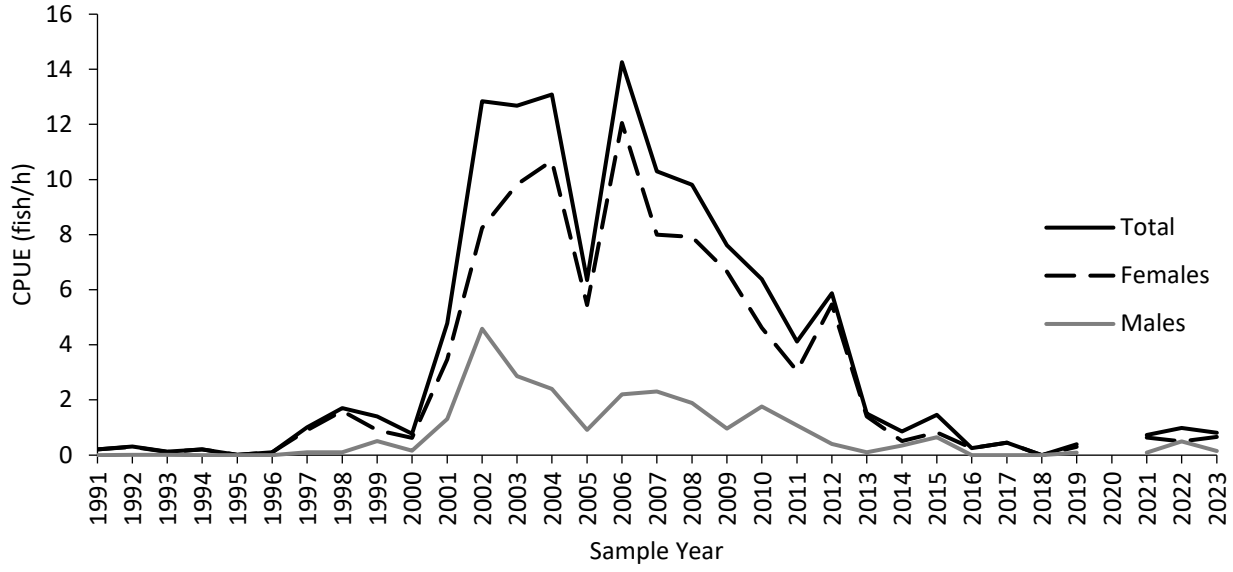


FIGURE 4. Relative abundance (CPUE; fish/h) of Roanoke River Striped Bass ≥ age 9 collected by electrofishing during spawning stock surveys at Weldon, NC; 1991–2023. No sampling occurred in 2020 due to COVID-19 restrictions.

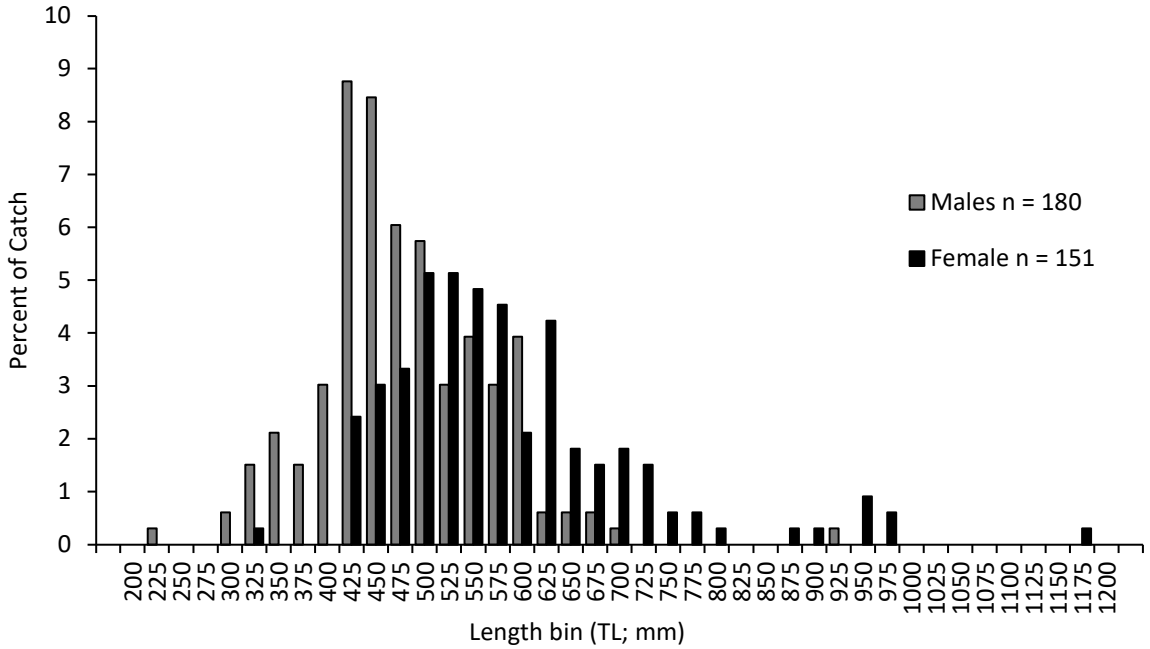


FIGURE 5. Length frequency histograms for Striped Bass collected from the Roanoke River, spring 2023.