Cape Fear River Striped Bass Spawning Stock Survey—2018

NEED

A harvest moratorium was effected for Cape Fear River Striped Bass in 2008 to promote population recovery. Monitoring is needed to assess the efficacy of recovery efforts. The goal of this project was to assess recovery indicators, including relative abundance, age-structure, size-structure, and hatchery contribution.

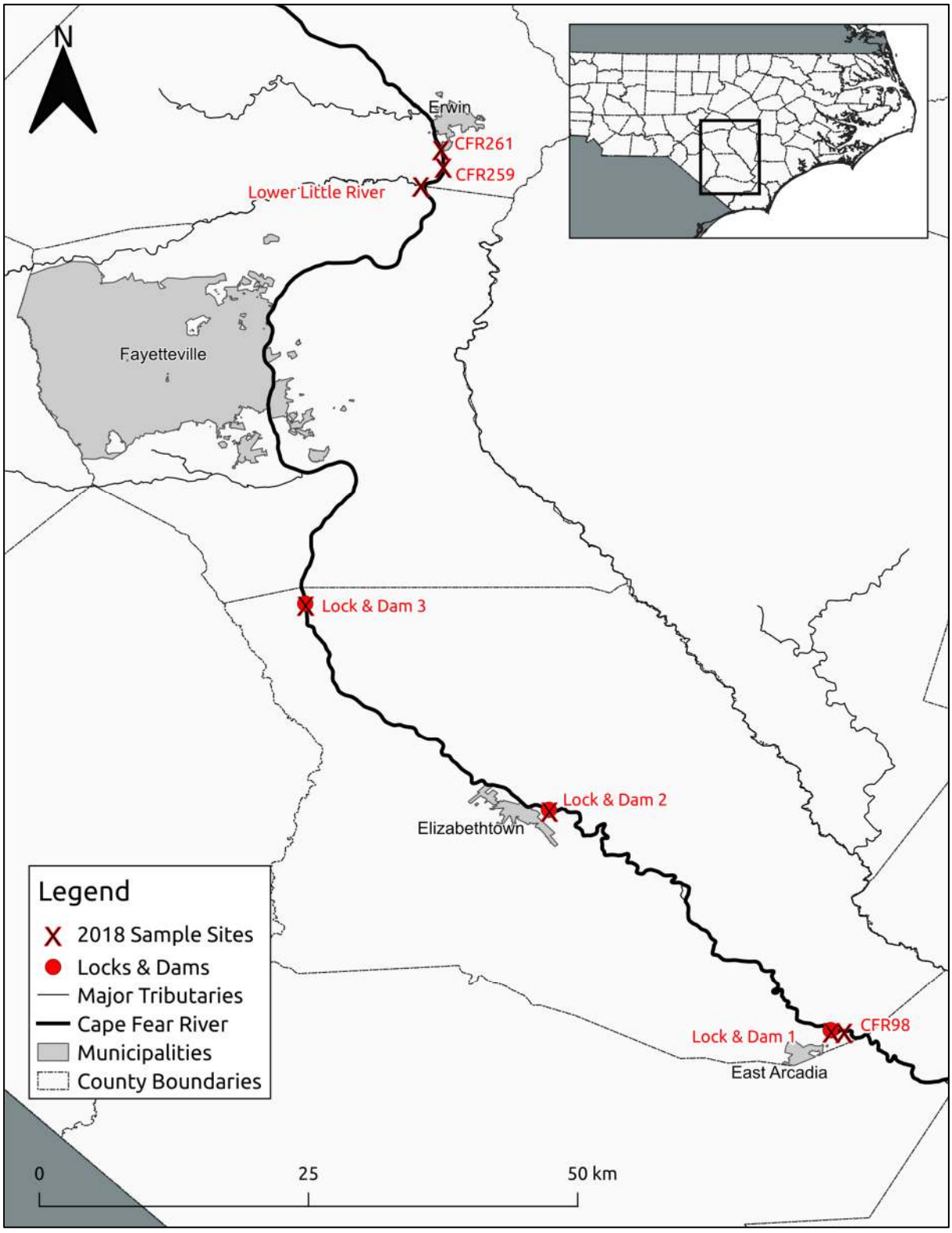
OBJECTIVES

1. Assess stocking contribution using parentage-based tagging (PBT).
2. Evaluate age- and size-structure.
3. Estimate relative abundance at long term sampling sites (locks and dams).

METHODS

Personnel: April Boggs, Clint Morgeson, Kyle Rachels—District 4 Fisheries Biologists.
Waterbody: Cape Fear River—32 sampling events.
Fish Sampling Gear: Boat-Mounted Electrofishing, High Frequency, 7.5 GPP, 120 PPS, 6–7 kW.
Other Gear Utilized: YSI water quality meter for water temperature (°C), dissolved oxygen (mg/L), % saturation, conductivity (µS/cm), salinity (ppt).
Species of Primary Interest: Striped Bass.
Sample Date(s): March 7, 8, 13, 21, 27; April 4, 11, 18, 19, 20, 25, 26; May 1, 3, 10, 15.
Funding Source: Federal Aid in Sport Fish Restoration and agency license receipts.
Project Name in BIODE Fish: Cape Fear River Anadromous Fish Stock Assessment.
Citation:
Rachels, K. T., and A. Boggs. 2021. Cape Fear River Striped Bass spawning stock survey–2018. North Carolina Wildlife Resources Commission, Federal Aid in Sport Fish Restoration, survey summary, Raleigh.

STUDY AREA


N
Erwin
CFR261
CFR259
Lower Little River
Fayetteville
Lock & Dam 3
Lock & Dam 2
Elizabethtown
Lock & Dam 1
CFR98
East Arcadia
Legend
2018 Sample Sites
Locks & Dams
Major Tributaries
Cape Fear River
Municipalities
County Boundaries
0
25
50 km

BIOLOGICAL OBSERVATIONS

The 2018 Cape Fear River Striped Bass spawning stock survey continued the sampling methodologies employed since 2008, except access to Lock & Dam 2 was limited due to construction activities. Thirty-one sampling events were conducted, including 25 at long-term sample sites located at the base of each lock and dam (Table 1). Overall, 129 Striped Bass were collected (Table 2). The maximum age (8; 2010 cohort) indicated by PBT was also the maximum age possible using the PBT technique. The overall hatchery contribution was 92% (115 of 125 fin clips). Several unknown-origin fish were in size-classes (e.g., greater than 650 mm) that could predate the ability of PBT to assign origin; however, some of these fish of unknown origin were in size-classes that were generally considered to occur within the range of fish ages since PBT techniques were introduced in the basin and indicate wild reproduction or emigration from an outside source (Figure 1). Catch-per-unit effort was greatest at Lock & Dam 1 and peaked during week 19 (Figure 2).

MANAGEMENT RECOMMENDATIONS

1. Due to high hatchery contribution and lack of recovery since the moratorium was effected in 2008, Rachels and Morgeson (2018) recommended establishment of put-grow-take regulations for Striped Bass in the Cape Fear River. No conflicting data are evident, and that recommendation remains in effect.
2. Improve anadromous fish passage at locks and dams.

TABLES AND FIGURES

TABLE 1. Sample sites and site conditions for Cape Fear River Striped Bass sampling events in 2018. Temperature data were recorded in situ. Discharge data were collected from USGS gage numbers 02105769 (located at Lock & Dam 1), 02105500 (located at William O. Huske Lock & Dam), and 02102500 (located on the Cape Fear River in Lillington, NC). For site name and boating access area, LD1 = Lock & Dam 1, LD2 = Lock & Dam 2, LD3 = Lock & Dam 3 (also known as Willian O. Huske Lock & Dam), LLR = Lower Little River, and RL = Riverside Landing.

Date	Week of year	Site name	Latitude	Longitude	Boating access area	Water temperature (°C)	Discharge (CFS)
Mar 7	10	LD1	34.4047	-78.2928	LD1	13.0	3,530
Mar 7	10	LD3	34.8352	-78.8226	LD3	11.5	2,850
Mar 8	10	LD2	34.6271	-78.5770	LD2	11.5	2,430
Mar 13	11	LD1	34.4047	-78.2928	LD1	11.0	2,750
Mar 13	11	LD3	34.8352	-78.8226	LD3	10.3	3,760
Mar 21	12	LD1	34.4047	-78.2928	LD1	12.1	5,140
Mar 21	12	LD3	34.8352	-78.8226	LD3	12.6	7,160
Mar 27	13	LD1	34.4047	-78.2928	LD1	11.0	7,540
Mar 27	13	LD3	34.8352	-78.8226	LD3	10.7	8,120
Apr 4	14	LD1	34.4040	-78.2799	LD1	16.2	2,920
Apr 4	14	LD3	34.8352	-78.8226	LD3	17.1	2,360
Apr 11	15	LD1	34.4047	-78.2928	LD1	15.8	4,820
Apr 11	15	LD3	34.8352	-78.8226	LD3	13.6	5,290
Apr 18	16	CFR98	34.4047	-78.2928	LD1	18.4	13,100
Apr 18	16	LD1	34.4047	-78.2928	LD1	18.4	13,100
Apr 18	16	LD3	34.8352	-78.8226	LD3	16.4	13,800
Apr 19	16	LD2	34.6271	-78.5770	LD2	16.6	13,200
Apr 20[a]	16	LD1	34.4047	-78.2928	LD1	16.3	13,900
Apr 25	17	LD3	34.8352	-78.8226	LD3	16.7	6,330
Apr 26	17	CFR98	34.4047	-78.2928	LD1	17.6	9,280
Apr 26	17	LD1	34.4047	-78.2928	LD1	17.6	9,280
May 1	18	CFR98	34.4047	-78.2928	LD1	17.5	10,200
May 1	18	LD1	34.4047	-78.2928	LD1	17.5	10,300
May 3	18	LD3	34.8352	-78.8226	LD3	18.8	6,830
May 3	18	CFR261	35.2954	-78.6863	RL	18.9	5,640
May 3	18	CFR259	35.2776	-78.6838	RL	18.9	5,640
May 3	18	LLR	35.2586	-78.7065	RL	18.9	-
May 10	19	LD1	34.4047	-78.2928	LD1	21.6	2,800
May 10	19	LD3	34.8352	-78.8226	LD3	22.3	2,120
May 15	20	LD1	34.4047	-78.2928	LD1	24.8	1,310
May 15	20	LD3	34.8352	-78.8226	LD3	25.6	1,270

[a] Collections for NC State University PFAS study; fish from this site are excluded from CPUE analysis but included elsewhere.

TABLE 2. Summary sex-specific length, age, and PBT data from the 2018 Cape Fear River Striped Bass Spawning Stock Survey.

Sex	Number collected[a]	Mean total length (mm)	Maximum total length (mm)	Maximum age	Hatchery origin[b]	Unknown origin
Female	60	630	804	8	51	8
Male	58	561	700	8	54	2
Juvenile	10	215	260	1	10	0

[a] Column does not sum to 129; one fish jumped out of boat before measurements were recorded.
[b] Hatchery and unknown origin columns do not sum to 129; four fish were excluded from PBT analysis.

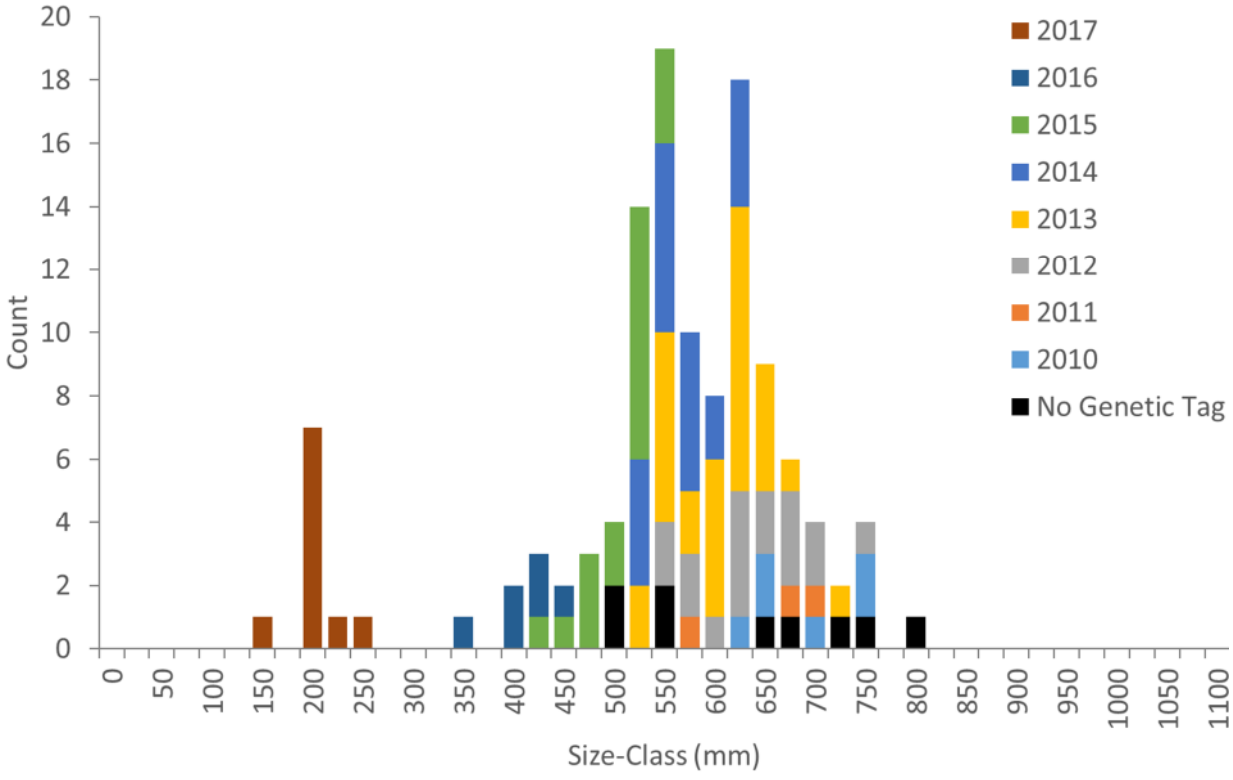


FIGURE 1. Size, age-structure, and origin of Striped Bass from field collections in 2018. "No Genetic Tag" indicates fish that are of unknown origin. Size-class denotes floor of a 25-mm size bin.

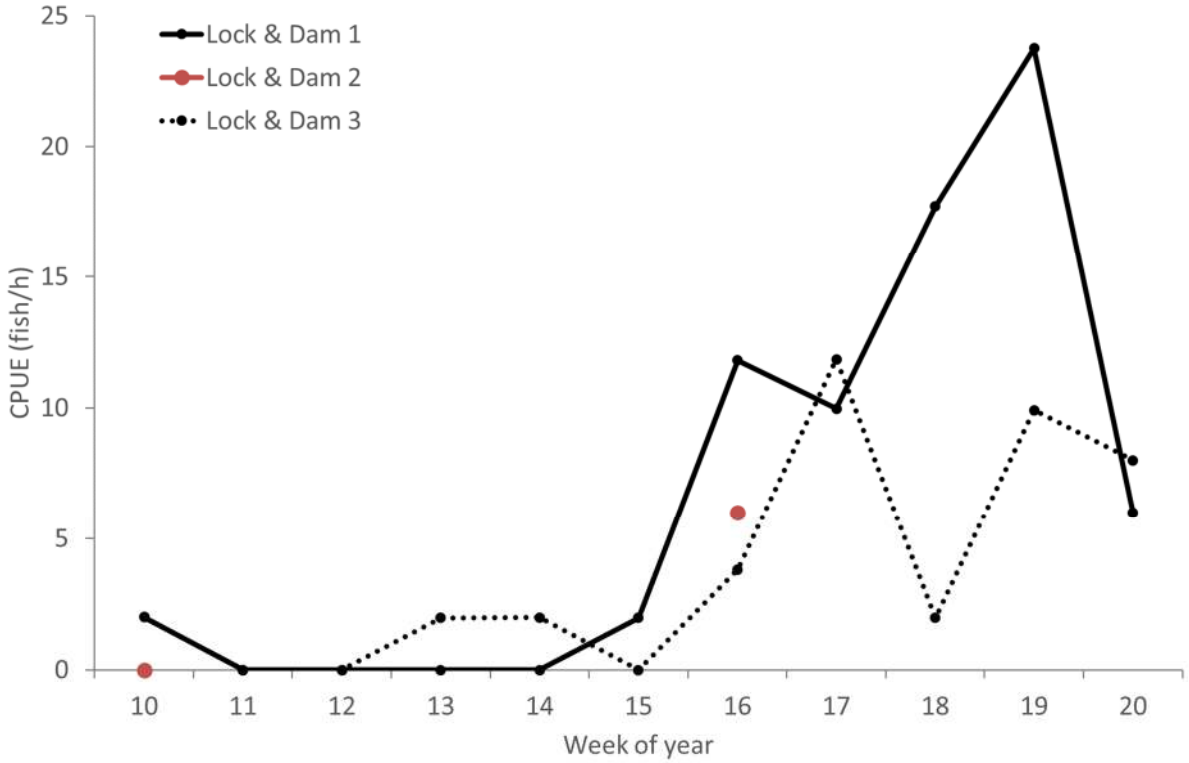


FIGURE 2. Catch-per-unit effort (fish/h) by week-of-year at each of the three long-term electrofishing sites. Lock & Dam 2 sampling was restricted due to construction activities.