

PROGRESS REPORT

State: NEW HAMPSHIRE **Grant:** F-61-R-22/F19AF00061

Grant Title: NEW HAMPSHIRE'S MARINE FISHERIES INVESTIGATIONS

Project II: **MARINE RECREATIONAL FISHERIES MONITORING**

Job 2: **VOLUNTEER ANGLER CREEL SURVEY FOR STRIPED BASS ANGLERS**

Objective: To annually monitor the recreational fishery for Striped Bass *Morone saxatilis* in New Hampshire waters in order to identify trends and evaluate the effect of management measures.

Period Covered: January 1, 2019 - December 31, 2019

ABSTRACT

Forty-six anglers participated in New Hampshire's Volunteer Angler Creel Survey for Striped Bass *Morone saxatilis* in 2019. Anglers reported a total of 1,898 angler hours directed at Striped Bass. A reported 2,001 Striped Bass were caught during the sampling period and volunteers provided length data on 1,860 (93%) of those caught. Lengths ranged from 8 to 47 inches, the mean length of Striped Bass reported was 20.8 inches. Ninety-three percent of the lengths were from sub-legal size fish that would not have been obtained by a conventional creel survey. Eighty-one percent of all legal-size fish that were caught by participating anglers were released. Reported measurements suggest a large input from the 2015 cohort, which had strong recruitment in the Chesapeake Bay. Climatic factors and the availability of different year-classes may be contributing factors to the variability of sizes of Striped Bass reported inter-annually. The Atlantic States Marine Fisheries Commission passed Addendum VI, with new management measures to take effect in 2020 to address the recent Striped Bass stock assessment designating the population as overfished and overfishing is occurring.

INTRODUCTION

Striped Bass *Morone saxatilis* has traditionally been an important component of the marine recreational fishery in New Hampshire (NH). The increased abundance of Striped Bass observed in the 1990s translated into

increased effort in the recreational fishery for this species on NH's coast.

The Marine Recreational Information Program, conducted by the NH Fish and Game Department (NHFG) in concert with the National Oceanic and Atmospheric Administration Fisheries Service, is a general purpose survey that captures basic catch and effort data. More specific information about the Striped Bass fishery, such as the relative use of different terminal tackle types and size distribution of sub-legal and legal fish that are released, would aid in the management of this fishery.

To gain additional information specific to this important recreational fishery, the NHFG developed and implemented a Striped Bass Volunteer Angler Survey Program (SBVAS) for Striped Bass in 1993. The program obtains information about the fishery that will assist managers in efforts to effectively manage the Striped Bass resource along the coast in NH and other Atlantic states.

PROCEDURES

Volunteer angler logbooks were distributed to anglers who expressed a willingness to participate in the program. Anglers were solicited at marinas, public access sites, sportsman's clubs, in NHFG publications, on recreational fishing websites, at public informational meetings concerning Striped Bass, and with social media at the start and end of the season. Two raffle prizes were advertised throughout the season.

The survey logbooks provided instructions and space for collecting the following information: angler's name and address, trip date, number of hours fished, number of anglers in party, number of fish caught and kept, number of fish caught and released, number of legal-size fish released, whether fishing occurred from boat or shore, the terminal tackle used, and length measurements (total length to the nearest inch) of any Striped Bass caught. Participants were given the opportunity to electronically submit logbook information in a spreadsheet format through e-mail, and an online version was made available in 2014. The online logbook allowed anglers to submit reports daily with identifying information so all trips could be traced back to the reporting angler.

A press release and social media were used at the end of the season in November to remind anglers to submit their logbooks. Those anglers that did supply a record of their fishing effort were provided with a letter summarizing their individual data, as well as the summarized data of all participants, and were included in a raffle draw.

If anglers reported measurements as ranges that were in increments greater than four inches, they were omitted because such large increments can

include the entire size range of several different age groups (Gary Nelson, Personal Communication, 2018). To utilize the smaller range measurements (four inches or less), the lengths of the fish reportedly caught in a given size range were sequentially apportioned to lengths within the range in one-inch increments with the central values having the greatest probability of being used. For example, if an angler reported catching four fish between 12 and 14 inches, length values would be assigned as follows: 12, 13, 13, and 14 inches. This method seems appropriate for the small range increments at the lower fish sizes because mean annual growth of Striped Bass less than 25 inches is approximately four to six inches per year (Gary Nelson, Personal Communication, 2018).

Summary statistics were calculated for all logbook and length data received.

RESULTS

Forty-six anglers submitted logbook data in 2019, a 31% decrease from the previous year. The number of Striped Bass trips reported, via the SBVAS program, decreased by 20% and the reported fishing effort decreased by 13% at 1,898 fishing hours (Table 2.2-1). Anglers reported catching a total of 2,001 Striped Bass during 2019, a 33% decrease. Seven percent of the reported Striped Bass caught were of legal size, and approximately 81% of the legal-sized fish caught were released.

The catch per unit effort decreased from 2018 by 16% for catch per trip and 23% for catch per hour fished. The index of legal Striped Bass caught per hour fished decreased to 0.08 from 0.11 in 2018, and remained below the decade mean (Table 2.2-1).

Anglers reporting by mail-in forms primarily fished from boats and preferred bait as their primary tackle (Table 2.2-2). Those who reported via e-mail had the greatest number of trips per angler; they also preferred bait and fished solely from a boat. Online respondents reported the fewest number of trips per angler and the average online respondent differed from the others in their preference for shore fishing and the use of lures.

Length measurements were provided on 1,860 fish ranging from 8 to 47 inches in 2019 (Table 2.2-3). Ninety-three percent of all reported length measurements were of sub-legal size fish (less than 28 inches). The mean size of fish caught was 20.8 inches, a slight increase over the previous year (Figure 2.2-1). Anglers employing bait as terminal tackle, on average, caught larger fish than lures or flies (Figure 2.2-2)

DISCUSSION

The Striped Bass survey relies on anglers to voluntarily submit logbook accounts of their fishing trips. The voluntary nature of the survey causes low response rates and retention of participants is difficult. During the past decade the number of reporting anglers has fluctuated from a low of 24 in 2010 to a high of 110 in 2017 (Table 2.2-1). A number of measures have been employed to boost participation; direct contact through mail and e-mail with potential Striped Bass anglers, advertising on social media, and offering raffle prizes. Prior to 2011, the Coastal Conservation Association of NH supplied one raffle prize per season. Beginning in 2011, Kittery Trading Post also contributed an item to the raffle. The added incentive seemed to have a short-term positive impact on the number of reporting anglers, however the level dropped again the following year and has continued to fluctuate. It appears that the incentives may not be a consistent driving factor for participation.

Anglers were able to report their fishing trips online for the first time in 2014, boosting the number of participating anglers by 57 percent. The online reporting option has remained the most popular form of submittal, with 72% of all participants choosing this media in 2019 (Table 2.2-2).

The three reporting options appear to be targeting different angler types. The majority of anglers report their trips online and 92% of all first time reporters chose this platform during the project period (Table 2.2-2). Anglers that reported their Striped Bass fishing activity online fished much less trips, mean of 4.2 trips. Those reporting through mail-in paper logbook or e-mail spreadsheet media fished more trips, mean of 13.9 and 33.0 trips, respectively. It appears reporting on an annual basis (mail-in logbook and e-mail spreadsheet mediums) are more appealing to anglers who make far more fishing trips in a year, mean of 13.9 and 33.0 trips, respectively, than those that reported via the online method. These are usually avid anglers, and while their inclusion is positive for collecting biological information, the data gathered from them could be misleading about the health of the Striped Bass fishery with biased catch per unit effort estimates. The continued availability of an online reporting option that is more appealing to the occasional angler while still offering options that are preferred by avid anglers will provide a more representative view of NH's Striped Bass fishery.

The majority of the Striped Bass reported each year are fish less than 28 inches in length, and during the project period, 93% of all reported measurements were sub-legal fish (Table 2.2-3). This survey is the primary source for length data on sub-legal, recreationally caught Striped Bass in

NH, and the SBVAS plays an important role in the management of the Striped Bass fishery. The NHFG has continued to promote the high importance of providing length measurements through communications related to this survey program, and as a result, during 2019 anglers provided measurements on 1,860 Striped Bass; 93% of all fish caught (Tables 2.2-1 and 2.2-3).

Length measurements provided by the SBVAS are important to the coast-wide stock assessment for Striped Bass to characterize the catch from recreational anglers in NH. The mean length of Striped Bass caught in NH varies annually and cohorts can visually be followed using length data collected through this program (Figure 2.2-1). From 2010 through 2011 the mean length increased from 25.9 to 26.5 inches. According to an age-length key provided by the Massachusetts Division of Marine Fisheries the strong 2003 year class appeared to influence the increasing mean length of fish through 2011 (Gary Nelson, Personal Communication, 2018). Another strong recruitment year was 2011, with large production in the Chesapeake Bay (ASMFC 2016). This cohort can be followed through the reported length frequencies over the years as a reported peak length of 18 inches in 2014, increasing to 22 inches in 2015. While the data suggest the continued presence of the 2011 cohort, their contribution was surpassed by the inundation of small fish starting in 2016.

The data shows that in both 2016 and 2017 a large percentage of the Striped Bass caught were very small fish, which had not been seen in most of the previous years (Figure 2.2-1). The majority of fish reported were between 12 and 16 inches in 2016 and 2017, increasing slightly in 2018. These fish were likely from the 2014 and 2015 year classes (Gary Nelson, Personal Communication, 2018). The strength of the Chesapeake Bay's 2014 year class was below average; it is possible that in 2016 these fish came from another producer area, such as the Hudson River, which produced a strong year class in 2014 (ASMFC 2016). However, juveniles typically are non-migratory, and the Hudson River also contains a contingent of permanent residents; making a large contribution of young fish unlikely in most years. On the other hand, the 2015 year class showed strong recruitment in the Chesapeake Bay (MD DNR 2016).

Many factors can affect the recruitment of juvenile Striped Bass and the resulting age-class availability within the fishery. These factors include winter temperatures, hydrological conditions, and zooplankton prey availability (NEFSC 2013). It appears as though the lengths reported through this reporting program follow the overall population trends closely, picking up the most prominent year-classes as with the 2011 and 2015 cohorts recently. However, northward migrating Striped Bass populations may vary

greatly from year to year and are dependent upon factors such as weather, disease, water temperatures, and abundance of prey (NEFSC 2013). Therefore, while the SBVAS is useful in demonstrating trends in angler effort and success within state waters, it should be noted that the fluctuations in Striped Bass abundance within the coastal waters of NH should not be used alone in drawing conclusions about the coast-wide Striped Bass population's size and structure.

Many of the anglers that report via the SBVAS practiced catch and release during all or a portion of their Striped Bass fishing trips. The catch and release angler seems to be making up a growing portion of all reporting anglers with the percent of legal-size fish released index generally increasing from the decadal low of 50% in 2010 to a high of 81% in 2015 and 2019 (Table 2.2-1). Many Striped Bass anglers are conservation-minded and it is difficult to say whether it was the more stringent management or the prevailing culture of catch and release that caused anglers to release a majority of the legal-size fish caught in recent years.

According to the 2013 stock assessment, Atlantic Coast Striped Bass was not overfished and overfishing was not occurring. It projected that the catch would decrease and the spawning stock biomass would dip below the threshold in 2015 (NEFSC 2013). This finding led to measures aimed at reducing Striped Bass harvest. To comply with the Atlantic States Marine Fisheries Commission's Addendum IV to the Striped Bass Fishery Management Plan and reduce Striped Bass harvest by twenty-five percent, the creel limit on Striped Bass was lowered in NH to one fish beginning in 2015. The recreational harvest estimates for 2015-2019 show a twenty-five percent or greater reduction in harvest in NH for one out of the past five years, compared to the estimated harvest of 203,403 pounds in 2014 (National Marine Fisheries Service, Fisheries Statistics Division, Personal communication, December 2019).

The most recent stock assessment, published in 2019, included the Marine Recreational Information Program's re-estimation of recreational catch and harvest (NEFSC 2019). Due in part to the inclusion of these revised data, it was found that Striped Bass are overfished and overfishing is occurring, despite management measures enacted in 2015. The Atlantic States Marine Fisheries Commission implemented Addendum VI, with new management measures to take effect in 2020, aimed at further reducing harvest. Proposed changes to the Striped Bass Fishery in New Hampshire include implementation of a slot limit allowing harvest of fish between 28 inches and less than 35 inches, as well as mandatory use of circle hooks when using bait to target Striped Bass.

In conclusion, participation in New Hampshire's Volunteer Angler Creel Survey for Striped Bass fluctuates, and in 2019 there was a 31% decrease over the previous year. The reported survey data indicated that 93% of fish caught during the sampling period were of sub-legal size, with a mean length of 20.8 inches. Reported measurements suggest a large input from the 2015 cohort, which had strong recruitment in the Chesapeake Bay. The persistence of certain year-classes could affect the size of fish reported caught. Comparisons to stock assessment data indicate that the survey may adequately characterize the NH fishery but efforts should continue, to ensure increased participation by anglers of various experience levels and fishing behavior. Regulatory changes to New Hampshire's Striped Bass Fishery, including a slot size limit and mandatory use of circle hooks, are proposed to begin in 2020 as a result of the most recent stock assessment.

REFERENCES

Atlantic States Marine Fisheries Commission (ASMFC). 2016. 2016 Atlantic Striped Bass Assessment Update. ASMFC. Atlantic Striped Bass Technical Committee. 15-19; 100p.

Maryland Department of Natural Resources (MD DNR). 2016. Maryland Juvenile Striped Bass Survey. Maryland Department of Natural Resources, Federal Aid in Sportfish Restoration, Project F-61-R-P11-J3-T3, Final Report, Annapolis, MD, 237-243p.

Northeast Fisheries Science Center (NEFSC). 2013. 57th Northeast Regional Stock Assessment Workshop (57th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-16; 967 p.

Northeast Fisheries Science Center (NEFSC). 2019. 66th Northeast Regional Stock Assessment Workshop (66th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 19-08; 457 p.

Table 2.2-1. Summary of data reported by participants in New Hampshire's Striped Bass Volunteer Angler Survey, 2010–2019.


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reporting anglers	24	41	32	35	55	70	65	110	67	46
# of trips	489	638	580	631	633	710	716	866	678	540
Angler hours	1,814	2,571	1,852	2,295	2,063	2,523	2,417	2,902	2,184	1,898
Total Striped Bass caught	1,050	1,314	1,638	1,885	2,015	1,637	3,988	7,526	2,996	2,001
# harvested	155	158	83	140	49	33	62	93	62	27
# legal sized released	154	314	253	276	125	145	122	192	169	117
Fishing type (percent)										
Boat	77%	75%	69%	66%	51%	62%	61%	59%	58%	61%
Shore	23%	25%	31%	34%	49%	38%	39%	41%	42%	39%
Tackle type (percent)										
Bait	59%	73%	54%	53%	40%	50%	46%	45%	45%	47%
Lure	31%	27%	24%	28%	25%	23%	23%	25%	24%	30%
Fly	15%	10%	27%	28%	40%	32%	34%	32%	32%	25%
Catch/trip	2.1	2.1	2.8	3.0	3.2	2.3	5.6	8.7	4.4	3.7
Harvest/trip	0.32	0.25	0.14	0.22	0.08	0.05	0.09	0.11	0.09	0.05
Catch/hr. fished	0.58	0.51	0.88	0.82	0.98	0.65	1.65	2.59	1.37	1.05
Legal catch/hr. fished	0.17	0.18	0.18	0.18	0.08	0.07	0.08	0.10	0.11	0.08
Harvest/hr. fished	0.09	0.06	0.04	0.06	0.02	0.01	0.03	0.03	0.03	0.01
% caught & released	85%	88%	95%	93%	98%	98%	98%	99%	98%	99%
% legal sized released	50%	67%	75%	66%	72%	81%	66%	67%	73%	81%

Table 2.2-2. Summary of data reported by participants in New Hampshire's Striped Bass Volunteer Angler Survey, by reporting type, 2019.

	Mail-in	E-mail	Online
# Reporting anglers	11.0	2.0	33.0
# First time reporters	2.0	0.0	22.0
# Trips reported per angler	mean max min	13.9 49.0 3.0	33.0 56.0 10.0
Trip length (hours)	mean max min	3.3 10.0 0.5	4.2 29.0 1.0
Tackle type	bait lure fly	62% 9% 32%	20% 62% 18%
Fishing platform	boat shore	58% 42%	100% 0% 45% 55%

Table 2.2-3. Length frequency data for Striped Bass measured by anglers participating in New Hampshire's Striped Bass Volunteer Angler Survey, 2019.

Length (inches)	#	%
8	2	0.11
9	0	0.00
10	2	0.11
11	4	0.22
12	57	3.06
13	33	1.77
14	99	5.32
15	61	3.28
16	91	4.89
17	60	3.23
18	190	10.22
19	148	7.96
20	214	11.51
21	150	8.06
22	191	10.27
23	105	5.65
24	199	10.70
25	49	2.63
26	56	3.01
27	22	1.18
28	10	0.54
29	8	0.43
30	7	0.38
31	8	0.43
32	19	1.02
33	3	0.16
34	13	0.70
35	6	0.32
36	11	0.59
37	1	0.05
38	10	0.54
39	8	0.43
40	7	0.38
41	3	0.16
42	7	0.38
43	4	0.22
44	0	0.00
45	1	0.05
46	0	0.00
47	1	0.05
N		1,860
Mean length		20.8

 Legal size fish

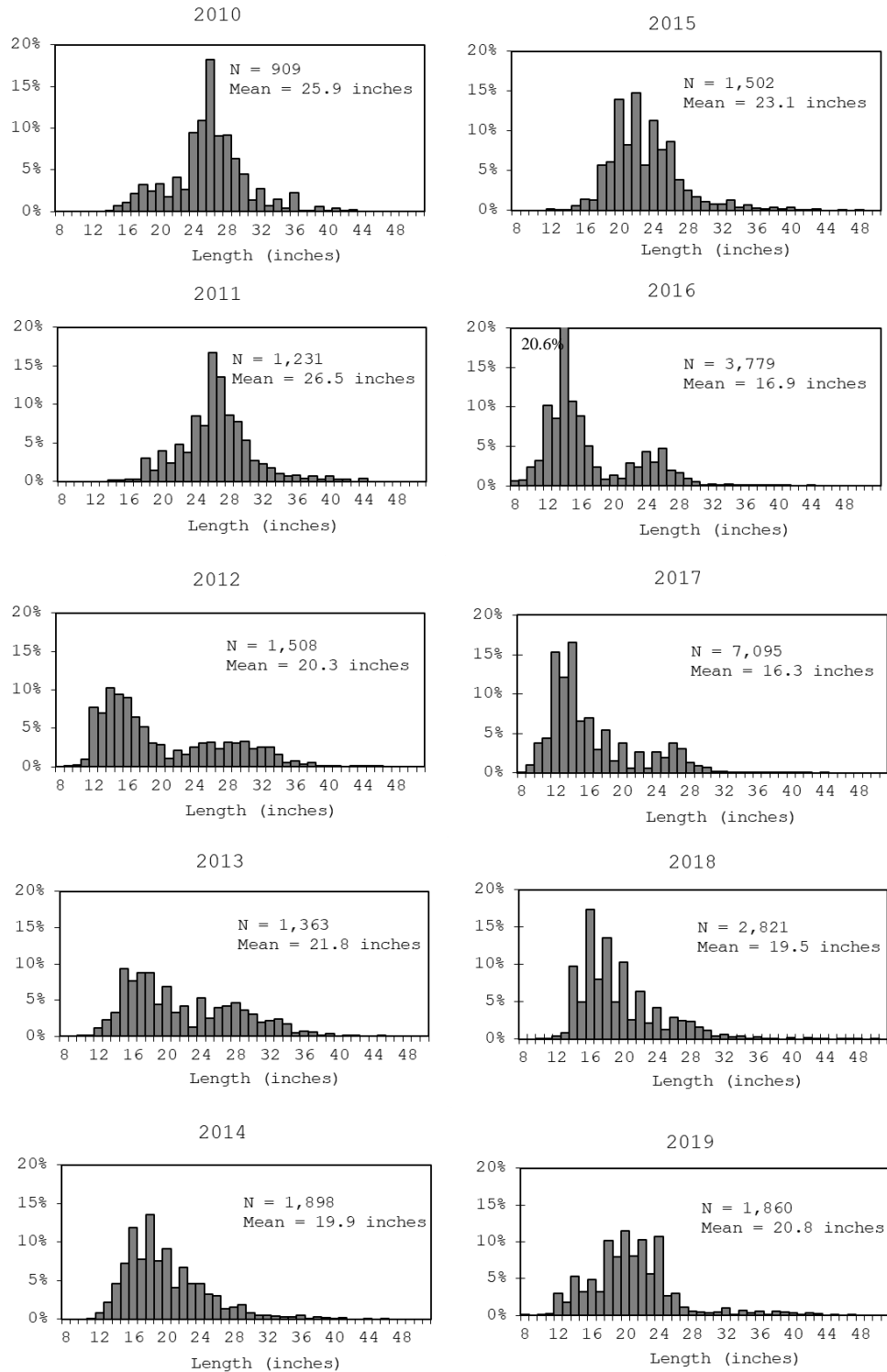


Figure 2.2-1. Annual length frequency comparisons of Striped Bass from New Hampshire's Striped Bass Volunteer Angler Survey, 2010–2019.

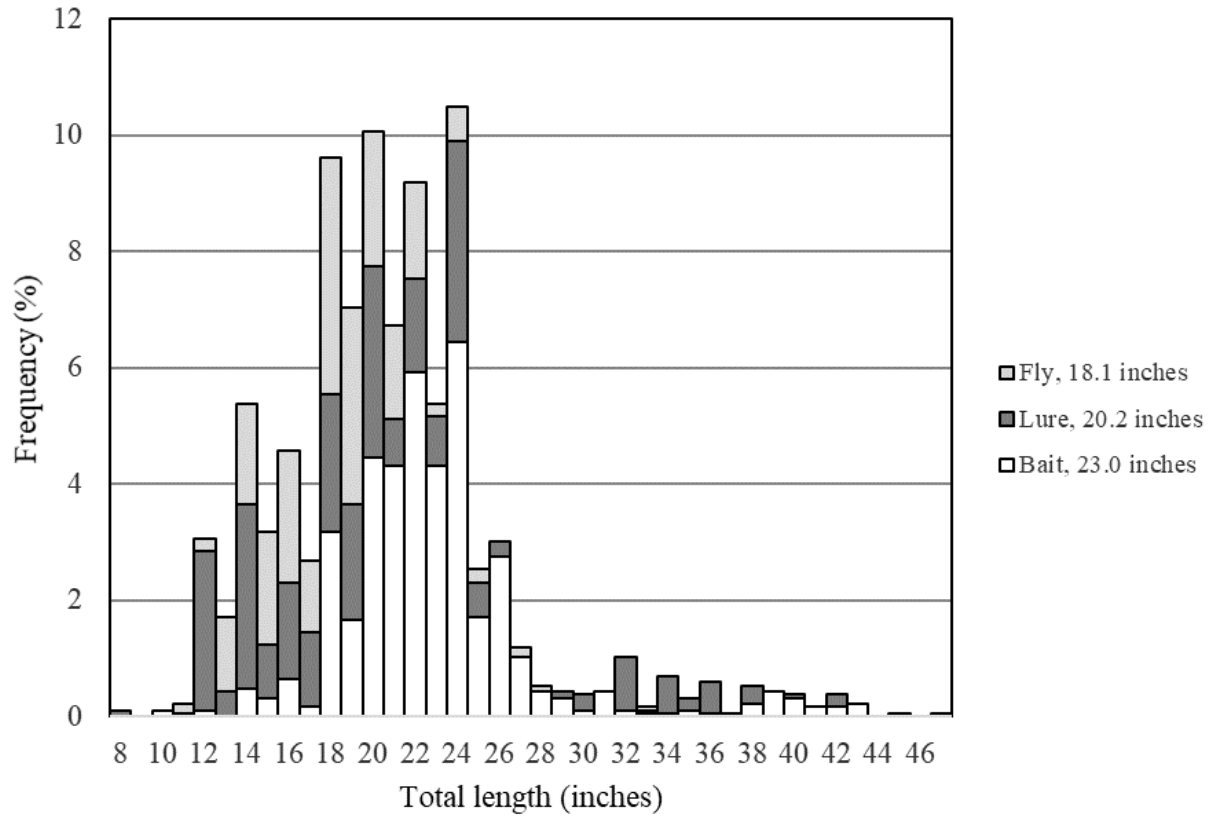


Figure 2.2-2. Length frequency and mean lengths of Striped Bass caught using bait, lure, and fly from New Hampshire's Striped Bass Volunteer Angler Survey, 2019.