

PROGRESS REPORT

State: New Hampshire Grant: F-61-R

Title: NEW HAMPSHIRE'S MARINE FISHERIES INVESTIGATIONS

Project I: ANADROMOUS FISH INVESTIGATIONS

Job 5: Volunteer Angler Creel Survey for Striped Bass Anglers

Objective: To annually monitor the recreational fishery for striped bass in New Hampshire waters in order to identify trends and evaluate the effect of management measures.

Period Covered: January 1, 2004 - December 31, 2004

Abstract:

Forty-six anglers participated in New Hampshire's Volunteer Angler Creel Survey for striped bass during 2004. The anglers reported on 1,219 trips directed at striped bass. Catch per unit effort indices from this survey show that catch per trip and catch per hour fished decreased this year after both increased in 2002, and remained steady thru 2003. Length data showed that the mean length of fish has remained basically unchanged since 2002.

A total of 4,174 striped bass were reported to be caught in 2004. Volunteer anglers provided 3,714 useable length measurements of striped bass between 10 and 47 inches. Eighty-five percent of these measurements were of sub-legal size fish that would not have been obtained by conventional shore-based creel surveys.

In 2004, the mean harvest per trip, and the harvest per hour fished increased from 2003 rates. Anglers reported releasing 92% of the 4,174 fish they caught in 2004 compared to a release rate of 97% the previous year. The 2003 percentage maybe biased due to the fact that a charter captain, who has been a regular participant in the program didn't report that year and there was a record high of legal fish released.

Introduction:

Striped bass (*Morone saxatilis*) has traditionally been an important component of the marine recreational fishery in New Hampshire. The increased abundance of striped bass observed in the 1990s has translated into increased effort in the recreational fishery for this species in New Hampshire.

Marine recreational fishing surveys conducted by the state (NH Fish and Game Department's Marine Recreational Fishing Survey) and the federal government (National Marine Fisheries Service's Marine Recreational Fishing Statistical Survey) in New Hampshire are general purpose surveys that provide basic catch and effort data about the fishery. More specific information about the striped bass fishery such as the relative use of different terminal tackle types and size distribution of sub-legal fish that are released would aid in the management of this fishery.

To gain additional information specific to this important recreational fishery in New Hampshire, the New Hampshire Fish and Game Department (NHFG) developed and implemented a Volunteer Angler Survey Program for Striped Bass in 1993. The program is used to obtain information about the fishery that will assist managers in more effectively managing the striped bass resource along the New Hampshire and other Atlantic states' coasts.

Procedures:

Volunteer angler logbooks were distributed to any anglers who expressed a willingness to participate in the program. Anglers were solicited at marinas, public access sites, several sportsman's clubs, and at public informational meetings concerning striped bass. Also, previous participants in the program were asked to participate again.

For the fifth straight year, the local chapter of the Coastal Conservation Association (CCA-NH) assisted with the program by providing their membership list to the Department so that survey forms could be sent to all members. In addition, they donated a framed and numbered striped bass print to the Department to be raffled to participants in the 2004 survey and distributed surveys at various sporting shows.

The survey log books contain space for the anglers name and address as well as information from each fishing trip for striped bass including: 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 sized fish released, whether they were fishing from boat or shore, what terminal tackle

they used, and length measurements (total length to the nearest inch) of any striped bass caught. Instructions on how to fill out the logbooks were included on the form.

Results:

In 2004, forty-six anglers provided information on 1,219 trips directed at striped bass via the Striped Bass Volunteer Angler Survey Program (Table 6-1). The majority of the trips taken were from a boat, and bait was the most common terminal tackle used. Volunteers reported catching a total of 4,174 striped bass this year, 568 (14%) of which were of legal size. Of the fish caught, 7.5% were harvested, and 43% of the legal size fish were released alive. Useable length measurements were provided on 3,714 striped bass ranging from 10 to 47 inches total length (Table 6-2). The mean length of fish measured was 21.6 inches.

The average catch per trip for survey participants decreased 17% and the average catch per hour fished decreased 25% from 2003 to 2004. This year's decrease was the second year in a row where catch rates have decreased, although the catch rates dropped by a higher percent this year. This year's harvest rates increased. Harvest per hour was slightly up and the harvest per trip almost doubled (Figure 6-1 and Table 6-1).

Discussion:

CCA-NH's cooperative efforts with the Department have continued to help with angler recruitment. There continues to be a respectable number of participants in the Striped Bass Volunteer Angler Survey (SBVAS) with 46 reporting anglers in 2004, 35% of which are new recruits to the program. The participation this year was similar to the number of reporting angler over the past five years.

It is important that more people be recruited to the program and that existing contributors participate each year. Even though there were 16 new recruits, 20 people who volunteered last year didn't report in 2004. If there were more people involved in the survey, a more accurate representation of the striped bass resource in New Hampshire's waters could be derived. By having access to CCA-NH's mailing list, the Department was able to directly contact over 200 potential marine anglers. Additionally, the artwork donated by CCA-NH provided an extra incentive for anglers to participate in the

survey. Perhaps more incentive is needed to maintain existing participants as well as attract new anglers to the program since there has been no significant increase in participation over the past five years.

In 2004, the average catch per hour fished decreased by 25% from 1.07 to 0.80 (Table 6-1). The mean catch per trip also declined. The average catch of legal size fish per hour fished also decreased dropping from 0.18 in 2003 to 0.11 in 2004, and is the largest decrease in the catch rate on legal sized fish since 2000. The overall CPUE in 2004 suggests that a smaller number of sub-legal and legal striped bass were available to NH fishermen compared to 2003 and 2002. The Atlantic States Marine Fisheries Commission's Striped Bass Technical Committee (SBTC 2004) stock assessment indicated that there was a reduction in the abundance of age two and older striped bass from 41 to 35 million fish. These are the fish that are available to New Hampshire angler's because striped bass don't begin migrating until at least age two. In addition, the reduced catch rate for New Hampshire anglers in 2004 could potentially be due to changes in migration patterns of striped bass to New Hampshire waters this year that resulted from colder water temperatures in the Gulf of Maine. Monitoring buoys from the Gulf of Maine Ocean Observing System (GOOMOS) show lower water temperatures in 2004 than the previous two years (Figure 2).

The mean harvest per trip in 2004 increased back to levels observed in 2002. One reason this number may have increased is because a charter boat captain who reports on many trips each year rejoined the program after a one-year hiatus. Since the captain is an experienced fisherman, he knows where and how to fish for striped bass, as indicated by a high catch per hour fished of 2.35 compared to the mean for all participants combined of 0.80 (Table 6-1). In addition, anglers on his boat kept fish more frequently than other participants in the survey therefore raising the overall harvest/trip. The captain's reports greatly influenced the survey since he provided about 20% of the lengths and caught 62% of the fish harvested in 2004. As a result, the catch rates for this year are more comparable to years prior to 2003 than 2003 itself when the captain did not report.

The data also shows that in 2004 fish >28 inches accounted for 15% of the reported catch, whereas in 2003 they accounted for about 16%, and 19% in 2002. This would suggest that a similar percentage of legal fish have been available to NH anglers in the past three years. However, the mean catch per hour fished of legal size fish decreased by 39% this year after remaining

relatively constant from 2001 to 2003, indicating that the relative abundance of larger fish available to New Hampshire anglers has decreased this year (Table 6-1).

The majority of anglers reported fishing from boats rather than shore (Table 6-1). This preference has remained constant each year since 1994. In addition, survey participants have consistently preferred to use bait as their main choice of tackle. In 2004, flies were the second most commonly used tackle followed by lures. Trends in tackle preference have remained relatively stable since 1995.

Length measurements provided by this survey are an important component of the coast wide stock assessment for striped bass as they are used to characterize the catch of recreational anglers in New Hampshire. Participants in this survey provided usable length information on 3,714 striped bass this year (Table 6-2). Eighty-five percent of these measurements were of sub-legal fish that would not have been obtained by conventional creel surveys. Most anglers reported individual lengths of the fish they caught. However, there appears to be an even digit bias by reporters as shown in Table 6-2 where the quantity of even number measurements is consistently greater than the adjacent odd numbers, particularly with sub-legal fish. For example, an angler may report three fish caught with lengths of 12, 14, and 16 inches.

The continued higher number of small fish caught this year resulted in some of the volunteer anglers reporting several fish within a size range (e.g. 6 fish between 12-14 inches) instead of individual measurements of each fish. Anglers reported range measurements in approximately 3.5% of the trips. An effort has been made to discourage reporting of lengths by this method. Survey participants have been instructed to either avoid range expressions of length or to limit the size of the length ranges to four inches or less. Collapsible rulers and/or adhesive rulers (for boat owners) have been distributed to the volunteer anglers to encourage exact measurement of fish.

Some trips had range measurements that were reported in increments greater than four inches. Such large increments can include the entire size range of several different age groups. In 2004, 291 of the reported length measurements had to be omitted from length-frequency analysis because the range was greater than four inches. To utilize the smaller range measurements (≤ 4 inches), the lengths of the fish reported 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, a report of four fish between 12 and 14 inches would be assigned length values as follows: 12, 13, 13, 14 inches. This method seems appropriate for the small range increments at the lower fish sizes because average annual growth of striped bass less than 25 inches is about 4 to 6 inches per year. In 2004, there were 757 lengths (18% of the reported measurements) with a range \leq 4 inches that were included in the length analysis and the vast majority of these fish were less than 28 inches.

In conclusion, survey participation was similar to what it had been in the past five years due to the assistance of CCA-NH with our volunteer angler recruitment efforts. Catch rates for 2004 decreased substantially after a slight decrease in 2003. The declines in CPUE of participants could possibly be due to population declines of striped bass ages two and greater or potential differential migration patterns due to relatively cold ocean temperatures in the Gulf of Maine.

The length frequency data suggested that the striped bass >28 inches comprised about the same percentage of the catch this year when compared to data from 2003 and 2002. The reported length data also indicates a large percentage of sub-legal fish were available to anglers in 2004.

References:

Striped Bass Technical Committee. 2004. 2004 Stock Assessment Report for Atlantic Striped Bass: Catch-at-Age Based VPA & Tag Release/Recovery Based Survival Estimation. Report to the Atlantic States Marine Fisheries Commission. Striped Bass Technical Committee Report # 2004-04. 93 pp.

Table 6-1. Summary of data reported by participants in NH Fish& Game Department's Striped Bass Angler Survey, 1993-2004.

	1993	1994	1995*	1996	1997	1998	1999	2000	2001 ⁺	2002	2003	2004
REPORTING ANGLERS	9	13	26	33	32	29	25	46	43	58	50	46
# OF TRIPS	333	403	922	1402	1104	1492	1184	1504	1442	1738	990	1219
ANGLER HOURS	1042	1339.5	3769.5	5700.2	4633.5	6884	5322	6345.5	7125.5	7015	3813.8	5252.7
TOTAL STRIPERS CAUGHT	571	1040	4108	7744	6341	8673	5469	6377	5450	7603	4093	4174
TOTAL STRIPERS HARVESTED	28	31	86	178	139	499	400	276	518	434	141	320
TOTAL LEGAL SIZE FISH RELEASED	45	118	177	427	458	628	519	243	837	798	561	248
FISHING TYPE (PERCENT)												
BOAT	95%	77%	80%	70%	69%	85%	87%	82%	89%	72%	73%	75%
SHORE	5%	23%	20%	30%	31%	15%	13%	18%	11%	28%	27%	25%
TACKLE TYPE (PERCENT)												
BAIT	89%	72%	61%	52%	65%	69%	66%	54%	61%	54%	53%	51%
LURE	14%	21%	18%	15%	13%	17%	16%	19%	13%	14%	26%	24%
FLY	3%	15%	35%	34%	39%	32%	29%	41%	39%	36%	32%	33%
CATCH/TRIP	1.7	2.6	4.5	5.5	5.7	5.8	4.6	4.2	3.8	4.4	4.1	3.4
HARVEST/TRIP	0.08	0.08	0.09	0.13	0.13	0.33	0.34	0.18	0.36	0.25	0.14	0.26
CATCH/HR. FISHED	0.55	0.78	1.09	1.36	1.37	1.26	1.03	1.00	0.76	1.08	1.07	0.80
LEGAL CATCH/HR. FISHED	0.07	0.11	0.07	0.11	0.13	0.16	0.17	0.08	0.19	0.18	0.18	0.11
HARVEST/HR. FISHED	0.03	0.02	0.02	0.03	0.03	0.07	0.08	0.04	0.07	0.06	0.04	0.06
% CAUGHT & RELEASED	95%	97%	98%	98%	98%	94%	93%	96%	91%	94%	97%	92%
% LEGAL SIZE RELEASED	63%	79%	67%	71%	77%	56%	56%	47%	62%	65%	80%	43%

*-1995-Size limit changed from 36 to 32 inches

+ -2001-Size limit changed from 32 to 28 inches

Table 6-2. Length frequency data for striped bass measured by anglers participating in New Hampshire's Striped Bass Volunteer Angler Survey, 2004.

Length (inches)	Number of Occurrences	Percent (%)	Length (inches)	Number of Occurrences	Percent (%)
8	0	0.00	29	74	2.00
9	0	0.00	30	81	2.18
10	4	0.11	31	47	1.27
11	1	0.03	32	51	1.37
12	37	1.00	33	21	0.57
13	41	1.10	34	28	0.75
14	123	3.30	35	19	0.51
15	108	2.90	36	28	0.75
16	413	11.12	37	14	0.38
17	325	8.75	38	17	0.46
18	366	9.85	39	14	0.38
19	181	4.87	40	14	0.38
20	312	8.40	41	12	0.32
21	184	4.95	42	7	0.19
22	197	5.30	43	6	0.16
23	176	4.73	44	7	0.19
24	267	7.19	45	3	0.08
25	137	3.69	46	2	0.05
26	193	5.20	47	2	0.05
27	105	2.83	48	0	0.00
28	97	2.61	49	0	0.00
			N	3714	
	-Legal minimum size		Mean Length	21.6	

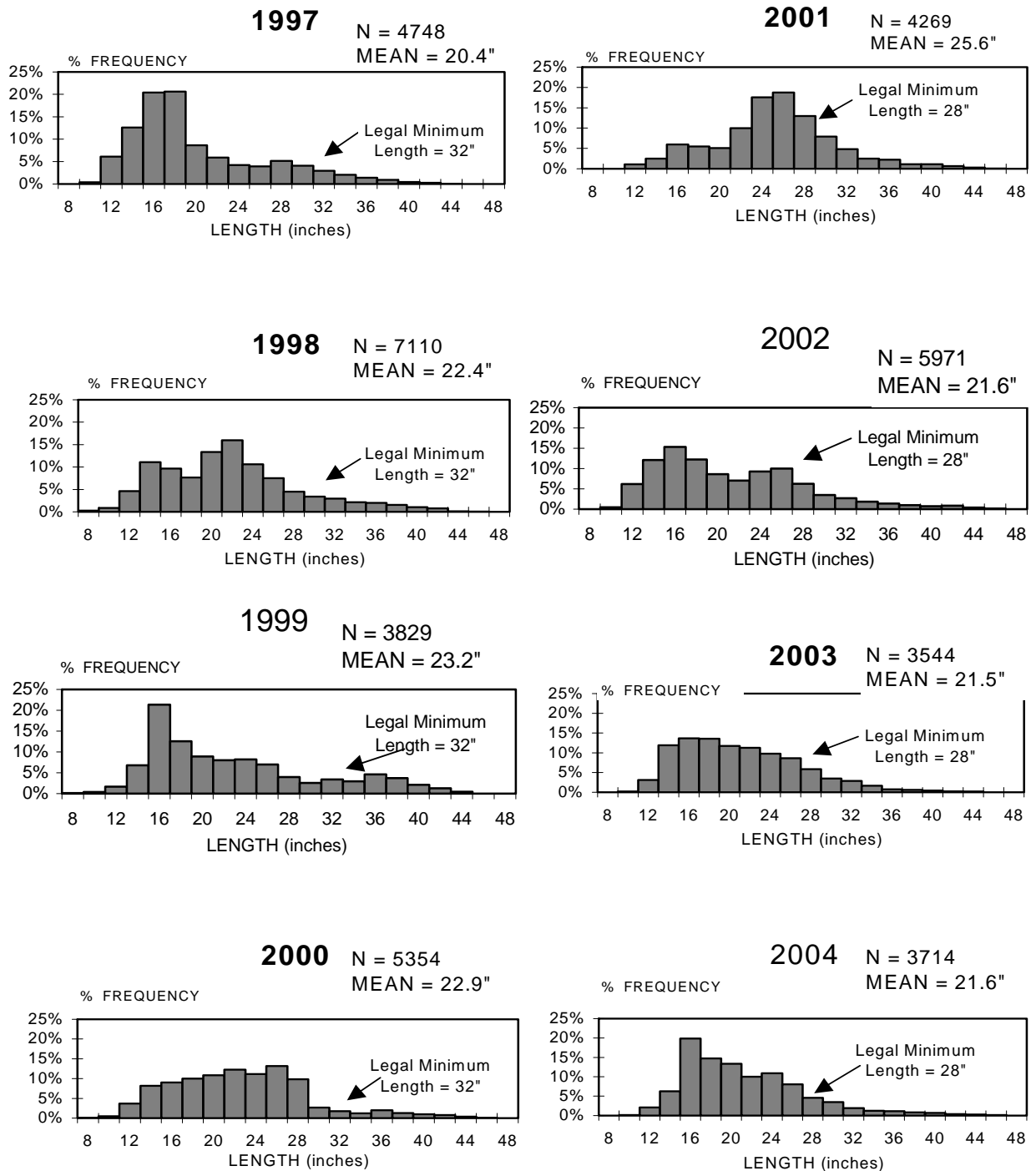


Figure 6-1. Length Comparisons of Striped Bass caught between 1997-2004.

Source: NH Volunteer Angler Survey

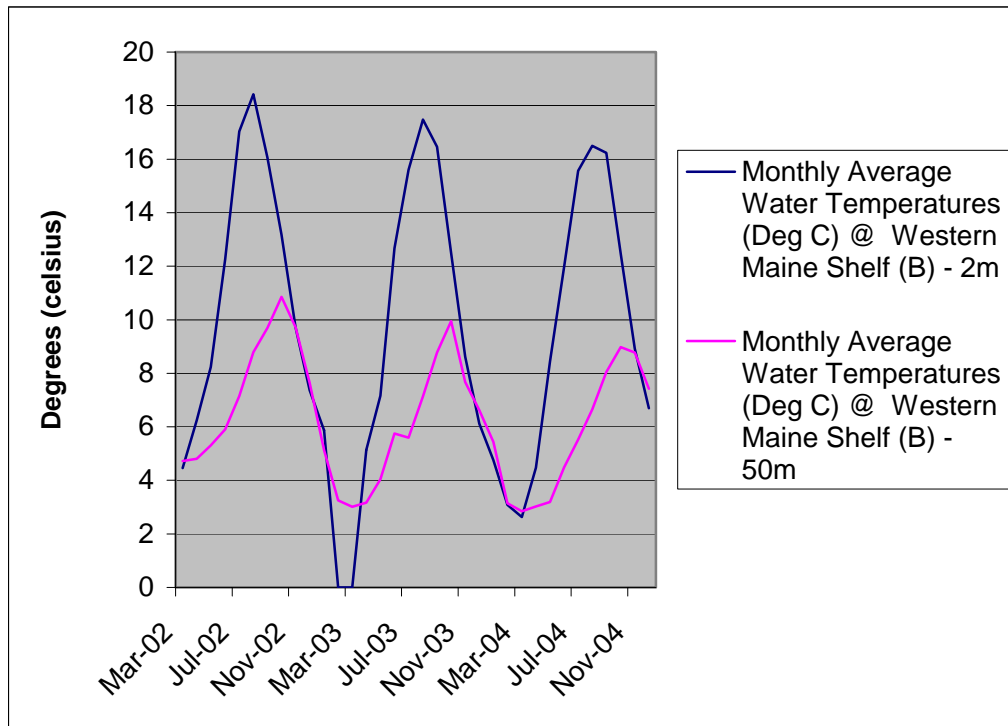


Figure 6-2. GoMOOS water temperature data at two meter and 50 meter depths from the western Maine shelf, March 2002 – December 2004.