



Massachusetts Division of Marine Fisheries
Technical Report TR-19

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2002 Massachusetts Striped Bass Monitoring Report

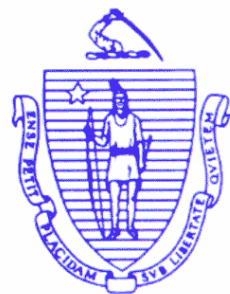
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Massachusetts Division of Marine Fisheries
Department of Fisheries, Wildlife and Environmental Law Enforcement
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

May 2003



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Summary

During 2002, the commercial fishery for striped bass in Massachusetts harvested about 44,897 fish weighing 924,870 pounds. Total losses due to commercial harvesting (including release mortality) were 54,128 fish weighing 1,011,283 pounds. The recreational fishery harvested about 309,582 striped bass weighing over 4.3 million pounds. Total losses due to recreational fishing (including release mortality) were 767,114 fish weighing 8.2 million pounds. Combined losses were 821,242 fish weighing 9.2 million pounds, which reflects a 6% increase in numbers lost and a 17.9% increase in weight lost compared to 2001 (773,038 fish; 7,800,929 pounds). The majority of losses, 93% by number and 89% by weight, was attributed to the recreational fishery.

Acknowledgements

The collection and quality of striped bass data would suffer greatly without the efforts of many DMF employees. Tom Hoopes, Micah Dean, and Kim Lundy assisted with the Oracle database of commercial landings and wrote SQL code to summarize the landings data. Kristen Ferry developed and coordinated the volunteer recreational angler data collection program. John Boardman aged all scale samples. John Boardman, Bill Hoffman, and Paul Caruso conducted the commercial sampling of stripers. Beth Shanks entered the data from catch reports.

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Introduction

This report summarizes the commercial and recreational striped bass fisheries conducted in Massachusetts during 2002. Data sources used to characterize the state fisheries come from monitoring programs of the Massachusetts Division of Marine Fisheries (DMF) and National Marine Fisheries Service (NMFS), which are considered to be essential elements of the long-term management approach described in Section 3 of the Atlantic States Marine Fisheries Commission's (ASMFC) Fisheries Management Report No. 41 (Amendment #6 to the Interstate Fishery management Plan for Atlantic Striped Bass (IFMP)).

Commercial Fishery

Season: July 3-September 4 (fishery closed on August 9). No landings were permitted on Thursday-Saturday.

Harvest: 924,870 pounds (against a harvest quota of 802,000 pounds).

Allowable Gear Type: Hook and line.

Minimum Size: 34 inches total length.

Licensing, Reporting, and Estimation of Landings: To purchase striped bass directly from fishermen, fish dealers are required to obtain special authorization from the DMF in addition to standard seafood dealer permits. Dealer reporting requirements include weekly telephone reports of all striped bass purchases; DMF administers a toll-free number and an interactive voice response system for this purpose. Following the close of the season, dealers are also required to provide a written transcript consisting of purchase dates, number of fish, pounds of fish, and names and permit numbers of fishermen from whom they purchased.

Fishermen must have a DMF commercial fishing permit (of some type) and a special striped bass fishing permit to sell their catch. They are also required to file catch reports at the end of the season, which include the name of the dealer(s) that they sell to and extensive information describing their catch composition and catch rates on a monthly basis. In addition, many fishermen voluntarily provide daily fishing logs. The dealer telephone survey is used to gauge the distance to the harvest cap, while the dealer written transactions are used to estimate the final harvest.

2002 Landings:

The estimate of landings used here comes from dealer phone transactions. Commercial landings in 2002 was 924,870 pounds (44,897 fish) (Box 1). Most striped bass were sold in Barnstable, Bristol and Essex counties of Massachusetts (Figure 1A).

SEASON	SEASON LENGTH (D)	HARVEST (Pounds) 000s	HARVEST (Numbers) 000s	DEALER PERMITS	FISHING PERMITS
1990	93	160.6	6.3	95	1,498
1991	59	234.8	10.4	92	1,739
1992	39	239.2	11.3	135	1,861
1993	35	262.6	13.0	152	2,056
1994	24	199.6	10.4	150	2,367
1995	57	782.0	41.2	161	3,353
1996	42	696.8	38.3	179	3,801
1997	42	785.9	44.8	173	5,500
1998	28	822.0	45.3	180	5,540
1999	40	788.2	40.8	167	3,577
2000	36	779.7	40.2	137	3,280
2001	29	815.0	40.2	164	4,241
2002	21	924.9	44.9	132	4,587

Box 1. *Attributes of the Massachusetts Striped Bass Commercial Fishery: 1990-2002.*

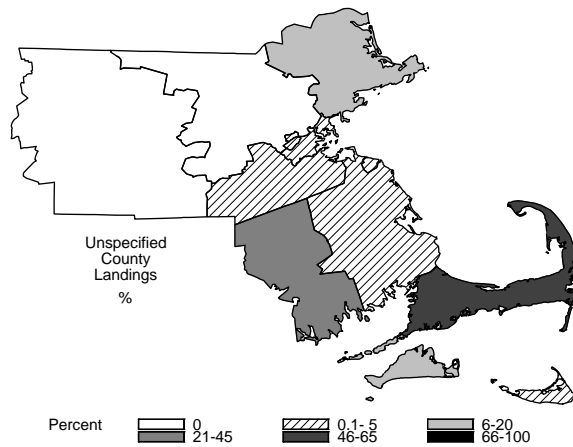


Figure 1. *Percentage of total numbers of striped bass sold by commercial fishers in Massachusetts counties during 2002.*

Size Composition

Information from biological sampling, catch reports and voluntary logs is used to characterize disposition of the catch, catch weight, and size composition by catch category. Data from 1,315 fish sampled from the 2002 commercial harvest and 2000 DMF diet study were used to construct a length-to-weight equation that was used to estimate weight-at-size for individual bass. The following geometric regression was derived:

$$\log 10 (W) = -3.4885 + 3.0240 * \log 10 (L), \quad \text{RMS} = 0.00331$$

where W equals weight in pounds, L equals total length in inches, and RMS is the residual mean square error. This equation was used to estimate the arithmetic average weight for given lengths by back-transforming the geometric weight as follows:

$$W = 10^{(-3.4885 + 3.0240 * \log 10 (L) + \text{RMS} / 2)}$$

Size composition of the commercial catch by category of disposition is presented in Appendix Tables 1A (numbers of fish) and 1B (pounds of fish). Some commercial license holders, as in past years, reported releasing legal-size fish during the commercial season. This category represented 9% of the total catch. About 36% of the fish from the total catch had lengths ≥ 34 inches.

Age and Sex Composition

Five hundred and forty-four striped bass sampled from the 2002 commercial harvest were used to sex the harvested fishes. The proportion that each age comprised the total catch was estimated from a sub-sample of 197 fish which guaranteed a precision of $\pm 10\%$ at $\alpha = 0.05$. Age sub-samples were selected using a weighted (landings per county) random sampling design. Age was determined from scales and sex was determined by visual inspection of gonadal tissue (Sykes Method). Age ranged from 7 to 15 years, and 99.6% were females. Approximately 87% of the sub-sample consisted of individuals from the 1989-1994 year classes (ages 8-13) (Box 2).

Age	Year Class	Number	%	Mean Length (in.)	Mean Weight (lbs)
7	1995	11	5.6	36	17
8	1994	33	16.8	36	16
9	1993	30	15.2	37	18
10	1992	34	17.3	38	19
11	1991	36	18.3	40	23
12	1990	23	11.7	41	27
13	1989	16	8.1	42	27
14	1988	10	5.1	45	33
15	1987	4	2.0	42	30

Box 2. Age composition of striped bass sampled from 2002 commercial harvest.

Estimation of Effort

Total hours fished from standard catch reports and average hours fished per trip from voluntary logs in 2002 were used to estimate effort. The estimate of total hours fished was increased by 46%, the fraction of non-reporters who fished. Effort during the 21-day season amounted to 106,478 h fished and trip duration averaged 5.6 h. These figures imply that 19,014 trips were conducted. This reflects an increase in effort from 2001 levels (Box 3). The commercial CPUE in 2002 was the highest observed in the time series (Box 3; Fig. 2).

Year	Harvest (Numbers)	Trips	CPUE
1991	10,400	17,827	0.58
1992	11,300	13,722	0.82
1993	13,000	10,593	1.23
1994	10,400	7,455	1.40
1995	41,200	28,455	1.45
1996	38,300	28,647	1.34
1997	44,800	20,621	2.17
1998	45,300	20,061	2.26
1999	40,838	25,929	1.57
2000	40,256	18,467	2.18
2001	40,248	18,989	2.12
2002	44,897	19,014	2.36

Box 3. Commercial CPUE Index based on number of fish harvested and number of trips.

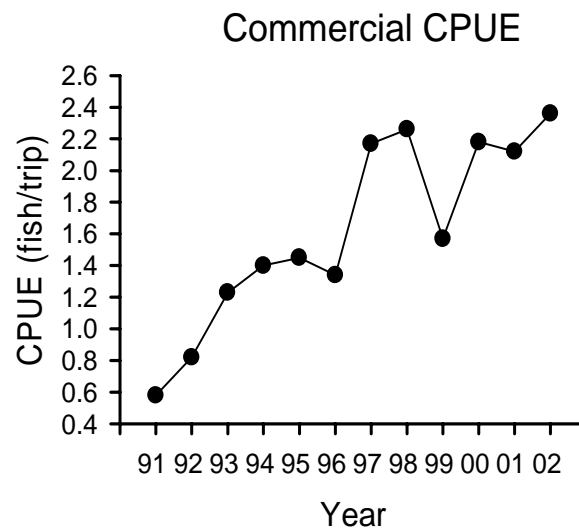


Figure 2. Estimates of harvest rates (numbers per trip) by the commercial fishery, 1990-2002 .

Characterization of Other Losses

Release mortality was estimated by using a hook-release mortality rate of 8% applied against the released sub-legal and legal-sized fish in Appendix Tables 1A and 1B. Total losses due to release mortality were 9,231 fish weighing approximately 86,413 pounds.

Recreational Fishery

Season: None

Daily Bag Limit: One fish per person

Allowable Gear Type: Hook and Line

Minimum Size: 28 inches total length

Licensing and Reporting Requirements: None

Harvest levels: Harvest (A+B1) and total catch (A+B1+B2) estimates were provided by the NMFS MRFSS. Massachusetts paid for approximately 4,000 additional intercept interviews which began during wave 3. A similar “add-on” has been conducted since 1988, however, prior to 1995 it began in wave 2. Reference should be made to Osborn and Salz (1994) for a description of the new trip estimation procedure and its affect on catch.

The estimate of total catch (including fish released alive) in 2002 was 6,028,736 striped bass, which is higher than the 2001 estimate (5,698,930 fish), but is lower than the 2000 estimate (7,563,326 fish) (Box 4). The estimate of total harvest was 309,582 striped bass, which is also higher than the estimate in 2000 (181,295 fish) and in 2001 (288,032 fish). Total pounds harvested was over 4.3 million in 2002 (Box 4).

Year	Harvest (A+B1)		Released (B2)	Total (A+B1+B2)	Standardized
	Numbers	Weight (lbs)	Numbers	Numbers	Trips
1986	29,434	298,816	442,298	471,732	342,387
1987	10,807	269,459	93,660	104,467	104,176
1988	21,050	421,317	209,632	230,682	248,499
1989	13,044	295,227	193,067	206,111	252,911
1990	20,515	319,092	339,511	360,026	478,415
1991	20,799	440,605	448,735	469,534	606,059
1992	57,084	972,116	779,814	836,898	1,032,189
1993	58,511	1,113,446	833,566	892,077	948,935
1994	74,538	1,686,049	2,102,514	2,177,052	1,808,518
1995	73,806	1,504,390	3,280,882	3,354,688	2,266,211
1996	68,300	1,291,706	3,269,746	3,338,046	2,209,667
1997	199,373	2,891,970	5,417,751	5,617,124	3,604,559
1998	207,952	2,973,456	7,184,358	7,392,310	3,556,015
1999	126,755	1,822,818	4,576,208	4,702,963	2,445,407
2000	181,295	2,618,216	7,382,031	7,563,326	4,265,663
2001	288,032	3,644,561	5,410,899	5,698,930	3,968,026
2002	309,582	4,319,215	5,719,154	6,028,736	4,214,343

Box 4. MRFSS estimates of striped bass harvested (in number and pounds), released, and total catch. Standardized trips were estimated from total catch and catch rates (see text).

The MRFSS estimates were post-stratified by county to determine where harvested bass were being landed by recreational anglers. Most landings (80%) occurred in Barnstable and Essex counties (Figure 3). Only 20% of landings occurred in Dukes/Nantucket, Suffolk, Norfolk, and Bristol counties (Figure 3).

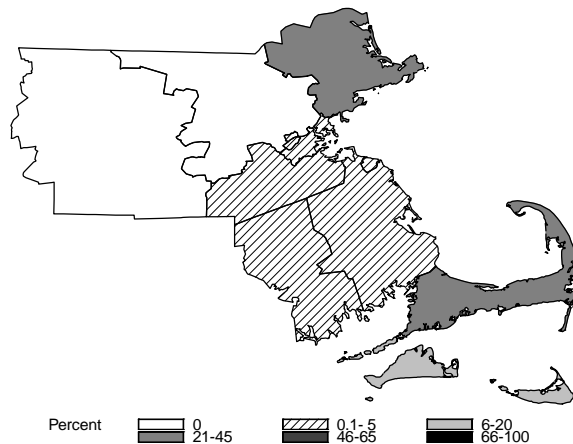


Figure 3. Percentage of total numbers of striped bass landed by recreational anglers in each county of Massachusetts during 2002.

Size Composition

The length distribution of harvested fish was estimated from biological sampling conducted by the MRFSS program in Massachusetts. Estimates of the length frequencies of the sub-legal and legal-size releases were obtained from the American Littoral Society's 2002 Massachusetts release data. Numbers-at-length and weight-at-length data by disposition are summarized in Appendix Tables 2A and 2B.

Age Composition

In 2002, volunteer recreational anglers were solicited to collect length and scale samples from striped bass that they captured each month (May-October). Each person was asked to collect a minimum of 5 scales from at least 10 fish per month. Over 1089 samples were received from 89 anglers. The size frequency of measured fish is shown in Figure 4. A sub-sample of 512 fish was aged to produce an age-length key used to convert the MRFSS size distribution in age classes. Samples were selected using a weighted random design based on the total number of striped bass caught in each wave and mode stratum (as determined by MRFSS).

Volunteer Angler Data

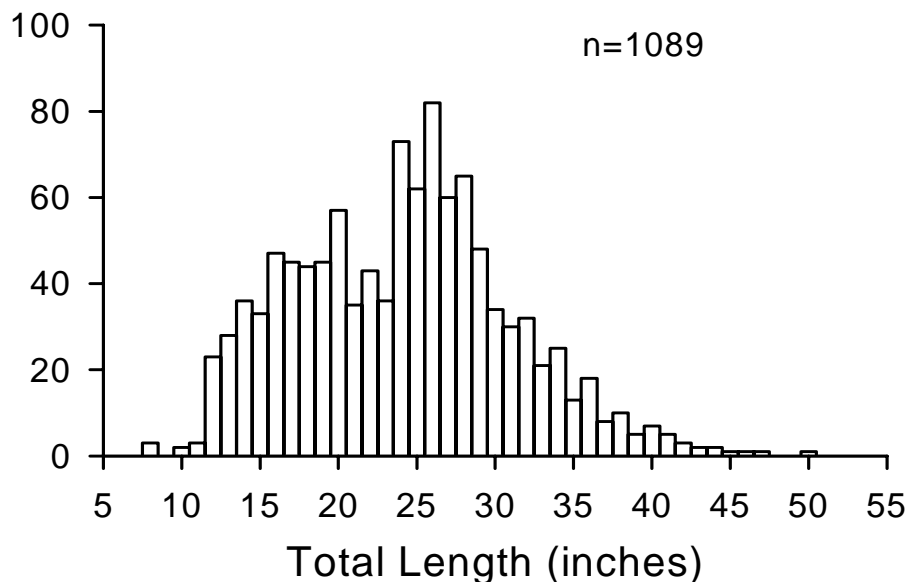


Figure 4. Size distribution of striped bass caught by volunteer recreational anglers in 2002.

Trends in Catch Rates

To examine trends in recreational angler catches, standardized catch rates (total number of fish per trip) for striped bass were calculated for all fish caught using a general linear model (GLM) which adjusts trip catches for the effects of year, wave, county, area fished, mode fished, numbers of anglers in party, and time spent fishing. Trip catches were transformed using $\ln(x+1)$. Only data for those anglers who said they targeted striped bass were used in the analyses.

Standardized catch rates (back-transformed geometric median) declined from 0.76 fish per trip in 1986 to 0.30 fish per trip in 1990, the lowest value observed in the time series (Fig. 5). Catch rates began to increase in 1991, peaked at 1.28 fish per trip in 1998, but declined through 2001 to 1995-96 levels. The catch rate in 2002 was similar to the 2001 estimate (Fig. 5).

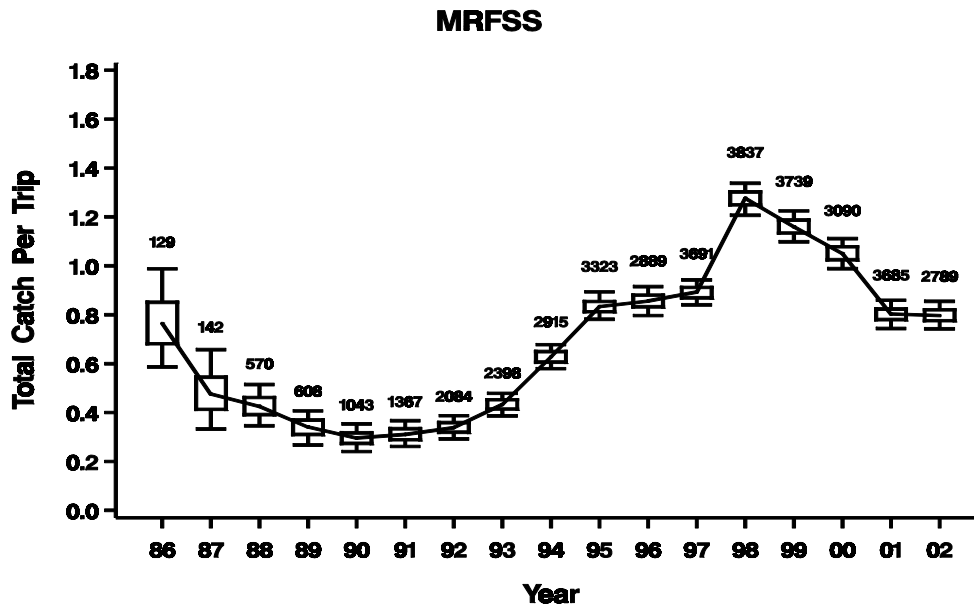


Figure 5. Estimates of total catch rates (total numbers of fish caught per trip) of the recreational fishery for striped bass in Massachusetts waters, 1986-2002. Whiskers represent the 10th and 90th percentiles, horizontal edges of the box represent the 25th and 75th percentiles, and the horizontal bar represents the geometric median. The number of intercepts are shown above each box.

Estimation of Recreational Effort

Standardized effort (no. trips) for each year was calculated by dividing the total number of fish caught (A+B1+B2) by the arithmetic mean total catch rate derived from the GLM analysis. Effort has steadily increased from about 104,176 trips in 1987 to about 3.5 million trips in 1997-1998. Standardized effort dropped in 1999 to 2.4 million trips, increased to 4.2 million in 2000, dropped in 2001 to about 4 million trips, and increased to 4.2 millions trips in 2002 (Box 4). Overall, the number of trips made by recreational anglers has been increasing since 1987.

Characterization of Losses

The same methods and rates previously described in the commercial fishery section were used to estimate recreational losses. Release mortality was 204,829 fish (995,271 pounds) for sub-legal size fish and 252,703 fish (2,909,132 pounds) for the legal-sized stripers released.

Scientific Collections

No bass were captured or released during scientific activities in 2002.

By-catch in Other Fisheries

During 1994, DMF sea-sampling efforts identified striped bass as by-catch in a Nantucket Sound springtime trawl fishery directed at long-finned squid (*Loligo pealei*). Those by-catch estimates were about 3,100 fish (17,600 pounds). Anecdotal information was also reported for this fishery which suggested that striped bass by-catch ranged from 8,000 pounds per day, with up to single tows landing 19,000 pounds. DMF personnel sea-sampled this fishery during 1995-2000 and observed only incidental catches of striped bass. Limited sampling and low catch rates make it unreasonable to extrapolate sample information. DMF will continue to monitor and investigate potential sources of striped bass by-catch during 2003.

Estimated Total Losses

Total estimated loss of striped bass during 2002 was 821,242 fish weighing 9,194,902 pounds (Box 5), which is a 6% increase in numbers lost and a 17.9% increase in weight compared to 2001 (773,038 fish; 7,800,929 pounds). The majority of losses, 93% by number and 89% by weight, was attributed to combined losses in the recreational fishery.

FISHERY	NUMBER	POUNDS	MEAN WT.
Commercial			
Harvest	44,897	924,870	20.6
Release Mortality	9,231	86,413	9.4
Recreational			
Harvest	309,582	4,319,215	14.0
Release Mortality	457,532	3,864,404	8.6
Scientific	0	0	0.0
Total	821,242	9,194,902	

Box 5. Estimates of striped bass losses occurring in Massachusetts during 2002.

Removals-At-Age Matrix

The removals (numbers) due to release mortality and harvest by the recreational and commercial fisheries, scientific activities and poaching are apportioned by age and mortality source in Box 6.

Age	Scientific	Recreational		Commercial		Poaching
		Release Mortality	Harvest	Release Mortality	Harvest	
2	0	10091	0	148		0
3	0	29183	0	402		0
4	0	50494	1074	774		0
5	0	57568	10392	1012		0
6	0	139835	65932	2711		0
7	0	69590	59855	1528	2506	0
8	0	48020	67607	1335	7521	0
9	0	28589	42652	816	6837	0
10	0	8454	20817	192	7749	0
11	0	7810	18834	158	8205	0
12	0	3958	9318	71	5242	0
13	0	2512	6925	56	3646	0
14	0	1124	2436	21	2279	0
15	0	304	3740	7	912	0

Box 6. Massachusetts Removals-At-Age Matrix for 2002 by Source.

Required Fishery-Independent Monitoring Programs

Massachusetts Tagging Study

The Massachusetts Division of Marine Fisheries (DMF) joined the Striped Bass Cooperative State-Federal Coast-wide Tagging Study in 1991. The study's primary objective has been to develop an integrated database of tag releases and recoveries that will provide current information related to striped bass mortality and migration rates. The majority of striped bass tagged prior to 1991 (the tagging study began in 1986) have ranged from 18 to 28 inches in length. Since Atlantic coastal fisheries had employed minimum sizes of 28-36 inches, resulting mortality estimates from these data may understate the effects fishing has on larger striped bass. The Massachusetts tagging effort has therefore focused on the tag and release of larger fish that reach coast-wide legal sizes. To accomplish this job, the DMF contracts several select charter boat captains to take DMF personnel on board to tag and release their catch during regularly scheduled fishing trips. Fish are caught in spring and fall by trolling artificial baits in shoal areas around Nantucket Island. Tag summary statistics are presented in Box 7.

Year	Trips	Boats	Number Tagged	Ave. Length	SE	Length Range	
						Min	Max.
1991	17	4	388	817	5.4	534	1300
1992	29	3	899	798	4.2	524	1267
1993	15	2	678	784	4.8	515	1210
1994	13	2	377	735	4.8	548	1028
1995	11	2	449	767	5.2	470	1178
1996	8	2	203	748	4.5	541	1077
1997	10	2	321	773	6.4	485	1090
1998	12	2	382	797	4.8	597	1055
1999	16	2	471	777	4.4	594	1108
2000	25	4	1095	752	3.1	510	1204
2001	14	3	456	786	4.8	503	1110
2002	12	3	239	764	6.7	487	1060

Box 7. Tag summary statistics.

Planned Management Programs in 2003

Regulations

Massachusetts will implement a bag limit for the recreational fishery that restricts individuals to a 2 fish creel limit and a 28-inch minimum size. The minimum size limit for the commercial fishery will remain at 34-inches. The commercial quota will be increased from 802,000 pounds to 1,159,750 pounds allowed under Amendment 6. However, the quota in 2003 will be reduced by 122,870 pounds to account for the overage in 2002. The commercial fishery quota will be monitored using the IVR system. In addition, an Emergency action was passed the Massachusetts Marine Fisheries Commission (effective May 2, 2003) to adopt a May 1, 2003 control date for the commercial striped bass fishery after which any person issued a new commercial fisherman's permit endorsed for striped bass fishing will not be assured of future access to or participation in this fishery if a management regime is developed and implemented that limits the number of participants in this fishery.

Monitoring Programs

All monitoring programs will continue in 2003.

Appendix Table 1A. Estimated size distribution of the Massachusetts commercial striped bass catch (numbers of fish) in 2002.

TL (in.)	Kept	Released Sub-legal	Released Legal	Total	Percent	Cumulative Percent
12	0	0		0	0.00	0.00
13	0	0		0	0.00	0.00
14	0	1,092		1,092	0.68	0.68
15	0	0		0	0.00	0.68
16	0	2,184		2,184	1.36	2.04
17	0	0		0	0.00	2.04
18	0	3,276		3,276	2.04	4.09
19	0	3,276		3,276	2.04	6.13
20	0	3,276		3,276	2.04	8.17
21	0	0		0	0.00	8.17
22	0	1,092		1,092	0.68	8.86
23	0	1,092		1,092	0.68	9.54
24	0	4,368		4,368	2.72	12.26
25	0	4,368		4,368	2.72	14.99
26	0	9,827		9,827	6.13	21.12
27	0	6,551		6,551	4.09	25.20
28	0	12,011		12,011	7.49	32.70
29	0	4,368		4,368	2.72	35.42
30	0	15,287		15,287	9.54	44.96
31	0	3,276		3,276	2.04	47.00
32	0	15,287	26	15,312	9.55	56.56
33	1077	10,919	493	12,489	7.79	64.35
34	2801		1,607	4,408	2.75	67.10
35	6792		1,841	8,633	5.39	72.48
36	4877		2,308	7,185	4.48	76.97
37	5742		1,841	7,583	4.73	81.70
38	4864		1,685	6,549	4.09	85.78
39	4178		1,582	5,760	3.59	89.38
40	3222		1,011	4,233	2.64	92.02
41	2701		648	3,349	2.09	94.11
42	2941		441	3,382	2.11	96.22
43	1834		130	1,964	1.23	97.44
44	1863		78	1,941	1.21	98.65
45	1216		52	1,268	0.79	99.44
46	445		26	471	0.29	99.74
47	147		26	173	0.11	99.84
48	0		0	0	0.00	99.84
49	0		0	0	0.00	99.84
50	197		52	249	0.16	100.00
Total	44,897	101,546	13,845	160,289		
Avg. Size	38.3	27.6	37.2	31.4		

Appendix Table 1B. Estimated size distribution of the Massachusetts commercial striped bass catch (pounds) in 2002.

TL (in.)	Kept	Released Sub-legal	Released Legal	Total	Percent	Cumulative Percent
12	0	0	0	0	0.00	0.00
13	0	0	0	0	0.00	0.00
14	0	1,047	0	1,047	0.05	0.05
15	0	0	0	0	0.00	0.05
16	0	3,136	0	3,136	0.16	0.21
17	0	0	0	0	0.00	0.21
18	0	6,717	0	6,717	0.34	0.54
19	0	7,910	0	7,910	0.39	0.94
20	0	9,238	0	9,238	0.46	1.40
21	0	0	0	0	0.00	1.40
22	0	4,108	0	4,108	0.20	1.60
23	0	4,699	0	4,699	0.23	1.84
24	0	21,377	0	21,377	1.07	2.90
25	0	24,186	0	24,186	1.21	4.11
26	0	61,270	0	61,270	3.06	7.17
27	0	45,785	0	45,785	2.28	9.45
28	0	93,697	0	93,697	4.67	14.12
29	0	37,886	0	37,886	1.89	16.01
30	0	146,916	0	146,916	7.33	23.34
31	0	34,764	0	34,764	1.73	25.07
32	0	178,578	303	178,881	8.92	34.00
33	13,808	139,995	6,316	160,119	7.99	41.98
34	39,305	0	22,557	61,862	3.09	45.07
35	104,041	0	28,198	132,239	6.60	51.66
36	81,350	0	38,490	119,840	5.98	57.64
37	104,052	0	33,358	137,410	6.85	64.49
38	95,544	0	33,104	128,648	6.42	70.91
39	88,775	0	33,606	122,381	6.10	77.01
40	73,909	0	23,195	97,104	4.84	81.85
41	66,762	0	16,021	82,783	4.13	85.98
42	78,189	0	11,718	89,907	4.48	90.47
43	52,354	0	3,701	56,055	2.80	93.26
44	57,011	0	2,380	59,391	2.96	96.23
45	39,828	0	1,698	41,527	2.07	98.30
46	15,577	0	908	16,485	0.82	99.12
47	5,491	0	969	6,460	0.32	99.44
48	0	0	0	0	0.00	99.44
49	0	0	0	0	0.00	99.44
50	8,874	0	2,336	11,209	0.56	100.00
Total	924,870	821,307	258,859	2,005,036		
Avg. Weight	20.6	8.1	18.7	12.5		

Appendix Table 2A. Estimated size distribution of the Massachusetts recreational striped bass catch (numbers of fish) in 2002.

TL (in.)	Kept	Released Sub-legal	Released Legal	Total	Percent	Cumulative Percent
12	0	8,198	0	8,198	0.14	0.14
13	0	5,465	0	5,465	0.09	0.23
14	0	32,790	0	32,790	0.54	0.77
15	0	54,650	0	54,650	0.91	1.68
16	0	90,173	0	90,173	1.50	3.17
17	0	144,823	0	144,823	2.40	5.57
18	0	81,975	0	81,975	1.36	6.93
19	0	150,288	0	150,288	2.49	9.43
20	0	0	0	0	0.00	9.43
21	0	125,696	0	125,696	2.08	11.51
22	0	234,996	0	234,996	3.90	15.41
23	0	207,671	0	207,671	3.44	18.86
24	0	251,391	0	251,391	4.17	23.03
25	0	256,856	0	256,856	4.26	27.29
26	1,362	377,087	0	378,449	6.28	33.56
27	8,452	538,305	0	546,757	9.07	42.63
28	22,228	0	721,384	743,612	12.33	54.97
29	28,172	0	510,980	539,152	8.94	63.91
30	30,896	0	398,947	429,843	7.13	71.04
31	39,537	0	319,704	359,241	5.96	77.00
32	33,531	0	273,252	306,782	5.09	82.09
33	17,061	0	188,544	205,605	3.41	85.50
34	17,711	0	161,218	178,930	2.97	88.47
35	23,067	0	147,556	170,623	2.83	91.30
36	12,913	0	117,498	130,411	2.16	93.46
37	12,510	0	60,115	72,626	1.20	94.66
38	20,807	0	73,778	94,585	1.57	96.23
39	16,318	0	49,185	65,503	1.09	97.32
40	7,309	0	65,580	72,890	1.21	98.53
41	5,820	0	21,860	27,680	0.46	98.99
42	4,241	0	8,198	12,439	0.21	99.19
43	1,641	0	21,860	23,501	0.39	99.58
44	1,424	0	13,663	15,087	0.25	99.83
45	1,176	0	2,733	3,909	0.06	99.90
46	279	0	2,733	3,011	0.05	99.95
47	279	0	0	279	0.00	99.95
48	0	0	0	0	0.00	99.95
49	0	0	0	0	0.00	99.95
50	0	0	0	0	0.00	99.95
51	1,424	0	0	1,424	0.02	99.98
52	0	0	0	0	0.00	99.98
53	1,424	0	0	1,424	0.02	100.00
Total	309,582	2,560,367	3,158,787	6,028,736		
Avg. Size	32.9	23.1	31.4	28.0		

Appendix Table 2B. Estimated size distribution of the Massachusetts recreational striped bass catch (pounds) in 2002.

TL (in.)	Kept	Released Sub-legal	Released Legal	Total	Percent	Cumulative Percent
12	0	4,921	0	4,921	0.01	0.01
13	0	4,179	0	4,179	0.01	0.02
14	0	31,371	0	31,371	0.06	0.08
15	0	64,414	0	64,414	0.12	0.20
16	0	129,189	0	129,189	0.25	0.44
17	0	249,233	0	249,233	0.47	0.92
18	0	167,694	0	167,694	0.32	1.24
19	0	362,048	0	362,048	0.69	1.93
20	0	0	0	0	0.00	1.93
21	0	409,828	0	409,828	0.78	2.70
22	0	881,935	0	881,935	1.68	4.38
23	0	891,519	0	891,519	1.69	6.07
24	0	1,227,436	0	1,227,436	2.33	8.41
25	0	1,418,896	0	1,418,896	2.70	11.10
26	8,472	2,345,366	0	2,353,838	4.47	15.58
27	58,921	3,752,861	0	3,811,782	7.24	22.82
28	172,980	0	5,613,865	5,786,845	11.00	33.82
29	243,780	0	4,421,660	4,665,440	8.87	42.68
30	296,217	0	3,824,897	4,121,114	7.83	50.51
31	418,570	0	3,384,666	3,803,236	7.23	57.74
32	390,758	0	3,184,386	3,575,144	6.79	64.53
33	218,214	0	2,411,501	2,629,715	5.00	69.53
34	247,930	0	2,256,818	2,504,748	4.76	74.29
35	352,486	0	2,254,798	2,607,284	4.95	79.24
36	214,864	0	1,955,147	2,170,011	4.12	83.37
37	226,150	0	1,086,718	1,312,868	2.49	85.86
38	407,723	0	1,445,711	1,853,434	3.52	89.38
39	345,890	0	1,042,567	1,388,457	2.64	92.02
40	167,259	0	1,500,696	1,667,956	3.17	95.19
41	143,510	0	539,015	682,524	1.30	96.49
42	112,484	0	217,410	329,894	0.63	97.12
43	46,725	0	622,516	669,241	1.27	98.39
44	43,473	0	417,084	460,557	0.88	99.26
45	38,438	0	89,283	127,721	0.24	99.51
46	9,729	0	95,418	105,148	0.20	99.71
47	10,383	0	0	10,383	0.02	99.73
48	0	0	0	0	0.00	99.73
49	0	0	0	0	0.00	99.73
50	0	0	0	0	0.00	99.73
51	67,938	0	0	67,938	0.13	99.85
52	0	0	0	0	0.00	99.85
53	76,319	0	0	76,319	0.15	100.00
Total	4,319,215	11,940,889	36,364,156	52,624,260		
Avg. Weight	14.0	4.7	11.5	8.7		