

Estimates of the Harvest of Coastal Migrant Striped Bass
in Chesapeake Bay in the Spring of 2003

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Introduction

The Maryland Department of Natural Resources re-opened its spring recreational and charter fisheries for coastal migrant striped bass in 1991 after a six-year closure. Virginia and the Potomac River Fisheries Commission reopened their spring coastal migrant fisheries in 1995. One of the tools used to manage the spring fishery in Chesapeake Bay was a harvest cap. A Bay-wide harvest cap was arbitrarily set at 3,000 fish from 1991 - 1993, 5,000 fish in 1994, 25,000 fish in 1995 and 30,000 fish in 1996.

Estimates of the spring harvest are reported in late spring or early summer of the following year in Maryland's annual striped bass harvest report to ASMFC. However, because Maryland spring coastal migrant landings exceeded the harvest cap for Chesapeake Bay in 2003, this information is being provided to the Management Board prior to the opening of the 2004 fishing season.

Methods and results

The general method used to estimate the spring trophy season harvest in Maryland is presented in Jones and Crecco (1996). The estimate is based on the size specific probability that striped bass tagged on the spawning grounds in Maryland will migrate to the Atlantic coast before December of the first year at large, and spring Chesapeake Bay fishery dependent length data.

Dorazio et al. 1994 used tagging data from striped bass marked on the spawning grounds in Maryland in the springs of 1988 - 1991 to determine the size specific probability of fish in the Maryland spawning stock migrating to the Atlantic coast through November of the first year at large. The probability of migration was determined from the equation:

$$M_p = 1/(1 + e^{15.5-0.191L})$$

where:

M_p = the probability of migration, and

L = total length (cm).

Size specific migration probabilities, length frequency distributions as determined from data collected during the trophy season and MRFSS estimates of the striped bass harvest in Waves 2 and 3 were used to estimate the migratory component of the spring 2003 Maryland Chesapeake Bay harvest. The size composition of Maryland's harvest was based on Maryland Volunteer Angler Survey data and Maryland DNR Charterboat Marina creel survey data. MRFSS access/intercept survey data for the spring of 2003 are not currently available. Data collected on the spawning grounds was not used as a proxy for the size composition of the harvest (as was done in 1995) because a large sample of fish harvested in the trophy season fishery were measured.

For purposes of this report, the spawning season in Maryland ended June 15. (April 18 was the opening date of the 2003 season and spawning is complete in Maryland prior to, or by June 15.) The MRFSS harvest estimate for Wave 3 (May – June) was partitioned into intervals that were approximately two weeks in duration so that the timing of emigration of coastal migrants from Maryland could be incorporated into the analysis. Daily harvest as reported in the charter fishery was used to develop proportions used to partition the MRFSS survey data into the intervals (Table 1). The Maryland Volunteer Angler Survey and Maryland DNR Charterboat Marina Survey were used to develop length frequency data for the harvest intervals (Table 1).

Estimates of the harvest were determined as follows:

Step 1. Partition the MRFSS harvest estimate into intervals of approximately two weeks. Partition the length data into intervals that correspond to the harvest intervals.

Step 2. Multiply the number harvested in each time interval by the fraction of the measured subsample in a given length group measured in that interval (see Tables 2 – 3).

Step 3. Multiply this value by the probability of migration of that length group.

Step 4. Sum the estimated number migrating over all length groups in each time interval.

Harvest estimates based on length frequency data collected from the Maryland Volunteer Angler Survey are presented in Table 2 and estimates based on Maryland DNR Charterboat Marina Creel Survey data are presented in Table 3. Averaging the harvest estimates determined from data collected in the two surveys indicated that Maryland recreational and charter anglers landed 43,248 coastal migrant striped bass during the 2003 spring season. The estimated coastal migrant harvest in Virginia in the spring of 2003 was 242 based on methods presented in VMRC (1995). Overall, the estimate of the spring 2003 trophy striped bass season harvest in Chesapeake Bay was 43,490 fish.

Literature cited

Dorazio, R.M., K.A. Hattala, C.B. McCollough and J. E. Skjeveland. 1994. Tag recovery estimates of migration of striped bass from spawning areas of Chesapeake Bay. *Transactions of the American Fisheries Society*, 123:150-963.

Jones, P. W. and V. Crecco. 1996. Estimates of the coastal migratory harvest of striped bass in the 1995 Chesapeake Bay spring fishery based on size specific probabilities of migration. Prepared for the Atlantic States Marine Fisheries Commission, Striped Bass Technical Committee.

VMRC. 1995. Virginia's trophy-size striped bass fishery: A report to the ASMFC Striped Bass Technical Committee, November 13, 1995.

Table 1. Reported charter harvest and estimated recreational/charter harvest by interval from May 1 – June 30, 2003. Note that the reported MRFSS harvest in Wave 2 was 6,940 fish.

Interval	Charter harvest (number of fish)	Charter harvest (% by interval)	MRFSS wave 3 harvest portioned into approximately 2 week intervals
May 1 - 15	6,388	17.15	28,198
May 16- 31	7,087	19.03	31,284
June 1 - 15	12,106	32.50	53,439
June 16 – 30	11,669	31.33	51,510
Total	37,250	100	164,431

Table 2. Estimate of the number of migratory striped bass harvested in the spring 2003 Chesapeake Bay fishery as determined from length data collected in Maryland's **Volunteer Angler Striped Bass Survey**. The size specific probability of fish tagged on the spawning grounds in Maryland migrating to the Atlantic Coast through November of the first year at large year was taken from Dorazio et al. (1994). The distribution of the harvest in MRFSS wave three was proportioned into intervals that were approximately two weeks in duration and were based on the 2003 daily charter harvest in Maryland.

Length group (inches TL)	Probability of migration	MD DNR Volunteer Angler Survey								
		April 19 -30		May 1 -15		May 16-31		June 1 -15		April 19 - June 15
		Number measured	Estimated number of migrants	Number measured	Estimated number of migrants	Number measured*	Estimated number of migrants	Number measured**	Estimated number of migrants	Estimated season harvest
26	0.0528	0	0	0	0	1	21	6	169	
27	0.0831	0	0	1	18	3	97	7	311	
28	0.1283	3	16	1	28	2	100	4	274	
29	0.1930	15	124	7	293	4	302	1	103	
30	0.2797	23	276	7	425	3	328	0	0	
31	0.3868	14	232	6	503	1	151	1	207	
32	0.5061	18	390	9	988	5	990	1	270	
33	0.6247	13	347	11	1,491	3	733			
34	0.7300	18	563	18	2,850	7	1,998			
35	0.8146	8	279	10	1,767	1	319			
36	0.8771	20	751	19	3,615	8	2,744			
37	0.9206	8	316	15	2,995	9	3,240			
38	0.9496	10	407	13	2,678	8	2971			
39	0.9683	4	166	3	630	4	1,515			
40	0.9803	1	42	1	213	1	383			
41	0.9878	1	42	3	643					
42	0.9924	1	43	2	431					
43	0.9953	2	85	2	432					
44	0.9971	1	43	2	433					
45+	1	2	86							
Total measured		162	4,208	130	20,433	80	15,892	100	1,334	41,867

* The total number measured includes 20 striped bass that were less than 26 inches TL.

** The total number measured includes 80 that were less than 26 inches TL.

Table 3. Estimate of the number of migratory striped bass harvested in the spring 2003 Chesapeake Bay fishery as determined from length data collected in the **MDNR Charterboat Marina Survey** (with the 3 exception of the period June 1 - 15.) The size specific probability of fish tagged on the spawning grounds in Maryland migrating to the Atlantic Coast through November of the first year at large year was taken from Dorazio et al. (1994). The distribution of the harvest in MRFSS wave three was portioned into intervals that were approximately two weeks in duration and were based on the 2003 daily charter harvest in Maryland.

Length group (inches TL)	Probability of migration	MD DNR Charterboat Marina Survey								April 19 - June 15
		April 19 -30		May 1 -15		May 16-31		June 1 -15		
		Number measured	Estimated number of migrants	Number measured	Estimated number of migrants	Number measured	Estimated number of migrants	Number measured	Estimated number of migrants*	Estimated season harvest
26	0.0528	0	0	0	0	8	38			
27	0.0831	0	0	0	0	4	30			
28	0.1283	5	19	1	14	5	58			
29	0.1930	15	88	2	43	5	87			
30	0.2797	19	161	3	93	9	226			
31	0.3868	24	281	8	342	17	589			
32	0.5061	30	460	11	616	22	998			
33	0.6247	16	303	23	1,589	27	1,512			
34	0.7300	24	531	22	1,776	28	1,832			
35	0.8146	20	494	25	2,252	24	1,752			
36	0.8771	16	425	32	3,104	28	2,201			
37	0.9206	10	279	24	2,443	17	1,403			
38	0.9496	15	432	27	2,835	29	2,469			
39	0.9683	13	381	21	2,248	10	868			
40	0.9803	8	238	20	2,168	8	703			
41	0.9878	5	150	8	874	2	177			
42	0.9924	3	90	7	768	3	267			
43	0.9953	0	0	8	880	1	90			
44	0.9971	4	121	5	551	0	0			
45+	1	2	61	8	885	0	0			
Total measured		229	4,514	255	23,481	349	15,300		1,334	44,629

* The MD DNR Charter Boat Marina Survey ended June 5. The estimated number of coastal migrants harvested during the period June 1 - 15 was taken from Volunteer Angler Survey estimated presented in Table 2.