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Striped Bass, *Morone saxatilis*, spawning season and grounds in Virginia River with notes on concomitant fisheries

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Striped Bass, Morone saxatilis, spawning
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Virginia Marine Resource Report 82-2

A Report
Presented to
The Virginia Marine Resources Commission

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The Virginia Institute of Marine Science
in cooperation with
The Virginia Marine Resources Commission

**Striped Bass, Morone saxatilis, spawning
season and grounds in Virginia Rivers,
with notes on concomitant fisheries.**

Summary

Spawning time:

Noticeably influenced by changes in water temperature, spawning occurs between 10°C and 24°C with periods of peak spawning occurring at 15°C (59°F) - 20°C (68°F).

Progressing northward geographically, peak periods of spawning occur later in the season as warmer temperatures progress northward.

The above temperatures correspond to the period March 15 to June 15 which brackets the majority of spawning activity while peak spawning occurs between April 1 and May 1.

Spawning Areas:

Generally spawning areas range from the furthest point of salinity intrusion to a point as far as 30 miles upstream.

James River: mile 35-40 to Hopewell,

Chickahominy River: mouth to Walker's Dam,

Pamunkey River: West Point to mile 60,

Mattaponi River: West Point to mile 60, and

Rappahannock River: mile 40-45 to mile 70-75.

Concomitant Fisheries:

Shad: stake gill net, drift gill net, pound net, fyke net

Catfish: fish pot, pound net, fyke net, trot line

White perch: pound net, fyke net

Herring: pound net, fyke net

Eels: fish pot

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Introduction

The delineation of striped bass spawning grounds in Virginia waters is essential to our future protection of this valuable resource. In the Virginia tributaries of the Chesapeake Bay region, there have been very few studies which present direct evidence of striped bass spawning activity (Table 1). Tresselt (1952) attempted a pelagic egg survey of all major Virginia rivers using anchored plankton nets during April and May of the 1950 spawning season. The study was severely limited by inadequate sampling effort over space and time, by the lack of quantitative, concurrent collections, and by the resulting highly variable data set. Although eggs were collected in all rivers, only in the Mattaponi River were they collected in appreciable numbers. In an extension of Tresselt's work, Massmann, Ladd and McCutcheon (1952) described spawning activity in the Rappahannock River during spring 1951. Although utilizing anchored plankton nets, Massmann et al. (1951) provided useful temporal data by weekly sampling for eggs from 26 March - 4 June 1951. In an unpublished thesis, Rinaldo (1971) systematically surveyed the York-Pamunkey rivers for the presence of eggs and larvae during April - July 1966. The sampling design followed that of Massmann et al. (1966) and revealed patterns in spawning intensity, location and duration. Finally, Merriner et al. (1980) reported on incidental catches of M. saxatilis eggs and larvae in an entrainment study at the VEPCO Nuclear Power Station near Hog Island on the James River. Currently, an intensive three-year survey of striped bass spawning grounds in Virginia rivers is being conducted by Planktology Department personnel of the Virginia Institute of Marine Science. The study, supported by the National Marine

Fisheries Service as part of the Chafee Emergency Striped Bass Amendment, is designed to provide data on the intensity, duration and location of spawn during the period 1980 - 1982. Presently, analysis of spawning activity in the York River system during spring 1980 is complete (Grant and Olvey, 1981) and samples resulting from 1981 surveys of the James and Chickahominy rivers are in final stages of analysis. During spring 1982, an intensive survey of the Rappahannock River is planned.

This report summarizes existing knowledge on the location and times of spawning of striped bass in Virginia waters, updates information being gathered by ongoing surveys, and comments on commercial fishing activities conducted on potential striped bass spawning grounds. The resulting discussion is intended to augment pending decisions of the Virginia Marine Resources Commission related to management of striped bass fisheries. The spawning grounds of the striped bass correspond approximately to specific VMRC coded water bodies. Reported landings within these VMRC designated areas therefore are a reasonable approximation of the spawning area landings, and are used in this report to that purpose.

Spawning Season

Spawning peaks of striped bass are apparently triggered by noticeable changes in water temperature and, thus, vary greatly from season to season. (Setzler et al., 1980). Spawning activity in Virginia rivers has been directly observed (as indicated by the presence of viable eggs in plankton collections) during April and May (Table 1). These data indicate that mean water column temperatures of 10 - 24°C bracket spawning activity with peak abundances of eggs occurring in water temperatures of 15°C (59°F) - 20°C (68°F). Given normal variability in meteorological conditions and the inherent inadequacies of sampling methodology, spawning activity in Virginia waters can be expected between the period mid-March through early June of each year.

Spawning Grounds

Gravid fish ascend the rivers to the tidal freshwater areas where spawning occurs. As with temporal considerations, the exact area of spawn will vary yearly due to prevailing meteorological conditions which affect salinity distributions. As an example, the current drought condition (1980-1981) has significantly increased salinities in normally oligohaline portions of Virginia estuaries. As a result, spawning activity can be expected to be displaced upriver from "normal" spawning areas.

Spawning locations in river miles from the river mouth is summarized for all Virginia rivers in Table 1. It is important to note that the actual location of any individual spawning event is not directly measured by the presence of planktonic eggs. Tidal excursions of eggs may account for displacements of up to 8 miles in either direction depending on current direction and magnitude. In the James River, spawning has been documented to occur between J25 (vicinity of Surry Power Station) and J66 (vicinity of Turkey Island Cutoff). Spawning in the Chickahominy may be limited to only the first 4-6 river miles. In the case of the Chickahominy, however, tidal excursions of eggs may solely account for their presence in the river. Thus, the conclusion that spawning takes place in the Chickahominy may be erroneous.

In the Pamunkey and Mattaponi rivers spawning occurs from the river mouth (P31 and M31) to P60 (Liberty Hall on the Pamunkey) and M43 (Wakema on the Mattaponi). Spawning on the Rappahannock River occurs between Mallory's Point (R40) to Leesville (R58).

Landings of striped bass in these selected spawning areas for 1977-1981 are presented in Table 2. The Potomac River and upper Rappahannock River support the largest landings of striped bass in the state as seen in Fig. 1.

Concomitant Fisheries

Data (Table 3) on pound nets were collected by semi-monthly aerial counts

of actively fishing pound nets. Counts of fyke nets, anchor and stake gill nets were collected by observers in small vessels at the peak of the Alosa spawning run in mid-April. Information on drift gill nets was obtained from interviews with inspectors from VMRC, seafood dealers who bought shad, agents for VMRC and fishermen. The number of nets listed for each gear are minimal estimates of actively fished gear.

The mileages listed represent the areas normally utilized when these gears are fished.

Several other commercial fisheries operate in the area representing potential striped bass spawning grounds (Table 3). There is a large stake gill net, drift gill nets, pound, and fyke net fisheries for shad on the rivers in or just below the "spawning areas". Also present is a substantial catfish fishery utilizing pound nets, fyke nets, trot lines, catfish pots and sometimes haul seines. Other species such as white perch, herring, and some freshwater species are taken in the pound nets, and fyke nets. An eel pot fishery on some rivers overlaps striped bass spawning range. Landings of these species in the major striped bass spawning zones are shown in Table 4.

Table 1. Summary of investigations of striped bass spawning activity in Virginia tidal waters. Temporal and spatial considerations based on presence of eggs.

Source	River Systems	Spawning Dates	Spawning Locations (River miles from mouth)
Tresselt (1952)	Pamunkey	6 - 13 April 1950	Station D
	Mattaponi	25 - 30 April 1950	Station D-B
	James	9 - 10 May 1950	Station B-H
	Chickahominy	5 - 6 May 1950	Station B-E
	Rappahannock	17 - 20 May 1950	Station D-H
Massmann et al. (1952)	Rappahannock	23 - 27 May 1951	Mallory's Point-Leesville
Rinaldo (1971)	Pamunkey	13 April - 10 May 1966	P35 - P60
Merriner et al. (1980)	James		J25 - J31
Grant and Olney (1981)	Pamunkey	16 April - 16 May 1980	P31 - P52
	Mattaponi	18 April - 9 May 1980	M31 - M43
Grant and Olney (study in progress)	James	22 April - 6 May 1981	J40 - J66
	Chickahominy	21 April - 6 May 1981	C0 - C04

Table 3. Number of nets fished during the spring fishery by river and river mile.

	Pound Net	Fyke Net	Stake Gill Net	Anchor Gill Net	Drift Gill Net
James River miles	35-70	35-55	35-55	35-70	45-60
number of nets	0	18	14	0	270-300
Chickahominy River miles	0-19	0-19	0-19	0-19	0-5
number of nets	0	0	0	0	6
Pamunkey River miles	30-60	45-55	40-42	30-60	30-60
number of nets	0	3	1	0	147
Mattaponi River miles	30-55	30-55	30-55	30-55	30-50
number of nets	0	0	0	0	111
Rappahannock River miles	40-65	40-70	40-70	40-60	40-70
number of nets	15	0	18	8	0

Table 4. Landings of selected species in Striped Bass spawning areas, 1977-1981.

YEAR	SPECIES	MARCH		SPECIES	APRIL		SPECIES	MAY		SPECIES	JUNE	
		LBS	\$		LBS	\$		LBS	\$		LBS	\$
1977	Alewives	12,404	869	Alewives	101,120	3,520	Alewives	10,854	326	Catfish	56,455	8,634
	Catfish	25,921	4,145	Catfish	50,921	9,715	Catfish	57,034	9,893	Shad	3	1
	Shad	18,859	10,402	Shad	16,395	5,872	Shad	1,539	216	White Perch	2,856	401
	White Perch	36,596	6,221	White Perch	15,792	2,631	White Perch	3,011	462			
1978	Alewives	292	26	Catfish	2,855	635	Alewives	55,949	2,238	Catfish	33,410	5,100
	Catfish	164	25	Shad	12,867	2,285	Catfish	56,156	8,424	White Perch	174	45
	Shad	6,320	1,801	White Perch	48	11	White Perch	4,018	803			
1979	Alewives	2,772	202	Alewives	50,976	2,803	Alewives	51,108	2,295	Alewives	150	8
	Catfish	3,163	626	Catfish	10,568	12,326	Catfish	15,990	2,718	Catfish	41,986	8,667
	Shad	5,697	2,039	Shad	3,860	1,273	White Perch	1,788	544	White Perch	170	43
	White Perch	15,149	2,758	White Perch	9,384	2,345						
1980	Alewives	669	67	Alewives	50,391	2,925	Alewives	46,574	2,329	Catfish	74,473	18,193
	Catfish	3,905	781	Catfish	20,707	5,055	Catfish	72,254	16,819	White Perch	331	100
	Shad	501	193	Shad	3,289	933	Shad	696	147			
	White Perch	5,411	1,879	White Perch	9,088	2,754	White Perch	2,348	704			
1981	Alewives	2,575	388	Alewives	14,341	861	Catfish	26,981	6,746	Catfish	1,975	474
	Catfish	10,004	2,505	Catfish	40,639	11,347	Shad	107	48	White Perch	3,282	1,149
	Shad	672	239	Shad	2,125	637	White Perch	875	306			
	White Perch	8,291	3,458	White Perch	6,859	2,057						

Upper
Rappahannock River
(377)

Table 4. Continued.

YEAR	SPECIES	MARCH		SPECIES	APRIL		SPECIES	MAY		SPECIES	JUNE	
		LBS	\$		LBS	\$		LBS	\$		LBS	\$
Pamunkey River (067)	1977	Catfish	4,804	1,096	Catfish	5,469	1,313	Catfish	6,927	1,593		
		Shad	103,586	45,352	Shad	194,560	58,462	Shad	7,000	984		
	1978											
	1979	Catfish	6,300	1,575	Catfish	6,439	1,926					
		Shad	40,866	8,260	Shad	16,000	4,000					
	1980			Shad	1,198	335						
	1981	Catfish	9,137	2,285	Catfish	31,803	7,951					

Table 4. Continued.

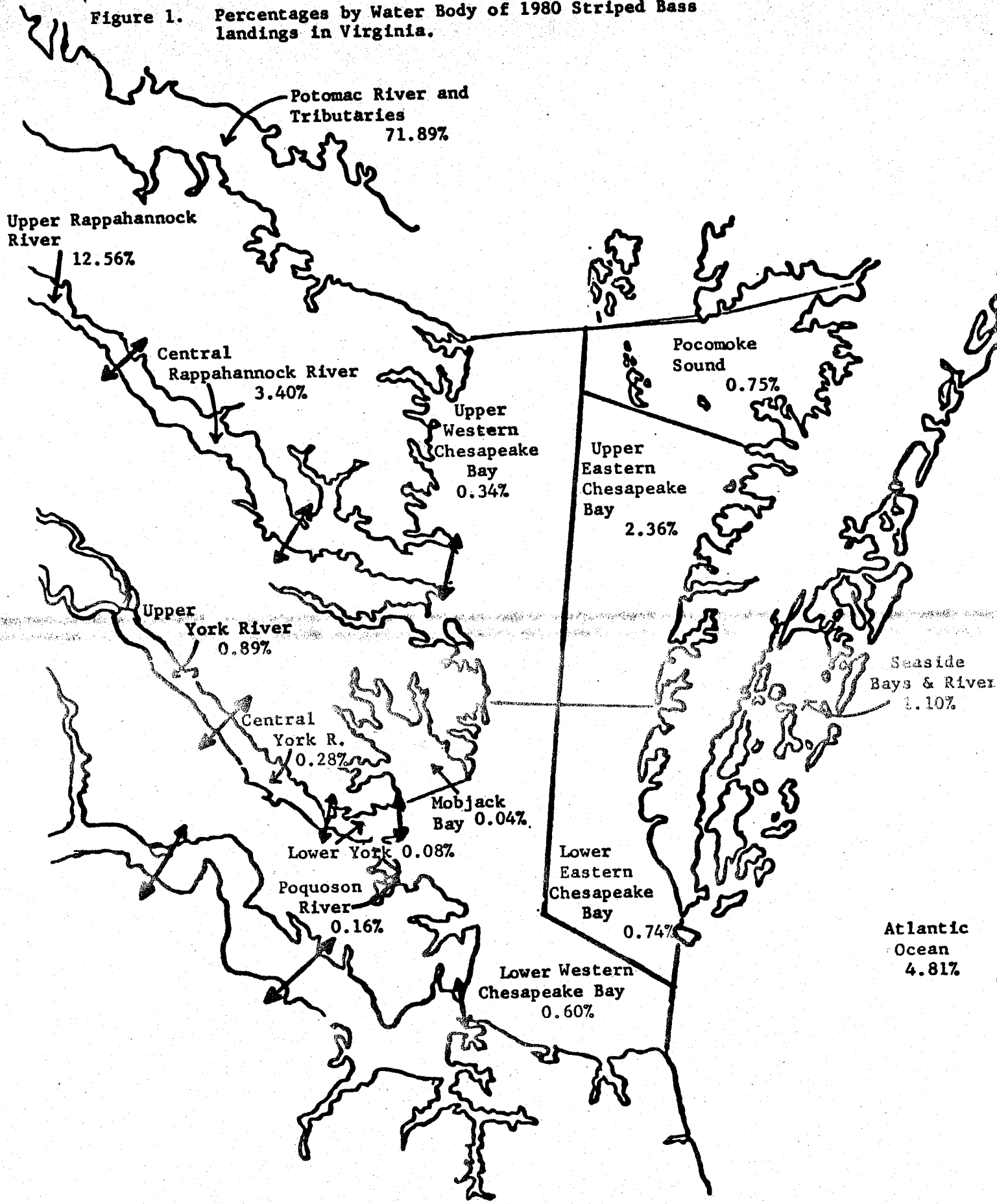
YEAR	SPECIES	<u>MARCH</u>		SPECIES	<u>APRIL</u>		SPECIES	<u>MAY</u>		SPECIES	<u>JUNE</u>	
		<u>LBS</u>	<u>\$</u>		<u>LBS</u>	<u>\$</u>		<u>LBS</u>	<u>\$</u>		<u>LBS</u>	<u>\$</u>
1977	Catfish	54,818	13,025	Catfish	137,393	32,976	Catfish	149,060	34,283	Catfish	105,885	24,353
1978												
1979	Catfish	11,754	2,938	Alewives	759	53	Alewives	39,900	1,995	Catfish	57,451	14,362
	Shad	16,665	3,294	Catfish	21,398	6,419	Catfish	19,416	5,825			
	White Perch	212	42	Shad	2,589	544						
1980							Catfish	95,547	21,714	Catfish	75,452	17,388
1981	Catfish	15,229	3,808	Catfish	76,974	19,244	Catfish	30,813	7,704	Catfish	30,182	7,546
	Shad	2,000	800									

Upper
James River
(337)

Table 4. Continued.

YEAR	SPECIES	MARCH		SPECIES	APRIL		SPECIES	MAY		SPECIES	JUNE		
		LBS	\$		LBS	\$		LBS	\$		LBS	\$	
Chickahominy River (013)	1977			Catfish	10,291	2,470	Catfish	16,103	3,704				
	1978	Catfish	2,890	665	Catfish	13,657	3,203	Catfish	40,449	9,304	Catfish	16,323	3,754
	1979	Catfish	3,783	946	Catfish	2,140	642	Catfish	9,704	2,911	Catfish	14,567	3,641
	1980	Catfish	2,614	575	Catfish	11,611	2,554	Catfish	13,739	3,254	Catfish	8,755	2,189
	1981	Catfish	6,092	1,523	Alwives	96,950	14,543						
					Catfish	16,454	4,113						

Figure 1. Percentages by Water Body of 1980 Striped Bass landings in Virginia.



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