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Oyster Spatfall in Virginia Rivers: 1982 Annual Summary

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MARINE RESOURCE SPECIAL REPORT



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Virginia Institute of Marine Science Gloucester Point, Virginia 23062

1982 Annual Summary

OYSTER SPATFALL IN VIRGINIA RIVERS

BY

Dexter Haven and James Whitcomb

The Virginia Institute of Marine Science (VIMS) conducts weekly surveys from June through early October to obtain oyster spatfall information. Spat counts are made from oyster shells strung on wire and suspended from stakes on public and private beds. The number of spat on shells are counted each week of the spawning season to determine the potential of a particular area for receiving a strike and to predict the most likely period the strikes will occur.

A moderate or heavy strike on shellstrings usually indicates a significant strike on exposed bottom cultch. This is especially true for cultch planted a week or two prior to the peak set.

However, a good strike on shellstrings in some localities may not always be accompanied by a good spatfall on naturally occurring bottom shell material or on shells planted too early or too late in the season. Bottom shells are often so fouled by other marine life that no room is left for small spat to attach. Moreover, even with a reasonable spatfall, survival of spat on the bottom in saltier waters may be extremely low due to predators such as oyster drills and blue crabs which eat the small spat.

Usually a light set of spat on shellstrings indicates a poor set on bottom cultch. During certain exceptional years, due probably to the absence of predators and fouling, a light set on our shellstrings may be accompanied by an above average set on the natural bottom.

The number of spat which set in one week on the smooth side of 10 shells is determined by microscopic examination; the average of the 10 shells is shown in this report as spat-per-shell-per-week. Weekly set

is arbitrarily rated as follows: fair, 0.1 to 1.0; moderate, 1.1 to 10; heavy, 10.1 to 100. As an index of total seasonal spatfall, the weekly sets are summed in this report for each station (total seasonal set). In evaluating setting levels, it should be recognized that in certain rivers, such as the Rappahannock, York and Potomac, the set is typically very low or zero in many sections and only fair in others. Other systems, including the lower James and Piankatank Rivers, Mobjack Bay and Seaside of the Eastern Shore, typically receive a moderate or heavy set and, as a result, often produce quantities of seed oysters or market oysters.

The shellstring study is supplemented each year in late fall by counts of spat on natural bottom cultch. This study is made after seasonal setting has stopped and indicates how many spat have survived. Half-bushel samples of bottom cultch were collected from selected locations with a dredge during the fall of 1982. Numbers of oyster spat setting on cultch were counted. The data are expressed as number of spat per bushel.

Acknowledgements

We wish to express appreciation to the Virginia Marine Resources Commission personnel who did the work of putting out and collecting the shellstrings in the Mobjack Bay area, in the Piankatank River, Great Wicomico River and the Potomac River. Samples were collected by VIMS personnel at Wachapreague. The cooperation and assistance of all the above and their supervisors is gratefully acknowledged.

Drafts and final copy of this report were prepared by the VIMS Report Center.

Summary of Setting for 1982

The 1982 season was above average in the set on shellstrings when compared with the past five years on record.

The James River shellstrings began catching spat the first week of July and continued into October, except at Deepwater Shoal. At most locations the set was better than in 1981. However, the records for the past three years have been above average when compared with the 1960-1979 period.

Setting was above average in the Potomac River, Great Wicomico River, Piankatank River, Mobjack Bay and the York River. Setting was average or below average in the Ware River and in the East River when compared with the past four years.

A single station at the VIMS pier in Wachapreague had a moderate set which was higher than that found in the past two years.

James River

The spatfall on shellstrings in the James River was high in comparison with sets of the past ten years. However, it was lower than in 1981 on all stations except at Brown Shoal; there it was slightly higher than in 1981. Setting began in the first week of July and extended until the first or second week of October. At all stations, except Brown Shoal and Point of Shoals, a peak in setting appeared during the first two weeks in August. Brown Shoal had a peak in the middle of July. Upriver, a secondary peak often occurred during September.

Samples of bottom cultch dredged from the oyster bars adjacent to the shellstring stations showed a decline of approximately forty per cent in spatfall on the bottom cultch when compared to 1981 spatfall. However, the set on natural bottom for 1982 shells (when compared to the set of the 1960-1979 period) is above average for the period since 1960. A summary of the 1982 spat counted in bushel samples of bottom material collected during October and November 1982 follows here: Nansemond Ridge - 128; Naseway Shoal - 220; Brown Shoal - 116; Wreck Shoal inshore - 830; Wreck Shoal offshore - 427; White Shoal - 286; Gun Rock - 218; Thomas Rock - 220; Point of Shoals - 78; Horsehead - 744; and Deepwater Shoal - 180.

York River

The total seasonal set at the VIMS pier in Gloucester Point increased from 6.7 spat in 1981 to 16.0 spat in 1982. The set had already started when the station was established on the first week of July and extended to the middle of September, peaking in the middle of August. This is considered moderate for this area.

The number of spat setting on bottom cultch in the York River ranged from very low to fair. A summary of the 1982 spat counted in bushel samples of bottom material follows here: Green Rock - 6; Pages Rock - 10; Aberdeen Rock - 0; and Bells Rock - 160.

Mobjack Bay

At Browns Bay setting occurred from the last week of June to the first week of October. The total set in 1982 (36.0 spat) was higher than in 1981 (10.8 spat) but much lower than in 1980. The heaviest set occurred from the first week of August through the first week of September.

At Tow Stake the setting extended from the first week of July through the first week of October. The total set (61.2 spat) was lower than the two previous years but higher than 1978 and 1979. The peak set was at the beginning of July.

Ware River

The 1982 spatfall in the Ware River off Wilson Creek was the lowest in the past five years, with a total seasonal set of 27.5 spat. Setting began the second week of July and continued for seven weekly periods. However, almost all of the spatfall took place in a single week, the second week of July.

East River

The total seasonal set in the East River was 33.3 spat, the lowest in the past five years. Setting began the first week of July and continued through the third week in September. Approximately one third of the set occurred in the third week of August, the period of maximum set.

Pepper Creek

In Pepper Creek the total seasonal set was 46.4 spat, higher than any of the past four years except 1980. Setting began the last week of June and continued through the last week of September with a peak during the third week of August.

Piankatank River

At three of the four stations the seasonal set was ranked as high (ranging from 36.0 spat to 61.2 spat) and at the fourth station the set was lower than at any time in the past three years. At the latter station the set was 23.3 spat.

The numbers of spat surviving on bottom cultch in late fall were high but approximately twenty-four percent lower than in 1981. Counts per bushel were: Three Branches - 264; Burton Point - 376; Cape Tune - 278; Island Bar - 340; Palace Bar - 476; and Ginney Point - 328.

Rappahannock River

There were no shellstring stations in the Rappahannock River in 1982. Surveys of the natural cultch on the bottom showed the following bushel counts: Hog House - 6; Smokey Point - 14; Morattico - 0; and Drumming Ground - 118. In the Corrotoman River the counts per bushel were: Corrotoman Point - 166; Shelton Bar - 240; and Black Stump - 280.

Sets on natural cultch in the Rappahannock would be termed low, and the sets on natural cultch in the Corrotoman River would be termed moderate.

Great Wicomico River

The set on shellstrings in the Great Wicomico system was the best set in the past ten years. Setting began approximately during the

last week of June and continued to approximately the third week of September. Downriver, there was a peak in the set in July and a second during August. Upriver, two peaks appeared in July, one early and another late in the month, but the magnitude of set upriver was much higher.

The bushel samples dredged from rocks near the shellstring stations exceeded the count from the same locations in 1981 in every instance, except at Rogue's Point. All of the sets would be termed moderate to very heavy. The counts per bushel were as follows: Dameron Marsh - 1246; Fleet Point - 1198; Whaley - 432; Ingram - 542; Haynie Point - 818; and Rogue Point - 336.

Potomac River

The set in the Potomac River was higher than the previous set on any station for the past five years, except for one station. At Hog Island in 1978 the set was approximately the same as the set was in 1982. The sets at Cornfield and Jones Shore were the highest ever recorded. The set at the remaining stations would also be termed moderate for the area.

The setting at Cornfield and Jones Shore peaked near the end of August, but the set continued to the month of October. The remaining stations at Great Neck, Coan River, Hog Island and at Thicket Point peaked in September. Jones Shore also showed a second peak in September.

Eastern Shore Seaside

The set on a shellstring suspended at the VIMS pier in Wachapreague ranked third highest in the period of the past five years. The set would be termed moderate for this area. It had started when the first shellstring was hung.

VIRGINIA INSTITUTE OF MARINE SCIENCE
AND
SCHOOL OF MARINE SCIENCE,
THE COLLEGE OF WILLIAM AND MARY
GLOUCESTER POINT, VIRGINIA 23062

Spatfall on Shellstrings*
Annual Summary
1979-1982

JAMES RIVER

Dates Exposed**	Nansemond Ridge				Naseway Shoal [●]			Brown Shoal			
	1979	1980	1981	1982	1980	1981	1982	1979	1980	1981	1982
Jun 18-25	0.0	--	--	--	--	3.7	--	--	--	0.2	--
Jun 25-29	0.0	0.0	--	0.0	--	--	0.0	--	--	--	0.0
Jun 29-Jul 8	0.0	0.0	0.9	0.0	0.0	8.2	0.0	0.1	0.0	2.1	0.0
Jul 8-13	0.1	0.1	--	0.5	0.0	20.5	1.0	0.3	0.1	2.6	0.4
Jul 13-20	0.1	0.1	11.7	2.1	0.4	61.8	6.1	0.5	0.0	2.9	4.7
Jul 20-27	--	0.1	7.3	1.0	0.3	14.3	16.8	0.4	0.4	1.1	3.0
Jul 27-Aug 3	--	--	8.2	3.4	2.7	130.5	--	0.4	0.0	3.4	1.4
Aug 3-10	3.1	0.1	1.9	3.1	51.0	40.7	24.7	0.2	2.5	5.1	3.3
Aug 10-17	3.3	1.8	1.6	3.8	50.5	23.8	10.2	2.0	7.8	1.7	1.8
Aug 17-24	0.4	0.8	--	2.8	37.2	3.5	10.2	0.0	6.1	1.1	3.3
Aug 24-31	--	0.6	--	--	9.4	2.7	3.9	0.4	10.1	0.2	1.0
Aug 31-Sep 8	0.1	--	--	--	34.5	0.8	--	0.5	8.3	0.2	4.1
Sep 8-14	0.3	--	--	--	24.0	0.9	1.3	1.5	5.8	0.3	0.6
Sep 14-21	--	--	0.0	1.2	9.2	0.3	3.1	1.3	--	0.1	2.6
Sep 21-28	--	2.1	0.1	0.3	--	0.5	1.7	0.0	--	--	0.5
Sep 28-Oct 5	--	--	--	--	3.5	0.5	--	--	2.0	--	--
Oct 5-12	--	--	--	1.5	--	0.3	1.8	0.0	--	0.1	1.8
Oct 12-20	--	--	--	0.0	--	--	0.2	--	0.2	--	0.5
TOTALS	7.4	5.7	31.7	19.7	222.7	313.0	81.0	7.6	43.3	21.1	29.0

* Shows spat per shell (smooth side only).

** Dates shown are for 1981. Dates in other years were approximately the same.

● Not sampled in previous years.

General Guide to Setting:

0.1 to 1.0 spat per shell = fair
1.1 to 10.0 spat per shell = moderate
10.1 to 100 spat per shell = heavy

Dates Exposed**	Miles Watch House				White Shoal				Wreck Shoal			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 18-25	--	--	} 0.4	0.0	--	--	} 1.6	0.0	--	--	} 1.1	0.0
Jun 25-29	--	--			0.0	--			--	0.0		
Jun 29-Jul 8	0.0	0.0	--	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0
Jul 8-13	0.5	0.0	1.5	0.6	0.0	0.1	7.9	0.9	0.3	0.2	3.8	1.1
Jul 13-20	0.1	0.0	7.8	0.8	0.1	0.6	17.9	2.9	--	0.3	24.4	3.3
Jul 20-27	0.7	0.2	0.8	1.6	0.7	0.0	7.4	1.3	0.5	0.8	5.5	3.0
Jul 27-Aug 3	0.2	0.0	5.7	2.3	1.6	0.2	13.5	5.9	1.2	0.4	9.3	4.3
Aug 3-10	0.4	0.7	2.0	1.9	2.7	2.4	12.9	5.9	1.8	2.0	2.9	7.5
Aug 10-17	2.9	1.5	0.7	5.0	2.0	7.8	4.0	2.9	} 1.5	2.7	2.3	4.7
Aug 17-24	0.0	5.6	0.5	0.4	0.5	3.4	2.6	2.8		1.3	1.6	2.2
Aug 24-31	0.1	2.6	1.6	1.1	0.2	4.0	0.7	2.2	0.2	2.8	0.1	1.9
Aug 31-Sep 8	0.2	5.2	0.0	4.1	0.3	5.7	0.3	2.8	0.1	2.7	0.0	7.1
Sep 8-14	0.0	1.8	0.1	0.7	0.1	9.3	0.2	2.6	0.5	1.7	0.4	0.7
Sep 14-21	0.8	0.6	0.0	0.0	0.8	3.9	0.1	0.3	0.7	1.0	0.0	0.6
Sep 21-28	} 0.6	} 0.7	--	0.0	} 0.0	} 1.7	0.0	1.0	0.1	0.4	0.1	0.2
Sep 28-Oct 5			--	--			0.0	0.2	0.1	0.3		
Oct 5-12	} 0.0	--	0.2	0.0	} 0.0	0.5	0.0	0.2	} 0.1	0.0	0.1	0.1
Oct 12-20		--	--	0.0		--	--	0.2		0.0		
TOTALS	5.9	18.9	21.3	18.5	9.0	39.6	71.0	31.9	6.9	16.4	51.9	36.7

Dates Exposed**	Point of Shoal				Mulberry Swash				Horsehead Bar				
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982	
Jun 18-25	--	--	} 0.6	0.0	--	--	} 3.4	0.0	--	--	} 2.1	--	
Jun 25-29	--	--			0.0	--			--	0.0			0.0
Jun 29-Jul 8	0.0	0.0	3.2	0.0	0.0	0.0	2.7	0.0	0.0	0.0	2.7	0.0	
Jul 8-13	0.1	0.0	4.6	0.6	0.6	0.0	8.5	0.1	0.1	0.0	7.2	1.8	
Jul 13-20	0.0	0.0	40.1	0.4	0.0	0.0	51.2	4.2	0.0	0.0	40.3	0.7	
Jul 20-27	0.0	1.9	3.2	1.4	0.0	0.6	1.7	3.2	0.0	2.7	3.9	1.1	
Jul 27-Aug 3	0.4	--	11.6	1.9	0.6	0.2	--	7.6	0.6	0.0	6.0	5.5	
Aug 3-10	0.4	5.2	2.2	3.0	0.7	4.9	7.0	18.8	1.4	2.6	3.9	2.2	
Aug 10-17	1.0	23.4	3.3	3.1	1.2	7.4	2.4	8.3	0.7	9.1	2.2	1.9	
Aug 17-24	0.0	17.9	4.1	0.3	0.5	2.6	1.9	2.1	0.0	0.2	2.6	0.7	
Aug 24-31	0.1	1.1	1.3	0.2	0.3	2.0	0.5	1.3	0.2	1.8	0.7	0.0	
Aug 31-Sep 8	0.0	0.4	0.1	5.0	0.0	1.0	0.0	13.8	0.0	0.1	0.1	1.8	
Sep 8-14	0.0	2.2	0.0	1.3	0.1	0.8	0.2	0.8	0.0	3.2	0.1	0.2	
Sep 14-21	0.2	3.1	0.0	1.3	0.0	0.5	0.0	0.1	0.0	1.0	0.1	0.1	
Sep 21-28	0.0	0.3	0.0	0.7	} 0.0	--	0.4	0.4	} 0.0	0.0	0.0	0.0	
Sep 28-Oct 5	} 0.0	} 0.3	0.0	0.1		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Oct 5-12			0.0	0.0	0.1	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.3
Oct 12-20			0.0	--	0.2	0.0	--	0.0	0.0	0.0	--	--	0.0
TOTALS	2.2	55.8	74.3	19.5	4.0	20.3	79.9	61.6	3.0	20.7	71.9	16.3	

Dates Exposed**	Deepwater Shoal				Buoy 32		Buoy 36	
	1979	1980	1981	1982	1981	1982	1981	1982
Jun 18-25	--	--	} 4.1	--	} --	}	--	
Jun 25-29	--	--		0.0			--	--
Jun 29-Jul 8	0.0	0.0	4.5	0.0	--	--	--	
Jul 8-13	0.0	0.0	8.6	0.4	--	--	--	
Jul 13-20	0.0	0.0	21.5	0.9	--	--	--	
Jul 20-27	0.0	0.8	9.4	0.6	--	--	--	
Jul 27-Aug 3	0.5	0.3	2.9	2.4	--	--	--	
Aug 3-10	0.3	0.6	5.2	2.5	4.0		1.6	
Aug 10-17	0.7	1.8	2.8	2.2	} 4.2	}	1.6	
Aug 17-24	0.3	1.2	3.9	0.4			1.1	
Aug 24-31	0.4	0.2	1.5	0.3	3.7		1.1	
Aug 31-Sep 8	0.4	0.0	0.1	2.5	0.3	NOT SAMPLED	0.1	NOT SAMPLED
Sep 8-14	0.0	0.1	0.3	0.5	0.0		0.2	
Sep 14-21	0.0	0.1	0.1	0.1	0.0		0.0	
Sep 21-28	} 0.0	0.1	0.0	0.0	0.0		} 0.0	
Sep 28-Oct 5			0.1	} 0.0	0.0			0.0
Oct 5-12		0.0	0.0		0.0			--
Oct 12-20			--	0.0	--			
TOTALS	2.6	5.2	65.0	12.8	12.2		4.6	

Dates Exposed**	YORK RIVER				WARE RIVER				EAST RIVER								
	VIMS Ferry Pier				Off Wilson's Creek Station 12				Mouth Station 6								
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982					
Jun 18-Jul 1	0.0	0.0	--	--	0.0	1.1	1.2	0.0	0.0	1.7	0.8	0.0					
Jul 1-8	0.0	0.0	0.1	--	1.7	0.3	6.4	0.0	0.0	0.9	3.2	0.1					
Jul 8-15	0.0	0.0	0.0	0.3	6.5	3.2	0.1	23.0	1.3	0.2	2.2	1.9					
Jul 15-22	0.3	0.1	0.0	1.7	25.6	0.1	0.7	2.2	1.3	1.2	8.8	0.6					
Jul 22-29	1.0	0.2	0.2	1.7	102.2	0.7	89.4	0.3	2.2	0.0	3.6	4.9					
Jul 29-Aug 5	0.6	0.5	0.0	0.5	0.9	0.0	45.7	0.8	4.6	0.2	3.0	6.1					
Aug 5-12	0.0	--	0.3	0.2	0.0	1.0	9.6	0.3	1.3	10.4	4.7	2.3					
Aug 12-19	0.3	10.3	0.9	1.6	27.6	8.0	17.0	0.8	8.4	69.6	67.3	0.5					
Aug 19-26	} 1.3	21.8	1.6	3.7	0.2	4.8	2.0	0.1	0.2	46.9	3.6	11.8					
Aug 26-Sep 2		6.1	0.6	0.4	0.2	2.1	3.8	0.0	0.1	0.0	1.9	2.0					
Sep 2-9	0.0	6.1	0.0	1.5	0.0	3.4	1.2	0.0	0.2	0.7	0.1	1.1					
Sep 9-16	1.6	1.7	0.4	3.2	0.2	0.0	0.0	0.0	1.6	0.2	0.1	1.0					
Sep 16-22	} 0.0	} 0.7	1.8	1.2	} 0.0	} 0.2	} 0.0	} 0.0	} 0.6	} 2.4	} 0.0	} 0.6					
Sep 22-25				0.0									0.0	0.0	0.0	0.0	0.0
Sep 25-30	} 0.1	} 1.0	} 0.7	--	} 0.1	} --	} 0.0	} 0.0	} 0.3	} --	} 0.1	} 0.2					
Sep 30-Oct 5				0.1									0.1	--	0.0	0.0	--
Oct 5-16				--									0.0	0.0	--	0.0	--
TOTALS	5.2	48.5	6.7	16.0	165.2	25.1	177.3	27.5	22.1	135.6	99.3	33.3					

Dates Exposed**	PEPPER CREEK				MOBJACK BAY				MOBJACK BAY			
	Mouth				Off Brown's Bay				Tow Stake			
	Station 7				Station 14				Station 13			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 18-29	0.0	0.0	0.2	0.0	0.0	—	0.0	0.0	0.0	1.8	0.7	0.0
Jun 29-Jul 7	0.0	0.0	0.7	0.1	0.0	0.1	0.3	0.4	0.1	0.0	3.4	0.0
Jul 7-14	0.0	0.2	0.3	0.1	0.0	0.6	1.1	1.0	0.0	1.4	0.4	17.5
Jul 14-20	2.9	2.7	0.0	0.4	0.1	1.0	0.6	1.4	6.0	0.0	0.0	14.3
Jul 20-27	0.9	4.0	10.9	1.5	1.0	9.9	0.0	3.0	3.2	0.6	5.8	6.3
Jul 27-Aug 4	3.2	4.9	1.5	2.8	1.3	6.4	0.4	1.5	0.3	0.0	3.4	2.7
Aug 4-10	0.3	19.6	0.7	5.9	1.3	49.6	2.4	5.8	0.4	0.3	66.4	9.5
Aug 10-17	8.1	36.6	2.6	0.6	5.7	35.9	2.7	0.8	4.3	9.0	9.4	0.5
Aug 17-24	2.7	32.3	0.3	10.0	—	171.6	1.5	4.7	7.4	81.0	1.3	5.8
Aug 24-31	2.3	12.7	1.4	5.6	—	13.0	0.2	5.4	} 0.0	2.8	0.9	1.5
Aug 31-Sep 8	2.1	6.2	0.8	7.4	—	27.0	0.1	2.6		0.1	0.1	0.8
Sep 8-15	4.9	3.8	0.7	3.6	—	6.5	0.2	6.2	0.2	0.6	0.1	0.1
Sep 15-21	—	2.5	0.4	2.6	—	8.8	0.7	1.2	0.1	0.4	1.3	1.5
Sep 21-28	} 0.6	0.8	0.0	5.1	—	2.2	0.2	1.0	} 0.2	0.4	0.0	0.2
Sep 28-Oct 5		—	0.3	0.7	—	—	0.0	1.0		—	0.1	0.2
Oct 5-16		—	0.1	—	—	—	0.4	—		—	0.0	—
TOTALS	28.0	126.3	20.9	46.4	9.4	332.6	10.8	36.0	22.2	98.4	94.0	61.2

Dates Exposed**	MILFORD HAVEN				PIANKATANK RIVER				PIANKATANK RIVER			
	Point Breeze				Three Branches				Burton Point			
	Station B				Station D				Station G			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 15-22	0.0	--	--		0.0	--	--	0.0	--	--		0.1
Jun 22-29	0.0	--			0.0	--		0.6	0.0	--		0.3
Jun 29-Jul 6	0.0	--	0.0		0.0	0.5		2.7	7.9	--	2.0	1.7
Jul 6-13	5.2	--	--		7.1	11.1	5.2	5.2	9.9	--	--	2.4
Jul 13-20	9.6	--	15.6		7.9	22.9	10.9	1.3	12.9	0.0	8.4	1.4
Jul 20-27	6.7	0.0	51.9		--	--	6.9	0.3	0.5	16.4	20.7	--
Jul 27-Aug 3	0.2		9.5		1.7	18.3	1.7	1.6	0.9	--	--	0.8
Aug 3-11	1.4	37.9	2.4		1.6	7.2	8.3	28.6	0.5	24.0	3.4	0.7
Aug 11-17	0.4	--	0.6		2.5	22.3	1.2	1.9	29.5	16.0	--	0.6
Aug 17-24	2.9	7.7	2.7		6.5	1.7	0.6	1.4	1.3	1.4		0.7
Aug 24-31	2.9	--			1.0	0.2		0.5	0.6	0.1	0.0	14.0
Aug 31-Sep 8	3.1	0.0	0.4		0.1	0.0	0.3	0.8	0.0	--	0.0	0.5
Sep 8-15	0.4	--	0.0		0.4	--	0.1	0.0	--	--	0.0	0.1
Sep 15-22	--	--	0.1		--		0.0	0.1	0.0	--	--	0.0
Sep 22-29	0.0	--			0.0	0.0		0.0	--	--	0.1	--
Sep 29-Oct 5	--	--	0.1		--	--	0.9	0.0	--	--	--	0.0
TOTALS\	32.8	45.6	83.3		28.7	84.2	36.2	45.0	64.0	57.9	34.6	23.3

NOT SAMPLED

Dates Exposed**	Palace Bar Station J				Ginney Point Station K				Twigg Branch Station L		Doctor Point Station M	
	1979	1980	1981	1982	1979	1980	1981	1982	1981	1982	1981	1982
Jun 22-29	0.3	—	} 0.0	0.1	0.0	—	} 0.0	0.1	—		—	—
Jun 29-Jul 6	0.0	0.0		3.4	0.0	0.0		3.7	—	—	—	—
Jul 6-13	9.9	29.1	—	6.4	48.0	3.0	4.4	6.2	—		—	—
Jul 13-20	145.1	70.5	12.6	—	—	2.0	21.0	15.1	—		—	—
Jul 20-27	11.6	5.0	46.8	1.7	30.6	5.9	2.5	4.2	—		—	—
Jul 27-Aug 3	0.6	82.1	2.9	9.6	0.1	84.9	—	11.0	—		—	—
Aug 3-11	3.5	71.3	10.5	23.7	0.0	23.0	3.3	0.8	—		—	—
Aug 11-17	5.5	0.9	2.6	4.5	20.1	15.7	3.1	6.6	0.9		2.9	—
Aug 17-24	1.4	—	1.0	2.1	0.3	36.0	—	2.1	2.4		—	—
Aug 24-31	3.0	4.4	} —	6.5	0.0	3.4	} —	9.1	—		—	—
Aug 31-Sep 8	1.9	1.1		0.7	1.6	0.4		0.5	—	0.0	—	—
Sep 8-15	0.6	0.9	0.0	0.5	0.1	0.4	—	0.3	0.0		0.0	—
Sep 15-22	—	0.0	—	0.2	—	0.3	—	0.2			—	—
Sep 22-29	0.0	0.0	} 0.4	0.0	0.0	0.1	} 0.2	0.0	} 0.1		} —	—
Sep 29-Oct 5	—	—		0.0	—	—		0.0		—		0.0
TOTALS	183.4	265.3	76.8	59.4	100.8	175.1	34.5	60.0	3.4		2.9	

NOT SAMPLED

NOT SAMPLED

GREAT WICOMICO RIVER

Dates Exposed**	Dameron Marsh Station a				Cranes Creek Station b				Fleet Point Station c			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 22-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun 29-Jul 7	0.0	0.0	0.5	0.0	0.0	0.0	0.2	2.4	0.0	0.0	0.2	0.0
Jul 7-14	0.0	0.9	0.4	2.6	0.0	0.7	1.1	1.9	0.0	0.8	0.2	0.2
Jul 14-21	0.1	4.5	1.8	0.4	0.0	5.2	2.6	2.3	0.5	2.0	0.4	1.5
Jul 21-29	0.5	5.1	0.2	8.2	0.0	5.7	1.4	8.9	0.7	--	0.1	4.5
Jul 29-Aug 4	0.0	1.6	0.0	--	0.0	0.7	0.0	19.3	0.0	0.0	0.2	0.7
Aug 4-10	0.0	0.0	0.0	5.2	0.0	0.4	0.0	--	0.0	1.3	0.0	2.9
Aug 10-17	0.0	0.0	0.4	0.6	0.0	0.1	--	0.9	0.0	1.5	0.0	1.0
Aug 17-24	0.0	0.7	--	6.9	0.0	1.0	0.0	12.9	--	2.6	1.0	18.8
Aug 24-31	0.1	0.5	0.0	0.9	0.0	0.7	0.1	--	0.0	0.7	0.0	5.3
Aug 31-Sep 7	0.3	0.1	0.0	3.4	0.0	0.2	0.1	3.8	0.0	0.1	0.0	9.4
Sep 7-14	0.0	0.2	0.0	1.7	0.1	0.1	0.1	1.4	0.1	0.0	0.0	4.9
Sep 14-22	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0	1.6
Sep 22-28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	0.2	--
Sep 28-Oct 5	--	0.0	0.0	0.0	--	0.0	0.1	0.2	--	--	0.0	--
TOTALS	1.0	13.7	3.3	30.2	0.1	14.8	5.7	54.1	1.4	9.0	2.3	50.8

Dates Exposed**	Whaley Flats ● Station b				Haynie Point Station e				Shell Bar Station f			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 22-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Jun 29-Jul 7	0.0	0.0	--	0.2	0.0	0.0	0.2	2.4	0.0	0.0	0.0	0.6
Jul 7-14	0.0	0.2	0.0	2.3	0.8	1.4	1.9	16.2	0.6	3.4	2.2	25.1
Jul 14-21	2.2	--	0.9	1.8	0.0	1.3	19.2	3.8	4.5	8.3	--	3.9
Jul 21-29	0.1	3.4	0.8	12.4	0.6	6.2	4.4	13.9	10.5	--	35.1	18.9
Jul 29-Aug 4	0.0	1.0	0.0	3.5	0.5	1.8	0.0	--	0.0	2.6	0.0	10.3
Aug 4-10	0.0	0.0	0.0	3.3	0.0	0.4	0.0	9.1	0.0	3.5	0.0	54.6
Aug 10-17	0.0	0.0	0.2	0.3	0.0	0.0	0.0	5.7	0.1	0.0	0.0	5.5
Aug 17-24	0.0	0.4	0.7	5.3	0.0	0.4	0.1	2.6	0.3	0.1	0.0	1.6
Aug 24-31	0.0	0.3	0.0	1.2	0.1	0.7	0.1	7.9	0.0	1.0	0.3	5.2
Aug 31-Sep 7	0.0	0.1	0.0	3.3	--	0.1	0.0	10.0	0.0	0.5	0.4	0.3
Sep 7-14	0.0	0.1	0.0	2.7	0.0	0.4	--	1.7	0.1	0.8	--	--
Sep 14-22	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.3	0.0	0.0	0.1	0.0
Sep 22-28	0.0	0.0	--	0.3	0.1	0.0	0.0	0.3	0.0	0.1	0.0	2.7
Sep 28-Oct 5	--	0.0	--	0.0	--	0.0	0.0	0.0	--	0.0	0.1	--
TOTALS	2.3	5.5	2.6	36.9	2.1	12.7	25.9	74.9	16.1	20.3	38.2	129.0

Dates Exposed**	Hudnall's Dock Station f				Glebe Point Station g				Upper Middle Ground Station g		Island Bar Station g	
	1979	1980	1981	1982	1979	1980	1981	1982	1981	1982	1981	1982
Jun 22-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--		--	
Jun 29-Jul 7	--	0.0	0.6	21.9	--	0.0	0.4	76.2	--		--	
Jul 7-14	0.5	7.3	1.0	9.5	0.0	2.1	0.7	49.8	--		--	
Jul 14-21	1.8	9.8	22.3	11.0	0.0	1.9	118.8	11.1	--		--	
Jul 21-29	10.5	28.0	6.9	20.7	6.3	0.6	171.1	24.7	--		--	
Jul 29-Aug 4	0.2	6.3	0.3	23.5	0.0	3.1	--	79.5	--		--	
Aug 4-10	0.0	2.1	0.0	--	0.0	1.4	0.0	105.4	--		--	
Aug 10-17	0.0	0.0	0.0	7.3	0.0	0.0	--	2.8	0.0	NOT SAMPLED	0.0	
Aug 17-24	0.0	0.9	0.0	13.3	0.0	0.1	0.0	3.9	0.4	NOT SAMPLED	0.0	
Aug 24-31	0.0	1.2	0.1	3.6	0.1	1.2	0.6	4.3	0.0	NOT SAMPLED	0.0	
Aug 31-Sep 7	0.0	1.1	0.3	8.6	0.1	0.1	1.6	5.3	0.8	NOT SAMPLED	0.0	
Sep 7-14	0.0	0.2	0.1	1.1	0.0	0.0	3.4	0.8	0.0	NOT SAMPLED	0.0	
Sep 14-22	0.0	0.0	0.0	0.4	0.0	0.0	--	0.0	0.0	NOT SAMPLED	0.0	
Sep 22-28	0.0	0.0	0.0	2.0	0.0	0.0	0.2	0.5	0.0	NOT SAMPLED	0.0	
Sep 28-Oct 5	--	0.0	0.0	--	--	0.0	0.0	0.0	0.1	NOT SAMPLED	0.0	
TOTALS	13.0	56.9	31.6	122.9	6.5	10.5	296.8	364.5	1.3		0.0	

POTOMAC RIVER

Dates Exposed**	Cornfield				Jones Shore				Great Neck			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 18-29	0.0	--	0.0	0.0	0.0	--	0.0	0.0	0.0	--	0.0	0.0
Jun 29-Jul 6	0.0	0.0	2.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.3	0.0
Jul 6-13	0.0	0.5	--	0.2	0.0	0.6	0.7	0.1	0.0	0.0	0.0	0.0
Jul 13-20	0.0	12.8	0.0	0.2	0.2	26.9	1.6	0.2	0.0	0.3	0.1	0.0
Jul 20-27	0.0	9.5	--	0.4	0.3	4.9	0.0	0.3	0.0	0.0	0.0	0.0
Jul 27-Aug 3	--	2.5	0.0	0.3	} 0.0	--	0.0	0.7	} 0.0	0.2	0.0	0.0
Aug 3-10	--	1.4	1.3	4.8		1.9	3.8	1.6		0.0	0.0	0.0
Aug 10-17	0.0	1.2	} 15.8	10.2	} 0.0	1.4	} 3.2	5.3	} 0.0	0.0	} 0.0	0.3
Aug 17-24	} 0.0	5.6		13.9		0.6		6.5		0.2		0.0
Aug 24-31		0.0	0.0	--	66.9	0.1	2.5	45.8	0.1	0.0	0.0	0.7
Aug 31-Sep 7	0.1	0.0	0.0	67.0	0.5	0.5	0.1	101.6	0.2	0.4	0.0	0.5
Sep 7-14	0.0	0.1	2.0	24.1	0.0	0.0	0.0	13.9	0.0	0.0	0.0	1.1
Sep 14-21	} 0.0	0.0	0.6	5.5	--	0.0	1.8	59.0	--	0.0	0.0	0.0
Sep 21-28		0.0	0.0	--	7.2	0.0	0.0	0.0	62.6	--	0.0	0.1
Sep 28-Oct 5	--	0.0	--	0.6	--	0.0	--	1.1	--	0.0	--	0.1
TOTALS	0.1	33.6	21.7	201.3	1.0	36.9	15.0	298.7	0.2	1.2	0.5	2.9

Dates Exposed**	Coan				Hog Island				Thicket Point			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 18-29	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	—	0.0	0.0
Jun 29-Jul 6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Jul 6-13	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	—
Jul 13-20	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Jul 20-27	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1
Jul 27-Aug 3	}0.0	0.0	0.0	0.8	}0.0	0.0	0.0	0.0	}0.0	0.0	0.0	0.4
Aug 3-10		0.0	0.0	0.0		0.0	0.0	0.0				
Aug 10-17	}0.0	}0.0	0.0	0.0	}0.0	}0.1	}0.2	0.2	}0.0	}0.0	}0.2	0.2
Aug 17-24			0.1	0.0				0.0				0.2
Aug 24-31	}0.0	}0.0	0.2	0.3	}0.0	}0.0	}0.1	0.1	}0.0	}0.0	}0.3	0.0
Aug 31-Sep 7			0.0	0.0				0.1				0.8
Sep 7-14	0.0	0.0	0.0	1.0	0.1	0.0	—	0.4	0.0	0.0	0.0	1.5
Sep 14-21	—	0.0	0.0	0.0	—	0.0	0.6	0.2	—	0.1	0.0	0.8
Sep 21-28	0.0	0.0	0.0	0.2	—	0.0	0.1	0.0	0.0	0.0	0.4	0.2
Sep 28-Oct 5	—	0.0	—	0.0	—	0.0	—	0.4	—	0.0	—	0.2
TOTALS	0.0	1.3	0.3	3.9	0.2	0.3	1.4	2.0	0.3	0.7	0.9	3.4

Dates Exposed**	Yeocomico River				Ragged Point				King Copsico			
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Jun 18-29	--	--	0.1			--	--			--	--	
Jun 29-Jul 6	0.0	--	0.0			--	--			--	--	
Jul 6-13	0.0	--	0.0			0.0	--			0.0	--	
Jul 13-20	0.0	--	0.1			0.0	--			0.0	--	
Jul 20-27	0.0	0.0	0.5			0.0	--			0.0	--	
Jul 27-Aug 3	} 0.0	0.0	--	NOT SAMPLED	ALL ZEROS	0.0	--	NOT SAMPLED	ALL ZEROS	0.0	--	NOT SAMPLED
Aug 3-10		0.0	0.0			0.0	0.0			0.0		
Aug 10-17		0.0	0.0			0.0	0.0			0.0		
Aug 17-24		0.0	0.0			0.0	0.0			0.0		
Aug 24-31	} 0.0	0.0	0.0			0.0	0.4			0.0	0.0	
Aug 31-Sep 7		0.0	0.0	0.0	} 0.0	} 0.0	} 0.0	} 0.0				
Sep 7-14	0.2	--	0.1	0.0					0.0			
Sep 14-21	--	0.0	0.1	0.0					0.0			
Sep 21-28	--	0.0	0.0	0.0					0.0			
Sep 28-Oct 5	--	0.0	--			0.0	0.0			--	--	
TOTALS	0.3	0.0	0.9			0.0	0.4			0.0	0.0	

EASTERN SHORE, SEASIDE

Dates Exposed**	Machipongo River at Quinby Bridge				VIMS Pier at Wachapreague			
	1979	1980	1981	1982	1979	1980	1981	1982
Jun 22-29	0.0	0.0	0.7		0.0	0.3	1.0	0.2
Jun 29-Jul 8	0.0	5.0	3.7		0.0	0.2	0.7	0.1
Jul 8-15	1.5	8.9	2.0		66.4	1.8	1.2	1.0
Jul 15-22	6.2	1.2	4.9	NOT SAMPLED	42.4	2.3	2.2	5.6
Jul 22-30	3.9	0.2	0.7		59.2	0.6	1.6	2.1
Jul 30-Aug 6	44.2	0.9	2.1		1.2	0.7	0.1	3.5
Aug 6-13	1.4	1.0	0.2		180.2	0.7	0.0	19.6
Aug 13-25	0.6	0.0	0.0		18.6	0.0	0.1	15.1
Aug 25-Sep 3	} 0.0	2.4	0.0		} 0.3	6.5	0.0	4.0
Sep 3-9		13.4	0.0			9.0	0.0	0.6
Sep 9-15	} 0.1	0.0	0.0		} 0.2	2.3	0.0	--
Sep 15-25	} 0.1	--	0.0		} 0.0	--	0.0	} 2.5
Sep 25-Oct 2		--	--			--	--	
Oct 2-9		--	--	--		--		
Oct 9-Nov 1	--	--	--	--	--	--	--	
TOTALS	58.0	33.0	14.3		368.4	24.4	6.9	46.5



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