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Oyster Shoal Survey, Spring 1986

By

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Oyster Shoal Survey

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James P. Whitcomb

The objective of the annual oyster shoal survey in the spring was to determine the bushel counts prior to fall harvest for seed and to assess the condition of market and seed oysters on selected shoals. The selection of the shoal was based upon the importance of the shoal as a source of seed and/or market oysters, whether it was representative of a region of the subestuary, and whether the shoal has been sampled in the past.

The sample unit was three samples on each station with a twenty-four inch (opening) dredge with three inch teeth, running either downcurrent or upcurrent on parallel tracks, and retention of a one-half bushel measured sample representative of each haul. An additional sample was taken if the relationship between the variances and the mean bushel counts fell outside an acceptable range. The acceptable range in variance was based upon experiential knowledge and principle. The principle has been described in a memo dated April 2, 1986 (see Appendix).

The data collection included: the count of market oysters (over 3" in length), the count of small oysters (less than 3" in length but larger than the previous year's set), the count of spat, the count of new boxes, count of old boxes, count of gapers, list of predators, a description of fouling, bottom temperature, bottom salinity and observations of the condition of the oysters and the bottom. The data summary for each shoal included: the average count of oysters per bushel, the percent mortality based upon the numbers of gapers and recent boxes, a list of predators retained in the

dredge, a description of fouling, and a characterization of the reef as a seed or market reef.

In the past fifty years approximately 75% of the seed planted on private leases in Virginia came from the James River (Haven et al. 1981). All of the shoals in the James River are characterized as seed areas. The value of a bushel of seed to the industry is correlated to the potential for converting it into one or more bushels of market oysters at harvest time. If the count per bushel of small oysters in the seed equals the count of market oysters per bushel at harvest time, approximately 220-300 oysters, the bushel of seed would be described as good. In addition, if the count of spat in the bushel of seed exceeded the high count of small oysters, for example 300-400 spat, then there is an additional potential to convert the bushel of seed into more than one bushel of market oysters at harvest time.

Usually bushels of seed oyster from the James River with counts of oysters exceeding seven hundred (700) are termed a "good count." None of the samples in the spring survey averaged as high as 700. None of the samples contained enough spat to have potential of providing an additional bushel at harvest time of market oysters from the spat. The average spat count for all of the shoals in the James River in 1986 is 40 spat per bushel. The highest spat count per bushel occurred at the Wreck Shoal Inshore station and was 112 spat per bushel. However, the Wreck Shoal Inshore samples and Horsehead samples averaged between 600-700 oysters per bushel. The large numbers of small oysters per bushel on these two shoals (509 and 583, respectively) characterize these shoals as excellent sources of seed in 1986. The remaining shoals, except for Brown Shoal and Ridge, are characterized as satisfactory. The latter two shoals are characterized as below average. The shoals characterized as satisfactory would yield at

harvest time at least one bushel of market oysters for each bushel of seed planted.

The count of market oysters per bushel sample upriver from Brown Shoal was 64 per bushel. This is a high count for the market fraction in the bushel of seed and is the result of under exploitation of seed in the James River in the past twenty-five years. For example, in 1985 it was possible for three tongers to collect 80 bushels of "clean culls" on one of the Point O Shoals lumps in one day. The 80 bushels of "clean culls" sold for \$800.00. Underutilization of a seed area for several years creates a disincentive to harvest seed thereafter.

In the York River Pages Rock and Aberdeen Rock were sampled. Because of the extremely low level of oysters and spatfall, both shoals are characterized as below average market areas. It would be correct to describe these shoals as depleted.

In the Piankatank River the oyster shoals sampled were small in area. Burtons Rock has an area of 65 acres; Palace Bar has an area of 50 acres; and Ginney Point has an area of 18 acres. The bushel counts have decreased on these shoals since the 1985 fall survey. Burtons Rock decreased from 506 oysters/bushel to 390 oysters/bushel; Palace Bar decreased from 1,184 oysters/bushel to 821 oysters/bushel; and, Ginney Point dropped from 1,384 oysters/bushel to 575 oysters/bushel. Mud crabs were numerous on all of the shoals. Urosalpinx cinerea egg cases were observed on Burtons Rock for the first time since 1972. The percentage of market oysters ranged from 3-13 on the shoals sampled. Although Piankatank oysters are usually small, there are enough markets on Ginney Point Shoal to make it possible for "skiff type" fishing. Three bushels of oysters will yield one bushel of markets. The two other shoals sampled would be characterized as below average market

shoals. The Piankatank public shoals have been suggested as sources of seed for leases in the Piankatank River. The bushel count at Palace Bar would be characterized as an excellent seed area, but the low acreage of shell area would provide a very limited production of seed.

The Rappahannock River is a market area with a history of poor sets. The bushel counts of oysters ranged from 80 oysters/bushel at Bowlers Rock to 312 oysters/bushel at Drummond Ground. The average number of markets in a bushel of dredgings was 62 for the entire river. Three and one-half bushels of bottom cultch yields one bushel of market oysters almost anywhere in the river. Morattico Rock, Smokey Point and Hog House have the highest percentage of market oysters, and all of these shoals are fished intensively. Stylochus sp. were present in all samples, except at Bowlers Rock and Smokey Point, and were more numerous downriver. Recently the Marine Police have reported mortalities at Deep Rock, off Gwynn's Island, and from the mouth of the Rappahannock River as far upriver as Drummond Rock. The downriver shoals all had Stylochus sp. with highest number being observed at Broad Creek Rock off Deltaville.

The Corrotoman River has been suggested as a potential source of seed for surrounding lease holders. There is no seed production in the Corrotoman at present. The oysters/bushel ranged between 255-305. Grouping the four shoals sampled, the average count of markets was 46/bushel; the average count of small was 146/bushel; and the average count of spat was 81/bushel. The Corrotoman Point shoal and Black Stump would be characterized as satisfactory market areas producing one bushel of markets for each 2.75 bushels of cultch. The remaining two shoals were below average market shoals.

The shoals in the Great Wicomico River have a high set surviving from 1985. The bushel counts for oysters ranged from 624-1,300 oysters/bushel. All of the shoals, except Haynie Bar and Rogue Point, are characterized as satisfactory market areas. Local lease holders could use Haynie Bar and Cranes Creek oysters as seed because the small oyster count is satisfactory. There is no seed production in Great Wicomico at present. Upriver areas, Haynie Bar and Rogue Point, have dense growths of Gracilaria sp..

The spring survey did not show any serious mortalities, based upon gapers and recent box counts, on any of the shoals sampled. The highest mortality was at Parrot Island (10%). Since the poorest correspondence between setting on shellstrings and setting on bottom cultch was apparent on the James River shoals, as shown by the 1985 fall survey and the 1986 spring survey, the surface condition of the James River shoals should receive continued attention from VIMS researchers.

The data collected is shown in Table 1; and, Table 2 presents the average bushel counts, percent mortality, evidence of predation, description of fouling and characterization of the shoal. The appendix shows the location of stations in each river sampled.

Table 1. Summary, Spring 1986 Oyster Bar Survey.¹

Bar	Oysters			Bu Count	\bar{x} Count	Capex	Boxes		Pred.	Fouling	Bottom		Time	Tide	\bar{x} Depth	Loran Coord.	Observations Sample Prec., etc.
	Mkt	Sm	Spat				Rec.	Old			°C	‰					
<u>James R.</u>																	
Deepwater	50	288	36	374		0	10	12	-	Barnacles	19.5	5.3	1245	Ebb	5-11'	27351.4	Barnacles mod. to heavy in all samp.
	80	290	34	404		0	2	4	-	Barnacles					41362.6		
	100	258	22	380	386	0	10	0	-	Barnacles							
Horsehead	46	690	32	768		0	4	4	-	Barnacles	19.5	6.9	1440	Low slack	7-8'	27346.0	Barnacles light to mod. in all samp.
	52	488	22	562		0	4	4	-	Barnacles					41333.2		
	58	572	24	654	661	0	0	4	-	Barnacles							
Point O Shoals	54	384	36	474		0	0	8	Mud crab	Barnacles	19.8	8.3	1320	Ebb	5-6'	27344.0	Barnacles light set in all samp. Small mud crabs
	92	402	18	512		0	0	6	Mud crab	Barnacles					41310.6		
Wreck In	96	268	44	408	465	0	0	2		Barnacles							
	42	428	40	510		0	2	64	Mud crab	Barn., mussel	19.0	11.1	1350	Ebb	9'	27325.4	Barnacles light to mod. set in all samp., occasional mussel
	48	574	112	734		0	12	48	Mud crab	Barn., mussel					41304.1		
58	526	54	638	627	0	10	62	-	Barn., mussel								
Wreck Off	70	236	34	340		0	10	90	Mud crab	Barnacles	19.0	13.0	1230	Ebb	10'	27326.0	Barnacles light to mod. set in all samples
	48	244	40	332		0	16	40	Mud crab	Barnacles					41301.8		
	62	232	24	318	330	0	10	88	-	Barnacles							
Brown Shoals	10	18	8	36		0	0	20	Mud crab	Barnacles							First collection off rock (not used for mean). Barn. light set in all samples
	26	126	50	202		0	6	58	Mud crab	Barnacles	17.1	16.7	1050	High slack	8-9'	27296.5	
	24	106	44	174		0	10	48	-	Barnacles					41279.6		
Ridge	30	140	44	214	197	0	6	48	Mud crab	Barnacles							Barn. light set in all samples Barnacles light to mod. in all samples
	46	56	62	164		0	0	80	Stylochus	Barn., Micro- cionia, Colo- nial bryozoan	17.0	16.4	0930	High slack	8-9'	27284.1	
	62	42	64	168		0	8	92	Mud crab	Ditto					41225.2		
	62	78	40	180	171	0	4	68	Mud crab	Barnacles, Microcionia							
<u>York R.</u>																	
Page's Rock	2	2	2	6		0	0	20	Mud crab	Microcionia, Anomia, Cliona	17.5	17.0	0925	Ebb	5-6'	27361.5	Fouling light. Third sample omitted
	4	2	0	6	6	0	0	10	Mud crab	Ditto					41485.3		
Aberdeen	4	0	0	4		0	0	50	Mud crab	Microcionia	19.0	16.8	0900	Ebb	7'	27367.9	Precision guide- lines not appli- cable to low counts. Bottom shelly.
	10	8	2	20		0	0	16	Mud crab	Microcionia					41501.2		
	12	10	0	22	15	0	0	20	Mud crab	Microcionia							
<u>Piankatank R.</u>																	
Burton Point	50	134	146	330		0	28	50	Urosalpinx egg cases	Barn.-mod. Molgula-light Microcionia	17.5	14.7	1100	Flood	12-16'	27326.0	Above average tides
	36	154	280	470		0	32	54	-	Algae					41650.9		
	28	144	198	370	390	0	24	44	-								

Table 1 (Continued)

Bar	Oysters			Bu Count	\bar{x} Count	Capcr	Boxes		Pred.	Fouling	Bottom		Time	Tide	\bar{x} Depth	Loran Coord.	Observations Sample Prec., etc.
	Mkt	Sm	Spat				Rec.	Old			°C	‰					
<u>Piannkatank R. (Continued)</u>																	
Palace Bar	28	324	524	878		0	8	20	Mud crab	Barn.-light	18.0	14.5	1300	Flood	11'	27338.1	Small shells very plentiful
	10	390	384	784		0	22	38	Mud crab	Molgula-light						41658.3	
	50	268	484	802	821	0	14	36	Mud crab	Microciona							
Ginney Point	72	324	178	574		2	42	32	-	Barn.-light	18.5	14.0	1330	High	11'	27347.4	41659.7
	68	290	208	566		2	20	40	-	Molgula-light				slack			
	76	348	162	586	575	0	14	50	Mud crab	Mussels-light							
<u>Rappa R.</u>																	
Bowlers Rock	16	24	8	48		0	0	2	-	None	18.5	9.2	1050	Flood	9-10'	27472.4	Cinder abundant 47% markets Precision NA
	70	44	6	120		0	0	4	-	Barn.-mod.						41847.3	
	26	44	2	72	80	0	0	0	-	Barn.-mod.							
Morattico	80	22	2	104		0	0	26	-	Mussels-mod.	18.5	11.8	1200	Flood	14-15'	27446.4	1 Mys 60% markets
	68	42	18	128		0	2	20	-	Molgula-light						41819.5	
	80	44	22	146	126	0	0	10	Stylochus								
Smokey Point	106	34	8	148		1	2	6	Mud crab	Mussels-mod.	19.0	12.1	1335	High	14'	27417.8	64% markets 41779.0
	76	66	0	142		0	0	6	-	Molgula-mod.				slack			
	84	38	6	128	139	0	0	20	-								
Hog House	26	10	20	56		0	2	4	Stylochus	Molgula-light	18.2	12.7	1430	Slack	13-17'	27398.3	69% markets 41725.8
	54	18	6	78		0	0	10	-	Mussels-light							
	62	2	10	74	69	0	4	12	Callinectes								
Drummond	62	100	90	252		0	24	60	Stylochus	Barn.-light	17.0	14.2	138	Flood	14'	27378.9	Samples outside precision standards
	68	90	170	328		0	30	70	-	Molgula-light						41738.0	
	80	116	234	430		0	20	84	-	Mussels-light							
	44	128	64	236	312	0	16	56	-	Colonial bryozoan							
Parrots	44	40	68	152		0	36	20	Stylochus	Barn.-light	19.0	13.6	1530	Slack	9-10'	27361.9	41710.4
	64	84	56	204		0	12	22	Mud crab	Mussels-light							
	52	50	50	152	169	0	6	28	-	Molgula-light							
Broad Creek	82	84	284	450		0	38	34	Stylochus (several)	Barn.-light	18.0	14.2	0900	Flood	18-24'	27329.5	Length of wire in- adequate because of depth & rough water
																41696.3	
<u>Corrotoman R.</u>																	
Corrotoman Point	80	106	68	254		0	18	14	-	Barn.-light	17.5	14.2	1140	Flood	7-8'	27388.6	41750.0
	74	126	112	312		0	12	28	-	Mussels-light							
	94	86	76	256	274	0	14	26	Stylochus								
Middle Ground	16	242	22	280		0	8	32	-	Barn.-light	17.5	14.3	1300	Slack	15-16'	27386.2	30% buried shell 41763.0
	22	182	26	230		0	4	22	-	Barn.-light							
	22	240	14	276	262	0	4	34	-	Barn.-light							
Black Stump	74	194	80	348		0	8	20	-	Barn.-light	17.5	13.0	1356	Ebb	7-8'		
	82	140	54	276		0	8	18	-	Molgula-light							
	84	116	92	292	305	0	10	22	-	Colonial bryozoan							

Table 1 (Continued)

Bar	Oysters			Bu Count	\bar{x} Count	Gaper	Boxes		Pred.	Fouling	Bottom		Time	Tide	\bar{x} Depth	Loran Coord.	Observations Sample, Prec., etc.
	Mkr	Sm	Spat				Rec.	Old			°C	‰					
<u>Corrotoman R. (Continued)</u>																	
Shelton	18	134	118	270		0	22	28	-	Barn.-light	20.0	12.0	1500	Ebb	10-11'	27391.8	Samples outside precision stds. large amt. cinder in 4th sample
Bar	2	74	104	180		0	10	18	-	Molgula-light						41777.2	
	22	160	170	352		0	42	10	-								
	6	98	114	218	255	0	14	14	-								
<u>Great Wicomico</u>																	
Fleet	64	204	1128	1396		0	62	98	Stylochus	Barn.-mod.	18.0	13.1	1040	Flood	12'	27358.3	
Point	64	234	1030	1328		0	64	78	Stylochus (several)	Mussels-light						41868.9	
Dameron	56	170	950	1176	1300	0	140	80	Oostomia	Molgula-light							
	96	146	540	782		0	30	54	-	Barn.-mod.	17.0	14.3	1230	Flood	10-11'	27356.3	
	82	178	590	850		0	22	44	-	Mussels-light						41855.4	
	72	166	658	896	843	0	14	56	-								
Whaley's	34	168	428	630		0	40	62	Mud crab	Barn.-light	17.0	14.1	1415	High	12-14'	27361.6	Samples outside precision stds.
E.	52	210	448	710		0	18	36	-	Mussels-light				slack		41867.3	
	54	142	234	430		0	10	38	-	Molgula-light							
	74	230	422	726	624	0	6	62	-								Above average tides
Crane's	62	236	288	586		0	2	24	-	Barn.-light	17.0	13.8	1015	Flood	12-15'	27363.0	
Creek	74	226	328	628		0	2	60	Mud crab	Mussels-light						41870.9	
	36	218	560	814	676	0	28	38	-								Gracilaria-heavy growth. Stylochus found in gaper
Haynie Bar	30	276	402	708		1	50	22	Callinectes	Barn.-mod.	17.0	13.7	1130	Flood	6-7'	27366.9	
	44	156	750	950		1	28	26	Stylochus (several)	Barn.-mod.						41881.6	
	28	230	658	916	858	0	60	30	-	Barn.-mod.							Gracilaria-mod.
Rogue	24	282	466	772		0	22	30	-	Barn.-mod.	18.0	13.5	1100	Flood	6-10'	27374.8	
Point	28	180	386	594		0	26	32	-	Barn.-mod.						41891.8	
	34	150	392	576	647	0	10	22	-	Barn.-mod.							

¹ Volume of each sample is 1 Virginia bushel (50 quarts).

Table 2. Bu. l count and condition of oyster on each bar.

Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
<u>James R.</u>					
Deepwater	386	2	-	Barnacles; mod. to heavy	Seed; satisfactory
Horsehead	661	< 1	-	Barnacles; light to mod.	Seed; excellent
Point O Shoals	465	0	-	Barnacles; light	Seed; satisfactory
Wreck In	627	1	Mud crabs	Barnacles; light to mod.	Seed; excellent
Wreck Off	330	4	Mud crabs	Barnacles; light to mod.	Seed; satisfactory
Brown Shoals	197	4	Mud crabs	Barnacles; light	Seed; below average
Ridge	171	2	Stylochus; Mud crabs	Barnacles; light to mod. Microciona	Seed; below average
<u>York R.</u>					
Pages Rock	6	0	Mud crabs	Microciona; Anomia; Cliona	Market; below average
Aberdeen	15	0	Mud crabs	Microciona	Market; below average
<u>Piankatank R.</u>					
Burton Point	390	7	Urosalpinx egg cases	Barnacles - mod. Molgula - light Microciona, Algae	Market; 10% market
Palace Bar	821	2	Mud crabs	Barnacles - light	Market; 4% market
Ginney Point	575	4	Mud crabs	Barnacles - light Molgula - light Mussels - light	Market; 13% market

Table 2 (Continued)

Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
<u>Rappa. R.</u>					
Bowlers Rock	80	0	-	Barnacles - mod.	Market; 47% market
Morattico	126	< 1	Stylochus	Mussels - mod.	Market; 60% market
Smokey Point	139	< 1	Mud crab	Molgula - light	
Hog House	69	3	Stylochus	Mussel - mod.	Market; 64% market
Drummond	312	7	Stylochus	Molgula - mod.	Market; 69% market
				Mussels - light	
				Molgula - light	
				Barnacles - light	Market; 20% market
				Mussels - light	
				Molgula - light	
Parrots	169	10	Stylochus Mud crabs	Colonial bryozoan	Market; 32% market
<u>Corrotoman R.</u>					
Corrotoman Point	274	5	Stylochus	Barnacles - light	Market; 30% market
Middle Ground	262	2	-	Mussels - light	
Black Stump	305	3	-	Barnacles - light	Market; 8% market
				Barnacles - light	Market; 26% market
				Molgula - light	
Shelton Bar	255	8	-	Colonial bryozoan	
				Barnacles - light	Market; 5% market
				Molgula - light	
<u>Great Wicomico</u>					
Fleet Point	1300	6	Stylochus Odostomia	Barnacles - mod.	Market; 5% market
				Mussels - light	
Dameron	843	3	-	Molgula - light	
				Barnacles - mod.	Market; 10% market
				Mussels - light	

Table 2 (Continued)

Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
<u>Great Wicomico (Continued)</u>					
Whaley's E.	624	3	Mud crab	Barnacles - light Mussels - light Molgula - light	Market; 9% markets
Crane's Creek	676	2	Mud crab	Barnacles - light Mussels - light	Market; 8% markets
Haynie Bar	858	5	Stylochus	Barnacles - mod.	Market; 4% markets
Rogue Point	647	3	-	Barnacles - mod.	Market; 4% markets

Appendix

Locations of stations in the rivers in the spring 1986









