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FILE

PUBLIC OYSTER SHOAL SURVEY - FALL 1988

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INTRODUCTION

Twice a year the Virginia Institute of Marine Science conducts a survey of selected public oyster bars (shoals) in Virginia waters for the purpose of assessing the status of the fishery. The spring survey provides information as to over-winter mortality, relative fishing pressure from the current harvesting season, and the potential for a particular shoal as a source of seed and/or market oysters the following fall. The fall survey provides information as to summer (disease) mortality, spatfall or recruitment, and the current status of each shoal as a source of seed and/or market oysters. Shoals are selected for sampling based on their historical significance, their current importance to the fishery, and/or their location (representation of a particular environment) within a subestuary.

METHODS

Replicate 0.5 bushel samples (one bushel=50 quarts) of bottom material were taken on each station (Figure 1) using a 24" dredge having three inch teeth. At least three samples were taken from shoals having more than 100 oysters per bushel. Additional samples were taken as needed to provide an acceptable range in variance.

The following data were recorded for each sample: number of market oysters (>3"), number of small (submarket) oysters, number of spat, number of recent boxes (inside of shells clean),

and number of old boxes. Bottom water temperature and salinity were obtained at each station, and observations concerning predators and fouling organisms, weather and tidal conditions and water depth were also made.

The data were summarized for each station as the average number of market, small, spat, and total oysters per bushel and percent recent mortality, calculated as: $(\text{recent boxes and gapers} / \text{oysters} + \text{recent boxes and gapers}) \times 100$.

Market oysters are those oysters that are 3" or greater in shell height. A reasonable count of market-sized oysters is 60 or more per bushel. Seed oysters include all oysters less than market size (small oysters and spat). A good seed count is 600-700 per bushel (including 300-400 spat). Spat are oysters that have set during the most recent setting period. A good spat count would be around 1000 per bushel; however, due to wide variations in survival, both between sites and between years, recruitment might be better judged based on eventual yields of seed or market oysters.

RESULTS

The 1988 Fall Oyster Bar Survey was conducted between 26 September and 11 October 1988. Field data are summarized in Table 1. Table 2 contains average counts of market, small, spat, and total oysters at each station as well as percent recent mortality.

Market Oysters

Only Horsehead Shoal and Point of Shoals in the James River had over 50 market sized oysters per bushel. Other stations in the James River ranged from 1 (Ridge) to 35 (Long Rock) market oysters per bushel. Aberdeen Rock in the York River had one market oyster per bushel. Pultz Bar in Mobjack Bay had 8 market oysters per bushel. In the Piankatank River, market oysters were almost absent at the sites surveyed. Stations in the Rappahannock River had from 0 (Broad Creek and Hog House) to 33 (Morattico Bar) market oysters per bushel. No market oysters were found on Middle Ground Bar in the Corrotoman River. In the Great Wicomico, market counts were below 2 oysters per bushel. Market counts were 1 or less at P.G. #9 and P.G. #10 in Pokomoke Sound.

Small Oysters

The greatest number of small oysters were also found in the James River, particularly Point of Shoals (420 per bushel) and Horsehead Bar (231 per bushel). Numbers decreased down-river from Point of Shoals, from 189 per bushel at Long Rock to 33 per bushel at Ridge. The York River (Aberdeen) station had 19 small oysters per bushel and the Mobjack Bay (Pultz Bar) station had 2 small oysters per bushel. In the Piankatank River, counts of small oysters per bushel ranged from 2 at Burton Point to 80 at Palace Bar. In the Rappahannock River, Bowler's Rock and Broad Creek had 96 and 83 small oysters per bushel, respectively. The counts at other stations on the Rappahannock ranged from 3 to 36 small oysters per bushel. The Middle Ground station in the

Corrotoman River had 21 small oysters per bushel. In the Great Wicomico River, counts of small oysters per bushel were 3 at Whaley's East, 145 at Fleet Point, and 228 at Haynie Point. In Pokomoke Sound, there were 4 small oysters per bushel at P.G. #9 and 25 and P.G. #10.

Spat

The number of spat per bushel ranged from 12 to 100 at the seven stations sampled on the James River. Aberdeen (York River) and Pultz Bar (Mobjack Bay) had 8 and 1 spat per bushel, respectively. In the Piankatank River, the number of spat per bushel ranged from 119 at Burton Point to 307 at Palace Bar. The number of spat per bushel ranged from a low of 1 at Morattico Bar to a high of 111 at Broad Creek in the Rappahannock River. There were 54 spat per bushel at the Middle Ground station in the Corrotoman River. The Great Wicomico stations had 467 spat per bushel at Haynie Point, 179 at Whaley's East, and 134 at Fleet Point. In Pokomoke Sound, there were 9 and 38 spat per bushel at P.G. #9 and P.G. #10, respectively.

DISCUSSION

It would be difficult to summarize the current status of the public Virginia oyster fishery as anything but dismal. Virtually all areas with the exception of the upper James River (Burwell Bay) and the upper Rappahannock River have been depleted, due primarily to the diseases Haplosporidium nelsoni (MSX) and Perkinsus marinus (dermo). Recent mortality (Table 2) was lower

in all locations in 1988 than in past years. This may indicate that in endemic areas, disease has killed all the susceptible oysters, and that in the upper James River (Point of Shoals and Horsehead), disease has not yet become a factor.

Traditionally, James River oysters, because of their slow growth rate and poor quality have been harvested only as a source of seed (to be planted in other areas for growout). However, to supplement the supply of market oysters lost to disease in other areas, the James River became the focus of intensive harvesting in the 1986-87 season. As a result, this area, which had averaged a 10% contribution of market oysters to the fishery in the ten previous years, produced 70% of the market oysters in 1986-87, over 90% in 1987-88, and most likely will contribute an even higher proportion in the current season. In conjunction with this increased market oyster harvest, there was a 35% decrease in seed oyster harvest between 1986-87 and 1987-88, a 70% decrease from the previous ten year average. Thus the harvest emphasis in the James River has recently shifted from seed oyster production to market oyster production.

Unfortunately, this strategy is proving to be short-lived. Considering the slow growth rate of oysters in the upper James River, the market portion of the stock is subject to over-fishing. In fact, there is concern among the watermen that the current (1988-89) season will be abbreviated due to a shortage of market oysters. The total bushel count of oysters (all sizes) decreased from 1103 in 1987 to 393 in 1988 on Horsehead and from 966 in 1987 to 540 in 1988 at Point of Shoals. Removal of a

large proportion of the older oysters in this area might also be having an effect on recruitment. Spat counts per bushel decreased from 695 in 1987 to 100 in 1988 at Horsehead and from 690 in 1987 to 66 in 1988 at Point of Shoals. Thus both segments of the fishery, now concentrated in a very small segment of the James River, are in trouble.

Considering that the upper James River remains relatively disease-free and predator-free suggests it still might be developed and utilized as a seed producing area. Shell planting and bottom cultivation in this area might enhance natural setting. Areas of the James River above Burwell Bay should be investigated for seed production potential. This entire region might also be utilized as a nursery area for hatchery-produced or other disease-free spat. There are no obvious short-term solutions to the problems faced by the public oyster fishery in Virginia. Long-term solutions will require the cooperation of industrial, regulatory, and scientific personnel.

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OYSTER BAR SURVEY STATIONS

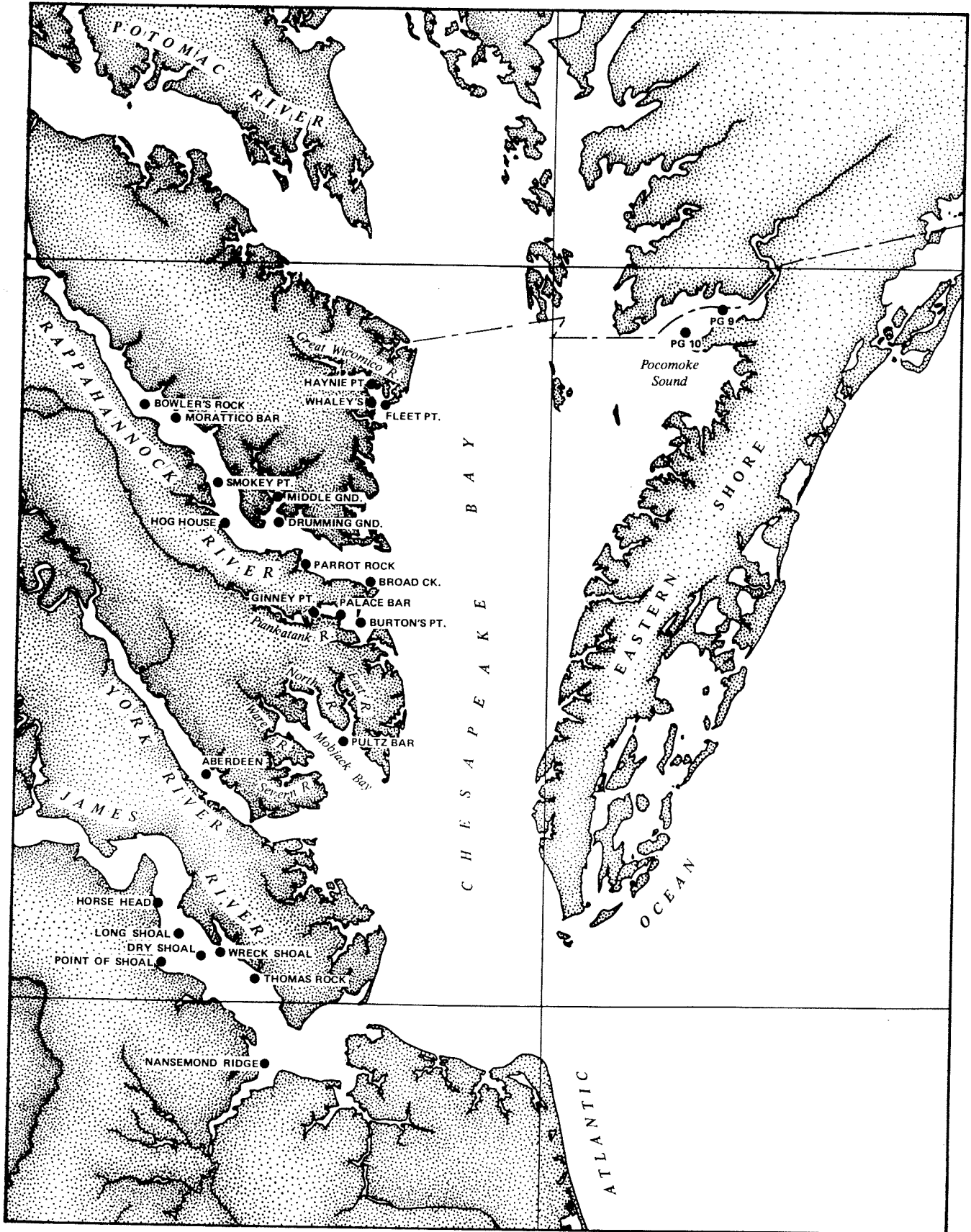


Fig. 1

TABLE 1

SUMMARY, FALL 1988 OYSTER BAR SURVEY

BAR	OYSTERS		BU. COUNT	X̄ COUNT	GAPER	BOXES		PRED.	FOULING	BOTTOM °C	TIME	TIDE	X̄ DEPTH	LORAN COORD.	OBSERVATIONS
	MKT SM	SPAT				REC	OLD								
<u>JAMES RIVER</u>															
Horsehead	68	206	66	340	0	10	12	mud crabs	muscls. barnacles	22.0	14.3	1125	9'	27346.0 41333.2	Wind light Seas calm
	62	238	116	416	0	12	12								
	56	250	118	424	0	16	18								
Pt. of Shls.	44	442	60	546	0	8	8	none	none	22.0	15.9	1327	6 1/2'	27344.0 41310.6	Wind light Seas calm
	82	598	30	710	0	4	6								
	40	288	76	404	0	4	2								
	52	354	96	502	0	8	10								
Long Rock	24	148	86	258	0	20	16	mud crabs	barnacles	22.7	19.6	1400	5'	27338.4 41312.9	Wind East light Seas calm
	24	186	46	256	0	12	10								
	56	232	14	302	0	22	22								
Dry Shoal	6	60	46	112	0	22	120	none	barnacles	22.8	20.8	1309	7'	27332.5 41302.3	Wind East light Seas calm
	14	100	24	138	0	32	78								
	12	88	30	130	0	16	86								
Wreck Shl.	4	92	54	150	0	20	136	mud crabs	Cliona, mussels	22.4	21.4	1133	10'	27326.0 41301.8	Wind NE light Seas calm
	4	66	34	104	0	18	114								
	8	110	44	162	0	24	108								
	6	78	62	146	0	38	132								
Thomas Rk.	2	92	18	112	0	42	76	mud crabs	Cliona; mod. Microciona, mussels, barnacles	21.8	22.4	1042	9 1/2'	27302.7 41218.8	Wind NE 5-10 Seas light
	2	62	12	76	0	30	88								
	0	62	40	102	0	26	98								
Ridge	0	36	16	52	0	14	70	mud crabs	Cliona, Anomia	21.5	22.8	1000	11'	27280.6 41218.8	Wind NE 10 Seas mod.
	2	30	8	40	0	6	54								
<u>YORK RIVER</u>															
Aberdeen	2	20	4	26	0	12	8	mud crabs	Molgula, Microciona, Anomia and barnacles	23.0	23.1	1330	6'	27368.3 41501.2	Wind NW 5 Seas calm
	0	18	12	30	0	2	0	oyster drill							

SUMMARY, FALL 1988 OYSTER BAR SURVEY

BAR MKT SM SPAT OYSTERS BU. COUNT X̄ COUNT GAPER BOXES REC OLD PRED. FOULING BOTOM °C /°oo TIME TIDE DEPTH X̄ DEPTH LORAN COORD. SAMPLE PREC.. ETC. OBSERVATIONS

MOBJACK BAY

Pultz Bar	8	0	0	0	8	11	0	0	10	66	mud crabs	Hydroïdes: heavy Anomia: mod. Cliona: light	21.4	22.7	1008	Late flood	12'	27310.6 41534.6	Wind N 10 Seas mod. Hydroïdes dominant
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PIANKATANK R.

Ginney Pt.	0	52	258	310	310	20	20	70	70	80	mud crabs	Microciona, Hydroïdes, barnacles, bryozoan	20.8	18.7	1315	Late ebb	8'	27347.2 41659.6	Wind ENE 5 Seas light
Palace Bar	2	110	260	372	374	6	6	28	28	34	mud crabs Callinectes		20.8	18.9	1130	Late ebb	12'	27338.0 41658.0	Wind ENE 5 Seas light Microciona dominant
Burton Pt.	0	0	166	166	166	2	2	10	10	14	mud crabs	Microciona, Hydroïdes: heavy Molgula, Crep. fornicata, Crep. plana, bryozoan	20.2	19.3	1015	Late ebb	12'	27326.4 41652.3	Wind ENE 15-20 Seas rough Hydroïdes dominant

RAPPA, R.

Bowler's	RK.14	136	4	154	154	2	2	8	8	12	none	Brachiodontes: mod; Molgula, barnacles	21.8	14.4	1015	Max ebb	7 1/2'	27472.4 41847.3	Wind N 10-15 Seas mod. Cinder abundant
Morattico	Bar	38	56	96	96	0	0	10	10	24	none	Brachiodontes, barnacles	21.8	16.6	1115	Max ebb	12'	27447.0 41820.0	Wind N light Seas mod.

SUMMARY, FALL 1988 OYSTER BAR SURVEY

BAR	MKT	OYSTERS SM	SPAT	BU. COUNT	\bar{x} COUNT	GAPER	BOXES REC	OLD	PRED.	FOULING	BOTTOM °C	TIME	TIDE	\bar{x} DEPTH	LORAN COORD.	OBSERVATIONS	
Fleet Pt.	0	132	152	284	284	0	12	6	mud crabs	musseles, barnacles	17.5	18.3	1105	High slack	12'	27358.2 41868.1	Wind NE 10-15 Seas mod.
<u>POCOMOKE SND.</u>																	
P.G. #9	2	6	14	22	22	0	2	36	none	Molgula; mod. Hydroïdes, bryozoans, barnacles, anemones	16.0	19.2	1310	Late flood	7 1/2'	27222.6 42011.3	Wind SW 10-15 Seas mod. Molgula dominant Black shell 40%
P.G. #10	0	26	34	60	60	0	6	32	none	Crepidula; heavy Hydroïdes, bryozoan	16.0	20.0	1340	High slack	7'	27230.8 41999.3	Wind SW 10-15 Seas mod. Crepidula dominant

TABLE 2

Average Number of Oysters per Bushel
and Percent Recent Mortality

Station	Market	Small	Spat	Total	% Recent Mortality
<u>James River</u>					
Horsehead	62	231	100	393	3
Pt. of Shoals	54	420	66	540	1
Long Rock	35	189	49	273	6
Dry Shoal	11	83	33	127	15
Wreck Shoal	6	86	48	140	15
Thomas Rock	1	72	23	96	25
Ridge	1	33	12	46	18
<u>York River</u>					
Aberdeen	1	19	8	28	20
<u>Mobjack Bay</u>					
Pultz Bar	8	2	1	11	31
<u>Piankatank River</u>					
Ginney Point	0	43	281	324	5
Palace Bar	1	80	307	388	2
Burton Point	0	2	119	121	1
<u>Rappahannock River</u>					
Bowler's Rock	26	96	6	128	<1
Morattico Bar	33	33	1	67	0
Smokey Point	9	21	28	58	1
Hog House	0	3	13	16	0
Drumming Gnd.	1	14	34	49	8
Parrot Rock	1	36	71	108	4
Broad Creek	0	83	111	194	10
<u>Corrotoman River</u>					
Middle Gnd.	0	21	54	75	0
<u>Great Wicomico River</u>					
Haynie Point	1	228	467	696	1
Whaley's East	0	3	179	182	1
Fleet Point	0	145	134	279	4
<u>Pokomoke Sound</u>					
P.G. #9	1	4	9	13	7
P.G. #10	0	25	38	63	6