1987

Oyster Shoal Survey - Fall 1987

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BY

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The survey of oyster shoals in the fall attempts to measure mortalities in the summer months, recruitment in the current setting period, and the condition of market and seed oysters on selected shoals.

The sample unit was three samples on each station with a twenty-four inch (opening) dredge with three inch teeth, running either down current or up current 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, count of old boxes, count of new boxes (attached shell clear of meat), count of gapers (dying oysters still containing meat), list of predators, a description of fouling, bottom temperatures, bottom salinities and observations of the condition of the oysters and the bottom. The data summary of each shoal included: the average count of oysters per bushel, the percent mortality based upon the numbers of gapers and all boxes except the current year's set, a list of predators retained in the dredge, a description of fouling and a characterization of the reef as a seed oyster or market oyster reef. Seed are the small oysters including spat.

The mortalities of oysters in Virginia, caused by disease, have resulted in a shortage of market oysters and the sale of oysters from the James River to meet demands for market oysters have resulted in a shortage of disease-free seed oysters. Overall the 1987 setting season was better than the average year. However, the only shoals which could be classified as excellent sources of seed are Point of Shoal and Horsehead. At Horsehead the bushel count was 1103 oysters per bushel with 358 small oysters and 693 spat. At Point of Shoal the bushel count was 966 with 227 small oysters and 690 spat. Overall these two shoals have an average count of 51 market oysters, 3" or larger, per bushel.

The mortalities in the James River ranged from three (3) percent at Point of Shoal to fifty-four (54) percent at Thomas Rock. The mortality calculations included the spat counts and a recalculation of mortalities, minus the spat count, produces a mortality of thirteen (13) percent at Horsehead. The large number of recent boxes, average 49, in the Horsehead samples raise the question of additional sampling for disease related deaths at deeper sites near Horsehead.

In the York River only Aberdeen Rock was sampled. It would be correct to describe this shoal as depleted because of the low level of market and small oysters.

One of the areas seriously affected by the increase in the incidence of disease mortalities was Mobjack Bay. A single station at Pultz Bar showed an 85 percent mortality and very few spat. This station was classified as depleted.

The bushel counts of samples in the Piankatank River have continued the downward trend from the highs in 1985. The mortalities ranged from 20 to 44 percent. The Palace Bar sample was classified as below average for seed but

the remaining shoals are of no value as seed or markets at present. The mortalities of market and small oysters at Ginney Point, the upriver station, was 54%.

The mortalities in the Rappahannock River ranged between 6 and 74 percent. It is apparent that the impact of disease is present as far upriver as Morattico Bar. Bowler's Rock and Morattico are the only stations that will support the harvesting of markets; however, the fouling at both stations will lower the yield per bushel substantially. Recruitment in the lower river was good and did lower the percentages of mortalities. Overall 63% of the market and small oysters have died up to, and including Morattico. The average recruitment from Morattico Bar to Broad Creek is 103 spat per bushel but 63% of all the spat were at one station, Broad Creek. In the Rappahannock River recovery of the river will require separate management options for areas demarcated by a line from Hog House Bar to Towles Point.

Middle Ground, in the Corrotoman River, lost 51% of the small and market oysters and had an average set of 100 spat per bushel. It is not, at present, a good source of seed and there is, on the average, only one market oyster per bushel. It should be managed with the lower part of the river since its condition is similar to the condition of Drumming Ground.

The bushel counts in the Great Wicomico River ranged from 622 to 2018 oysters/bushel. The mortalities ranged from 8 to 20 percent based upon the total bushel count. On basis of count, the shoals would be classed as satisfactory to excellent as sources of seed. However, dropping the high spat count, which averages 745 spat/bushel overall, we find that 43 percent of the markets and small oysters have died. In addition, at Fleet's Point only 10 percent of last year's set has survived. All of the shoals were a

source of markets in spring 1986, and, in the fall 1987 only 16 markets were harvested all together. Therefore, the shoals sampled were heavily infected, probably Perkinsus mar., among the larger oysters. Any management options for moving the seed should be deferred for at least one year.

The mortalities in Pocomoke Sound range from 39 to 100% but more important is the almost complete absence of recruitment below P. G. #10. In addition, based on counts, there are no market oysters areas left in Pocomoke Sond that would attract more than a single vessel. Recovery from the disease mortalities is not possible within the management area with out closing the area for several seasons. Outside the management area recovery might proceed, with hand tong exploitation, at about the normal expected rate.

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

Table 1. Summary, Fall 1987 Oyster Bar Survey[1]

BAR	OYSTERS MKT.	SM.	SPAT	BU. COUNT	MEAN COUNT	GAPER	BOXES REC.	OLD	PRED.	FOULING	BOTTOM °C	°/₀₀	TIME	TIDE	MEAN DEPTH	LORAN COORD.	OBSERVATIONS, SAMPLE PREC, ETC.
James River																	
Horsehead	70	460	478	1008		None	24	12	Turbellarian	Barnacles; light to moderate.	18.1	12.6	1430	Early Ebb	6.5'	27346.0	Seas light.
	40	252	1082	1374		None	88	16	None							41333.2	Wind WNW 10K.
	48	368	534	950		None	40	18	None								
	50	352	676	1078	1103	None	42	24	None								
Pt. of Shls.	48	304	768	1120		None	16	12	Mud Crabs	Barnacles; light.	18.3	12.5	1250	Late Flood	7.5'	27344.0	Seas light.
	60	170	460	690		None	8	10	Mud Crabs							41310.6	Wind WNW 10K.
	30	192	700	922		None	22	8	Mud Crabs								
	62	240	830	1132	966	None	10	12	Mud Crabs								
Wreck Shl.	20	58	182	260		None	42	116	Mud Crabs	Barnacles; light.	18.5	16.8	1100	Max. Flood	9.5'	27326.0	Seas calm.
	16	38	240	294		None	42	66	Mud Crabs							41301.8	
	16	58	308	382	312	None	54	76	Mud Crabs	Cliona; light.							
Thomas Rock	8	34	104	146		None	54	234	Mud Crabs	Barnacles; light.	18.5	17.9	1300	Early Ebb	7.0'	27302.7	Seas calm.
	4	32	200	236		None	48	206	Mud Crabs	Cliona; light.						41288.4	
	10	48	238	296	226	None	24	240	Mud Crabs								
Ridge	12	18	144	174		None	14	92	Mud Crabs	Cliona; mod.	18.0	19.3	1030	Late Flood	8.8'	27280.6	Seas light.
	14	58	184	256		None	30	64	Mud Crabs	Barnacles; light.						41218/8	Wind SW 10K.
	16	40	178	234		None	36	50	Mud Crabs	Hydroides.							
	8	50	262	320	246	None	44	22	Mud Crabs								
York River																	
Aberdeen Rk.	0	8	24	32		None	0	6	Mud Crabs	Microciona; heavy.	21.2	20.2	1020	Late Ebb	4.5'	27368.3	Seas rough.
	4	0	22	26	29	None	2	4	Eupleura	Barnacles; light.						41501.2	Wind NW 25K.
										Crepidula,							Microciona dominant.
										Anomia and Molgula.							

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

BAR	OYSTERS MKT.	SM.	SPAT	BU. COUNT	MEAN COUNT	GAPER	BOXES REC.	OLD	PRED.	FOULING	BOTTOM °C	°/₀₀	TIME	TIDE	MEAN DEPTH	LORAN COORD.	OBSERVATIONS, SAMPLE PREC., ETC.
Mobjack Bay																	
Pultz Bar	2	8	0	10		None	0	80	Mud Crabs	Hydroids, Cliona	16.4	22.4	1045	Late Ebb	12'	27310.6	Seas calm.
	4	8	4	16		None	0	72	Mud Crabs	Anomia,						41534.6	Hydroids dominant.
	2	8	0	10		None	0	56	Mud Crabs	Crepidula; mod. Blood clams.							
Piankatank River																	
Ginney Pt.	4	34	36	74		2	20	78	Mud Crabs	Molgula; heavy.	16.2	18.9	1300	Mid Flood	8.5'	27347.4	Seas light.
	2	76	52	130		None	12	102	Mud Crabs	Mussels; mod.						41659.7	Wind N 20K.
	10	98	68	176		None	36	98	Mud Crabs	Barnacles,							Molgula dominant.
	6	124	104	234	154	1	30	114	Mud Crabs	Hydroids; light.							
Palace Bar	8	22	120	150		None	14	66	Mud Crabs	Microciona,	15.2	19.2	1120	Early Flood	13'	27338.1	Seas moderate.
	4	80	248	332		1	20	58	Mud Crabs	Molgula;						41658.3	Wind N 20K.
	0	188	306	494		None	14	26	Mud Crabs	heavy.							Microciona dominant.
	2	126	134	262	310	None	22	92	Mud Crabs	Hydroides, Bryozoans; mod.							
Burton Pt.	0	4	2	6		None	2	72	Urosalpinx	Hydroides,	18.0	19.3	1315	Ebb	9.7'	27326.0	Seas moderate.
	0	0	6	6		None	4	144	Mud Crabs	Microciona; heavy.						41652.9	Wind NW10-15K.
	0	4	352	356		None	46	108	Callinectes,	Molgula; light.							Hydroides dominant.
	0	4	246	250	155	None	48	46	Juvenile	Crepidula.							
Rappa. River																	
Bowler's Rk.	64	14	64	142		None	0	0	Mud Crabs	Molgula;	19.8	13.2	1030	Ebb	7.5'	27472.4	Seas light.
	48	8	20	76		None	0	14	Turbellarians	heavy.						41847.3	Wind S 10K.
	48	22	20	90	103	None	2	4		Barnacles, Mussels; mod.							Molgula dominant.

BAR	OYSTERS MKT.	SM.	SPAT	BU. COUNT	MEAN COUNT	GAPER	BOXES REC.	OLD	PRED.	FOULING	BOTTOM °C	°/₀₀	TIME	TIDE	MEAN DEPTH	LORAN COORD.	OBSERVATIONS, SAMPLE PREC., ETC.
Morattico	114	66	30	210		None	16	40	Mud Crabs	Barnacles,	20.3	14.7	1230	Ebb	14.5'	27446.8	Seas moderate.
	56	46	10	112		None	16	22	Mud Crabs	Mussels,						41819.8	Wind S 10-15K.
	66	72	8	146		None	14	42	Mud Crabs	Molgula; light.							
	84	38	10	132	150	None	4	38	Mud Crabs								
Smokey Pt.	22	10	12	44		None	4	66	Mud Crabs	Molgula,	18.0	16.1	1015	Late flood	13'	27417.8	Seas calm.
	26	22	10	58		None	14	66	Mud Crabs	Mussels;						41779.0	1/3 of shell was black.
	24	16	14	54	52	1	6	82	Mud Crabs	light to mod. Barnacles; light. Anemones, Anadera.							
Hog House	12	16	10	38		1	2	72	Mud Crabs	Mussels;	19.2	18.3	1120	High slack	15'	27398.3	Seas calm.
	6	12	10	28		None	0	74	Mud Crabs	mod. Banacles; light.						41725.8	
	6	8	12	26	31	None	6	102	Mud Crabs	Anadera, Mya.							
Drumming Ground	0	12	116	128		None	4	52	Mud Crabs	Bryozoan, Molgula; med.	19.3	18.3	1300	Early Ebb	12'	27377.8	Seas calm.
	0	8	146	154	141	None	0	70	Urosalpiux	Mussels, Barnacles, Hydroides, light.						41738.1	
Parrot Rk.	0	24	116	140		None	30	46	Mud Crabs	Molgula; heavy.	16.2	18.4	1200	Late Flood	8.5'	27361.9	Seas light.
	6	12	94	112		None	30	64	Mud Crabs	Mussels, Barnacles; light.						41710.4	Wind NE 10K.
	2	10	96	108	120	None	28	66	Callinectes								Molgula dominant.
Broad Ck.	4	20	360	384		None	20	96	Mud Crabs	Barnacles,	16.0	19.2	1000	High slack	14'	27329.5	Seas light.
	0	30	402	432		None	18	94	Turbel-	Mussels,						41696.3	Wind N 10K.
	0	8	402	410	409	None	8	122	larians	Molgula; light.							

BAR	OYSTERS MKT.	SM.	SPAT	BU. COUNT	MEAN COUNT	GAPER	BOXES REC.	OLD	PRED.	FOULING	BOTTOM °C	°/₀₀	TIME	TIDE	MEAN DEPTH	LORAN COORD.	OBSERVATIONS, SAMPLE PREC., ETC.
Corrotoman R.																	
Middle	2	46	92	140		None	2	86	Mud Crabs	Molgula;	19.5	17.6	1345	Early Ebb	11'	27386.2	Seas calm.
Ground	0	134	104	238		None	4	60	Mud Crabs	light to heavy.						41763.0	
	2	76	118	196		None	2	96	Mud Crabs	Barnacles;							
	0	68	86	154	182	None	6	82	Mud Crabs	light; Microciona.							
G.R. WICOMICO																	
Haynie Pt.	0	294	574	868		None	32	130	Mud Crabs	Gracilaria;	15.5	19.3	1300	Flood	15'	27366.9	Seas light.
	2	254	444	698		None	74	162	Mud Crabs	mod. Barnacles.						41881.6	Wind N15-25K.
	0	264	486	750	772	None	36	130	Mud Crabs	Mussels, Hydroides; light.							Gracilaria dominant.
Whaley's E.	2	274	372	648		None	46	122	Mud Crabs	Barnacles,	15.0	19.3	1120	Low slack	8.5'	27361.6	Seas moderate.
	6	290	294	590		None	20	130	Mud Crabs	Mussels;						41867.3	Wind N15-20K.
	6	278	344	628	622	None	34	116	Mud Crabs	light.							
Fleet Pt.	0	122	2062	2184		None	60	162	Mud Crabs	Barnacles,	14.0	19.2	0945	Late Ebb	10.5'	27358.3	Seas moderate.
	0	106	1810	1916		1	76	48	Turbellarians	Mussels,						41868.9	Wind N 15-20K.
	0	92	1862	1954	2018	None	42	110		Bryozoans; light.							
Pocomoke Snd.																	
P. G. #9	16	12	60	88		1	10	38	Mud Crabs	Molgula,	13.8	20.3	1400	Early Flood	5'	Loran	Seas calm.
	16	28	50	94		None	4	52	Turbellarians	Hydroides,						out	
	4	28	38	70	84	None	14	40		Bryozoans, Anemones, light. Mussels, Sabellidae.							
P. G. #10	2	18	34	54		None	4	72	Mud Crabs	Molgula, Hydroides	14.0	20.3	1545	Flood	8'	Loran out	Seas light.
	2	20	40	62		None	2	74	Mud Crabs	Barnacles; light.							Wind NW 5-10K.
	6	22	38	66	61	None	8	100	Mud Crabs	Mussels, Sabellaria.							

BAR	OYSTERS MKT.	SM.	SPAT	BU. COUNT	MEAN COUNT	GAPER	BOXES REC.	OLD	PRED.	FOULING	BOTTOM °C	°/₀₀	TIME	TIDE	MEAN DEPTH	LORAN COORD.	OBSERVATIONS, SAMPLE PREC., ETC.
Marshall Rk.	0	10	0	10		None	0	32	Mud Crabs	Hydroides; mod. Barnacles, Molgula, Crepidula, Cliona, Sabellidae, Anomia.	14.0	20.0	1010	Max. Ebb	12'	Loran out	Seas calm. Hydroides dominant.
	0	4	0	4		None	0	36	Urosalpinx								
	0	2	0	2	5	None	0	14	Mud crabs								
Bird Rk.	0	0	0	0		None	0	2	Mud Crabs	Hydroides, Molgula Cliona, Anomia, Sabellidae, Anadera.	15.5	20.5	1100	Max. Ebb	15'	Loran out	Seas calm. Hydroides dominant.
	0	0	0	0	0	None	0	2	Urosalpinx								
Island Rk.	0	0	0	0		None	0	20	Mud Crabs	Hydroides, Molgula, Sabellidae, Crepidula, Cliona	15.0	20.3	1130	Late Ebb	13.5'	Loran out	Seas calm. Hydroides dominant.
	0	0	0	0	0	None	0	10	Mud Crabs								
Robin Hood	0	0	2	2		None	0	16	Mud Crabs	Hydroides, Molgula, Anomia, Cliona, Bryozoans, Anadera.	15.8	20.6	1230	Low slack	18'	Loran out	Seas calm. Hydroides dominant.
	4	0	6	10		None	0	20	Mud Crabs								
	2	0	0	2	5	None	0	8	Mud Crabs								

Table 2. Bushel count and condition of oyster on each bar.

Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
James R.					
Horsehead	1103	6	Turbellarian	Barnacles; light to mod.	Seed; excellent.
Point of Shoals	966	3	Mud Crabs	Barnacles; light.	Seed; excellent.
Wreck Shoals	312	28	Mud Crabs	Barnacles; light.	Seed; below average.
Thomas Rock	226	54	Mud Crabs	Barnacles, Cliona; light.	Seed; below average.
Ridge	246	32	Mud Crabs	Cliona; mod. Barnacles; light, Hydroides.	Seed; below average.
York R.					
Aberdeen Rock	29	17	Mud Crabs Eupleura	Microciona; heavy. Barnacles; light. Crepidula, Anomia and Molgula.	Depleted.
Mobjack Bay					
Pultz Bar	12	85	Mud Crabs	Hydriods, Cliona, Anomia, Crepidula; mod. Blood Clams.	Depleted.

Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
Piankatank R.					
Ginney Point	154	44	Mud Crabs	Molgula; heavy Mussels; mod. Barnacles, hydroids; light.	No value at present.
Palace Bar	310	20	Mud Crabs	Microciona, Molgula; heavy. Hydroides, Bryozoan, mod.	Seed; below average.
Burton Point	155	43	Mud Crabs Urosalpinx	Hydroides, Microciona; heavy. Molgula; light. Crepidula.	No value at present.
Rappa. R.					
Bowler's Rock	103	6	Mud Crabs Turbellarians	Molgula; heavy Barnacles, Mussels; mod.	Market; 51% market.
Morattico	152	24	Mud Crabs	Barnacles, Mussels, Molgula; light.	Market; 53% market.
Smokey Point	52	61	Mud Crabs	Molgula, Mussels; light to mod. Barnacles; light Anemones, Anadera.	Market; 46% market.

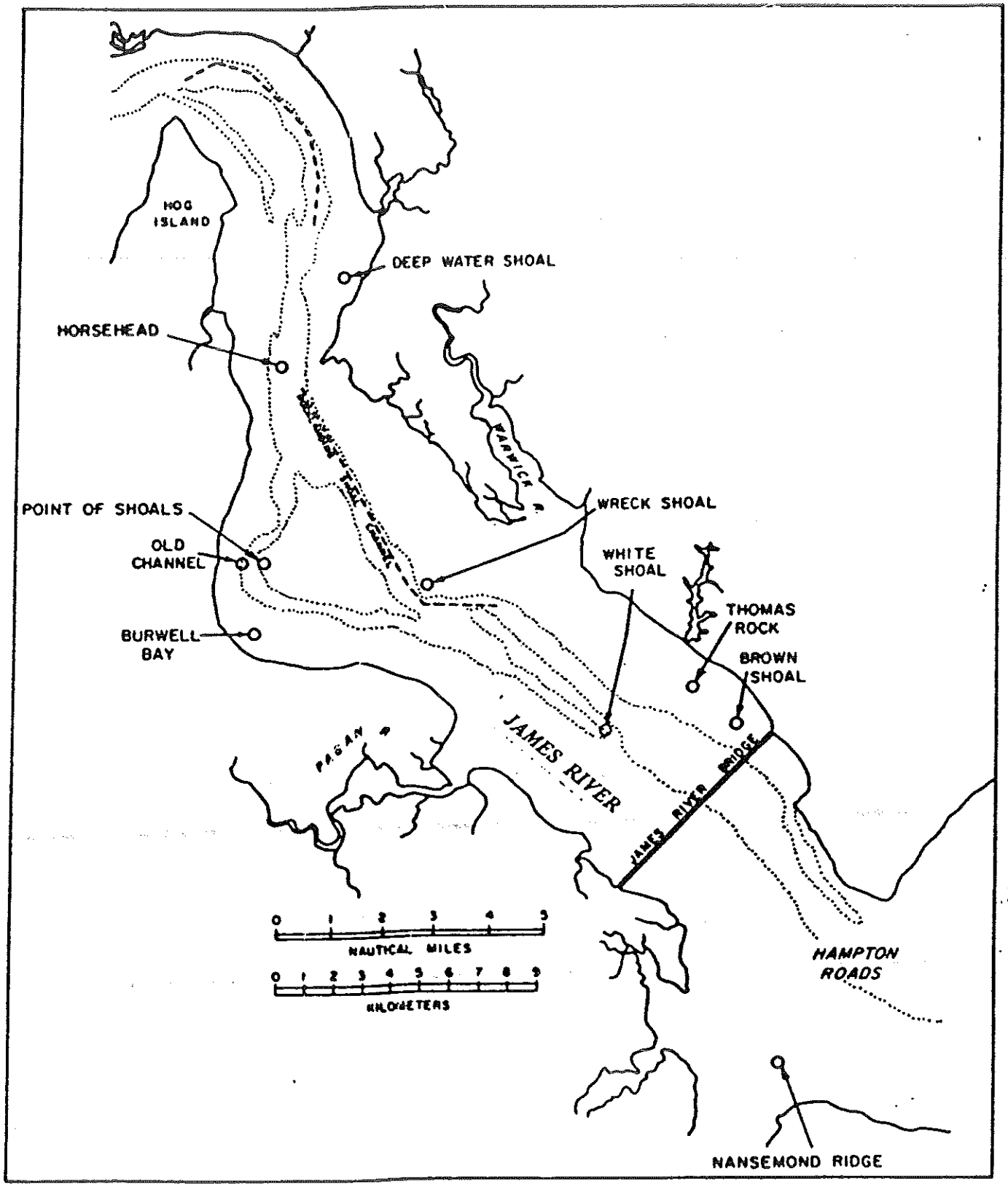
Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
Hog House	31	74	Mud Crabs	Mussels, mod. Barnacles light. Anadera, Mya.	No value at present.
Drumming Ground	141	31	Mud Crabs Urosalpinx	Bryozoan, Molqula; mod. Hydroides; light. Microciona, Anadera.	No value at present.
Parrots	120	42	Mud Crabs Callinectes	Molgula; heavy. Mussels, Barnacles; light.	No value at present.
Broad Creek	409	22	Mud Crabs Turbellarians	Barnacles, Mussels, Molgula; light.	No value at present.
Corrotoman R.					
Middle Ground	182	32	Mud Crabs	Molgula; light to heavy. Barnacles; light. Microciona.	No value at present.
Great Wicomico					
Haynie Point	772	20	Mud Crabs	Gracilaria; mod. Barnacles, Mussels, Hydroides; light.	Seed; Excellent.
Whaley's E.	622	20	Mud Crabs	Barnacles, Mussels; light.	Seed; Excellent.

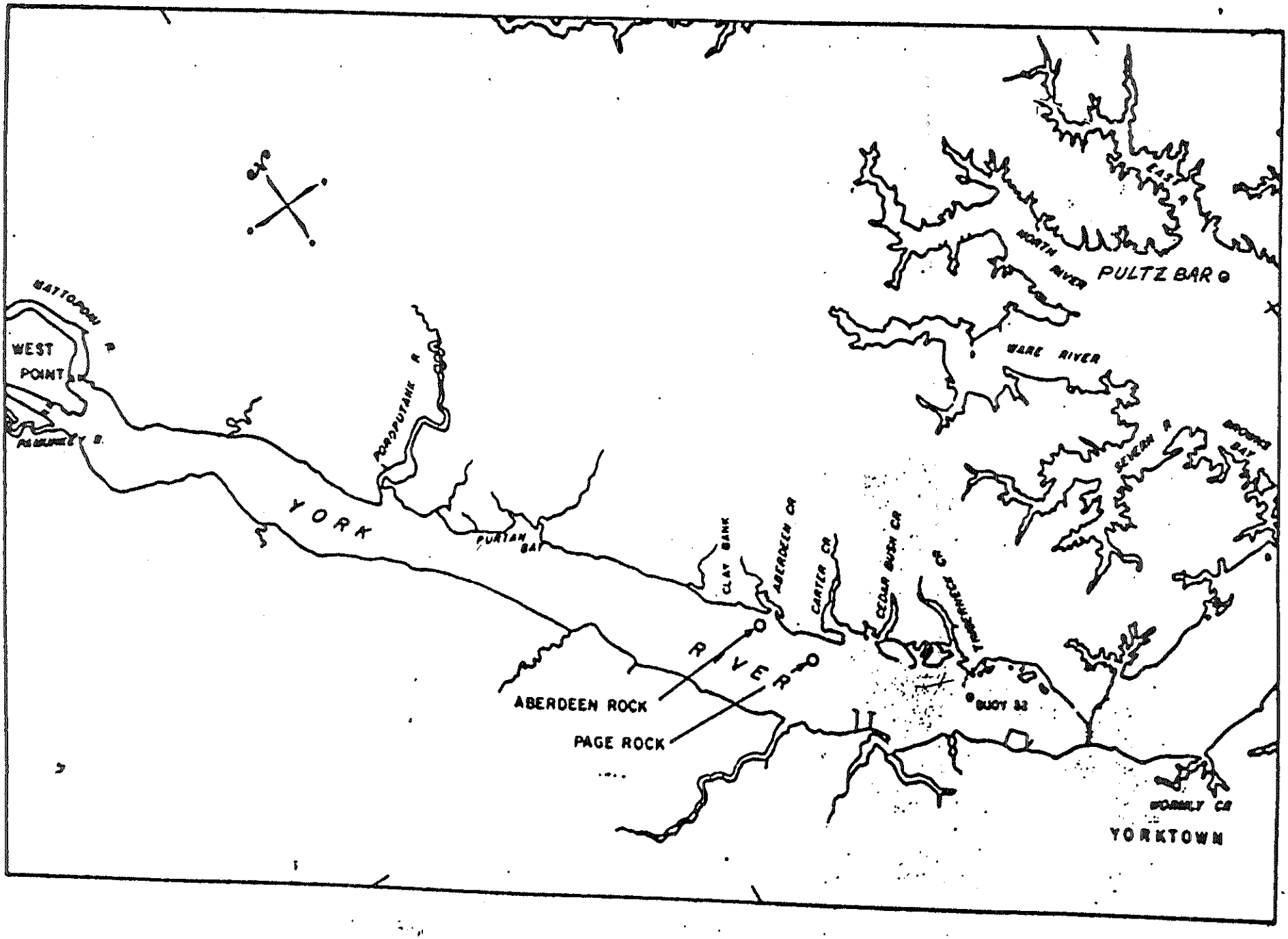
Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
Fleet Point	2018	8	Mud Crabs Turbellarians	Barnacles, Mussels, Bryozoans; light.	Seed, satisfactory.
Pocomoke Sound					
P. G. #9	84	39	Mud Crabs Turbellarians	Molgula, Barnacles, Hydroides, Bryozoans, Anemones; light. Mussels, Sabellidae.	Market, 14% markets.
P. G. #10	61	59		Sabellidae.	No value at present.
			Mud Crabs	Molgula, Hydroides, Barnacles; light. Mussels, Sabellaria.	
Marshall Rock	5	84	Mud Crabs	Hydroides; mod. Barnacles	Depleted.
			Urosalpinx	Molgula, Crepidula, Cliona, Sabellidae, Anomia.	
Bird Rock	0	-	Mud Crabs	Hydroides, Molgula,	Depleted.
			Urosalpinx	Cliona, Anomia, Sabellidae, Anadera.	

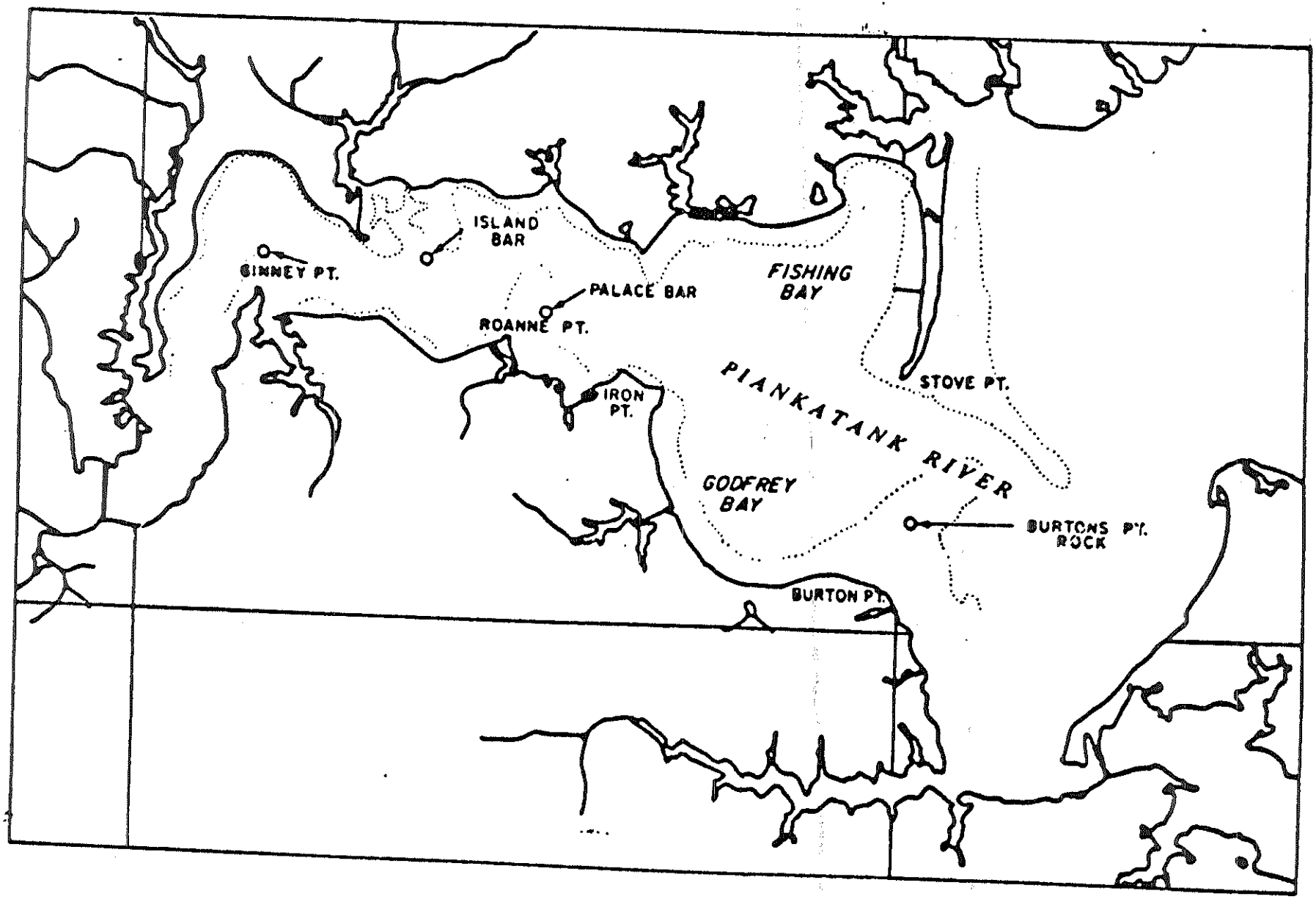
Bar	Average Bu. Count	Percent Mortality	Evidence of Predation	Fouling	Classification
Robin Hood	0	-	Mud Crabs	Hydroides, Molgula, Sabellidae, Crepidula, Cliona.	Depleted.
Island Rock	5	75	Mud Crabs	Hydroides, Molgula, Anomia, Cliona, Bryozoan, Anadera.	Depleted.

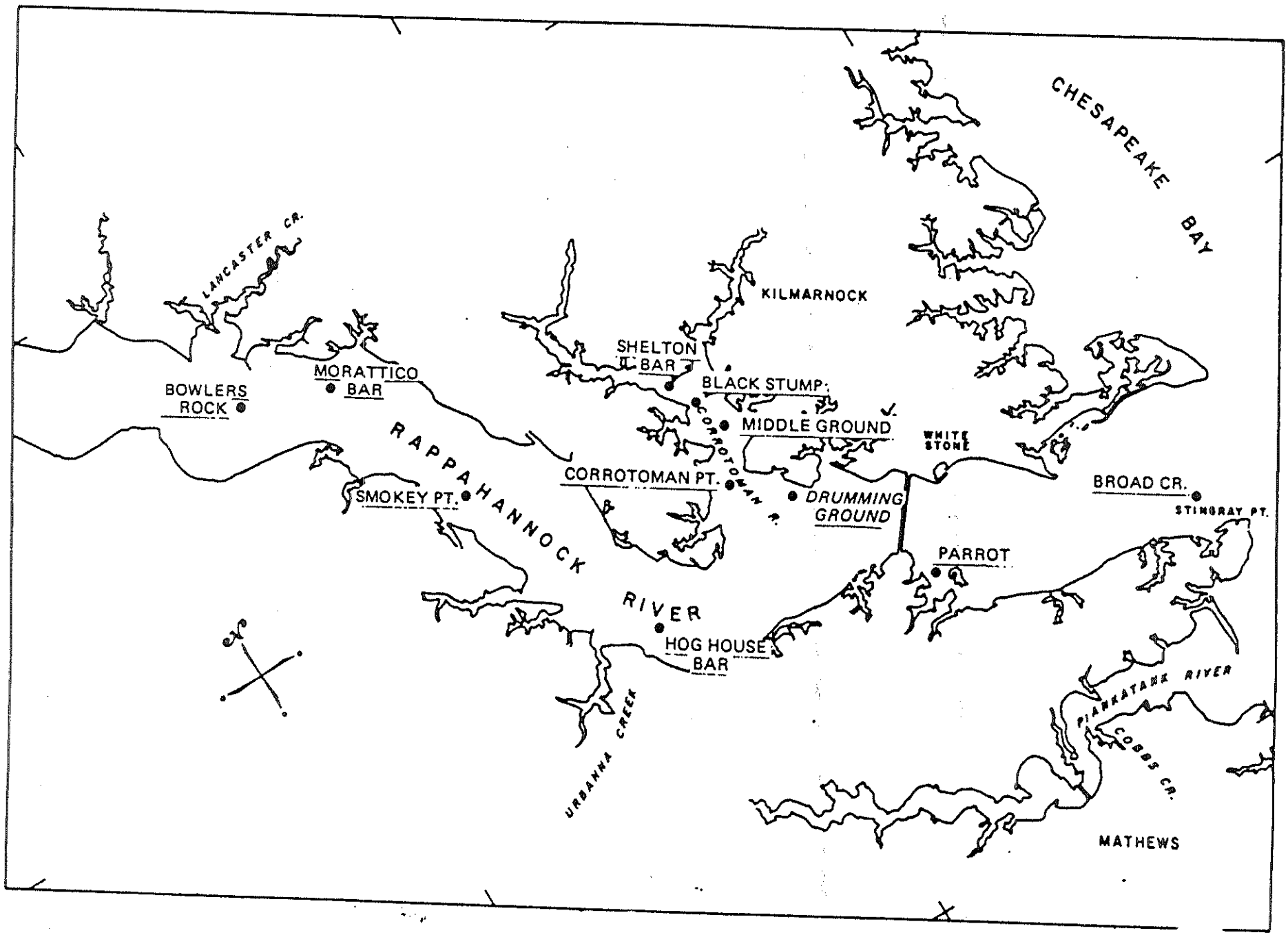
APPENDIX

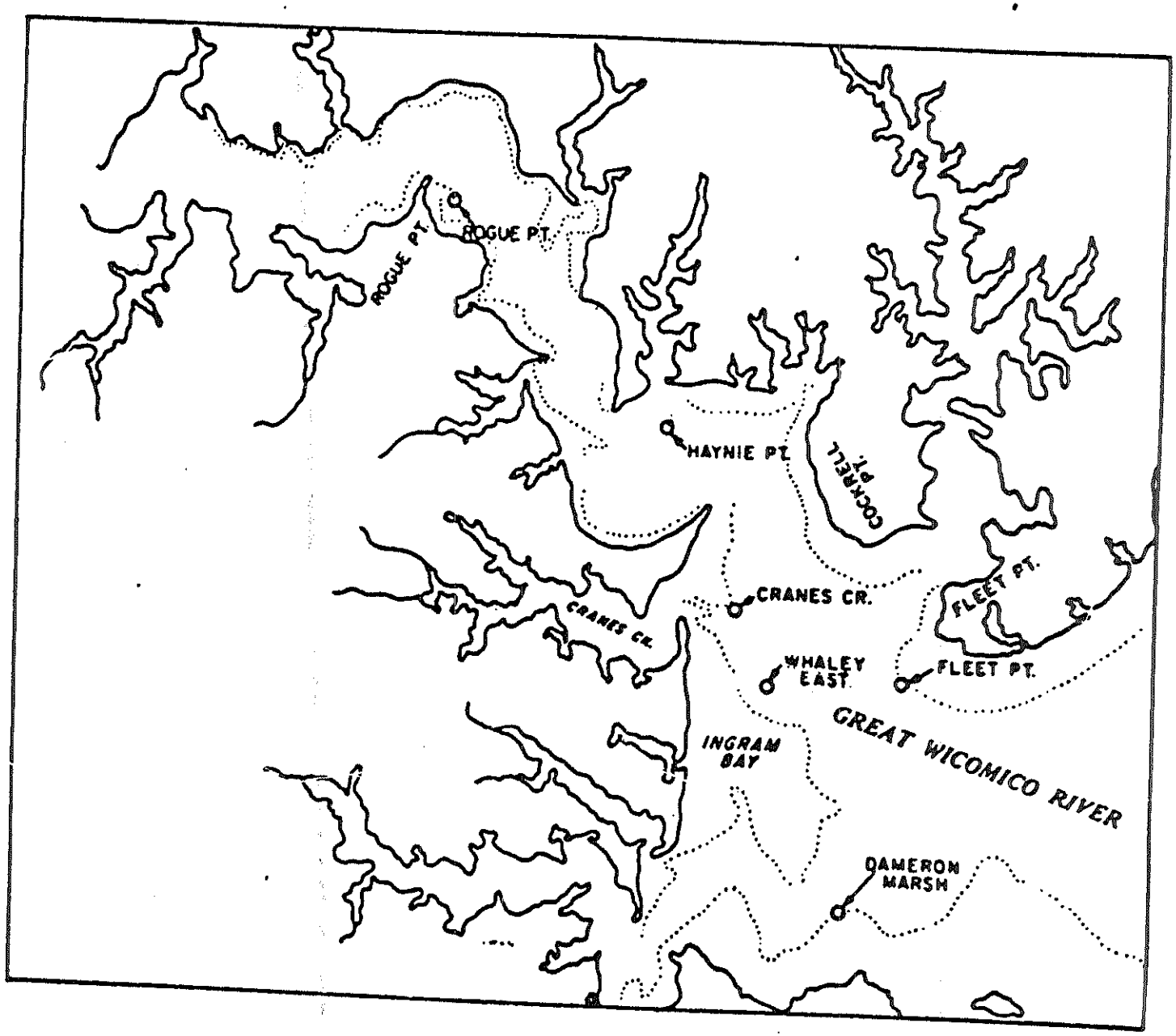
Locations of stations in the rivers in the fall 1987.

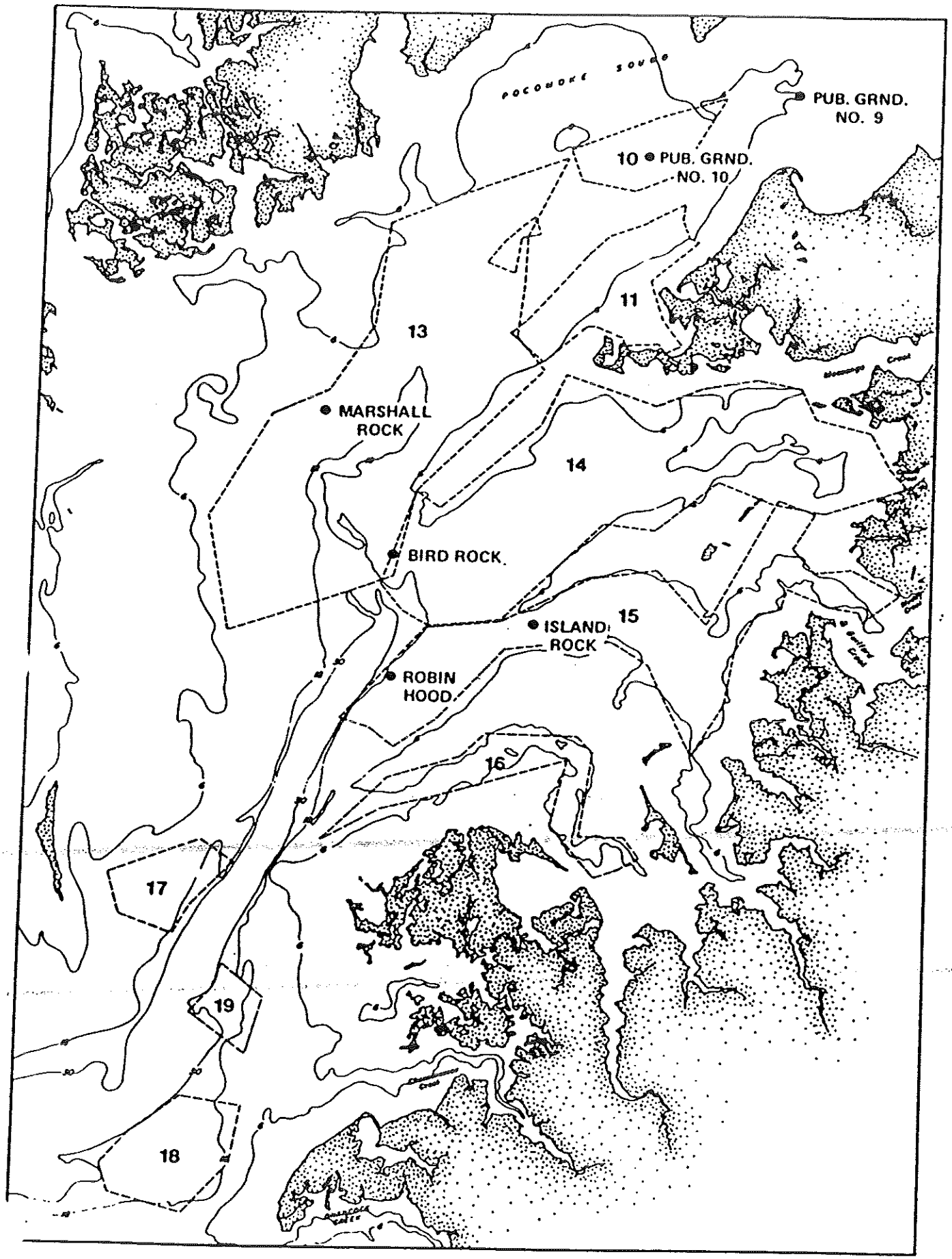

HOG ISLAND
DEEP WATER SHOAL
HORSEHEAD
JAMES RIVER
WARWICK R.
POINT OF SHOALS
OLD CHANNEL
WRECK SHOAL
WHITE SHOAL
THOMAS ROCK
BROWN SHOAL
BURWELL BAY
PAGAN R.
JAMES RIVER
JAMES RIVER BRIDGE
0 1 2 3 4 5
NAUTICAL MILES
0 1 2 3 4 5 6 7 8 9
KILOMETERS
HAMPTON ROADS
NANSEMOND RIDGE


MATTAPONI R.
WEST POINT
PAMUNKEY R.
POMPUTANE R.
YORK
PURTAN BAY
CLAY BANK
ABERDEEN CR.
CARTER CR.
CEDAR BUSH CR.
HOWERTON CR.
RIVER
ABERDEEN ROCK
PAGE ROCK
BUOY 32
NORTH RIVER
PULTZ BAR
WARE RIVER
SEVERN R.
WORMLEY CR.
YORKTOWN


ISLAND BAR
SINNEY PT.
PALACE BAR
FISHING BAY
ROANNE PT.
STOVE PT.
IRON PT.
PIANKATANK RIVER
GODFREY BAY
BURTONS PT.
ROCK
BURTON PT.


CHESAPEAKE BAY
LANCASTER CR.
KILMARNOCK
SHELTON BAR
BLACK STUMP
MORATTICO BAR
BOWLERS ROCK
MIDDLE GROUND
WHITE STONE
RAPPAHANNOCK RIVER
CORROTOMAN PT.
SMOKEY PT.
DRUMMING GROUND
BROAD CR.
STINGRAY PT.
PARROT
HOG HOUSE BAR
URBANNA CREEK
PIANKATANK RIVER
COBBS CR.
MATHEWS


ROGUE PT.
ROGUE PT.
HAYNIE PT.
COCKRELL PT.
CRANES CR.
CRANES CR.
FLEET PT.
FLEET PT.
WHALEY EAST
INGRAM BAY
GREAT WICOMICO RIVER
DAMERON MARSH


POCOMOKE SOUND
PUB. GRND. NO. 9
10
PUB. GRND. NO. 10
11
13
MARSHALL ROCK
14
BIRD ROCK
15
ISLAND ROCK
ROBIN HOOD
16
17
19
18