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Virginia Institute of Marine Science

MARINE RESOURCE INFORMATION

VIRGINIA INSTITUTE of MARINE SCIENCE BULLETIN

Vol. 2 No. 6 June 29, 1970

Weekly Summary for 1-25 June

WEEKLY OYSTER SPATFALL ON SHELLSTRINGS IN VIRGINIA RIVERS

Prepared by the Virginia Institute of Marine Science
at Gloucester Point, Virginia 23062

JUNE 1970

Explanation

The Applied Biology Department in the Division of Applied Marine Science and Ocean Engineering at VIMS conducts regular surveys of oyster "setting" in Virginia rivers. These surveys are made weekly from the end of May through the beginning of October each year. Beginning at the mouth of each river and proceeding upstream to the limits of oyster setting, collecting areas are established on public and private beds. Counts of the number of oysters setting are obtained from a string of of oyster shells strung on wire and suspended from stakes at these locations. The number of spat which set in one week on the smooth side of each shell on the string are tabulated.

Use of Information

Using the numbers of spat counted on shells during each week of the spawning season, it is possible to estimate 1) the potential of a particular area for receiving a "strike" or set of oysters, and 2) the weeks when the strike occurs. This information is useful because shells planted just before the period of maximum set have the best chance of getting a good strike. For example, spatfall counts indicated that in the Great Wicomico River optimum time for planting shells and shellbags was the last week in June during the past year; cultch planted later than mid-July had little chance for receiving a strike.

A good strike on shellstrings usually indicates that a strike has taken place on bottom shells. However, a good strike on shellstrings in some locations may not be accompanied by good spatfall on the rock.

One reason for such a failure is that bottom shells can be so fouled by other marine life -- much of which cannot even be detected with the naked eye -- that no room is left for small spat to attach. Even with a reasonable spatfall, survival may be extremely low due to predators such as screw borers in the saltier waters, which kill many small oysters soon after attachment.

To provide information on the actual situation on the rocks, a companion survey of spatfall on bottoms will be issued in November 1970. This will help in determining the success of this year's strike on bottom shells and can be compared to the information presented in the series of tables attached to this report.

Key

Spat per Shell = a derived figure denoting the average number of spat set on the smooth side (one side only) of a shell.

To obtain approximate number of sets on both sides of oyster shells on shellstrings, total and spat per shell counts may be doubled. Figures are presented here for one side only because it is difficult to accurately count spat on the rough side of an oyster shell.

Index
0 to 1 spat per shell = poor set
2 to 10 spat per shell = fair set
11 to 100 spat per shell = good set

QUESTIONS CONCERNING SETTING AND SPATFALL MAY BE ADDRESSED TO MR. DEXTER HAVEN, VIRGINIA INSTITUTE OF MARINE SCIENCE, GLOUCESTER POINT, VIRGINIA 23062.

List of stations in various rivers in Virginia. The table shows average number of spat on a single oyster shell (smooth side only). See charts on following pages for locations.

	May 13-30	June 1-15	June 15-22
JAMES RIVER			
Brown Shoals	0	0	0
Wreck Shoals	0	0	0
Horse Head	0	0	0
Point of Shoals	0	0	0
Deepwater Shoals	0	0	0

	June	June	June 17-24
YORK RIVER			
VIMS Pier	N.S.*	N.S.*	0
Clay Bank	N.S.*	N.S.*	0
Foxes Creek	N.S.*	N.S.*	0

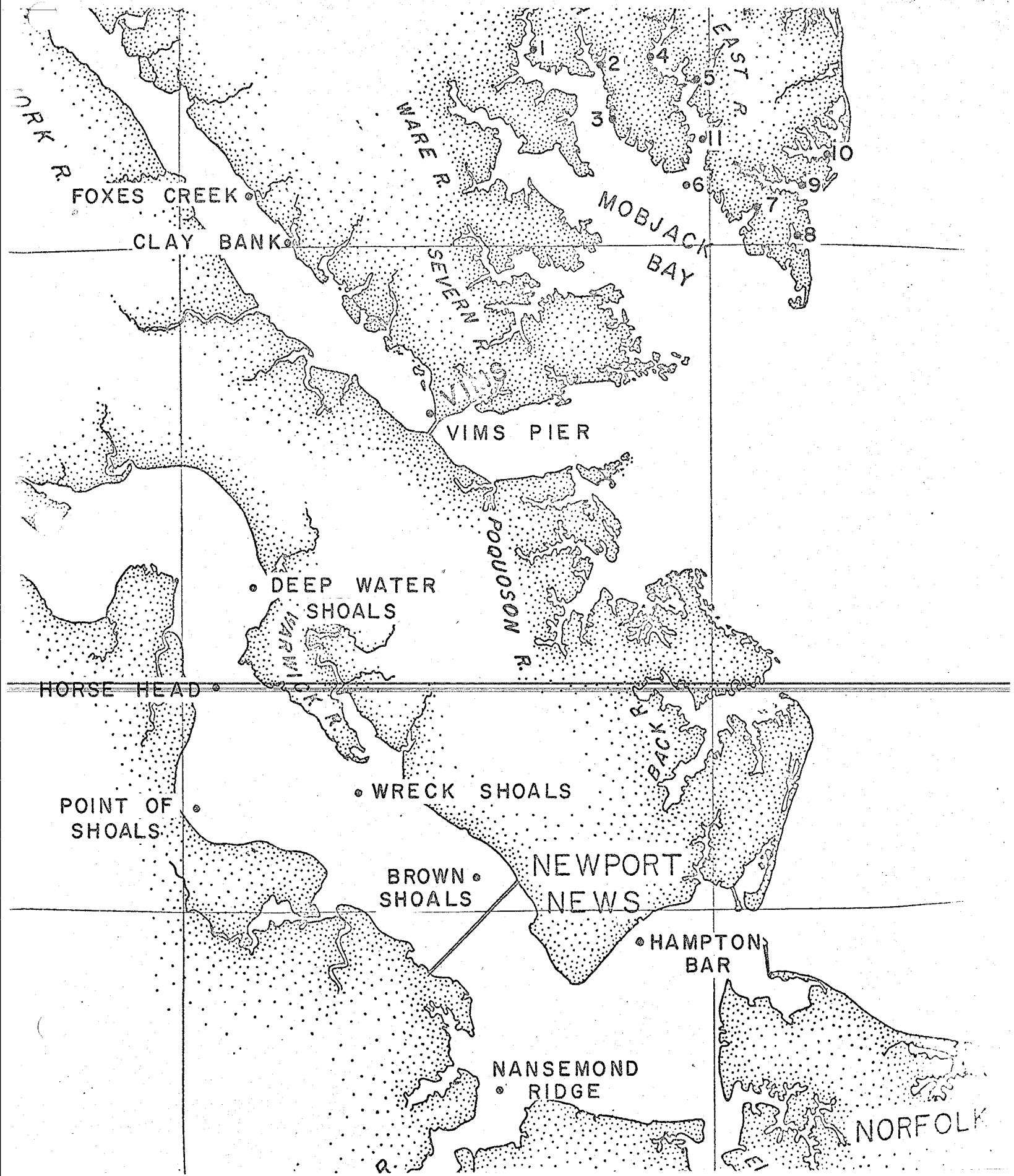
	June 1-11	June 11-18	June 18-25
MOBJACK BAY AREA			
1 North River head	0	9.9	8.2
2 North River Black Water Creek	0	0.0	1.4
3 North River Cedar Point	0	0.0	0
4 East River head	0	0.4	1.2
5 East River Put-In Creek	0	0.1	1.2
6 East River mouth	0	0	0
11 Williams Wharf	0	0.1	.5

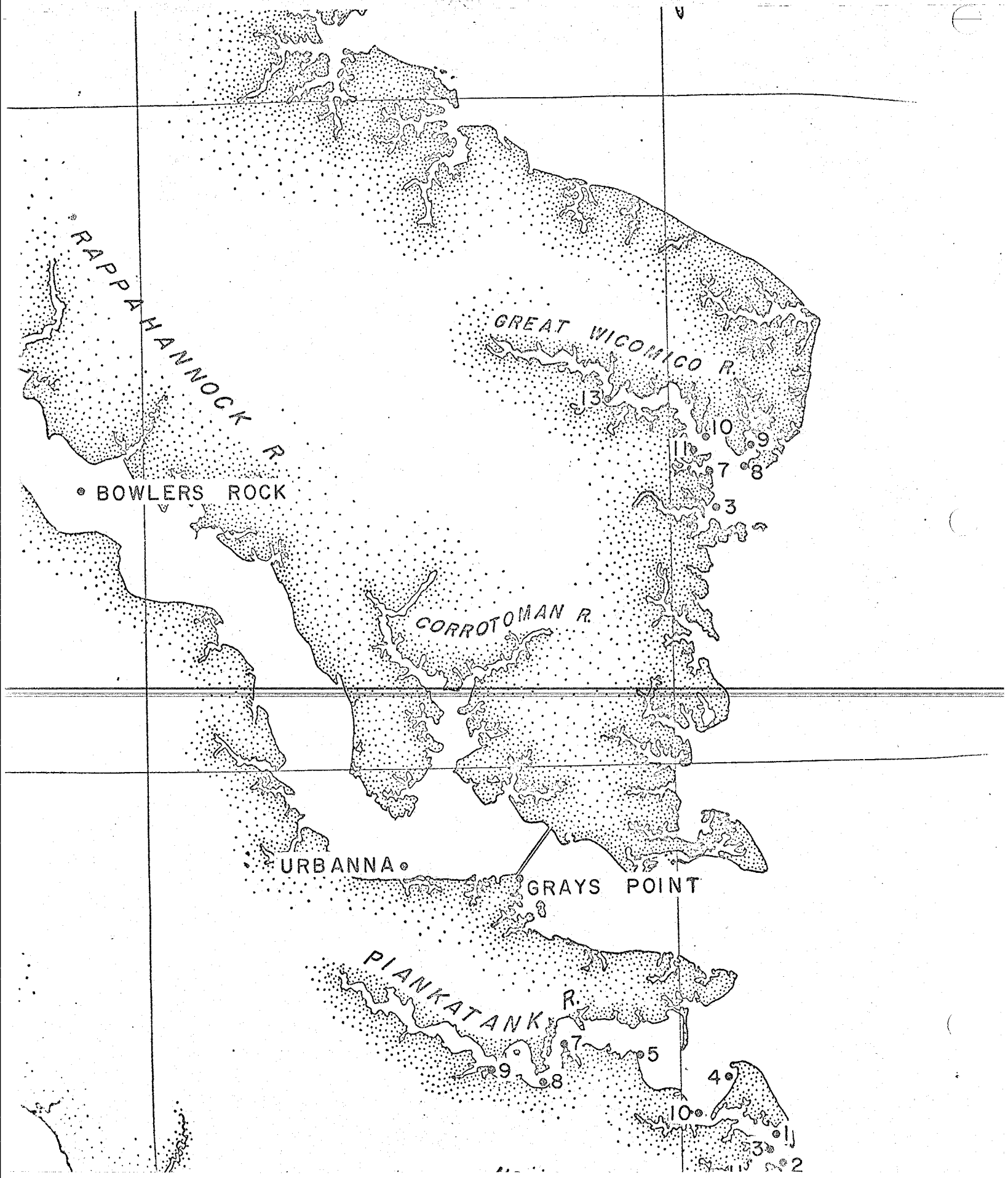
	June 1-11	June 11-18	June 18-25
NEW POINT COMFORT AREA			
7 Pepper Creek	0	0	.5
8 Dyer Creek	0	0	0
9 Horn Harbor	0	0	0
10 Winter Harbor	0	0	0

	June	June 9-16	June 16-25
PIANKATANK RIVER AREA			
1 Milford Havan	N.S.*	0	0
2 Stoakes Creek	N.S.*	0	0
3 Point Breeze	N.S.*	.4	0
4 Three Branches	N.S.*	0	N.S.*
5 Iron Point	N.S.*	0	0
6 Island Bar	N.S.*	0	0
7 Ginney Point	N.S.*	0	0
8 Twiggs	N.S.*	0	0
9 Ferry Point	N.S.*	0	0
10 Hill Bay	N.S.*	0	0
11 Stutts Creek	N.S.*	0.3	0

*Not Sampled

	June 1-8	June 8-15	June 15-22
GREAT WICOMICO RIVER			
3 Off Mill Creek	0	.2	0
7 Off Cranes Creek	.9	1.9	8.7
8 Off Fleet Point	0	.2	.3
9 Off Cockrells Creek	0	.1	0
10 SW Haynie Point	.5	4.0	9.1
11 Off Shell Creek	.1	1.3	42.7
13 Glebe Point	0	1.8	31.0


ORK R.
FOXES CREEK
CLAY BANK
WARE R.
SEVERN R.
MOBJACK BAY
EAST R.
1
2
3
4
5
6
7
8
9
10
11
VIMS
VIMS PIER
POQUOSON R.
DEEP WATER SHOALS
HORSE HEAD
BACK R.
WRECK SHOALS
POINT OF SHOALS
BROWN SHOALS
NEWPORT NEWS
HAMPTON BAR
NANSEMOND RIDGE
NORFOLK


RAPPAHANNOCK R.
GREAT WICOMICO R.
BOWLERS ROCK
CORROTOMAN R.
URBANNA
GRAYS POINT
PIANKATANK R.
13
10
9
11
7
8
3
7
5
9
8
4
10
1
3
2

JUNE 1970 OYSTER MEATS QUALITY INDEX
(From Public Rocks)

By Dexter Haven, Head, Department of Applied Biology
Division of Applied Marine Science and Ocean Engineering

Summary

Oyster for meat quality were collected from all Rivers during the first week in June 1970.

Meat quality continues high in the Rappahannock River with only a slight dip in the Lower River. The uniformly high quality of Rappahannock River oysters during the past seasons was most welcome to dealers and growers.

High meat quality in the Rappahannock is usually a constant feature of these oysters. However, there are occasional years when for some unexplained reason quality is low. 1968-69 was such a year and meat quality indices for December of 1968 are included in this report for comparison.

James and York River oysters were of better quality in May and June 1970 than during the winter period. Quality for both areas was much higher than in December 1968.

Possible reasons for differences in quality which influence all rivers from year to year cannot be explained on local difference in disease or locality of oyster grounds.

One possibility being investigated in relation to this point is the role of carbohydrates such as starch in the nutrition of oysters. Carbohydrates are present in natural waters. Studies by Dexter Haven of the Applied Biology Department in the Division of Marine Science and Oceanographic Engineering show that minute qualities of starch may result in tremendous differences in quality in laboratory reared oysters. Research is being continued at the present time with oysters and other mollusks to find what substance in natural waters may be responsible for good shellfish meat quality.

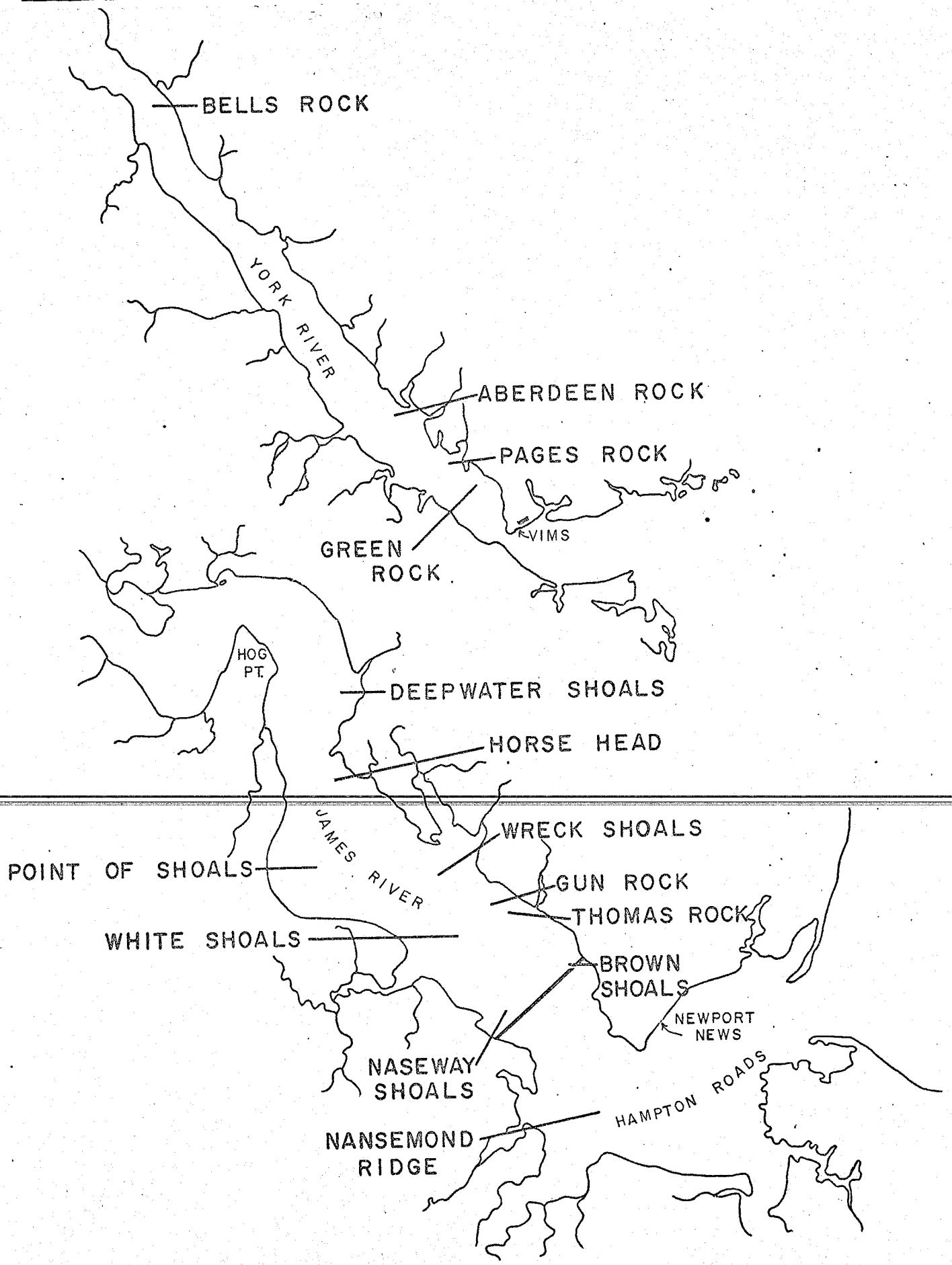
	Dec. 1968	Dec. 1969	May 1970	June 1970
JAMES RIVER				
Brown Shoals	4.0	5.0	5.9	7.1
White Shoals	N.S.*	6.1	N.S.*	N.S.*
Gun Rock	N.S.*	N.S.*	N.S.*	N.S.*
Wreck Shoals				
shallow	N.S.*	N.S.*	N.S.*	N.S.*
deep	4.2	4.7	6.2	6.7
Point Shoals	N.S.*	N.S.*	6.6	7.8
Horsehead	3.5	4.6	4.7	6.1
Deepwater Shoals	4.6	5.6	5.5	6.3

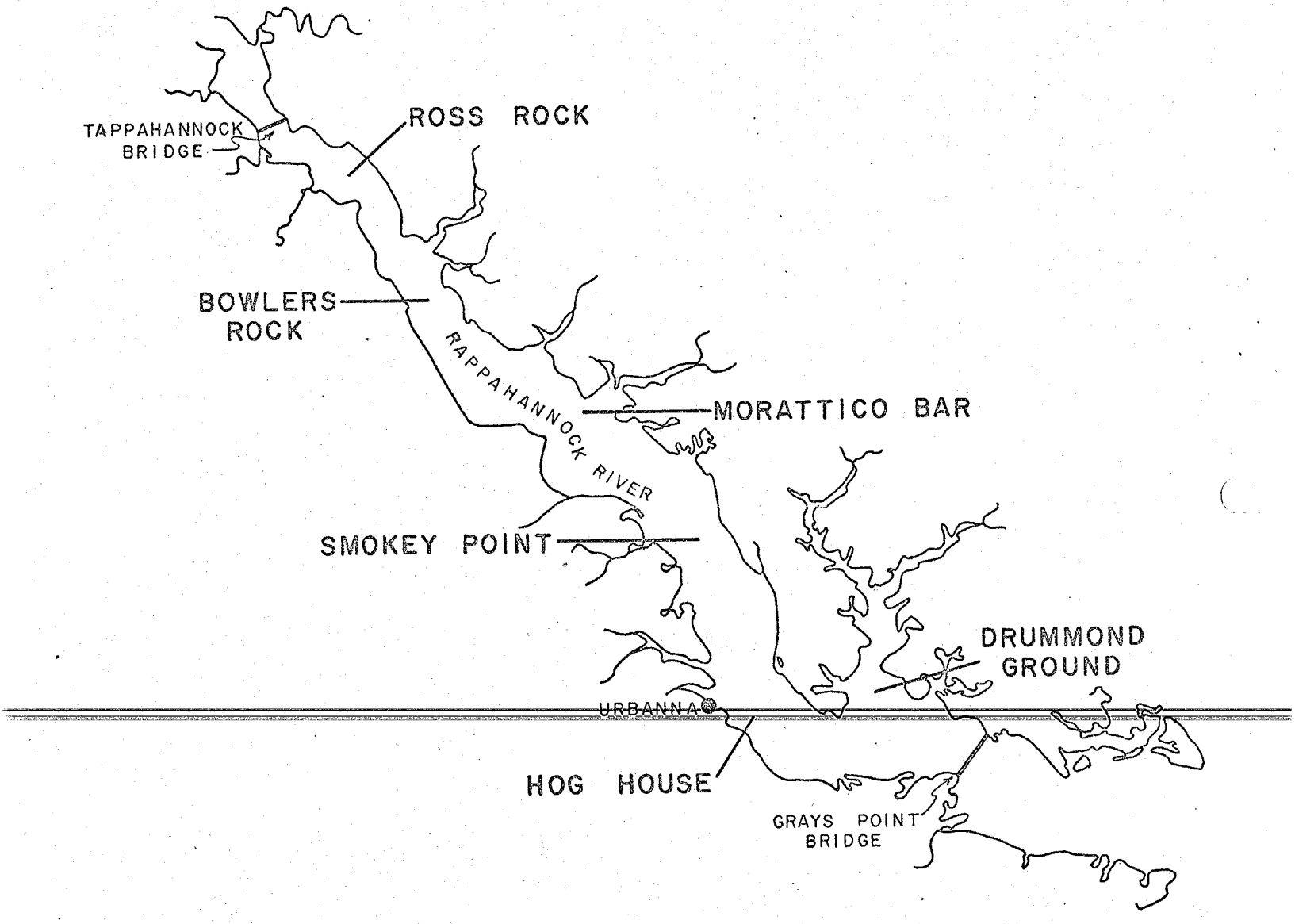
YORK RIVER				
Green Rock	N.S.*	6.6	7.1	7.3
Pages Rock	4.0	6.4	6.4	7.2
Aberdeen Rock	4.6	7.0	6.7	7.5
Bells Rock				
shallow	N.S.*	N.S.*	N.S.*	N.S.*
deep	4.0	7.8	7.2	7.8
RAPPAHANNOCK RIVER				
Drummond Ground	5.6	10.3	N.S.*	N.S.*
Urbanna	4.5	13.8	12.0	11.8
Smokey Point				
shallow	3.8	10.8	10.7	10.1
deep	N.S.*	8.6	N.S.*	N.S.*
Morattico Bar				
shallow	4.7	11.7	N.S.*	N.S*
deep	N.S.*	11.1	8.9	9.1
Bowlers Rock				
shallow	7.2	13.8	10.7	11.9
deep	N.S.*	11.6	N.S.*	N.S.*
Ross Rock	N.S.*	10.8	N.S.*	N.S.*

*Not Sampled

Explanation

The Index number is obtained by comparing the actual size of oyster meats with the amount of space inside an oyster's shell cavity. For oysters with the same shell size (for example, three-inch shucking oysters) the Index indicates relative differences in meat size due to season, type of growing area, age, disease, nutrition, crowding and other natural factors. The Index does not reflect yield differences caused by the amount of clumping in a particular bushel or caused by processing methods. The higher the Index number, the greater the amount and quality of meats that can be expected from a bushel of oysters. Whether an oyster is small or large has no effect on the Index number because meats of small oysters can fill shell cavities as completely as meats of large oysters. Using the Index, one can compare the potential meat yield of oysters of the same size 1) from different growing areas and 2) from one season to the next. (A more detailed explanation of the Index is available upon request)


BELLS ROCK
YORK RIVER
ABERDEEN ROCK
PAGES ROCK
VIMS
GREEN ROCK
HOG PT.
DEEPWATER SHOALS
HORSE HEAD
JAMES RIVER
WRECK SHOALS
POINT OF SHOALS
GUN ROCK
THOMAS ROCK
WHITE SHOALS
BROWN SHOALS
NEWPORT NEWS
NASEWAY SHOALS
HAMPTON ROADS
NANSEMOND RIDGE


TAPPAHANNOCK
BRIDGE
ROSS ROCK
BOWLERS
ROCK
RAPPAHANNOCK RIVER
MORATTICO BAR
SMOKEY POINT
DRUMMOND
GROUND
URBANNA
HOG HOUSE
GRAYS POINT
BRIDGE

SALINITY-TEMPERATURE

The Ecology-Pollution Department of the Division of Applied Marine Science and Ocean Engineering surveyed Virginia's three major estuaries, the James, York, and Rappahannock, on June 23, 24 and 25 to determine the salinity and temperature structures of the three systems. The cruises started at the mouth of each river and extended up to the transition zone between fresh and salt water. This service is performed monthly to provide information to the recreational and commercial users of Virginia's marine resources.

The salinity and temperature structure of the systems reflect the hot and dry weather experienced during the month. Salinities near the river mouths were 4 °/oo higher than in May off Deltaville in the Rappahannock and 2 °/oo higher near the mouths of the York and James. Bay salinities are still below average, however, due to high runoff in the Susquehanna drainage basin. The 1970 salinities in the Virginia section of the Bay are comparable to the 1968 levels but approximately 2 °/oo lower than the 1969 values.

RIVER MOUTH SALINITIES
(10' depth)

	1968	1969	1970
James	19 °/oo	18 °/oo	20 °/oo
York	18 °/oo	22 °/oo	20 °/oo
Rappahannock	15 °/oo	22 °/oo	16 °/oo

The salinity structure up the rivers is more dependent upon the freshwater inflow at Richmond, Hanover, and Fredericksburg than upon the Bay salinities. The attached chart shows how the 5 °/oo breaks are "compressed" in the lower James and York but more extended in the Rappahannock. A comparison of 1968, 1969 and 1970 salinities also indicates the variations which can be expected between years.

MIDDLE ESTUARINE SALINITIES

	June '68	June '69	June '70
JAMES			
Wreck Shoal	10 °/oo	15 °/oo	11 °/oo
YORK			
Bells Rock	10 °/oo	13 °/oo	10 °/oo
RAPPAHANNOCK			
Morattico Bar	11 °/oo	11 °/oo	10 °/oo

Salinity values at the 10' level were roughly the same in 1970 as had been reported in 1968 and lower than found in 1969. Runoff was low in 1969 until the August rainfall which was climaxed by Hurricane Carmille.

Water temperatures rose from below normal in May to above normal in June or an increase of approximately 10°. The value at Wreck Shoals in the James was 69° last month and 70° in June. The same values were found at Morattico Bar during the two periods. The water temperature off VIMS in the York was 77° at the 10' depth. The average temperature at this station for the 10 years of records maintained by EcoPol was 75° with a recorded maximum for this date 81° and a minimum of 69°.

Although the June '70 temperature values are slightly above normal they were within the range expected for Virginia's three major estuaries.

(See chart on page 13.)

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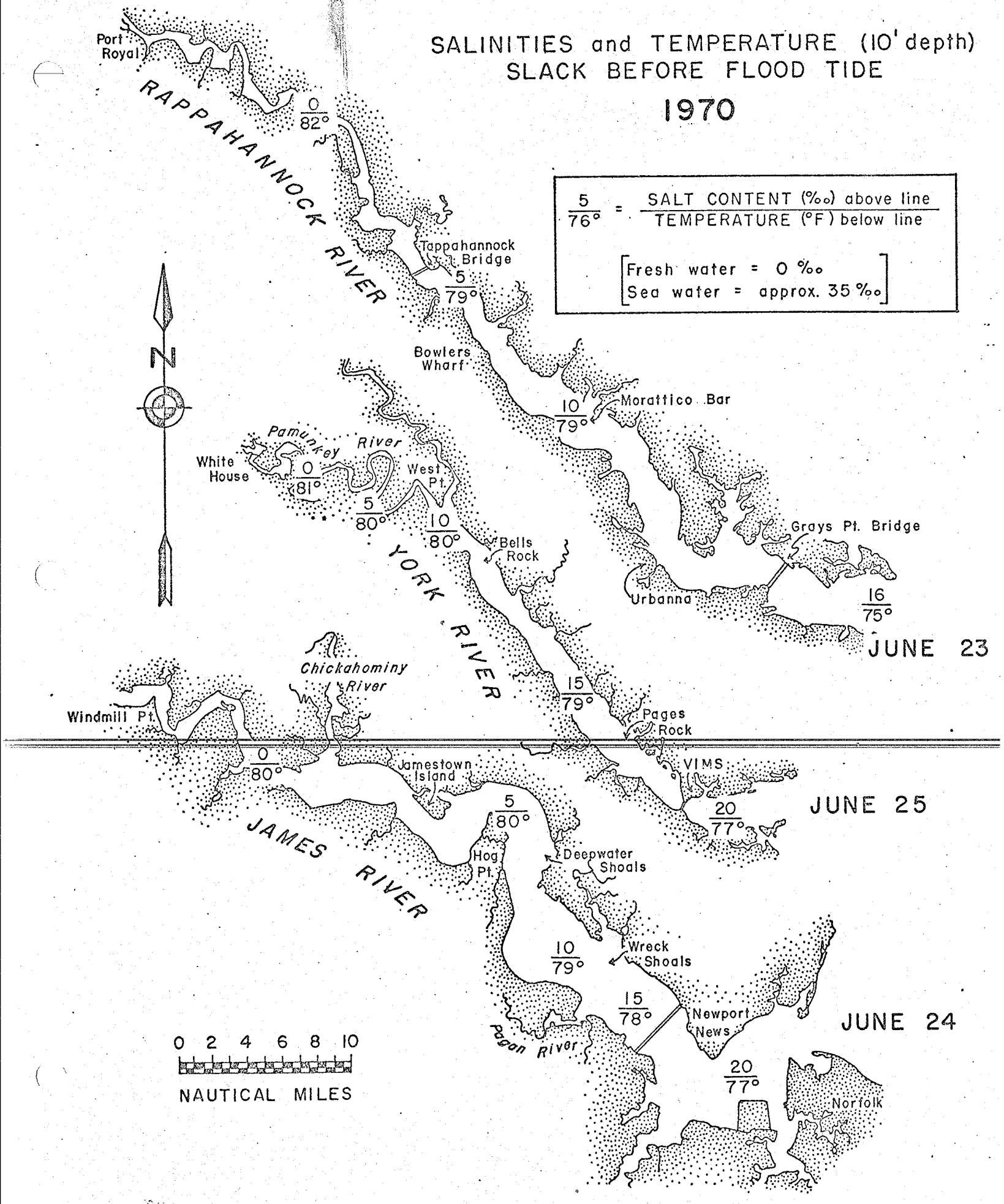
Dr. William J. Hargis, Jr., VIMS Director. Robert S. Bailey, Head, Information and Education Department. Editorial staff: Robert S. Bailey and Fred C. Biggs. Jane Davis and Kay B. Stubblefield, Illustrators. Rose Marie Horsley and Becky Ashe, Typists.


SALINITIES and TEMPERATURE (10' depth)
SLACK BEFORE FLOOD TIDE
1970
5 / 76° = SALT CONTENT (‰) above line / TEMPERATURE (°F) below line
[Fresh water = 0 ‰
Sea water = approx. 35 ‰]
Port Royal
RAPPAHANNOCK RIVER
0 / 82°
Tappahannock Bridge
5 / 79°
Bowlers Wharf
10 / 79°
Morattico Bar
N
Pamunkey River
White House
0 / 81°
West Pt.
5 / 80°
10 / 80°
Bells Rock
YORK RIVER
Grays Pt. Bridge
Urbanna
16 / 75°
JUNE 23
Chickahominy River
Windmill Pt.
15 / 79°
Pages Rock
0 / 80°
Jamestown Island
VIMS
20 / 77°
JUNE 25
5 / 80°
JAMES RIVER
Hog Pt.
Deepwater Shoals
10 / 79°
Wreck Shoals
15 / 78°
Newport News
JUNE 24
Pagan River
20 / 77°
Norfolk
0 2 4 6 8 10
NAUTICAL MILES