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Virginia Sea Grant

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Virginia Institute of Marine Science

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BULLETIN

VIRGINIA INSTITUTE OF MARINE SCIENCE

Vol. 3, No. 7

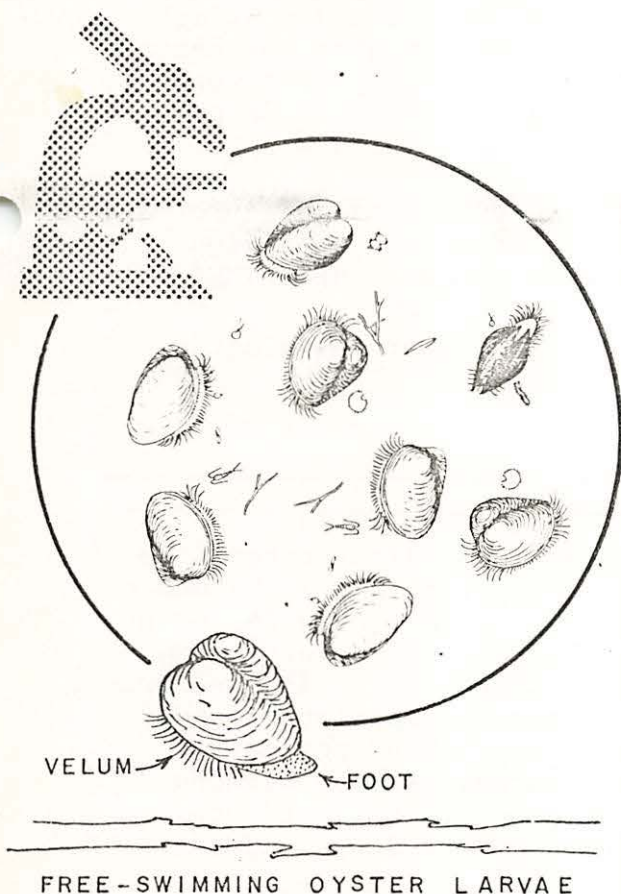
April 30, 1971

VIMS SCIENTISTS IMPROVE METHODS FOR PRODUCING "CULTCH-FREE" SPAT

The costly washing and handling of bulky oyster and clam shells used as natural cultch has been a major deterrent in developing seed oysters in commercial hatcheries at reasonable cost. However, the development of "cultch-free" seed oysters gives promise for a hatchery operation which eliminates the use of shells for cultch and does away with the costly washing and handling. VIMS scientists are now concentrating on improving methods for separating spat from artificial substrate at a very early age and growing them in trays and tanks without cultch until they are large enough to be planted on beds.

Oysters pass through a free-swimming larval stage for a period of about two weeks, after which most larval oysters settle to the bottom, extend their fleshy feet and crawl about seeking suitable substrate for attachment. The first successful method developed at VIMS for producing cultch-free spat is based on the natural sequence of changes that begin at the time the well-developed larval oyster (eyed larva) attaches to a shell or artificial substrate. The method is accomplished at the time when oyster larvae change their structure to become juvenile oysters or spat. The initial period when the newly set oyster can be easily removed from the cultch occurs while the spat is developing gills and after the foot and velum have begun to disappear, but before sufficient new shell for permanent attachment is produced.

Two methods have been developed at VIMS -- one for growing the spat in relatively clear estuarine areas after removal from the substrate, and one for growing them in areas which have muddy waters.



In VIMS' method for growing spat in clear river water, it is important that oyster spat be removed before they become permanently attached. During the time that massive setting of eyed larvae is occurring in the setting trays,

a strong stream of river water, when applied to the Mylar* sheet on the bottom surface of the setting tray at intervals of one to two hours, yielded cultch-free spat. Microscopic examination showed that water pressure tore the temporary organic matrix attachment releasing the spat before any new shell could be deposited, but after metamorphosis had begun. These free spat are then put into containers having a glassy Mylar* bottom. If some spat do reattach to the Mylar, they can be removed easily by bending the Mylar over a roller. Heavy sets, which have been avoided on natural cultch, are advantageous for free spat production; therefore, limitations of setting surface is desirable.

A second method was developed to manipulate newly set oyster spat where siltation and fouling are serious problems. In this method, removal of the newly set spat from the Mylar sheet is delayed from 19 to 21 days. A new setting tray, frames and tank were designed to efficiently manipulate setting, growth and removal of spat. The Mylar sheets on which larvae spat have set are mounted in frames which hold the sheets in a vertical position in the tank to reduce to a minimum the accumulation of silt and trash around the oyster spat. Untreated river water is circulated to the holding frames and then spills over a ledge into an auxiliary tank.

Development of nursery techniques or methods of growing cultch-free spat to sizes resistant to predators such as crabs, fish, drills and starfish also is under investigation. Unlike clams, oyster spat are not able to reattach or dig into the substratum, hence they are easily washed away or covered by silt. The challenge now is to grow cultch-free spat in trays or in ponds to a size suitable for planting in oyster beds.

A "Marine Resources Advisory Series" which presents detailed information on laboratory procedure and design of hatchery equipment for obtaining cultch-free spat will soon be available for those who wish to duplicate VIMS' methods.

*A commercial plastic

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Dr. William J. Hargis, Jr., VIMS Director. Robert S. Bailey, Head, Information and Education Department. Editorial staff: David Garten, Editor; Robert S. Bailey and Fred C. Biggs. Jane Davis, Kay B. Stubblefield and Bill Jenkins, Illustrators. Virginia Camechis and Becky Ashe, Typists.

FOREIGN FISHING OFF THE U.S.

AREA COVERED BY
 U.S. FISHERIES
 AGREEMENTS
 WITH POLAND
 AND U.S.S.R.

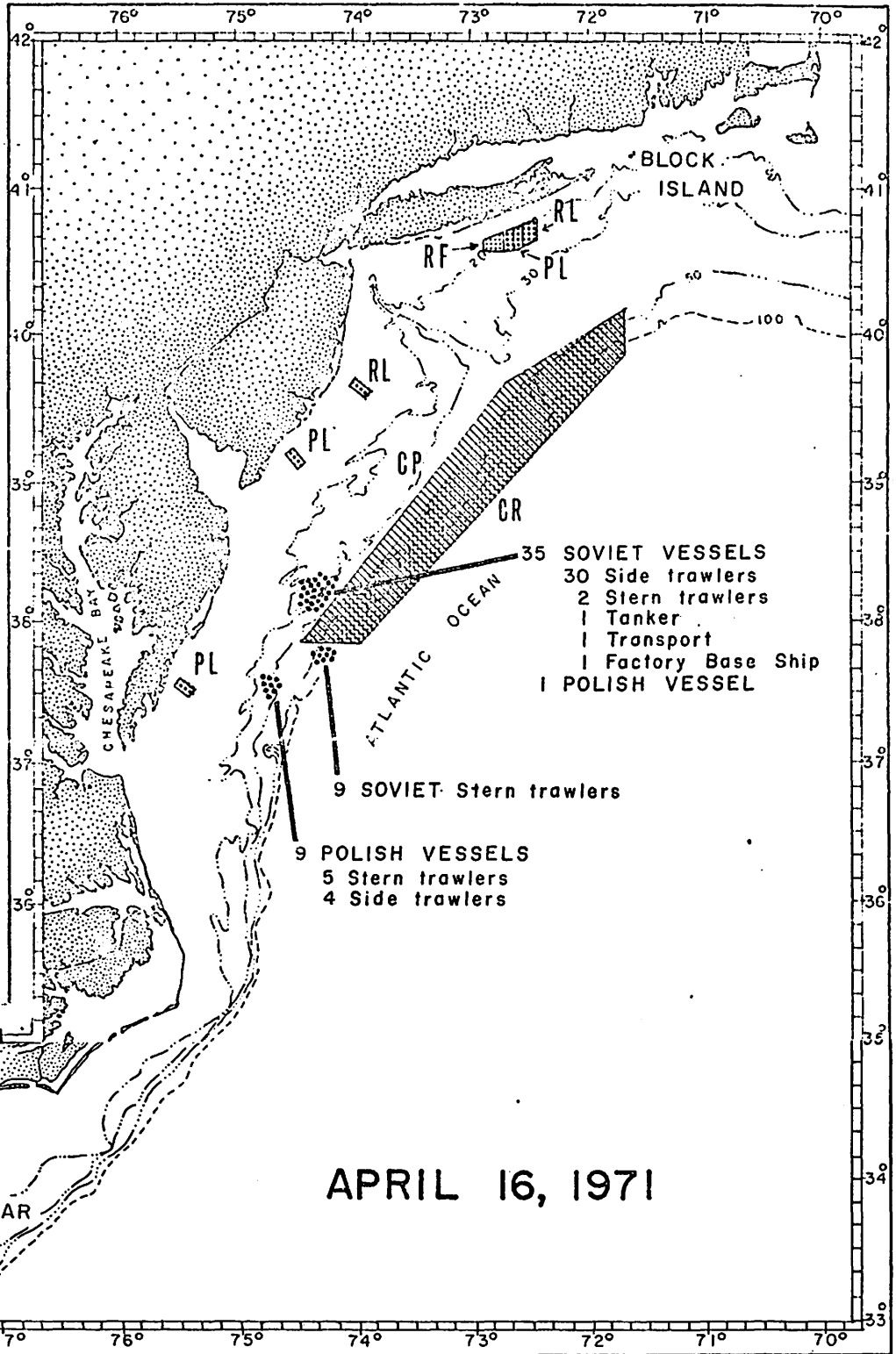
RL - Russian
 Loading Zone

PL - Polish
 Loading Zone

RF - Limited
 Russian
 Fishing Zone

CP - Closed to U.S.
 and Polish
 fishing vessels
 longer than
 110 feet

CR - Closed to U.S.
 and Russian
 fishing vessels
 longer than
 110 feet



On April 16, 1971, personnel of the U.S. Coast Guard and the National Marine Fisheries Service made a surveillance flight over the area from Cape Hatteras, N.C., to Ocean City, Md. There were 44 Soviet vessels and 10 Polish vessels operating in the area. No U.S. vessels were observed.

Most of the fishing vessels were observed 45 to 55 miles offshore and catches of mackerel and herring appeared to be heavy.

Since fleets are moving northward beyond the Chesapeake Bay, subsequent surveillance flight observations will not be reported in the MRI Bulletin.

OYSTER MEATS QUALITY INDEX

The Oyster Meats Quality Index for April 1971 declined slightly over the previous month at stations in the James River. Oysters remained average to above average from Deep Water Shoals to Wreck Shoals; oysters at Brown Shoals were below average.

Indices in the James River during April 1971 were about the same in the lower river as they were during April 1970. However, oysters collected in the upper James in April 1971 were of much higher quality than those observed in April 1970.

Oysters in the York River during April 1971 had about the same quality as during the previous month. They were average in the lower river, and below average at Bells Rock Light. In general, quality was about the same in the lower river as it was in April 1970; however, it was much lower at Bells Rock in 1971 than it was in 1970.

Oysters were above average in quality at all stations in the Rappahannock River during April 1971, but had declined slightly over the previous month. In general, the oysters in the Rappahannock were of better quality than they were during the same month of the previous year.

The following table compares the meat quality in 1971 with data collected during the same months in 1970:

KEY TO INDEX NUMBERS	
4.0 to 5.9	-- Below average
6.0 to 7.5	-- Average
7.6 and up	-- Above average

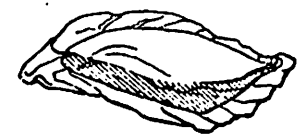
Three oysters of same size illustrate grades of meats in VIMS' index. Shaded area represents meat.



High index number (7.6 and up) for good quality oyster. Meat fills shell.

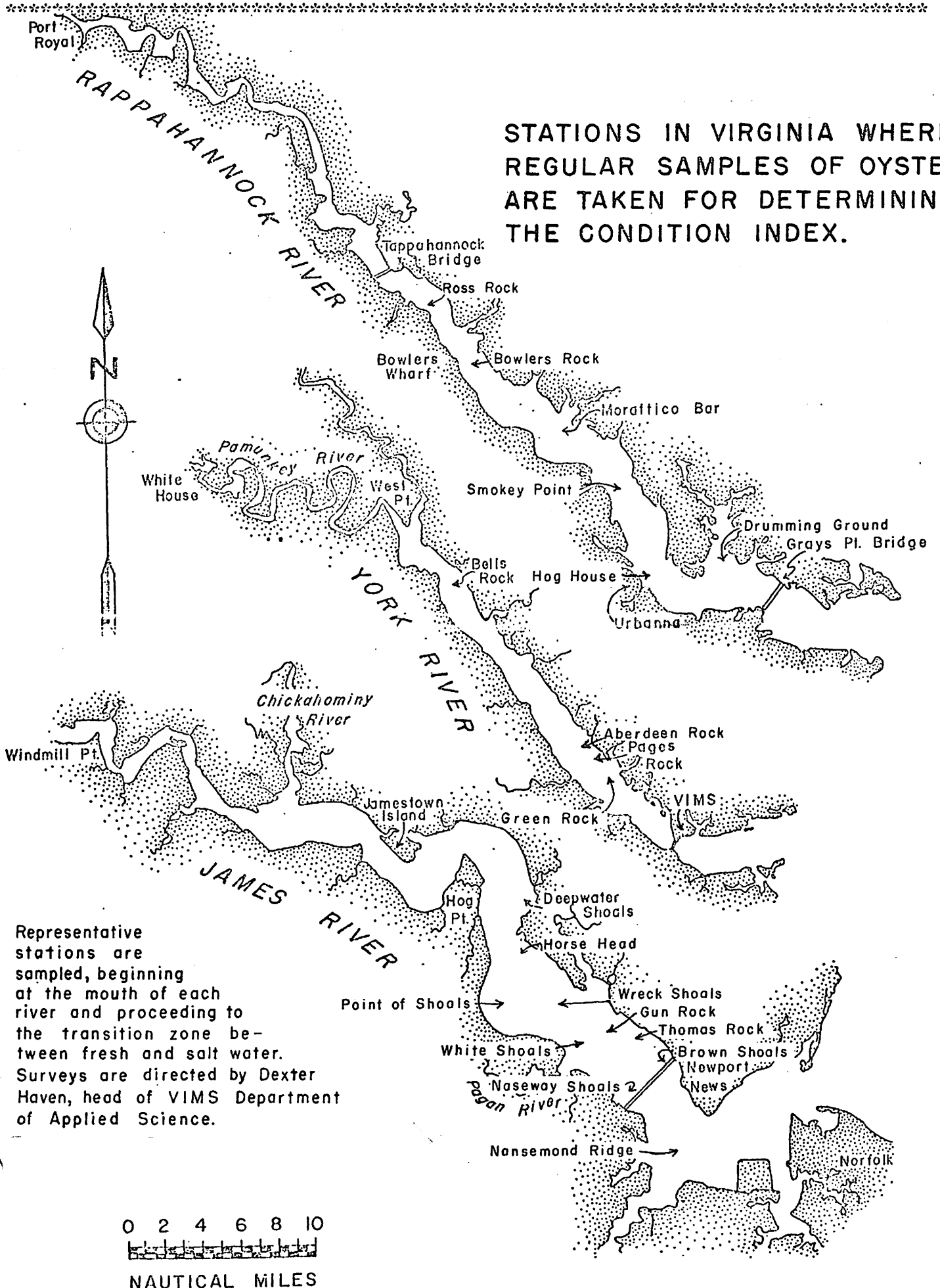


Medium index number (6.0 to 7.5) for fair quality oyster. Meat does not fill shell.



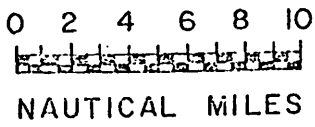
Low index number (4.0 to 5.9) for poor quality oyster. Much unfilled space in shell and the meats are watery.

	March		April	
	1970	1971	1970	1971
JAMES RIVER				
Brown Shoals	5.3	5.3	5.6	5.1
White Shoals	6.1	6.4	6.3	6.2
Wreck Shoals				
shallow	7.6	6.9	6.8	6.8
deep	6.5	6.4	6.3	6.2
Point of Shoals	7.9	8.9	6.8	8.7
Horsehead	4.8	7.0	4.7	6.8
Deepwater Shoals	5.4	8.8	---	8.6
YORK RIVER				
Green Rock	6.3	5.9	6.9	6.0
Pages Rock	5.8	6.4	6.0	6.3
Aberdeen Rock	5.5	6.7	6.0	6.5
Bells Rock				
deep	7.6	---	7.4	5.5
RAPPAHANNOCK RIVER				
Urbanna	12.6	11.5	11.7	11.1
Smokey Point				
shallow	10.8	11.5	10.9	11.3
deep	9.0	10.0	9.1	9.7
Morattico Bar				
deep	9.3	10.1	9.0	10.0
Bowlers Rock				
shallow	11.7	11.3	10.1	11.3
deep	10.7	11.1	9.6	11.0
Ross Rock	---	---	8.2	---



STATIONS IN VIRGINIA WHERE
REGULAR SAMPLES OF OYSTERS
ARE TAKEN FOR DETERMINING
THE CONDITION INDEX.

Representative
stations are
sampled, beginning
at the mouth of each
river and proceeding to
the transition zone be-
tween fresh and salt water.
Surveys are directed by Dexter
Haven, head of VIMS Department
of Applied Science.



CERTIFIED CRAB MEAT PLANTS
IN VIRGINIA*

Virginia crab plants are certified by the Virginia Department of Health. All certificates expire March 31, 1972, unless cancelled or revoked by that date.

<u>NAME</u>	<u>ADDRESS</u>	<u>PLANT NO.</u>
Blake and Bass Seafood Co., Inc.	Newport News	VA 45 C
Channel Crab & Lobster Co., Inc.	Norfolk	VA 40 C
Chesapeake Crab Co.	Hampton	VA 9 C
Dawson Packing Co., Inc.	Yorktown	VA 11 C
Eastern Shore Seafood Co.	Onancock	VA 51 C
G. T. Elliott, Inc.	Hampton	VA 37 C
Ewell & Freeman Seafood Co., Inc.	Seaford	VA 72 C
E. J. Fleming	Portsmouth	VA 44 C
W. Haywood Forrest Seafood Co., Inc	Poquoson	VA 58 C
Graham & Rollins, Inc.	Hampton	VA 17 C
P. K. Hunt & Son	Hampton	VA 16 C
Keyser Bros., Inc.	Lottsburg	VA 5 C
Lawson Seafood Co., Inc	Hampton	VA 6 C
Little River Seafood Co., Inc.	Reedville (Sunnybank)	VA 70 C
Martin & Richardson Seafood Co., Inc.	Newport News	VA 18 C
Millers Crab Shore	Colonial Beach	VA 36 C
Old Dominion Crab Co., Inc.	Newport News	VA 19 C
Phillips Seafood Co.	Hampton	VA 74 C
M. F. Quinn Seafood, Inc.	Hampton	VA 25 C
R. C. V. Seafood Corp.	Morattico	VA 35 C
Richardson's Seafood, Inc.	Hampton	VA 76 C
Smith Seafood Co.	Reedville	VA 69 C
Tidewater Seafoods, Inc.	Newport News	VA 39 C
Wicker's Crab & Seafood Co.	Portsmouth	VA 85 C
Herbert Wilkerson & Son	Colonial Beach (Potomac Beach)	VA 13 C
York Crab & Oyster Co., Inc.	Seaford	VA 33 C

*Prepared by members of the Tri-State Seafood Committee as an aid to seafood buyers in locating certified crab meat suppliers.

