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MARINE RESOURCE INFORMATION

BULLETIN

of VIRGINIA INSTITUTE of MARINE SCIENCE

Vol. 3, No. 6

March 31, 1971

FIELD CREWS STUDY HERRING SPAWNING SITES AND NURSERIES

Recent investigations by VIMS scientists have determined which areas of four major river systems serve as spawning and nursery grounds of the river herring and shad. The largest of the systems is the Potomac River with 45,000 acres of mainstream and 16,000 acres in 40 creeks from both Virginia and Maryland. The James River system ranks second in area with 41,000 total acres, 8,300 of which make up 104 major primary and secondary streams. The Rappahannock River is third with 16,000 acres, including 1,860 in 56 tributaries, and the York-Pamunkey-Mattaponi river system is fourth with 11,000 acres, including 900 acres in 38 streams. Only the two major branches of the York River system serve as nurseries since the York proper is too salty.

Sampling was done monthly at five-mile intervals from the mouth of each river to the fall line to locate the nursery areas. A four-man field crew used gill nets, seines and fyke nets to capture adult fish, and plankton nets to locate the eggs and newly-hatched larvae. Extensive collections of juveniles were made with surface and mid-water Cobb trawls. The field crew worked from the onset of the spawning season in the spring until the juveniles left in the fall, sampling a single river system each year.

If ripe adults were caught, the site of capture was assumed to serve as a spawning area. The same assumption was made if eggs or larvae were taken in the plankton nets. At least two visits and frequently more were needed to confirm whether or not a tributary or site in the mainstream served as a spawning area.

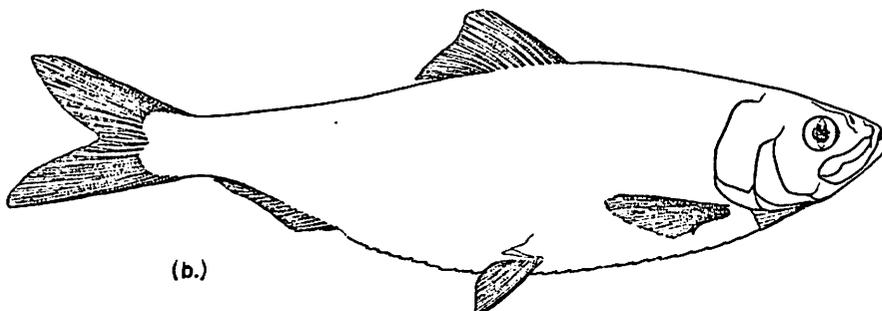
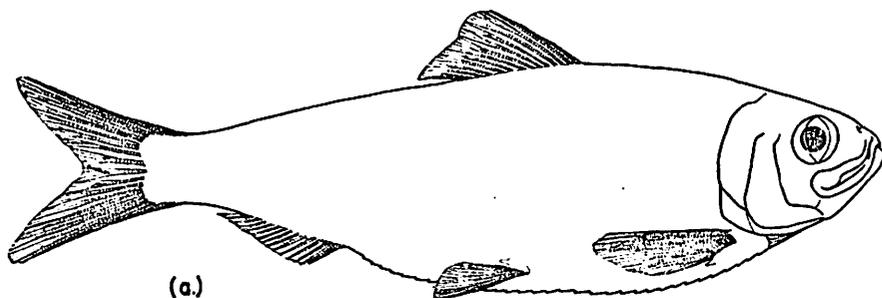
River herring and shad spawning areas extend upstream from the point where fresh and salt water meet. The study indicates that most river herring spawn in the freshwater reaches of the tributaries and to a lesser extent in the tidal freshwater portion of the mainstream. Above the zone in each river where fresh water first meets salt water, nearly all streams could be listed as "probable" or "confirmed" spawning sites. However, extensive industrial and domestic pollution in both the James and Potomac rivers has rendered some spawning waters unsuitable.

American shad prefer spawning on shallow-water flats of the tidal freshwater section of the mainstream. Most running-ripe spawners were captured on this area of the river. Shad also apparently spawn in the tributary streams since shad larvae and young juveniles were found in the upper reaches of tributaries shortly after the spawning period.

Hickory shad also were found in running-ripe and spent condition in both tributary streams and the mainstream. These shad appear to run as far up the mainstream as possible to spawn below the first insurmountable barrier encountered. Hickory shad in spawning condition were taken below

the dam on the Rappahannock River at Fredericksburg, at Walkers Dam on the Chickahominy River, and below the first dam at Richmond on the James River. Both spawning hickory shad and river herring were captured in several tributary streams in these rivers.

Alewife, hickory shad and American shad enter Chesapeake Bay about the same time during early spring. Blueback herring come in later. Alewives have been reported in the York-Pamunkey-Mattaponi river system in December



Fishermen recognize alewife (a) and blueback (b) as two distinct kinds of river herring, but use several different names for them. In this discussion, alewife is the deep-bodied, big-eyed, greenbacked fish that runs early; blueback is the slender, small-eyed, bluebacked fish that runs later.

and January, although the earliest capture of alewives during the study was in early February in the James River system when surface water temperature was 41°F. Alewives were found in spawning condition in tributary streams until the middle of May, with the height of spawning occurring during the latter part of April when surface water temperatures ranged from 61° to 73°F.

The earliest capture of hickory shad recorded by the field crews in the York River system was in late March when surface water temperature was 50°F. These fish were found on the spawning grounds with partially spent gonads until late May when surface

water temperature was 73°F, but not enough were taken to determine a peak spawning period.

American shad enter Chesapeake Bay in March with the height of the spawning migration in April. The earliest capture of ripe shad by field crews was in late March in the Pamunkey River when surface water temperature was 50°F. Shad were found in the spawning areas until late May when water temperature was 67°F.

Blueback herring usually do not appear in the rivers until April, and remain until late May and early June. Most blueback spawning occurs during May when water temperature ranges from 64°F to 75°F.

In all four species the males are generally more numerous than the females throughout the spawning season; they also appear in the rivers earlier and stay later.

Investigations of the effect of water temperatures on shad catches were conducted by VIMS as early as 1953 when scientists studied the relation-

ship for a period of four years. They reported that below a water temperature of 40°F, almost no shad were caught. Between 40° and 45°F, a few were taken, but largest catches were made in water of 45° to 59°F. At higher water temperatures, catches tapered off, but even at 70° to 74°F, more shad were caught than at 39°F for less.

* * * * *

OYSTER MEATS QUALITY INDEX

Surveys to determine the condition of oysters in Virginia rivers are directed by Dexter Haven, head of VIMS Department of Applied Biology. Representative stations on public rocks are established and sampled, beginning at the mouth of each river and proceeding to the transition zone between fresh and salt water. (See page 5 for locations.) Oysters on private beds are not examined for the survey.

For oysters with the same shell size (e.g. three-inch shucking oysters) this Index indicates relative differences in meat size due to season, type of growing area, age, disease, nutrition, crowding and other natural factors. The Index is not influenced by differences in yields per bushel of oysters caused by the amount of clumping in a particular bushel, nor does it reflect differences resulting from shucking or 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.

Chief value of this Index is to provide industry with a useful tool for comparing the potential yield of oysters of the same size from different growing areas and from one season to the next.

This report begins the second season of condition index studies for public oyster rocks in Virginia. Oysters from adjacent areas may differ slightly but the present sampling stations are believed to be representative.

Beginning with the current index, the meat quality in 1971 will be compared with data collected during the same months in 1970.

In the James River, the index showed little change during the period from December 1970 through March 1971. Oysters were average to above average up river in the region from Deep Water Shoals to Point of Shoals; those at Brown Shoals graded down to below average quality.

Indices in 1971 in the lower James were similar to those collected in the same region in March 1970; however oysters observed in the upper river in March 1971 were of much higher quality than they were a year ago.

Oysters in the York River were average to below average this month, and were similar in quality to those in the lower James. In general, quality was about the same or slightly higher than it was a year ago.

In the Rappahannock River, meat quality of oysters was about average at all stations sampled in March 1971. In general, they were of better quality at all stations than they were the previous year.

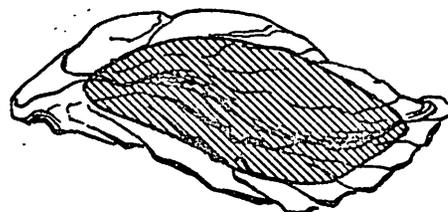
OYSTER MEATS QUALITY INDEX

March
 1970 1971

JAMES RIVER

| | | |
|------------------|-----|-----|
| Brown Shoals | 5.3 | 5.3 |
| White Shoals | 6.1 | 6.4 |
| Wreck Shoals | | |
| shallow | 7.6 | 6.9 |
| deep | 6.5 | 6.4 |
| Point of Shoals | 7.9 | 8.9 |
| Horsehead | 4.8 | 7.0 |
| Deepwater Shoals | 5.4 | 8.8 |

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



YORK RIVER

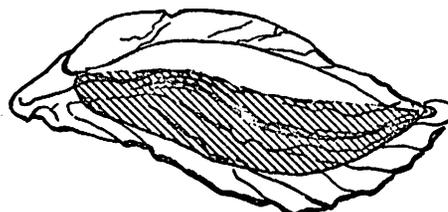
| | | |
|---------------|-----|-----|
| Green Rock | 6.3 | 5.9 |
| Pages Rock | 5.8 | 6.4 |
| Aberdeen Rock | 5.5 | 6.7 |
| Bells Rock | | |
| deep | 7.6 | --- |

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

RAPPAHANNOCK RIVER

| | | |
|---------------|------|------|
| Urbanna | 12.6 | 11.5 |
| Smokey Point | | |
| shallow | 10.8 | 11.5 |
| deep | 9.0 | 10.0 |
| Morattico Bar | | |
| deep | 9.3 | 10.1 |
| Bowlers Rock | | |
| shallow | 11.7 | 11.3 |
| deep | 10.7 | 11.1 |
| Ross Rock | --- | --- |

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



KEY TO INDEX NUMBERS

4.0 to 5.9 -- Below average

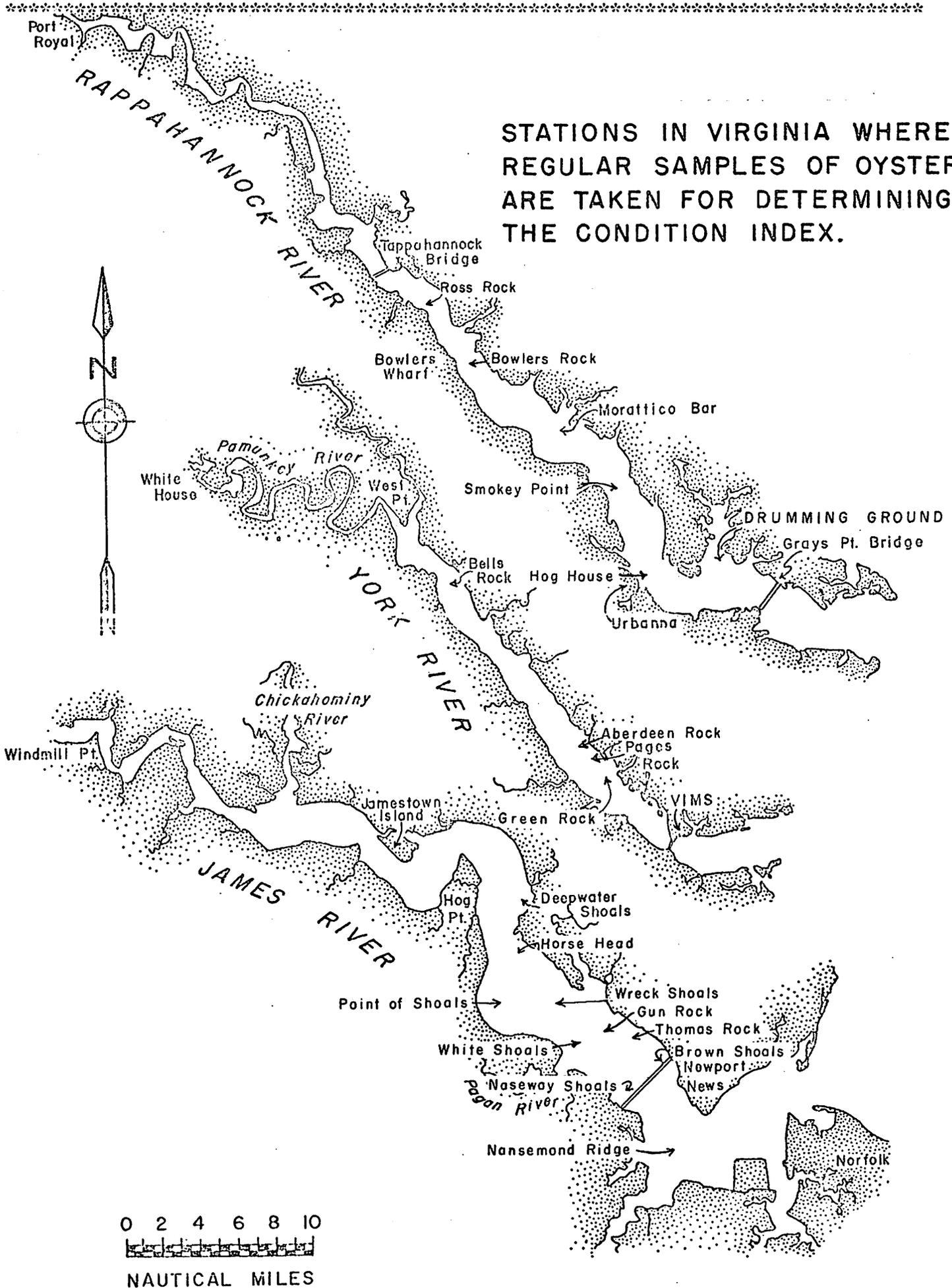
6.0 to 7.5 -- Average

7.6 and up -- Above average



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

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



CERTIFIED CRAB MEAT PLANTS
IN MARYLAND*

Maryland crab meat plants are certified by the Maryland Department of Health. Certificates expire February 28, 1972, unless revoked prior to that date.

| <u>Name</u> | <u>Address</u> |
|-------------------------------|----------------|
| Byrd's Inc. | Crisfield |
| I.F. Cannon & Son | Crapo |
| Chesapeake Shellfish Co. | Sherwood |
| J. M. Clayton Co. | Cambridge |
| Crisfield Packing Co. | Crisfield |
| Dorchester Crab Co. | Wingate |
| Goose Creek Seafood | Toddville |
| Harrison & Jarboe Seafood Co. | St. Michael's |
| Charles W. Howeth & Bros. | Crisfield |
| Island Seafood Co. | Deal Island |
| Maryland Crabmeat Co. | Crisfield |
| Meredith & Meredith | Toddville |
| Milbourne Oyster Co. | Crisfield |
| Milbourne Oyster Co. | Stockton |
| Powley, Inc. | Wingate |
| Rippons Brothers | Hoopersville |
| Herbert E. Sadler | Eastport |
| Seacrafters of Crisfield | Crisfield |
| J. C. W. Tawes & Son | Crisfield |
| Todd Seafoods, Inc. | Cambridge |
| W. A. Turner & Sons, Inc. | Bellevue |

*Prepared by members of the Tri-State Seafood Committee as an aid to Seafood buyers in locating certified crab meat suppliers. Other plants will be listed as they are certified.

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