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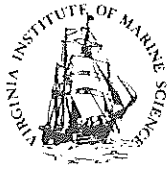


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Virginia Institute of Marine Science

MARINE RESOURCE ADVISORY

A SEA GRANT ADVISORY SERVICE

Gloucester Point, Virginia 23062

AN ECONOMIC APPRAISAL OF EASTERN SHORE SEAFOOD HARVESTING

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Virginia's Eastern Shore has been a slowly developing region. Its population, for example, declined by 16% from 1950 to 1970, while Virginia's total population rose by 33%. Its economy has not shifted greatly from the agriculture (chickens and sweet potatoes) and fisheries base on which it was originally founded.

This rate of development, however, will soon be challenged by population growth in adjacent areas and the development of offshore oil reserves. Second-home community development has begun in Chincoteague and is proposed in other areas. Oil exploration in the Middle and South Atlantic, to begin later this year, has created impetus for industrial development. Brown and Root, Inc., has purchased 2,000 acres in Cape Charles City to build an oil platform fabrication plant. In addition, an oil tank farm is proposed for Crisfield, Maryland, a community bordering Virginia. Since change seems likely, the current economy warrants study.

This advisory examines the Eastern Shore seafood harvesting industry. Based on monthly (1972-1974) and annual (1949-1972) data, short- and long-term trends are analyzed. Seasonal variations in landings, production problems and changes in scale, and capital to labor ratios are examined. This information serves as a baseline assessment of current production, sheds light on industry problems, and is used in the final section to assess probable changes in the fishery, especially in light of industrial development.

A PERSPECTIVE ON THE EASTERN SHORE'S COMMERCIAL FISHERY

Although completely accurate data on fishery employment are difficult to obtain because the Bureau of Census in its *Census of Business* does not separate fishery from forestry products, unpublished data from the National Marine Fisheries Service list 1,420 commercial fishermen on the Eastern Shore in 1972. This is about 8.5% of total Eastern Shore employment. If fishery processing, wholesaling, and retailing employment were also considered, the

author estimates about 25% of 1972 employment would have been involved in fisheries.

The Eastern Shore makes a significant contribution to Virginia's seafood industry. Monthly and

Table 1. Value (\$) of major Eastern Shore commercial species¹ (1972-1974)

| Species | 1972 | 1973 | 1974 |
|------------------|------------------|------------------|------------------|
| <i>Finfish</i> | | | |
| Bluefish | 14,503 | 35,913 | 43,695 |
| Croaker | 11,717 | 27,853 | 73,229 |
| Eels | 40,039 | 32,207 | 53,329 |
| Fluke | 134,200 | 106,285 | 155,152 |
| Sea Bass | 28,905 | 67,973 | 35,861 |
| Sea Trout | 77,039 | 156,238 | 148,999 |
| Spot | 29,820 | 43,315 | 46,151 |
| Striped Bass | 116,382 | 149,744 | 192,725 |
| Sub total | 452,605 | 621,358 | 753,112 |
| <i>Shellfish</i> | | | |
| Blue Crab | 1,066,838 | 1,364,682 | 1,390,040 |
| Clam | 2,409,681 | 4,478,872 | 6,787,145 |
| Oyster | 315,765 | 362,494 | 239,683 |
| Subtotal | 3,792,284 | 6,206,048 | 8,416,868 |
| TOTAL | 4,244,889 | 6,827,406 | 9,169,980 |

¹Computed on the basis of monthly statistics gathered by NMFS.

annual values indicate that the Eastern Shore supplied 23% of 1972 landings and 37% of 1974 landings. The share is growing because of increased surf clam catch. These estimates are upwardly biased due to the exclusion of menhaden values from the data.

The principal harvested products are clams, blue crabs (hard and soft), oysters, and a variety of finfish (Table 1). Hard and surf clams currently account for \$7 million in ex-vessel value. Annual landings of hard and soft crabs bring between \$1 and \$1.5 million in ex-vessel income to the watermen. Oyster production, from public grounds and leased private

grounds, yields nearly \$300,000 in revenues. Finfish, including bluefish, croaker, eels, flounder, sea bass, sea trout, spot, and striped bass, bring another \$750,000 in ex-vessel revenues.

Harvesting methods vary markedly in their labor intensity. State regulations, for example, require public oyster grounds to be hand-tonged, an extremely labor intensive technique. However, surf clam harvesting in the Atlantic utilizes quite sophisticated hydraulic dredge techniques and minimizes the amount of labor required. As will be shown later, these differences significantly alter the intertemporal patterns of production.

LONG-TERM TRENDS IN PRODUCTION

Expanded use of capital equipment is apparent throughout Virginia's seafood industry (Strand and Dias, 1975). Since industry wages have increased faster than the price of capital equipment, boat owners have substituted capital for labor. The growth in the capacity of fishing craft and in the capital to labor ratio are indicative of this trend.

Crab-scrape craft, specific to the Eastern Shore, illustrate the increased capitalization. Crab-scrape vessels with capacity greater than five net tons have

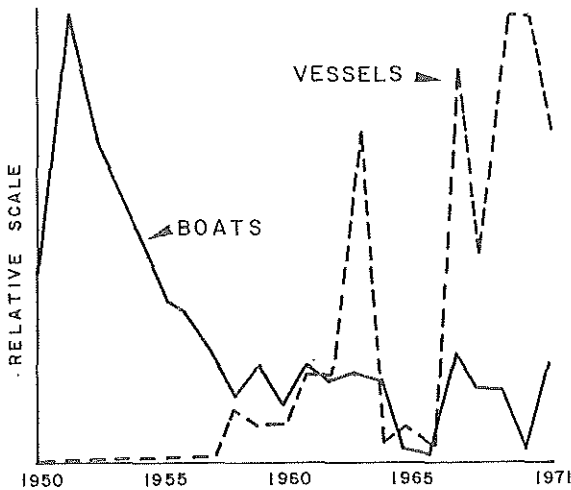


Figure 1 - Annual Number of Boats and Vessels Engaged in Scrape Production.

gradually replaced the smaller-capacity boats (Figure 1). In addition, men per boat have decreased (Figure 2) and scrapes per fisherman have risen (Figure 3).

There have been two obvious long-term trends in shellfish production: sharp declines in soft crabs and oysters (Table 2). Decrease in soft-crab industry production may result from increased wages in the industry and the disappearance of Chesapeake eel

Table 2. Eastern Shore landings of soft crabs and oysters (in thousands of pounds).

| | 1950 | 1960 | 1972 |
|------------|-------|-------|------|
| Soft Crabs | 2,167 | 690 | 605 |
| Oysters | 2,432 | 2,464 | 501 |

grass. The labor intensity of soft-crab processing and labor problems throughout the industry (Coale et al, 1972) have combined to decrease the demand for soft crabs. Further, the loss of eel grass com-

munities, which protected and congregated the soft-crab resource, has increased the per unit cost of soft-crab catch.

Decline in oyster production may also be attributed to a changing environment and labor intensive production methods. An oyster disease, MSX, spread across the lower, more saline portions of the Bay in the early sixties and induced high mortalities

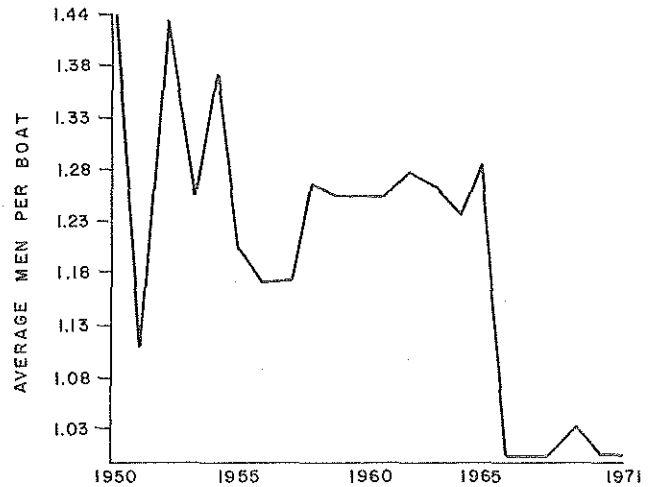


Figure 2 - Average Number of Boatmen per Boat Engaged in Scrape Production.

in two- and three-year-old oysters. Private growers reduced their demands for seed oysters because of the lower yield and production fell tremendously. This impact was confined to the Bay side of the Eastern Shore. However, Ocean-side production also fell, indicating that labor costs may have aided the slump in production.

Since the law forbids mechanized methods for harvesting seed oysters, little capitalization has

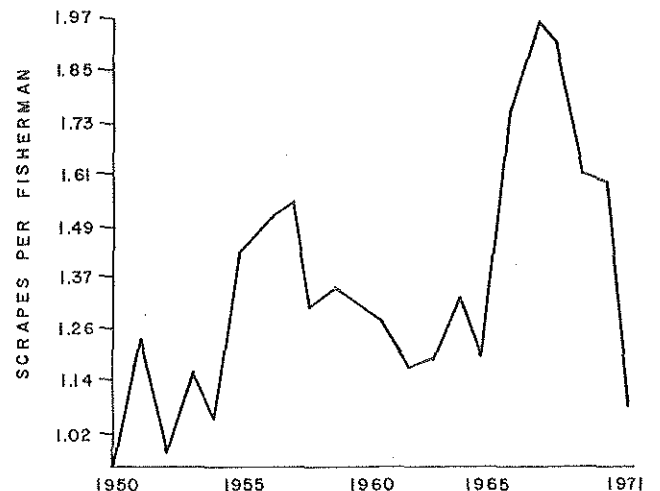


Figure 3 - Number of Scrapes per Fisherman.

occurred. The regulation arises from a concern that mechanized techniques will damage the shell base where the oysters grow and will cause displacement in the labor force. Yet there is little doubt that rising labor costs have created incentives to employ capital intensive production techniques and that the law has thwarted this movement in seed oyster production.

Long-term trends in finfish production are extremely difficult to discern and appraise because of

the variety of finfish and harvesting techniques, biological interactions among species, and the tremendous variations in age-class strength. The

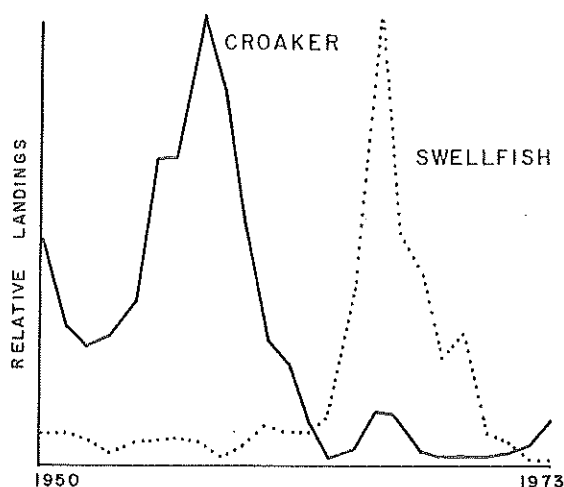


Figure 4 - Annual Virginia Croaker and Swellfish Landings.

variability in production is dramatic (Figure 4). Croaker landings between 1949 and 1962 peaked at

1,400,000 pounds and never fell below 175,000 pounds. Between 1963 and 1970, however, landings never surpassed 30,000 pounds and fell as low as 100 pounds. Puffers, on the other hand, never exceeded 210,000 pounds from 1949 to 1962, yet rose to 1,500,000 pounds in 1965. There are a host of possible biological and economic reasons for these changes but, to date, no econometric research has been attempted.

RECENT EVENTS

Monthly landings and prices from 1972 to 1974 of seven Eastern Shore species show the most recent developments in the industry. Some preliminary reports are used which may differ from final data due to delinquent reports and exclusion of certain species. However, the promptness of the data and the intent to review seasonality necessitate use of the preliminary data.

The 'nominal' prices shown (Tables 3, 4) are derived from an index based on prices received by Virginia farmers. The index is based on agricultural products because farming is the most likely alternative employment for Eastern Shore fishermen. The

Table 3. Seasonality of landings and prices of selected finfish and shellfish in Accomack County.¹

| Species | Peak Landings | | Peak Prices | | Seasonality of Landings | | Recent Trends | | |
|--------------|------------------------|---|-------------|--|-------------------------|------------------------------------|---------------|-------------------|----------------|
| | Months | Highest Level ² (thousands of lbs.) | Months | Highest Level ² (\$ / lb.) | Index ³ | Length of Season | Landings | Prices Nominal | Prices Real |
| Bluefish | June/Sept. | 35 | June-Sept | .25 | MS | 6-8 Months (Summer) | ↑ | ↑ | No Trend |
| Fluke | July | 123 | Sept. | .50 | HS | 6 Months (Summer) | No Trend | ↑ | No Trend |
| Sea Trout | April and Oct./Nov. | 155 | Apr. | .30 | Double Season | 2-3 Months (Spring and Fall) | No Trend | ↑ | No Trend |
| Striped Bass | Dec. and March | 165 | Feb. | .50 | HS | 4-6 Months (Winter) | ↑ | ↑ | No Trend |
| Hard Crab | April/Oct. | 1111 | Feb. | .30 | SS | 5-7 Months (Spring to Fall) | No Trend | No Trend | ↓ |
| Soft Crab | May and Aug. | 197 | Aug.-Sept. | .50 | SS | 7 Months (Spring to Fall) | No Trend | ↓ | ↓ |
| Hard Clam | March and July/Aug. | 68 | — | .95 | MS | 6 Months (Summer) | ↓ | ↑ | ↓ |

¹ Based on unpublished monthly data obtained from the National Marine Fisheries Service, NOAA

² Between January 1972 and December 1974

³ Index: HS—Highly seasonal MS—Moderately seasonal SS—Slightly seasonal

Table 4. Seasonality of landings and prices of selected finfish and shellfish in Northampton County.¹

| Species | Peak Landings | | Peak Prices | | Seasonality of Landings | | Recent Trends | | |
|---------------------------|---------------------|---|-------------|--|-------------------------|--|---------------|------------------------|----------|
| | Months | Highest Level ² (thousands of lbs.) | Months | Highest Level ² (\$ / lb.) | Index ³ | Length of Season | Landings | Prices Nominal Real | |
| Bluefish | May and Oct. | 283 | July | .20 | MS | 3-4 Months (Summer) | ↑ | No Trend | ↓ |
| Sea Trout | May and Oct. | 293 | Sept. | .20 | HS | 4-6 Months (Summer) | ↑ | ↑ | No Trend |
| Striped Bass | April and Nov./Dec. | 115 | Aug./Dec. | .50 | HS (Double Season) | 2 Months (Spring) 4 Months (Fall) | ↓ | ↑ | No Trend |
| Hard Crab | April/May and Dec. | 1092 | Feb./Mar. | .18 | SS | — | No Trend | ↑ | No Trend |
| Hard Clam | Oct./Nov. | 40 | Sept./Nov. | .95 | SS | — | No Trend | No Trend | ↓ |
| Surf Clam | May | 5654 | — | .12 | SS | — | ↓ | No Trend | ↓ |
| Conchs | Jan. and May/June | 149 | — | .20 | SS | — | ↑ | ↓ | ↓ |
| Oyster (Leased ground) | Nov./Dec. | 102 | Nov. | 1.00 | HS | Nov.-Dec. | No Trend | ↓ | ↓ |

¹ Based on unpublished monthly data obtained from the National Marine Fisheries Service, NOAA

² Between January 1972 and December 1974

³ Index: HS—Highly seasonal MS—Moderately seasonal SS—Slightly seasonal

species were chosen by economic importance and dynamic characteristics.

Bluefish — A recent experience with bluefish underscores further the large variability in production. Landings of bluefish on the Eastern Shore in 1973 and 1974 were about ten times greater than any year since 1949. Comparable landings were last seen in the 1930's. Biologists have few explanations for this fluctuation, but investigations are underway. Bluefish landings arise from two distinct population movements: a northerly migration in April and May and a southerly migration any time from August to November. Some of the population, normally the young, remain in the Chesapeake Bay throughout the year. Although nominal prices rose for bluefish, adjusted prices remained stable through 1973. They fell substantially in 1974 as a result of the market's inability to absorb Northampton's enormous landings in April and May.

Fluke — Fluke (or flounder), landed primarily in Accomack, do not follow the extreme variations apparent in other finfish. Flounder apparently move in an east-west direction, summering in the Bay and moving offshore in winter to spawn. Adjusted prices have remained stable but fluctuate each six months and peak in March and July/August.

Striped Bass — Annual landings from 1972 to 1974 were approximately 500,000 pounds, twenty times the average from 1949 to 1970. Predominant factors include a huge 1970 year-class and greater effort directed to the species. As with bluefish, two distinct peaks occur with north-south migration. Migratory habits also affect the distribution of landings between counties (Figure 5). Northampton, for example, is predominantly a Bay fishery and landed the large 1970 age-class in 1972 and 1973 when they were young. By 1974, this age-class apparently bypassed the Chesapeake Bay and was caught by

Accomack's Ocean Fishery. Peak prices for striped bass occur in February and are approximately twice the normal 25¢ per pound. There is no trend in the adjusted prices.

Hard Crabs — Annual landings of Eastern Shore hard crabs were approximately 60% of the 1950 and 1960 landings. Preliminary statistical results (Strand and Dias, 1976) indicate a downward time trend in demand, particularly for Northampton's dredged crabs. The decrease results from the labor intensive nature of processed hard crabs, rising labor costs, and the requirement of more labor per pound for dredged crabs which have lower meat yields and are filled with mud. Seasonal differences in landings between Accomack and Northampton are caused by different harvesting techniques and population movements of the crabs. Northampton's dredge fleet works in winter when the crabs are at the Bay's mouth. Accomack's crabbers use pots to catch Bay and tributary populations. Prices in both counties peak in February/March and have definite seasonal patterns — low prices in summer and high prices in winter. Adjusted prices show no distinct trend.

Soft Crabs — Accomack's growing share of Eastern Shore soft-crab landings is significant, rising from 50% in 1950 to 97% in 1973. This increase is probably a result of the growth of the Crisfield, Md., crab processing facilities. In addition to the production shift, there has been a decrease of approximately 60% in soft-crab landings since 1950. Soft-crab landings are caught between May and September with pronounced peaks in May and August, corresponding to crabs' molting cycle. Finally, a distinct

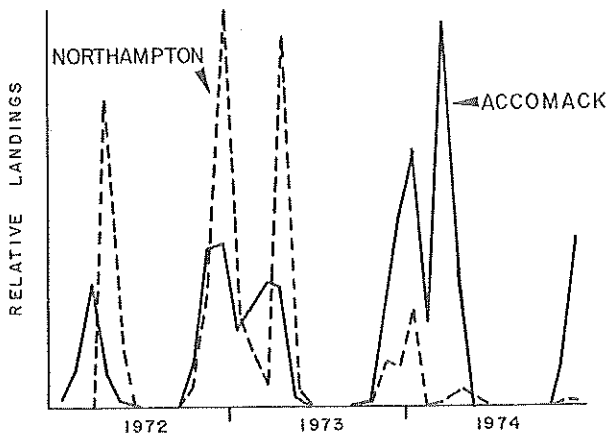


Figure 5 - Monthly Eastern Shore Striped Bass Landings.

decline in adjusted prices indicates a critical weakness in the market, especially since landings actually fell during this period.

Hard Clams — Eastern Shore's share of Virginia hard-clam landings is significant and fluctuates considerably. The fluctuation is apparently due to the diversity of products available in the Bay and wide regional variations in hard-clam spawning success. There is no apparent seasonality in landings but the recent trend in real prices is disturbing. Despite falling hard-clam production in the state and Eastern Shore, adjusted prices have fallen considerably over 1972-74. Although the fall in price

may represent shifting consumer preferences, it is more likely that the recent encroachment of surf clam production into Virginia's chowder clam market has caused the decline.

Surf Clams — The dramatic rise of Eastern Shore surf-clam landings, over a thirty-fold increase in four years, is the most striking recent event in the fishery (Figure 6). Unlike finfish, where abrupt changes emanated mostly from environmental and biological factors, this shift stems primarily from increasing demand. Because Virginia's surf-clam resource is

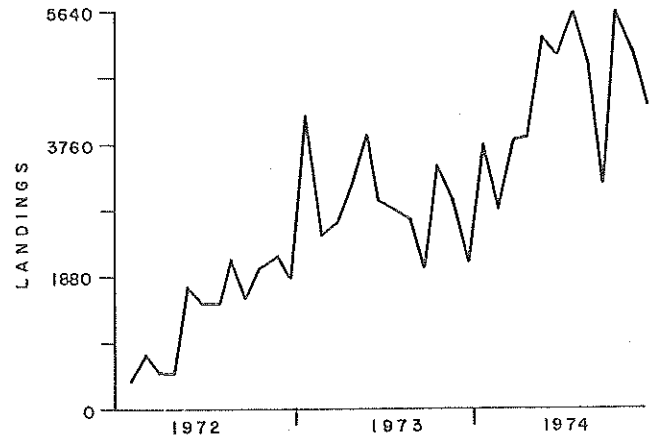


Figure 6 - Monthly Surf Clam Landings (Thousands of Pounds) in Northampton County.

plentiful and the offshore technology (hydraulic dredges) is very efficient, surf-clam price is much lower than hard clams (9¢/lb. vs. 70¢/lb.). There is evidence of encroachment by surf clams in some of the processing markets. Although attempts are underway to manage surf-clam exploitation, consensus from industry and government is likely to be reached only after the resource has been depleted. This occurrence could be within a year if the biological assessments are correct. There is no discernible seasonality in either surf-clam landings or prices but there is a noticeable downward trend in their price. This could be the result of great quantities supplied, smaller clams as marginal beds are brought into production, or possibly increased production efficiency, i.e., increasing knowledge of the location of surf-clam beds.

OBSERVATIONS

Several new developments from the Federal government will undoubtedly affect the Eastern Shore fishery. An outlook for the future of the industry is given by combining long-term trends and recent events with the new developments.

Eastern Shore watermen relying on shellfish for income will probably experience severe cost-price squeezes in the near future. Declining prices may continue because processors will be required by Federal regulations to increase costs, which forces ex-vessel demand down. EPA's waste water discharge procedures will become effective in 1977, and the FDA may renew efforts to impose a Good Manufacturing Code on the oyster industry. In the long run, competition for labor should intensify with development, causing wage increases.

In addition, recent income tax rulings and the espoused enforcement of them may force costs up. The pending extended fisheries jurisdiction may be the only bright spot in the future. Although management may evolve after the surf-clam resource is gone, long-run management possibilities can only help the industry. However, the benefits to the shellfish industry will be far in the future.

The finfish situation does not appear as bleak. First, recent price declines are not prevalent in the finfish market. They only result from occasional tremendous changes in landings. Secondly, EPA and FDA regulations will have far less effect in the finfish industry. Processed waste water requirements and health hazards arising from finfish are not significant. Competition for labor from offshore oil might raise wage rates. Finally, extended jurisdiction management is more likely to have positive impacts on finfisherman in the near future. There are possibilities that finfish resources now caught by foreign fleets can be utilized solely by domestic fleets, and the Eastern Shore has easy access to these resources. Even without exclusive access, more stringent management of foreign fleets can aid Eastern Shore finfishery.

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