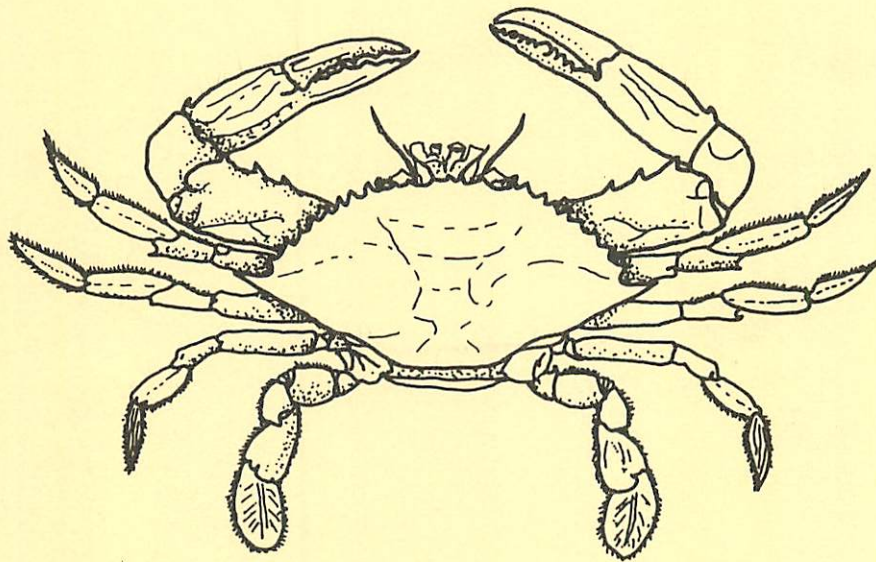


VIRGINIA TECH SEA GRANT ANNUAL REPORT 1976 — 1979



Sea Grant
Extension Division
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

Introduction

In 1971, Virginia Polytechnic Institute and State University received its first Sea Grant project to develop marine advisory services for seafood processors. The original grant established the first Marine Extension Specialist's position. During the next three years, the project leaders identified their audience and developed a program that reflected both the needs of the audience and the role of a land grant university. While Sea Grant support from 1974-1977 remained constant, the program was expanded so that other audiences, in addition to the seafood processing industry, would be better served.

After 1977 the university became more committed to Sea Grant and to the responsibilities that acceptance of a Sea Grant program mandated. University administration officials also realized that Sea Grant funding was intended not only to develop an efficient and effective grant program, but also to develop a program within the university that would consider the marine environment as well as the land environment. In order to integrate the Sea Grant program into the university, a field station was established in Hampton, Virginia, in 1975.

An advisory committee was established to assist in the definition of program objectives and to provide assistance in achieving the goals of the Virginia Tech Marine Advisory Project (MAP). The advisory committee is composed of representatives from the seafood industry, the Virginia Seafood Council, the National Marine Fisheries Service, the Virginia Departments of Health and Agriculture and Commerce, and the Virginia Marine Resources Commission.

In 1979, three unit extension agents and eight college-based specialists (over half of the costs are supported by county or state funds) focused their activities on five areas: (1) seafood processing industry; (2) consumer education; (3) seafood retail marketing; (4) 4-H and youth; and (5) public participation in Marine Resource Allocation.

MAP Administrative Structure

Advisory Services at Virginia Tech are coordinated through the Cooperative Extension Service under Associate Dean E. Neal Boyd, who was named Sea Grant Director in 1979 by Virginia Tech President William E. Lavery. Six Sea Grant specialists are assigned to academic departments in Blacksburg: Agricultural Economics, Food Science and Technology, and Mechanical Engineering. One person, who works with 4-H, is located with the Extension Division at Virginia State University in Petersburg. Two other specialists and three unit agents are located in three coastal communities (Lancaster and Northampton Counties and the City of Hampton). The three unit agent's support is derived from eight counties. Sea Grant supplies 25 percent of their salaries and related costs. A home economist was also added on a part-time basis.

Coastal county leadership has seen significant value in Virginia Tech's Advisory Service effort. They have funded most of their agents' costs. The university's commitment is also clear, since one of the three new positions at Virginia Tech was assigned specifically to bolster the Sea Grant effort.

Meeting Goals and Objectives

Virginia Tech's MAP began to serve primarily as a liaison between the Sea Grant community users and decision makers of marine resources, during 1976 through 1979.

The MAP set specific goals in both seafood education and the business management fields along with energy and engineering. The primary objective in these fields was to develop materials and then disseminate this information into specific audiences. Specific

audiences included: (1) the seafood industry; (2) school food service managers; (3) elementary, intermediate, secondary and college home economics students and teachers; (4) extension agents; (5) food editors; (6) homemaker clubs; (7) the Governor's Kepone Task Force; (8) sport fishermen; (9) the general public; (10) agricultural and food chemists; (11) federal, state and local health agencies; and (12) professional food technologists.



SEAFOOD EDUCATION

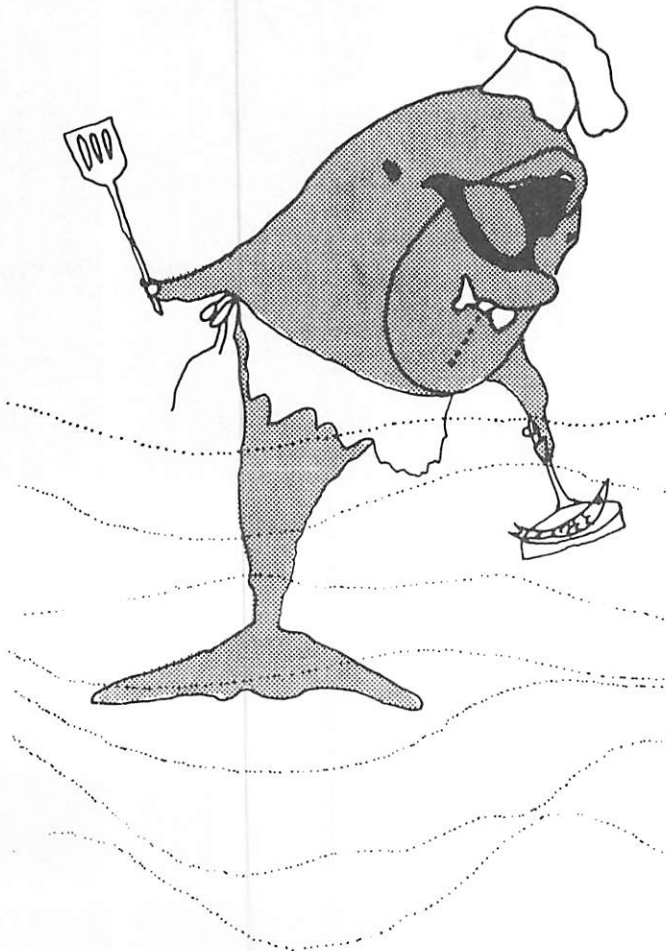
Public education on seafood products began in 1971 under the Virginia Tech MAP. The objectives in seafood education were to (1) develop subject matter information; (2) develop educational materials; (3) develop a graduate course for teachers; (4) implement and evaluate the program in target school systems, both coastal and non-coastal; (5) develop a model for coordinating educational activities to supplement class instruction; and (6) disseminate materials and information on a national basis.

During 1976 through 1979, the MAP had many accomplishments towards meeting the goal of educating people on seafood. Some of the major accomplishments are listed below.

(1) Published two low cost college

level textbooks, Seafood Products: Food Service Program Guide first and second editions; and a low cost lecture guide, Seafood Products Course Lecture Guide, which saved \$2,000 to \$5,000 in book purchase costs; and scientific monographs on research diving and artificial reefs.

- (2) Published a weekly seafood column, "Foods from the Sea"; the Virginia Marine Times; Seafood Memoranda; Consumer's Guide to the Code Federal Regulations; Discover the Atlantic Ocean; the Use of Underwater Equipment in Freshwater Research; Analysis of Exploited Fish Populations; Microbiological Techniques Manual for Food Quality Control; and How to Build a Freshwater Artificial Reef.
- (3) Prepared movies and television videotapes on filleting fish and handling seafoods for consumer information and use.
- (4) Prepared a model for delivering seafood information to school lunch personnel.
- (5) Prepared a kepone report for the Virginia Department of Health and other related agencies.



AGRICULTURAL ECONOMICS

Business management or agricultural economics for the seafood industry and Sea Grant officials is an important aspect of the Virginia Tech MAP. These advisors help the MAP to serve as managers and advisors of the seafood processing and marketing firms.

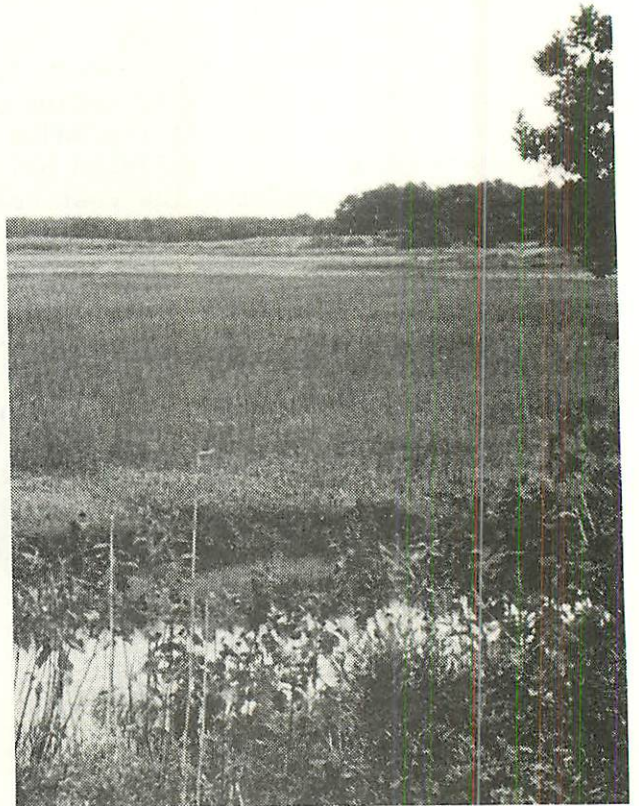
Seafood marketing firms (representing processing, wholesaling, and retail functions) had been under severe economic pressure. This economic pressure has resulted from shifts in consumer demand and a decrease in the supply of raw seafood products.

The MAP staff involved in agricultural economics emphasized educational programs dealing with marketing and economic analysis in support of seafood firm management. In meeting this objective, the MAP had many accomplishments.

- (1) Firm management analysis and supporting workshops trained professionals in the seafood industry, including the development and presentation of a Seafood Marketing Management Workshop, a time management workshop, and a Fresh Fish Merchandising Workshop.
- (2) Computer assisted management programs were designed to extend the capabilities of decision makers managing seafood marketing firms.
- (3) The Federal Land Bank of Baltimore, Maryland, in cooperation with Virginia Tech, presented two programs to inform membership of the seafood industry provisions under which they could finance aquatic operations.
- (4) A cooperative averaging \$3,000,000 in sales was saved from bankruptcy through a management audit and subsequent consultation.
- (5) A company with over \$13,000,000 in annual sales was audited.

After changes were made, the management was strengthened; a management succession plan was developed; and a plan for reduced transportation costs was developed.

- (6) Transportation computer programs were developed that enabled Virginia Seafood dealers to reduce shipping costs by improving loading factors and changing route characteristics.



MANAGING ENERGY



Energy was once an insignificant part of the overall cost of industrial products. However, this cost has risen approximately ten percent per year since 1973, and estimates indicate that it will continue to rise until some unforeseeable point in the future.

Implementing an energy management program, in the applied engineering advisory program, follows the same basic principles of other management techniques, except that it requires technical skills generally beyond those available within most companies. It also involves a technique for keeping up with the latest technology in a field which is moving rapidly. This is a service that the Virginia Tech MAP brought to the seafood processors and which had an immediate cost benefit.

The MAP conducted an energy audit of selected seafood processors and information was provided on the types and amounts of fuel used, electrical demand, and an insight

into the potential for energy reduction within those firms. The MAP then determined how to best implement an energy management program in the seafood industry and developed support material.

Major accomplishments of the MAP's applied engineering staff were as follows: (1) a clam sorting machine was designed and partially built which could save \$10,000 to \$15,000 per year in labor costs; the machine has the capability to sort and count up to 20,000 clams per hour in six sizes and requires one operator; materials are corrosive resistant and the machine meets all federal, state, and local requirements as well as complying with the Occupational Safety and Health Administration (OSHA) requirements. (2) Assistance in developing a heat shock method for shucking oysters was given to a seafood processor; the system should reduce labor costs by 25 percent or \$30,000 to \$50,000 per year.

OTHER MAP ACCOMPLISHMENTS

In order to meet specific goals and objectives of the Sea Grant program at Virginia Tech, the MAP tried to fully utilize the resources of the Cooperative Extension Service, in addition to unit agents. Through this cooperation, the following accomplishments were made from 1976 through 1979.

- (1) A boiling tank was developed to process crabs, which resulted in \$3,000 annual savings to crab processors.
- (2) A process to pasteurize crab soup, clam chowder, and seafood mix for industrial use was developed. The total sales of products which had used the process was from \$200,000 to \$300,000.
- (3) Crab meat processors were informed of faulty storage containers for pasteurized meat. The product repack prevented a \$30,000 loss.
- (4) A Virginia processor was aided in developing a package and marketing his scallops, resulting in a \$20,000 increase in gross sales.
- (5) A processor was assisted in developing a scallop processing line estimated to yield a net value of \$75,000 per year.
- (6) A processor was assisted in reducing wastewater surcharges by \$4,800 per year.
- (7) An improved crab cake formula was developed for a seafood processor with an estimated savings of \$25,000 per year over current ingredients.
- (8) Retort crates were redesigned and insulation application was recommended to reduce crab processing energy use by 11 to 12 percent.
- (9) A management audit was conducted of one seafood plant which should save \$6,000 to \$18,000 per year.
- (10) An oyster repacker was assisted in developing a quality control program with a product savings estimated at \$5,000 per year.
- (11) A community was assisted in the development of a marine industrial port.
- (12) Mid-day television programs were presented on mechanically deboned meat, food colors, the 200 mile limit, handling fresh seafood do's and dont's, food bacteria, smoked fish, the shelf life of foods, natural toxicants in foods, oysters, and kepone.

Workshops and conferences were presented to many groups. The following is a list of the major workshops and conferences the Virginia Tech MAP presented and/or participated in.

- (1) Thirty-one Pacific Sea Grant Advisory Program professionals were taught seafood merchandising, processing methods and effective program development techniques and prepared a management manual illustrating ways to increase sales and reduce costs. The potential benefits could amount to over \$250,000.
- (2) A sport fishermen course was held.
- (3) A national conference for Blue Crab processors was presented. It was designed to reduce a loss of over \$500,000 per year of pasteurized meat.
- (4) Twenty-one one-day short courses were held in Virginia, Maryland, Delaware, New Jersey, and Louisiana on seafood utilization. Audiences were individuals, extension agents, food editors, home economics school teachers, and home demonstration club leaders.

- (5) Seafood products programs were presented at the request of various Virginia extension service staff for in-service training, and to community college students in food service classes.
- (6) Employee training was given to employees of a processor to find a more efficient approach of picking crab meat. "How to Pick the Blue Crab" was a film developed for this purpose by Virginia Tech.
- (7) A national conference on microbiological techniques for quality control was presented. Attendees were in a position to save companies \$5000 to \$10,000 per year by minimizing losses occurring through neglect and inadequate manufacturing practices.
- (8) A sanitation conference was presented to 50 processors. Potential benefits could range from \$500 to \$2,500 per year.



KEPONE

The Virginia Tech advisory staff spent a large percentage of time working on a major kepone problem in Virginia. The problem was first discovered in 1975, after a blood sample from a worker at the Life Sciences Plant in Hopewell, Virginia, was sent to the center for disease Control (CDC) in Atlanta, Georgia.

Kepone or chlordecone is a pesticide that was developed by Allied Chemical Company during the 1950's for use against pests which cause human, plant, or animal health and sanitation problems. During the 1950's through 1975, the chemical was produced at Allied Chemical's Semiworks Plant or at the Life Sciences Plant, which was specifically built to produce kepone for Allied. The massive pollution of the James River did not occur until Life Sciences began production in 1974.

The State Air Pollution Control Board cited the plant for the release of sulfur trioxide in 1974. The board required the company to install dust collectors and other devices to prevent air pollution. Hopewell was also experiencing difficulty with digesters at the sewage treatment plant.

A standard of 0.4 parts per million (ppm) was set for the amount of discharge of kepone into the sewage treatment system.

In June 1975, the plant was still discharging high amounts of kepone into the system. After the CDC received a blood sample from the Life Sciences Plant worker, the physician in charge immediately visited the Hopewell plant and found massive pollution. Within a day, the plant was closed for health and safety violations.

Because of the long-term release of kepone into the James River, the

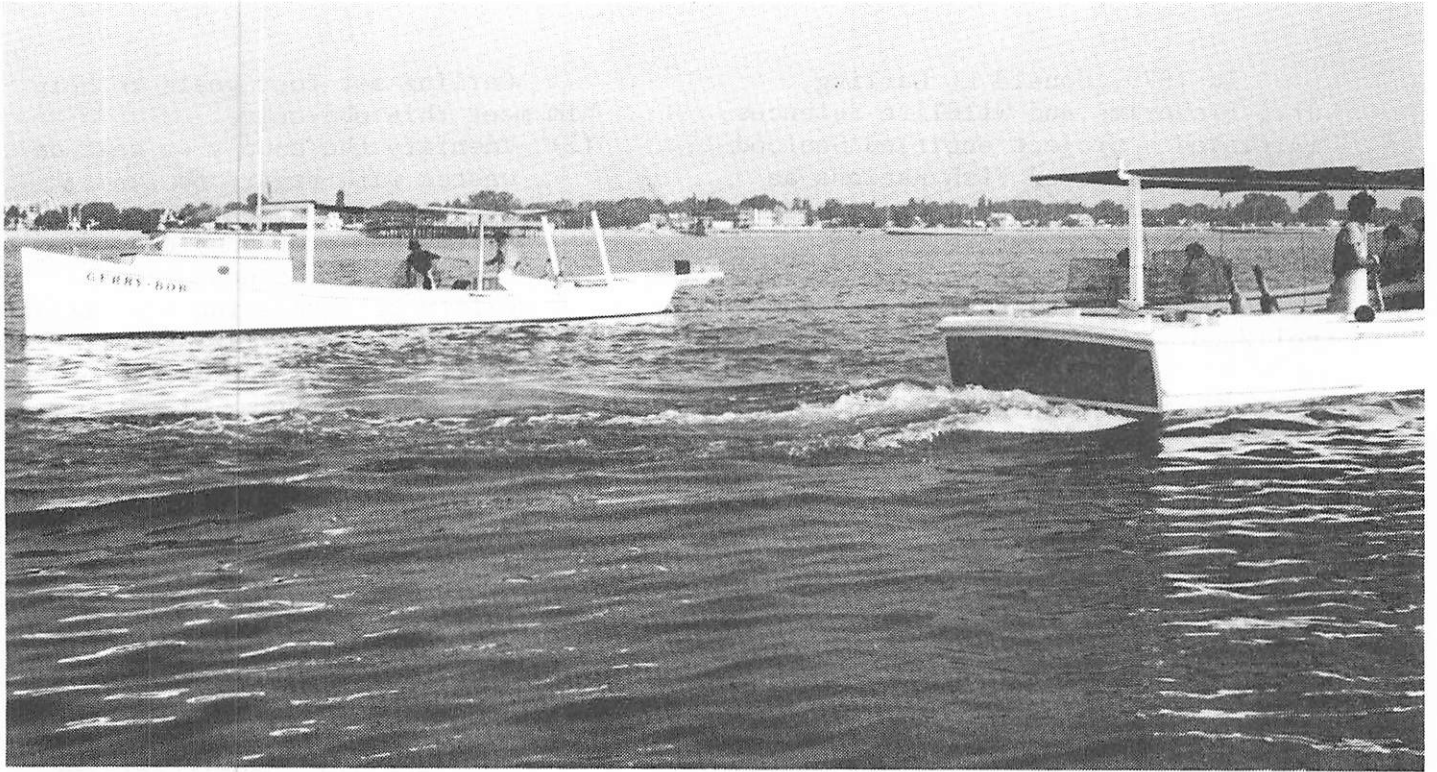
entire river below Hopewell was affected. The Governor of Virginia closed the river to commercial and/or sport fishing on the advice of the Kepone-Inter Agency Task Force.

In January 1976, the Food and Drug Administration (FDA) enforced established action levels for kepone. An action level is the level of a chemical above which the chemical's residue in food is considered to make food unsafe for human consumption. Levels set were 0.1 ppm for finfish, 0.3 ppm for oysters, 0.4 ppm for crabs, and 0.3 ppm for canned oyster stew.

In the winter of 1976, the Virginia General Assembly passed a Toxic Substances Act. The act was similar to a federal law signed in the fall of 1976 by President Gerald Ford. The Virginia statute requires all manufacturers, users, or transporters of "economic poisons" to register those chemicals before manufacture, transportation, or use. The law also applies to "active ingredients," which was the loophole kepone producers used to escape registration as a pesticide.

Virginia Tech cooperated with Professor R. Young in Biochemistry and Nutrition and the Virginia Seafood Industry in concert with the Virginia Seafood Council to develop a monitoring program which assured that large areas of the Chesapeake Bay, or the entire Bay area, would not be closed as a result of kepone contamination from transplanted oysters.

The Virginia Tech Sea Grant program analyzed transplanted oysters for kepone content and was instrumental in reopening the James River. Virginia Tech's advisory staff found that oysters were able to rid themselves of kepone within four summer months, when they were removed from



the James River and transplanted into clean waters until they reached harvestable size. Except for oysters and clams, however, the elimination of kepone from the body seemed to be much slower than the accumulation.

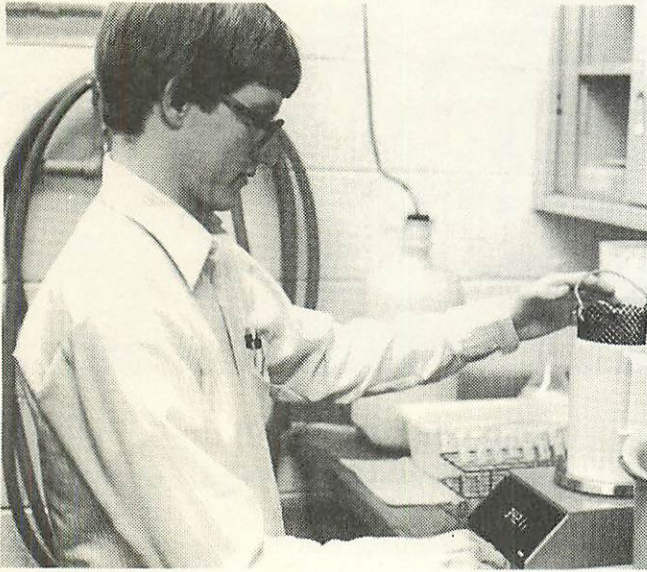
Virginia Tech spent much time preparing a consumer information paper on the kepone situation. This paper is a complete file of published materials on kepone. It was used as a brochure which was published by

the State Health Department in 1978.

Seafood sampling has continued by the FDA, the State Health Department, and other agencies to insure against unsafe levels of kepone. When foods are found to exceed the action levels for kepone, they are removed from the market and the seller is cited for non-compliance with Virginia's Toxic Substances Act.

PELLETED FISH RATIONS

In 1979, Donald L. Garling, Jr., Fisheries and Wildlife Sciences, initiated a project entitled Seafood Wastes in Pelleted Fish Rations as Fish Meal Substitutes. Garling's objective was to determine the feasibility of using various seafood wastes as fishmeal substitutes in pelleted feeds for channel catfish.



Garling set four goals to help him meet this objective.

- (1) Identify the supply of seafood wastes with regard to type, quantity, location, seasonality, and protein yield.
- (2) Evaluate the economic feasibility of processing identified products with existing equipment, construction of new facilities, development of new technologies, and transportation costs.
- (3) Evaluate any promising product both chemically and biologically.
- (4) Define the technology to process scrap fish or waste into a fish feed ingredient where prior evaluation indicates economic potential.

Garling's preliminary results indicate that crab and finfish processing wastes merit further study as possible fishmeal substitutes in pelleted fish rations. The project is to be completed in December, 1981.

MAP STAFF 1976-1979

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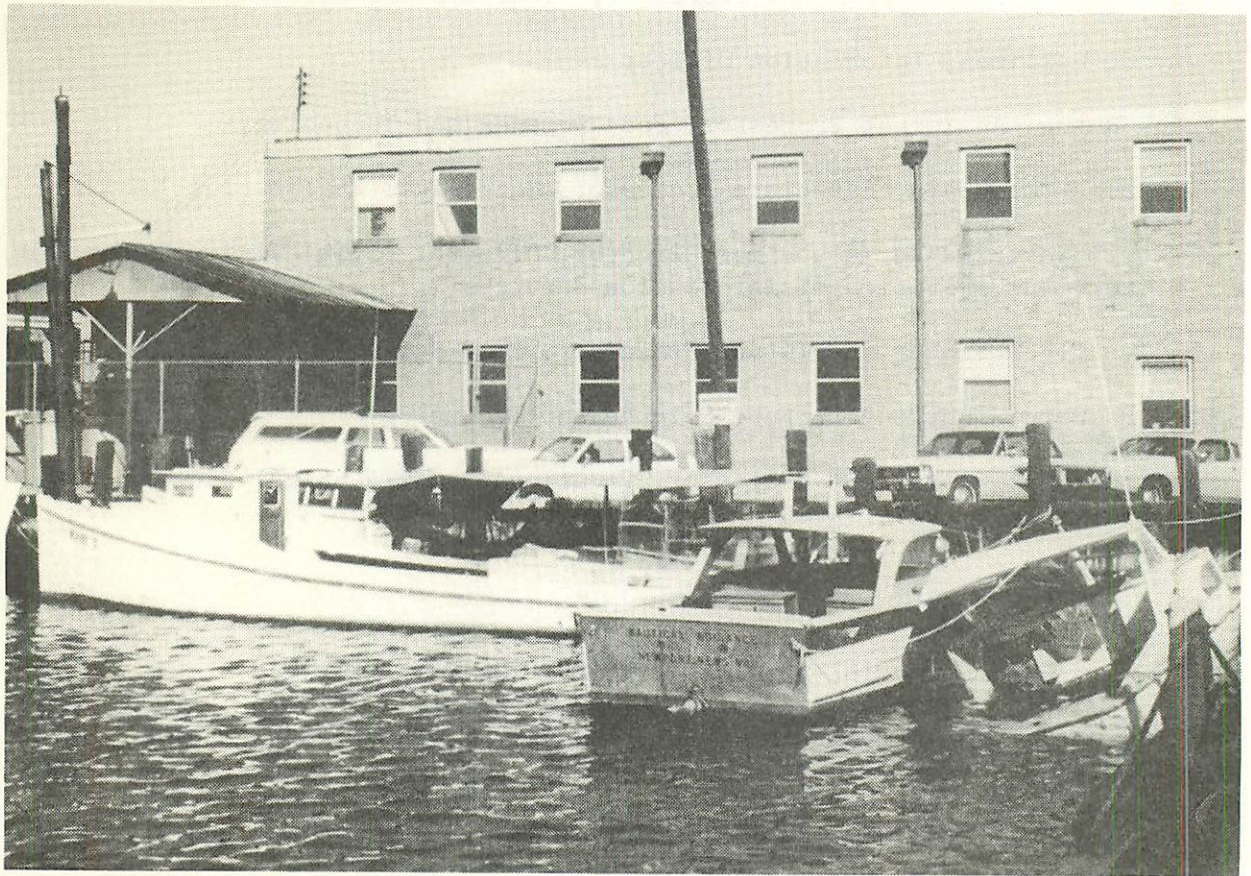
Donn R. Ward, Instructor, Food Science and Technology

Anita H. Webb, Assistant Professor, Vocational and Technical Education

MARINE ADVISORY SERVICE PUBLICATIONS

VPI-SG-76-05	Discover the Atlantic Ocean
-74-02	Introductory Fisheries Science
-77-02	How to Build a Freshwater Artificial Reef
-77-03	The Use of Underwater Equipment in Freshwater Research
-77-11	Proceedings of the 1977 Interstate Seafood Seminar
-78-01	Seafood Products Course Lecture Guide
-79-12	Seafood Consumer's Guide

- 79-03 Seafood Products: An Instructional Guide for Home Economics Program
- 79-04 Seafood Products: Food Service Program Guide
- 79-06 101 Bulletin Board Ideas
- 79-05 Annotated Bibliography for Seafood Products Education
- 79-11 Care and Maintenance of Boilers in Food Processing Plants
- 77-09 Microbiological Techniques Manual for Food Quality Control in the Food Industry
- 78-05 Sanitation Notebook for the Seafood Industry



BUDGETS

		<u>Federal Sea Grant Funds</u>	<u>University Matching Funds</u>
1976	Food Science and Technology Marine Advisory Project	\$45,000	\$28,964
1977	Food Science and Technology Marine Advisory Project	\$47,700	\$30,420
1978	VPI & SU Marine Advisory Sea Grant Project	\$79,000	\$51,400
1979	VPI & SU Marine Advisory Sea Grant Project	\$94,800	\$71,100
	Seafood Wastes in Pelleted Fish Rations as Fish Meal	\$16,800	\$ 8,400
	Seafood Products Education Program for Intermediate, Secondary, and College Students and Faculty	\$46,100	\$21,900

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