1973 ANNUAL REPORT

MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM

MASGP-74-14

THE MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM
PARTICIPATING INSTITUTIONS

Auburn University

Gulf Coast Research Laboratory

Mississippi State University

Tuskegee Institute

University of Alabama, Birmingham

University of Alabama, Huntsville

University of Alabama, Tuscaloosa

University of Mississippi

University of South Alabama

University of Southern Mississippi

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". . . Sea Grant - people working for people to improve the quality of our lives."

The contiguous coastlines of Mississippi and Alabama form the keystone of the great arch of the Northern Gulf of Mexico. These two States share common marine resources and common problems associated with utilizing, developing and managing them.

The past Director of the Mississippi-Alabama Sea Grant Consortium, Dr. Sidney D. Upham, realized the importance of cooperation between Mississippi and Alabama toward more efficient use of their common resources. Under his able guidance and leadership, the expertise and research capabilities of ten institutions of higher learning within the two States were focused sharply on common marine problems. The administration of the Program has now changed hands, but the momentum of his efforts continues through the guidance provided by a vigorous two-state Management Committee.

Investigators are merging into a critical mass of inter-disciplinary expertise, and through their efforts re-search projects are being combined and adapted to answer more effectively the needs of the two States. Projects also are being coordinated with organizations and agencies which have marine responsibilities within Mississippi and Alabama, and the nation.

Much progress was made on faith during 1973 toward making the Program of the Mississippi-Alabama Sea Grant Consortium truly two-state in scope and meaningful in application. An exciting array of proposals has been prepared for 1974 to help make this first two-state Program an outstanding success in the true spirit of Sea Grant – people working for people to improve the quality of our lives.

Bruce W. Mattox, Ph.D.
Director
Mississippi-Alabama Sea Grant Consortium

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INTRODUCTION

Innovation has continued to characterize the major thrust of Program Management and Development of the Mississippi-Alabama Sea Grant Consortium. These two States made history when they joined forces to become the first two-state program in the annals of Sea Grant.

A two-state Management Committee, composed of the Deans of the Graduate Schools of the institutions comprising the Consortium, including the Director of the Gulf Coast Research Laboratory, has been formed; and research projects are being designed to utilize the expertise available in all participating institutions. Funding difficulties have prevented growth of the two-state venture of the scale originally envisioned, but continued cooperation between the two States has made possible a viable but smaller effort.

The Mississippi Sea Grant Program has focused primarily on Legal Studies, Pollution Studies, Engineering in the Ocean, Fisheries Development, Industrial and Socio-Political Development, Education and Advisory Services. Due to financial constraints at the federal level, the Alabama Program faced serious problems early in 1973, and a real challenge was overcome to keep the highly publicized two-state program together. The obvious approach was to retrench and hold position or proceed with caution. Although no funds were available, communication channels were kept open and an excellent two-state rapport was maintained while plans were being made for future activities.

When funds became available in June of 1973, Alabama made rapid progress in the areas of Fisheries Development, Industrial and Socio-Political Development and Advisory Services. The Cooperative Extension Service of Auburn University began a program to identify problems of the Alabama seafood industry, thereby providing a visible presence of the Sea Grant Program.

The Alabama Sea Grant Office is located at the Dauphin Island Sea Lab, Alabama; and the Administrative Offices of the Mississippi-Alabama Sea Grant Consortium are located on the campus of the Gulf Coast Research Laboratory in Ocean Springs, Mississippi.

LEGAL RESEARCH

With ever increasing state and federal interest in land use planning, conservation, environmental protection, and resource development, the Mississippi Sea Grant Legal Program has been especially useful as a research center. The University of Mississippi Law School has provided intensified research activity in legal problems affecting the State's marine resources and coastal zone. In addition to legal research services, Sea Grant has established a program of quality education in the legal problems of the marine area.

The objective of the research into the law of the coastal zone has been to provide the vehicle for evaluating all Mississippi laws, administrative regulations, and county and municipal ordnances influencing the development of the Mississippi marine and coastal zone. This research was conceived originally as a three year project to be accomplished in six stages. All but two of these stages have been completed.

All of the Mississippi laws and regulations that particularly affect the development of the coastal zone have been compiled and analyzed. This body of laws was published in a comprehensive form readily understandable by the layman, lawyer, and legislator. All of the laws were categorized to enable the user to identify easily those laws that affect and govern a particular category of activity. These articles were divided into eight functional categories: Property Laws, Living Resources, Mineral Resources, Recreational Activities, Industrial and Agricultural Activities, Environmental Control, Navigation, General Administration and Management of the Marine and Coastal Zone.

These eight volumes were disseminated to coastal leaders, scientists, administrators, economists, and representatives of other disciplines whose expertise will be needed in determining the proper development of the marine and coastal zone.

All federal laws and agency regulations affecting marine and coastal resources are being compiled and evaluated to determine which federal programs can provide maximum economic benefits from these resources without detriment to the coastal ecology. This project is designed to provide information concerning federal programs to lawyers, businessmen, planners, and administrators on the Mississippi Gulf Coast to enable them to determine which programs, if any, should be utilized. These federal laws are being grouped into eight functional categories: Weather, Forest, Soil, and Animal Conservation, International Law, Water Pollution, Oil Pollution, Recreation, Environmental Engineering, Land Use Management.

Sea Grant legal researchers have worked closely with the Mississippi Marine Resources Council to develop a comprehensive coastal zone management plan and to help prepare new legislation to assist the State's seafood industry. A vast amount of research was required before recommendations could be made to determine the best possible type of governmental support for the severely depressed industry. A comprehensive analysis of laws and regulations from states having similar marine fisheries problems provided the foundation for these recommendations. By studying federal controls and regulations, and problems of other states, the Sea Grant Legal Research staff suggested a plan for the development of the seafood industry, while at the same time maintaining a conservationist view for the industry in the years ahead.

The Sea Grant Legal Program assisted the Mississippi State Legislature in researching several proposed bills that would affect the marine and coastal zone. One of these bills concerned the prevention of oil spill pollution. The staff compiled the federal regulations pertaining to this issue and noted that states are empowered to write more stringent standards if they so desire. Two states, Maine and Florida, have imposed strict liability standards for oil pollution. An analysis of these laws and subsequent court decisions led to the recommendation that the State of Mississippi draft a strict liability act.

The Sea Grant Legal Research staff studied another bill that would establish a land use study task force and made recommendations relative to establishing a comprehensive land use study to enhance the orderly development of the coastal zone.

POLLUTION

Pollution is an area of grave concern to the people who live in the Mississippi Coastal Zone. Many divergent interests compete for coastal resources. Some of these interests have greater ecological impact than others. In many instances information is not available to permit proper planning, or the technology is not available to put an ecologically sound plan into action. The Mississippi Sea Grant program has given both of these inadequacies prime consideration in the overall pollution abatement project.

A comprehensive program to measure the baseline conditions of the Bay of St. Louis, Mississippi, gave rise to a computer project to evaluate and interpret ecological baseline data. The combined data on the Bay of St. Louis are available and ordered by date for selective retrieval of any particular variable. A supplementary program also has been developed to permit an investigator to determine the possible significance of altering any baseline condition in an estuarine system. This system is currently in operation, and the results of any query about the data base or master file can be furnished. Results of the statistical analysis of the original baseline data sets are essentially complete.

The results of this work will be applied in two main areas. First, data will be available in a logical, computer-oriented fashion, and the organization and retrieval function will provide easy access to the complete data base. The versatility of this data management system will allow satisfaction of almost any demand for information. Second, this project will achieve results not only in the management and interpretation of a selected group of data but also in the application of statistical methodology.

The concern for clean estuarine waters has recently focused the attention of the Environmental Protection Agency and the Mississippi Air and Water Pollution Control Commission on seafood processing wastes. The problem basically concerns the disposal of solid waste products and the treatment of waste water to remove any pollutants prior to discharge into the estuarine environment.

Preliminary investigations revealed that the solid processing wastes – shrimp heads, hulls, viscera, and other processing debris – contained 47 percent protein. This information led the investigators to the conclusion that a high-grade fish feed could be made from these waste products. A method was then developed for grinding and pelletizing this material. Laboratory tests were conducted to determine if the product was acceptable to fish. The results of these investigations revealed that all of the experimental fish, including channel catfish, thrived on the pellitized waste, and the dissolved oxygen content of the water remained well within acceptable limits.

The excellent acceptance of the product by fish in the laboratory indicates the strong possibility of an inexpensive means of increasing estuarine productivity by seeding artificial reefs and other areas. Another possible use for the processing waste is to combine it with other nutritious waste products such as cotton gin wastes, to produce an even more nutritious feed for a variety of animals.

The treatment of waste water has presented a far more complicated problem. Nutrient-rich seafood processing waste water is more difficult to treat than solid wastes, which may effectively be removed by screening. Electrolysis as a means of treating waste water from seafood processing plants is encouraging. Significant decreases in oxygen demand, ammonia, protein, and phosphates have been shown to occur using the electrolytic process. Bacterial counts have been reduced essentially to zero.

Investigations are now concentrated on developing engineering criteria for the design of a system for waste water treatment using electrolysis in individual seafood processing plants. Engineering economics are being investigated to provide a cost estimate for a prototype system.

Only within the past few years has boating been linked to problems of water quality. Pleasure boats of all descriptions are filling existing marinas to capacity, and if population estimates are correct the demand for boat slips will more than double within the next twenty years. The impact of increased numbers of boats and new marina construction to accommodate them will create a great impact on the water quality of the Gulf Coast.

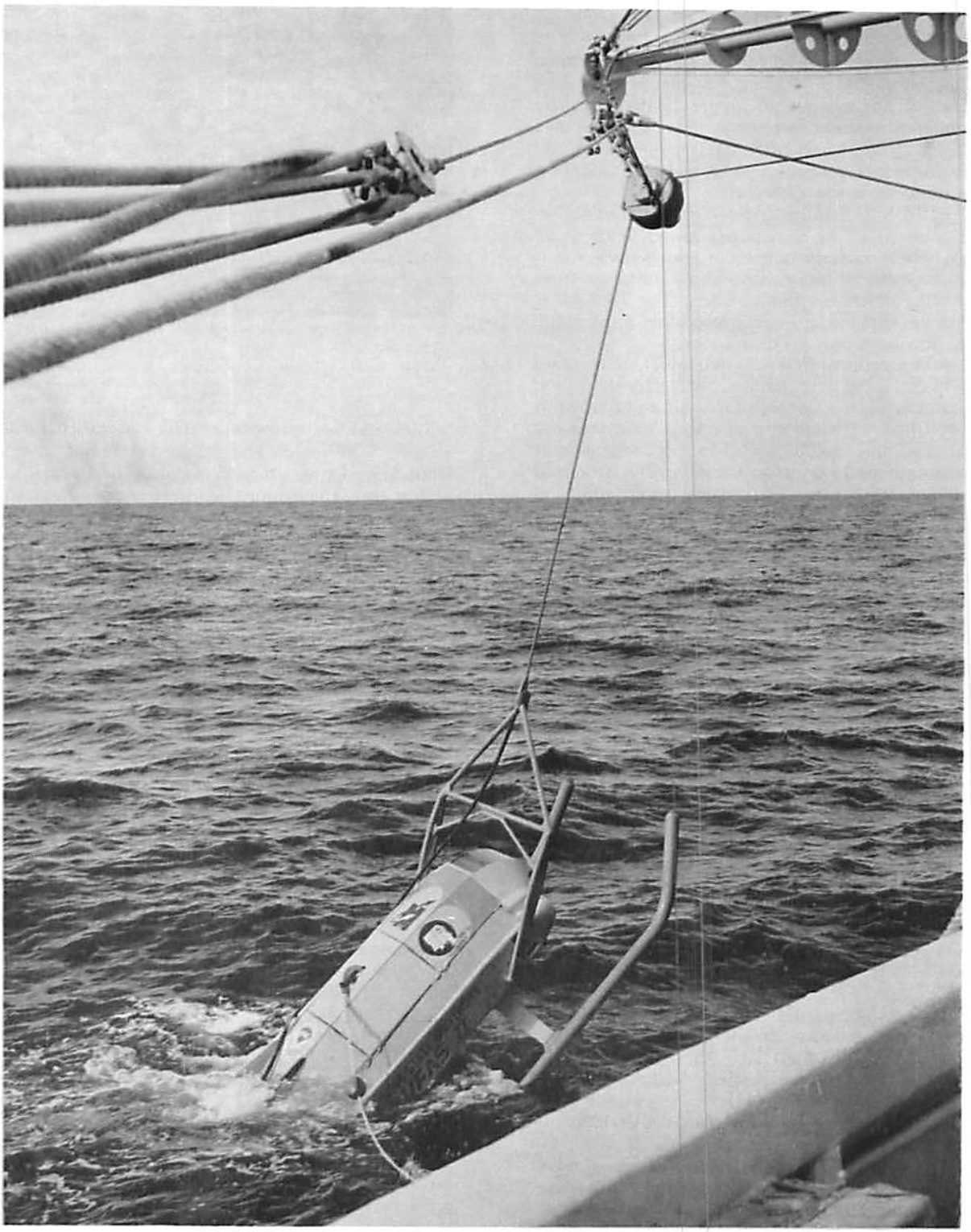
A Sea Grant research team has made biological, chemical and economic investigations in selected harbors and marinas along the coast. These investigations concentrated primarily on identification of specific disease-producing bacteria and in determining chemical composition of the water. Heavy metals from anti-fouling compounds also were of particular interest.

The economic survey indicated that marina operation is profitable, and a wide variety of services are provided to the boating public. But many operators were unaware of the 1975 water quality standards that require holding tanks for boat toilets to prevent discharge of raw sewage into coastal waters. Few operators had any idea how they would provide pump-out service for boat owners.

Another area of Sea Grant research has been to find an effective control for algae, or pond scum. Nuisance algae continues to be a serious problem for fish farmers and other activities adversely affected by algal blooms. Sea Grant researchers are working on a contuining project to identify the inhibiting compounds found in two species of flowering water plants. The activity of the inhibiting compounds on fresh water algal species from hatchery ponds has been completed. Twenty-four representative algae were used. The blue-green algae were inhibited, but none of the other types were affected. Activity on marine blue-green algae was similar to the fresh water types. The partially purified inhibitor has been incorporated

into paints, and after five weeks of submersion in the Mississippi Sound the test panels supported no blue-green algae.

Work is now in progress to identify the inhibiting compound to permit synthesis and commercial production. A natural solution to a problem is frequently the best solution since most commercial chemical algecides are not selective and often are harmful to beneficial plant and animal life.



RUFAS II

ENGINEERING IN THE OCEAN

The expanding need for more detailed information in all fields of science has placed increasing demands on the engineer to supply the hardware and technological systems to provide answers to complex problems. Marine scientists are relying more and more on highly sophisticated systems to add new dimensions to marine research.

RUFUS II (Remote Underwater Fisheries Assessment System) is an unmanned, towed, underwater vehicle whose mission is bottom and midwater surveillance under remote control and monitoring from the towing vessel on the surface. The RUFAS II system was designed to operate to a depth of 2,400 feet at towing speeds up to 4 knots.

An operational RUFAS II will be of tremendous value in gathering data required for better definition of resources on the Continental Shelf and Slope out to 2,400 feet. The amount of information that can be gathered may well be useful to more segments of the marine community than those merely associated with biological resources. Geological information and mineral resources could be revealed in addition to various physical oceanographic phenomena.

The vehicle, a vane-controlled, towed, hydrodynamic body, senses pitch, roll, and height above the bottom. A unique control system maintains the height above bottom selected by the operator on the towing vessel. The precision of altitude control is limited only by the accuracy of the down looking sonar. Sea tests indicate the system can follow ocean floor contours of 30 degrees at a towing speed of 2.5 knots.

RUFAS II is equipped with two separate camera recording systems. The forward looking television camera is controlled in pan, tilt and focus by the shipboard operator. Monitors on the operator's console repeat the picture that is being recorded on video tape. Illumination is furnished by two forward-looking lights that move with the camera.

The permanent record of objects on the bottom is provided by a 35mm motion picture camera. The lighting system is a high intensity strobe light. The camera, which is housed in a pressure tight sphere, can take photos for 24 hours without changing film.

The development of RUFAS II followed the successful design, development, and operation of a shallow water (300 feet) RUFAS I system by the National Marine Fisheries Service. RUFAS II differs from RUFAS I in many ways. One of the most significant differences is the increased depth capability necessitating stronger pressure vessels.

The National Marine Fisheries Service supplied the Mississippi State University Institute of Engineering Technology with the desired operational capabilities and performance criteria for the RUFAS II system. The vehicle was designed and built at Mississippi State University and tested both in a tow tank and at sea. The National Marine Fisheries Service has has RUFAS II available for use since autumn of 1973.

Engineering research also has been focused on the development of a mathematical model for the hydrodynamics of a bongo plankton sampling system. This work has involved theoretical investigation of the hydrodynamics of the sampler body.

The basic objective of this research was to better define the operating characteristics of a bongo plankton sampling system for the marine biologist. Of particular interest were filtration efficiency, extrusion characteristics, and avoidance. Due to the low velocities involved, it has been difficult to obtain good data on these sampling systems. This investigation has provided data beneficial to understanding the performance and design characteristics of an improved sampling system. More accurate information on these parameters will allow the marine biologist to obtain better research results.

Engineering is making a significant contribution to estuarine water quality studies. In response to the need for detailed studies of sediments in rivers and estuarine areas to determine the long range effects of pollutants such as heavy metals, a new type of coring device has been developed. This device uses liquid nitrogen to freeze the sediment sample and to prevent distortion. The water column, including suspended material at the sediment-water interface, is frozen and recoverable, thus making studies possible on the exchange of materials between the sediments and the water column. The sampling device is generally operated from the surface in shallow water, but it may be modified to obtain deeper samples of varying sizes, depending upon need.

FISHERIES DEVELOPMENT

Development and management of fishery resources is receiving increased attention in the maritime countries of the world. Widely divergent research projects are being pursued to increase total productivity. The Mississippi Sea Grant program has a comprehensive group of projects that are providing data and answers to problems concerning the total Mississippi fishery.

Commercial and sport fishing contribute heavily to the economy and quality of life on the Mississippi Gulf Coast. The contribution of the commercial fishery is a matter of statistical record, but until recently there were no data available on the value of the sport fishery.

A continuing Sea Grant project has been providing data on sport fish species composition, seasonal occurrence, and numerical abundance. Additional investigations have provided data on the number of fishing parties, boats, boat source – privately owned or rented – and residence of fishermen.

Statistics indicate that fishing on the Mississippi Gulf Coast is among the best to be found anywhere, but no definite financial data were available until the economic portion of the sport fish survey was inaugurated.

Preliminary results indicate that sport fishing is indeed an important factor on the Gulf Coast and represents a multi-million dollar industry. As additional data is made available, the total economic impact of sport fishing will be known.

Biological data gathered in the preliminary phase of this study are being combined with the economic data to help initiate a program of sound management practices for the total fishery resources, sport and commercial, on the Mississippi Gulf Coast.

Sound management of fishery resources requires consideration of all factors affecting production and consumption of seafood. Parasites of finfish and shellfish in the Northern Gulf of Mexico are receiving increased attention as more people eat seafood and reside in coastal areas. Research has centered primarily on bacterial parasites, but attention also has been given to viruses and visible parasites that economically affect sport and commercial fisheries.

Progress has been made in an effort to control a disease affecting blue crabs. One drug has been identified that will possibly prevent infection of crabs held for soft-shelled fishery purposes. Additional investigations are being conducted on this and other drugs.

Work has been done to control an organism that causes a disease capable of decimating fish in a closed culture system. An outbreak of this disease could literally wipe out a mariculture operation. So far no remedy other than fresh water has been found. Hypersalinity and drugs appear to have no effect, but work is in progress to find a remedy.

Visible parasites such as worms and tapeworm larvae also are receiving increased attention. Not only are such organisms aesthetically displeasing, but the possibility exists that they could cause disease in man. As additional sampling is accomplished, the effect on the host, the relationship between environmental factors and infection, and other relationships will be investigated.

Another disease studied by Sea Grant researchers is caused by a virus and produces external and internal tumors in certain fish.

Several bacteria have been isolated that could cause a condition of severely protruding eyes in fish. Work is in progress to isolate and identify the specific organism causing the disease. Other work is in progress on parasitic flatworms that can possibly infect man and also on an organism that is implicated in "swimmer's itch."

Another area of intense Sea Grant research is a fish poison – ciguatera – that has been a problem in tropical and subtropical waters throughout recorded history. Some 400 species of fish, primarily from reefs and shallow water, have been reported to contain

the toxin. Ciguatera fish poison has a world-wide distribution, but most cases are reported from the Western Pacific or the Caribbean. It is assumed, but not yet proven, that ciguatera poisoning in the Pacific and Caribbean is caused by similar or identical toxins since the symptoms are similar. These symptoms include a variety of distressing sensations. Most of the victims survive, although recovery may require several months.

Reports of ciguatera fish poisoning in the Southeastern United States have been largely linked to barracuda and red snapper species. Ciguatera-like symptoms also have appeared in individuals who ate clams and oysters harvested in certain areas along the coast of Florida.

Ciguatera fish poison is not only a major health problem but also an economic problem. Fish are not harvested in many marine waters and commercial fishing is not conducted in some areas because of the possibility of encountering toxic fish.

Work has progressed steadily on this project, and problems associated with obtaining and shipping the toxic fish from the Virgin Islands to the University of Mississippi have been solved. Extraction and purification of the toxin is now in progress.

Complementary to research on the sport fishery and associated health aspects is the project to define the current regime and exchange characteristics of the Mississippi Sound and adjacent estuarine areas. This information is essential to the intelligent planning and design of coastal development, navigation, and in describing the current patterns and mixing rates of waters from the Sound and the Gulf. Seasonal exchange rates and variations also are being studied.

Knowledge gained from this investigation is essential to the fields of fisheries management and research. This study also will permit intelligent planning for coastal structures, correct orientation of navigation channels, proper placement of dredge spoil, and logical location of water dependent industries.

A program of water analysis is in progress with special emphasis being placed on temperature, salinity, acidity, dissolved oxygen, and nutrients.

INDUSTRIAL AND SOCIO-POLITICAL DEVELOPMENT

Many plans and programs have been proposed for the Mississippi Gulf Coast region, but bridging the gap between plans and action has always been a problem. This lack of action was caused in part by planning agencies who came from the outside to cure coastal ills and in part because coastal residents did not have the opportunity to participate in the planning.

The Sea Grant Coastal Leaders Program was designed to bridge the gap between plans and action. A nonpolitical forum was provided to help stimulate interest and involvement in local problems and to generate solutions by using a regional approach. Initial efforts involved bringing together selected coastal leaders for a day-long workshop to develop a listing of broad categories of problems of local interest. These problems were identified and prioritized, and committees were formed to take the necessary action. The activities of the program were coordinated with university personnel and other interested individuals participating in related activities. However, the discussions were initiated by the coastal leaders themselves. Support personnel participated only to provide specialized services and information.

Most committee activity has occurred in the areas of tourism and recreation and the seafood industry. Both of these committees have made significant progress. The Tourism and Recreation Committee has brought together coastal leaders interested in the orderly development of the tourist industry and has provided for the interchange of ideas. Tangible benefits accruing from this committee are the newly constructed beach oases. These attractive arrangements of palm trees and thatch-roofed shelters enhance the appearance and enjoyment of the beach. This project was originally discussed at a coastal leaders meeting, and coordinated activity by the Sea Grant Advisory Services and the Harrison County Board of Supervisors brought the project to a successful conclusion.

The Seafood Committee also has been very active. The primary concern of this committee has been to aid the seafood industry during a time of general distress. A number of serious problems have been confronted. These problems have been placed in two general categories: problems that can be solved by local cooperation, and problems requiring research that must be done by other agencies.

Work has progressed steadily on the seafood waste disposal problem, and several viable suggestions have been generated. One of these was described in the Pollution section of this report. The problem of fresh water in the Mississippi Sound has received great

attention. Both too much and too little fresh water cause problems. A possible solution is the scheduled opening of the Bonnet Carre spillway to permit a regulated amount of fresh water to enter the Sound. This solution is being approached with cautious optimism, and at least one year will be required before any positive benefits may be expected. Interstate coordination and cooperation with the State of Louisiana will be required.

An estimated 500 million to 2 billion pounds of fish are discarded annually by the shrimp fleet in the Gulf of Mexico. The Seafood Committee became interested in the problems generated by these discards in coastal waters and by the loss of this valuable protein. The objectives of the fish discards study are to determine the volume and species composition of these discards, and to determine an effective method for collecting, transporting, and processing these discards into a useful product.

The Sea Grant Coastal Leaders Program has provided the means by which leaders from industry, government, and the universities can exchange ideas and solve problems affecting the coastal zone.

Development planning, whether it relates to urban renewal, economic development, environmental protection, or natural resource conservation, must be pursued with the ultimate objective of benefits for people. Successful planning, therefore, is that which includes knowledge of relevant populations.

An analysis of demographic composition and growth components of the coastal region of Mississippi is a project undertaken by three major universities. The objective of this project is to provide a detailed body of demographic data for distribution to various planning agencies and other users.

Social and demographic indicators currently under investigation are those which have been used most effectively in previous research to document and monitor the growth and change in the urban environment in regard to various dimensions and functional areas.

The Biloxi-Gulfport Standard Metropolitan Statistical Area provides a unique laboratory for a study of demographic growth and change for two reasons. In the first case, this study will provide the structure of metropolitan areas in the South that are directly comparable to data on cities in other sections of the United States. Secondly, this study will provide a benchmark against which later Biloxi-Gulfport data may be compared, thereby contributing to the longitudinal investigation of ecological structure and change. In other words, this research will provide both cross-sectional data for the comparative analysis of South and non-South cities and a quantitative foundation for a study of the changing ecology of Southern coastal cities.

Twenty-two measures of seven composite social and demographic indicators have been extracted from the census summary tapes, and these indicators are being standardized for the purpose of constructing the composite indicators. Other measures will be added or deleted as the analysis progresses.

EDUCATION

Education is an integral part of the Mississippi Sea Grant program. The educational programs sponsored by Sea Grant provide students with a greater depth of experience than is normally possible in other programs, for students often are able to work directly with Sea Grant principal investigators on specific research projects. Educational programs have been concentrated in the areas of engineering and law.

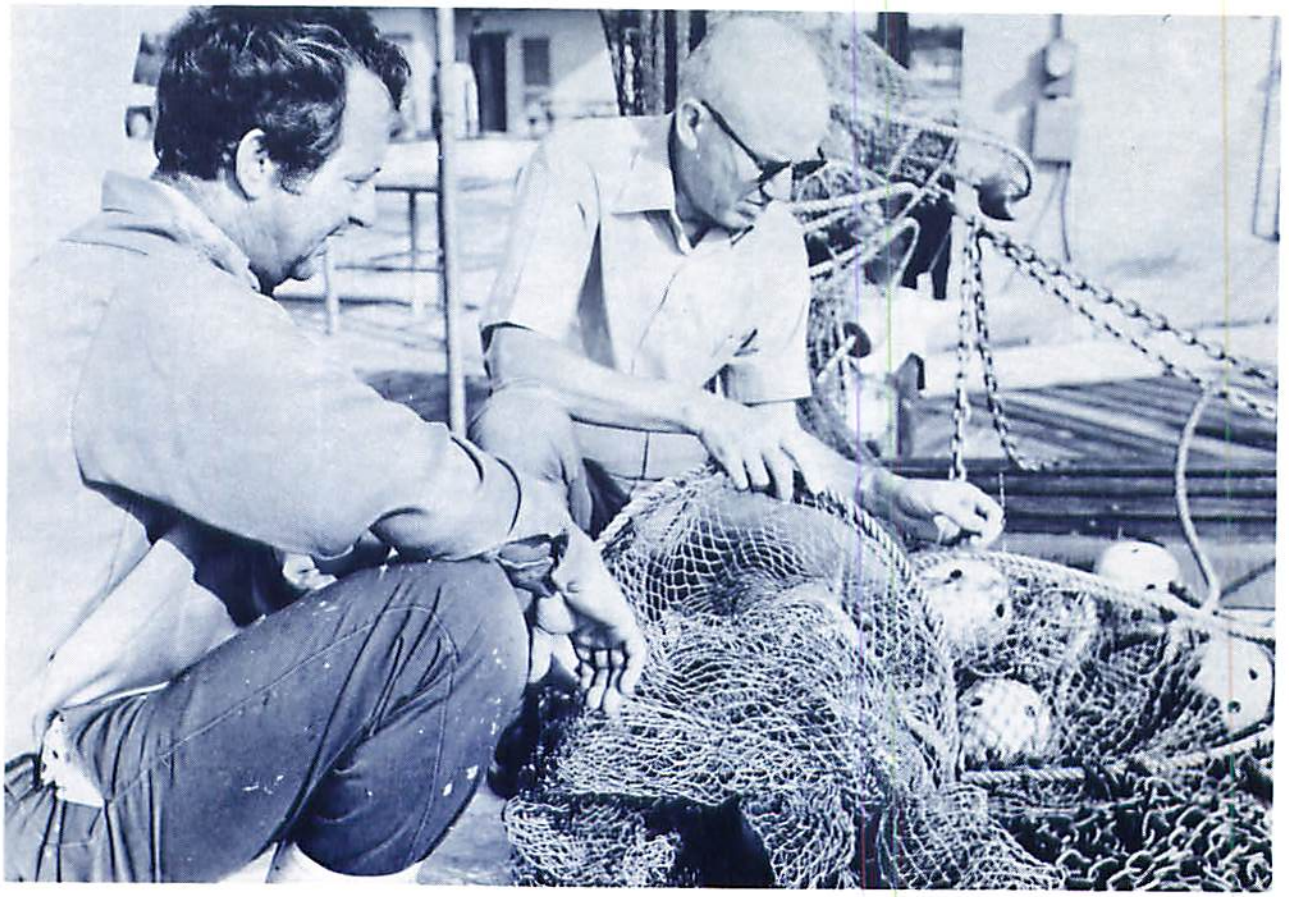
The curriculum in marine engineering technology, taught at the Institute of Engineering Technology at Mississippi State University, has continued to produce highly competent manpower to work in those industries concerned with shipbuilding, ship repair, and shipyard operation. Job offers have continually exceeded the number of graduates this curriculum has produced. These marine engineering technologists understand the principles of ship structure and ship propulsion and are able to communicate with marine architects. They are welcome members of the team of specialists who will design, build, and operate the marine vehicles of the future.

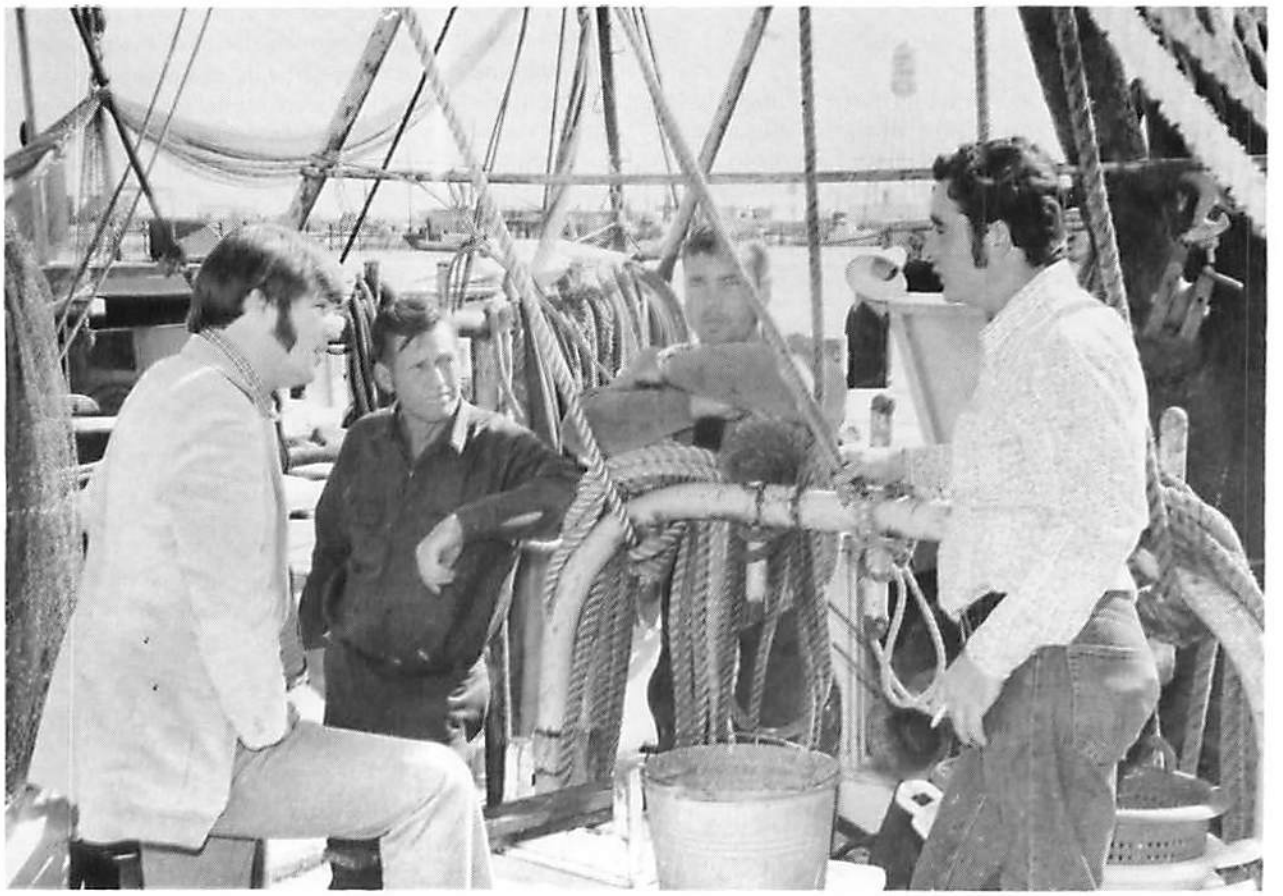
The School of Law at the University of Mississippi is presently teaching three law courses sponsored by Sea Grant. These courses – Law of the Coastal Zone, Interdisciplinary Studies on Problems of the Coastal Zone, and Master of Marine Law and Sciences – are taught to expose law students to the legal problems unique to the coastal area. The broad objectives of these curriculums are to combine the study of law with other disciplines whose assistance is needed in solving these problems. These courses also serve to acquaint members of other disciplines with the legal problems in developing and regulating the coastal zone.

ADVISORY SERVICES

Advisory Services have continued to make a significant contribution to the Mississippi-Alabama Sea Grant Program. Staff members have been in contact with most of the commercial fishermen, marine recreational industries, federal and state governmental agencies, news media personnel, civic groups, and seafood processors.

The energy crisis caused some severe hardships and concern by all fishermen during the latter part of the year. Fuel was difficult to obtain and very expensive. Regulations were confusing and changed with alarming regularity. Advisory Services Specialists disseminated information to the seafood industry almost daily through the media, newsletters, and personal contacts in an effort to ease the situation. Users were assisted in complying with regulations to insure they received their proper allocation.





The Advisory Services assisted the Mississippi Marine Resources Council in surveying and evaluating the seafood laws and regulatory agencies for the State of Mississippi. The results of this survey were used as a basis for recommending changes in existing legislation.

Marine communications were an important part of the total Advisory Services program. The primary objective was to disseminate information that could be put to use by a cross section of marine users. Two major publications were used for this purpose: The Sea Grant Newsletter, and the Fisherman's Newsletter. Other publications were concerned with fishing information, how to crab and flounder, and how to use Mississippi's beaches. In addition to publications, many general Sea Grant news articles were prepared for coastal newspapers.

Marine educational services provided a variety of training programs for homemakers, young people, and fishermen. A seafood preparation workshop for professional home economists was conducted on a state-wide basis, and young people from nine counties participated in marine recreation, ecology, and safety workshops. Training in fishing skills and boating safety were conducted by industry personnel for more than 1,800 young people.

Advisory Services Specialists held several meetings with fishermen to explore the possible formation of a cooperative and assisted Sea Grant investigators in arranging meetings on the coast. Advisory Services Specialists participated in the Coastal Leaders Program as an integral part of the Tourist and Recreation and Seafood Committees.

The Cooperative Extension Service of Auburn University has begun planning and problem identification studies in the seafood industry in Alabama. Extension agents have established contacts with key individuals in marine related businesses and industries in Alabama. The objectives of this project are to support and complement the Sea Grant Program by providing information to the general public and interested agencies for the purpose of achieving optimum utilization, conservation, appreciation and enjoyment of marine resources in the development and growth of industry and business within the coastal zone.

BUDGET SUMMARY

ACTIVITY SHEET

	NOAA Grant Funds	Grantee Matching
PROGRAM MANAGEMENT AND DEVELOPMENT		
Program Administration and Development	$ 37,166	$ 33,945
MARINE RESOURCES DEVELOPMENT		
Aquaculture	14,500	8,644
Living Resources, other than Aquaculture	25,558	39,526
SOCIO-ECONOMICS AND LEGAL STUDIES		
Ocean Law	25,094	22,243
Marine Recreation	15,893	10,285
MARINE TECHNOLOGY RESEARCH AND DEVELOPMENT		
Ocean Engineering	36,038	14,752
MARINE ENVIRONMENTAL RESEARCH		
Research and Studies in Direct Support of Coastal Management Decisions	26,082	18,188
Ecosystems Research	33,453	14,175
Pollution Studies	19,254	7,390
Applied Oceanography	14,043	43,985
MARINE EDUCATION AND TRAINING		
College Level	6,164	5,353
ADVISORY SERVICES		
Extension Programs and Other Advisory Services	48,233	39,987
	$301,478	$258,473

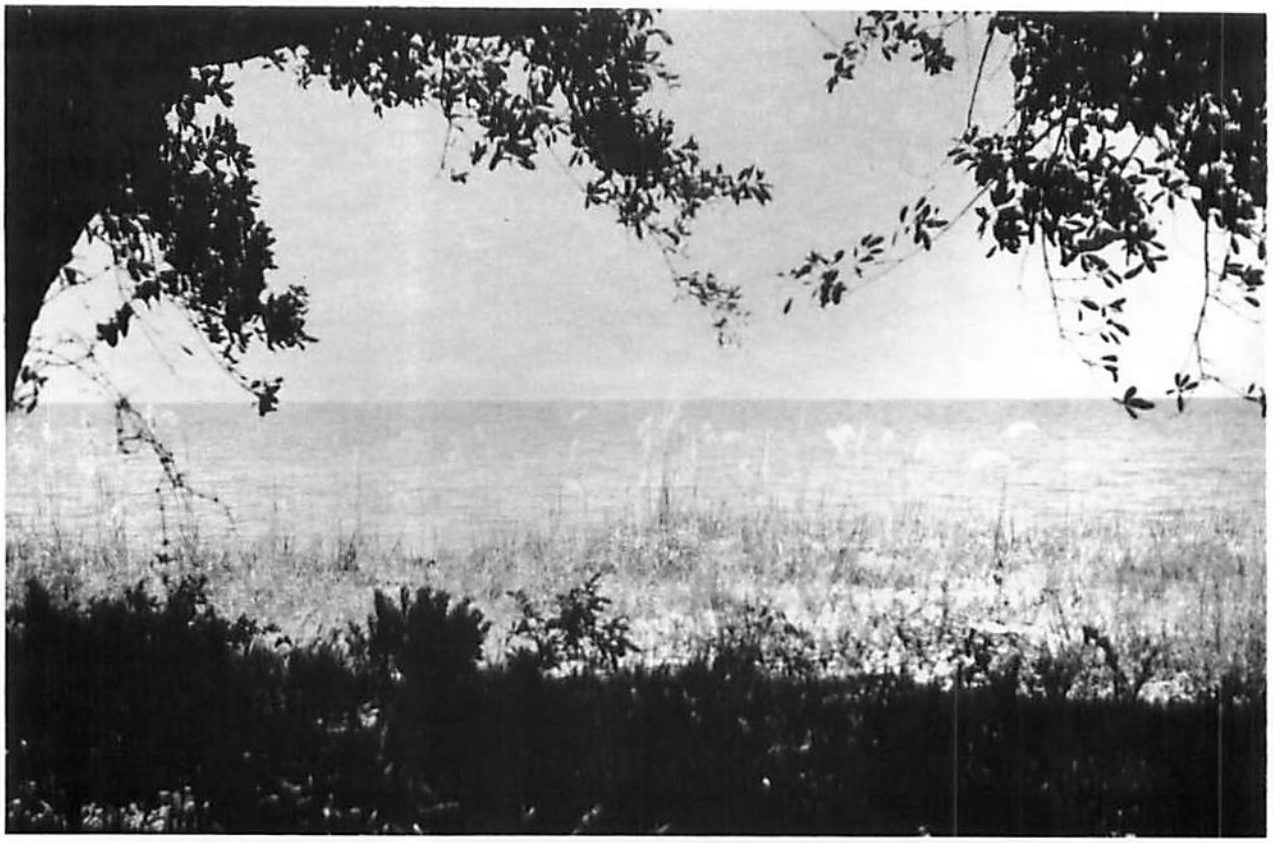
Partial funding from Sea Grant #2-35362 as follows:

	NOAA	Matching
Living Resources, other than Aquaculture	$ 3,058	$ 1,340
Ocean Engineering	4,544	-0-
Program Administration and Development	3,167	-0-

This summary is only approximate. The official financial report will be submitted to NOAA's Office of Sea Grant Programs in accordance with federal grant requirements.

1973
SEA GRANT PUBLICATIONS

MASGP-73-001	Mississippi-Alabama Sea Grant Newsletter, No. 3 - Spring, 1973
MASGP-73-002	Mississippi-Alabama Sea Grant Newsletter, No. 4 - Summer, 1973
MASGP-73-003	Overstreet, Robin M., and Donald M. Martin. "Some Digenetic Trematodes from Synaphobranchid Eels." **The Journal of Parasitology,** Vol. 60, No. 1, February 1974.
MASGP-73-004	Advisory Services "Floundering for Family Fun."
MASGP-73-005	Advisory Services "Crabbing for Family Fun."
MASGP-73-006	Advisory Services "Mississippi Beaches -- Fun in the Sun."
MASGP-73-007	Advisory Services "Fisherman's Newsletter Vol. 1-13."
MASGP-73-008	Mississippi-Alabama Sea Grant Newsletter, No. 5 - Fall, 1973



"In the year 1690 some persons were on a high hill observing the whales spouting and sporting with each other, when one observed; there -- pointing to the sea -- is a green pasture where our children's grandchildren will go for bread."

Obed Macy's History of Nantucket

For Further Information Contact

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