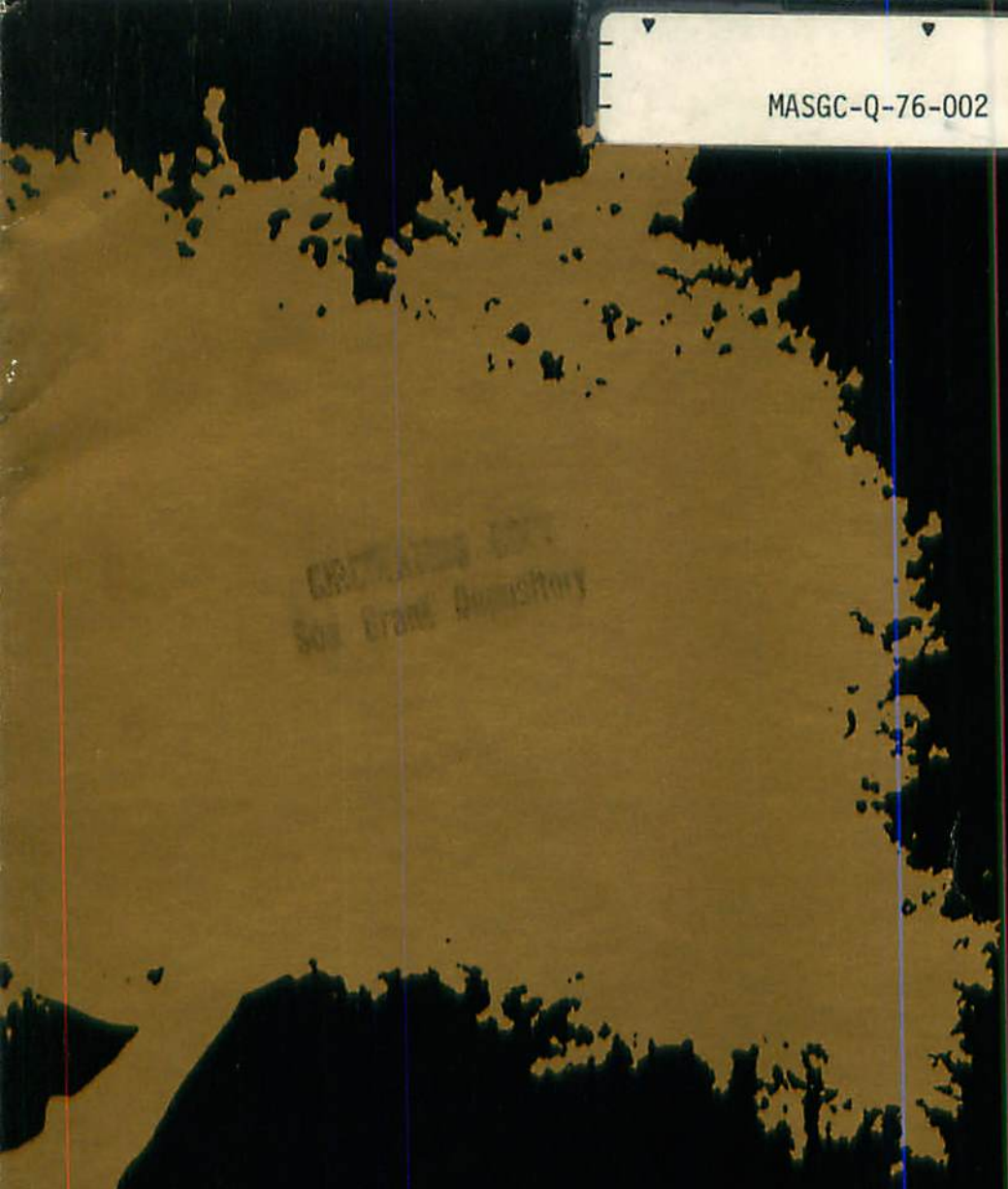

mississippi-alabama sea grant consortium
1976 annual report

MASGP-77-035

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Special thanks to Kevan Brown, Mississippi Sea Grant Advisory Service, for her help in preparing this annual report.

foreword

What lies in the future for the coastal areas of Mississippi and Alabama? According to Sea Grant scientists and the research they did during 1976, the Gulf Coast can expect many changes.

Sport fishermen, commercial fishermen, and many fishing and tourist-related industries should reap recreational and financial benefits from artificial reefs in the Gulf of Mexico. Studies on fish infected with parasites and ciguatera poison will help fishermen, aquaculturists, and consumers to detect diseased fish. Elimination of such diseases may be forthcoming with improved treatments.

Seafood processors can look forward to bettering quality control of their products. Methods for determining what species and how much plant protein are in precooked fishery products have already been established, and techniques for detecting and extracting enteroviruses from Gulf oysters are being reviewed.

Another development for seafood processors may be electrolysis for treating the waste water from their plants. Investigators have designed, built, and tested an electrolysis unit that operates economically. This unit produced significant BOD reductions in shrimp processing waste water.

Techniques for detecting and treating waste water are only the beginning of eliminating problems at processing plants. Chitinous waste materials from the exoskeletons of shellfish show promise as raw materials for the polymer and fertilizer industries. Not only will these uses of chitin create new industries, but the processors will be rid of financial and aesthetic burdens of waste disposal.

Other research done by Sea Grant scientists and attorneys will help coastal leaders solve many complex coastal problems and predict environmental effects of land and water developments. Much information, including coastal maps and atlases, has been distributed not only to coastal leaders but to public agencies and other interested groups.

While coastal leaders benefit from data supplied by the Sea Grant Advisory Service, informing fishermen, fishing industries, and the general public is a main concern. During 1976 the Advisory Service promoted the fishing and tourist industries on local, state, national, and international levels. Additionally, they distributed a wide variety of informative publications to coastal residents.

The success of the 1976 projects can be attributed to investigators at the nine institutions that comprise the Mississippi-Alabama Sea Grant Consortium:

Auburn University
Gulf Coast Research Laboratory
Mississippi State University
Tuskegee Institute
University of Alabama
University of Alabama in Birmingham
University of Mississippi
University of South Alabama
University of Southern Mississippi

With the continued support of these institutions, guidance from the new director, and talents of dedicated staff members, this two-state program will be better prepared to help solve the many problems facing users and managers of coastal resources.

research

Fish abound in new housing projects — sunken liberty ship hulls.

marine resources development

Housing Projects for Fish

How would you like to gather your family together and move, along with many other types of families, into the hull of a liberty ship? Fish in the Gulf of Mexico didn't seem to mind in the least doing just that.

Since May of 1974, a Sea Grant project monitored the development of artificial reefs along the Gulf Coast of Mississippi and Alabama. These reefs were formed by sinking ten surplus liberty ship hulls (Figure 1). Two of these reefs, the Waterhouse (Mississippi) and Anderson (Alabama), were the focal points of this study.

The team concentrating on this project was interested in evaluating the total community structure of the artificial reef complexes — especially its effects on fishing. Life at the reefs has flourished. In fact, an examination of Waterhouse a month after she was sunk showed only sparse plant and animal growth, but less than a year later 57 different species of fish were observed at the site.

At Anderson artificial reef, 33 of the 55 species observed were potential residents. The other 22 were considered transients or incidental occurrences. Among those thought to become permanent residents was the red snapper, one of the most popular sport fish along the northern Gulf of Mexico.

Not only was there an abundance of red snapper, but investigators noted at least 75 species of other fish at these two reefs during this study (Table 1). This occurrence is probably due to the fact that the two reefs are located on the fringe of a high nutrient area with bottoms rich in organic matter. Those reefs situated eastward from Perdido Bay to Destin, Florida, revealed low species

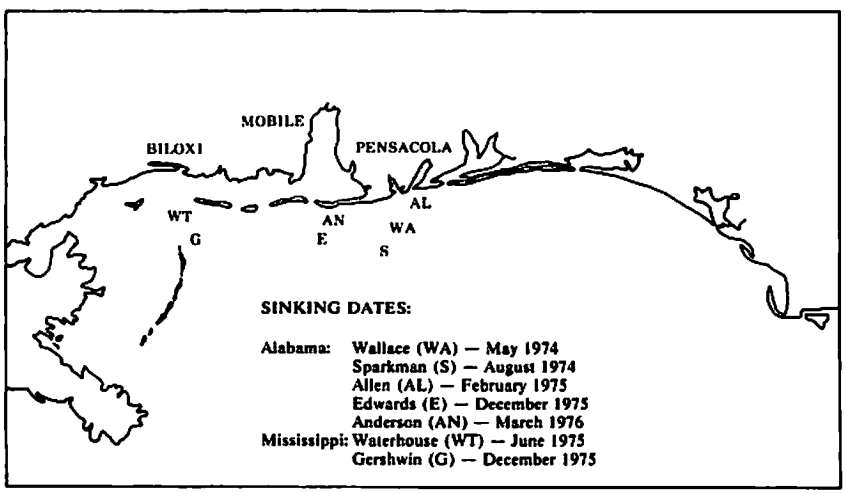


Figure 1. Locations of Liberty Ship Reefs off Mississippi-Alabama

1. Doctorfish	27. Sharksucker	53. Bigeye
2. Twospot cardinalfish	28. Atlantic spadefish	54. Cobia
3. Orange filefish	29. Spotted goby	55. Silverperch
4. Gray triggerfish	30. Twoscale goby	56. High-hat
5. Planehead filefish	31. Island goby	57. Jackknife fish
6. Atlantic needlefish	32. Freckled soapfish	58. Spot
7. Seaweed blenny	33. Greater soapfish	59. Atlantic croaker
8. Crested blenny	34. Slippery dick	60. Little tunny
9. Southern flounder	35. Painted wrasse	61. Mackerel
10. Yellow jack	36. Red snapper	62. Barbfish
11. Blue runner	37. Lane snapper	63. Smoothead scorpionfish
12. Crevalle jack	38. Gray snapper	64. Bank sea bass
13. Round scad	39. Wenchman	65. Rock sea bass
14. Rainbow runner	40. Vermillion snapper	66. Dwarf sand perch
15. Pilotfish	41. Goatfish	67. Sand perch
16. Greater amberjack	42. Bearded brotula	68. Warsaw grouper
17. Almaco jack	43. Pales	69. Snowy grouper
18. Rough scad	44. Queen angelfish	70. Black grouper
19. Atlantic moonfish	45. Rock beauty	71. Scamp
20. Spotfin butterflyfish	46. Yellowtail reeffish	72. Belted sandfish
21. Reef butterflyfish	47. Purple reeffish	73. Sheepshead
22. Banded butterflyfish	48. Bicolor damselfish	74. Spottail pinfish
23. Blue angelfish	49. Cocoa damselfish	75. Pinfish
24. French angelfish	50. Tomtate	76. Longspine pogy
25. Round herring	51. Pigfish	77. Dwarf seahorse
26. Scaled sardine	52. Bluefish	78. Puffer

Table 1. Fish Observed at Artificial Sport Fishing Reefs.

diversity and low numbers of individual fish. This decline in the presence of marine life correlates with the low-nutrient, low-organic, clear water on the sea floor of those areas. Based on these data, the locations of the artificial reefs off Mobile Bay - Orange Beach westward along the coast of Mississippi appear nearly ideal. Presently, the artificial reefs could withstand greater fishing pressure than many natural reefs in the area.

Additional recruitment of snapper and other game fish is likely to continue due to the favorable environment; thus many people should enjoy the benefits of these artificial reefs. The sport fisherman is expected to enjoy the greatest benefits; but commercial fishermen, charter boat operators, and many others will realize some economic benefits from the reefs.

These reefs continue to provide recreational opportunities and financial profits. In addition, the ship hulls were a gift from the Federal Government, so their salvage value yielded to the states enough cash revenue to pay for preparing, placing, and marking the hulls. Although the long-range economic benefits appear promising, definite predictions could not be quantified in this study.

All information gained from this study will be supplied to commissions and agencies in Mississippi and Alabama that will be responsible for developing and managing future reefs. Additionally, all information will be available to local fishermen and other interested parties.

Disease From the Seas

If your skin is broken out in a rash, ask yourself if you've eaten any raw fish lately. According to a Sea Grant project, some parasites present in raw fish can be harmful to man if he eats them. This project focused on finding and eliminating parasites in marine animals of the northern Gulf of Mexico. Several different parasites have increasingly appeared in varieties of marine animals over the past decade.

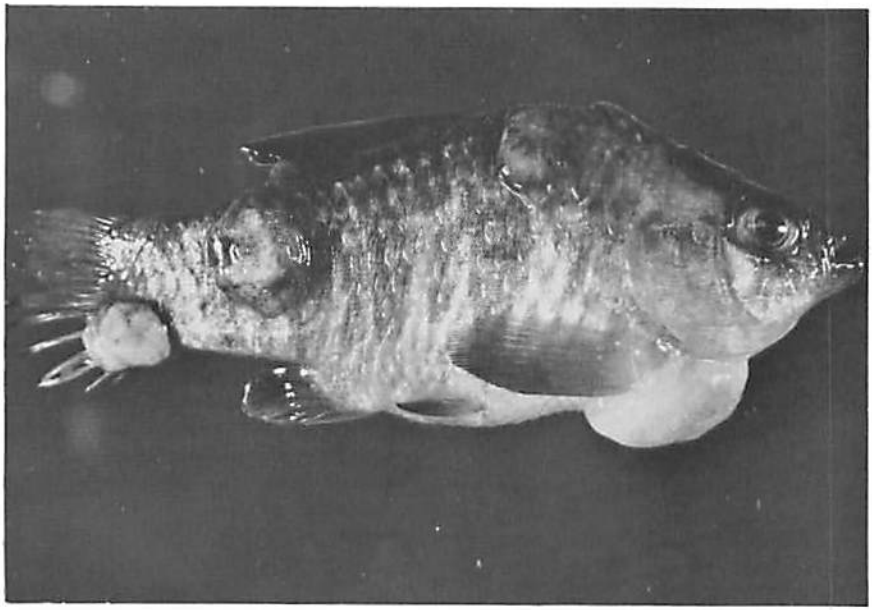
Buquinolate, a drug used to control disease in broiler chickens, proved effective in controlling a parasite common to the blue crab; but experiments with a possibly more successful drug are still being conducted. Commercial bleach or disinfectants containing iodine will destroy infective spores in closed-system, culture facilities. Ultraviolet light will kill some parasitic spores as well, but the most effective means of control is to bathe the infected hosts in fresh water for three to five minutes.

Other fish with parasites were also studied, including croaker, silver perch, blue gill, mullet, and sea trout. Some parasites can cause fish to have external red sores while others attach themselves to the fish's intestine. Most parasites cause the host to weaken and sometimes die.

Although many parasites of fish do not infect man, most human beings wish neither to catch nor eat such unpleasant-looking fish. This presents a problem in the Mississippi Sound since about 40 percent of the speckled trout over 10 inches long are infected with at least two parasitic worms each.

Certain species of parasites infect man and the fish host. Not only may we expect external and intestinal problems from eating raw, infected fish; but severe infections could cause neural complications. However, some people are not as susceptible to the diseases from harmful parasites as others. Also, cooking usually rids fish of possible infection to man.

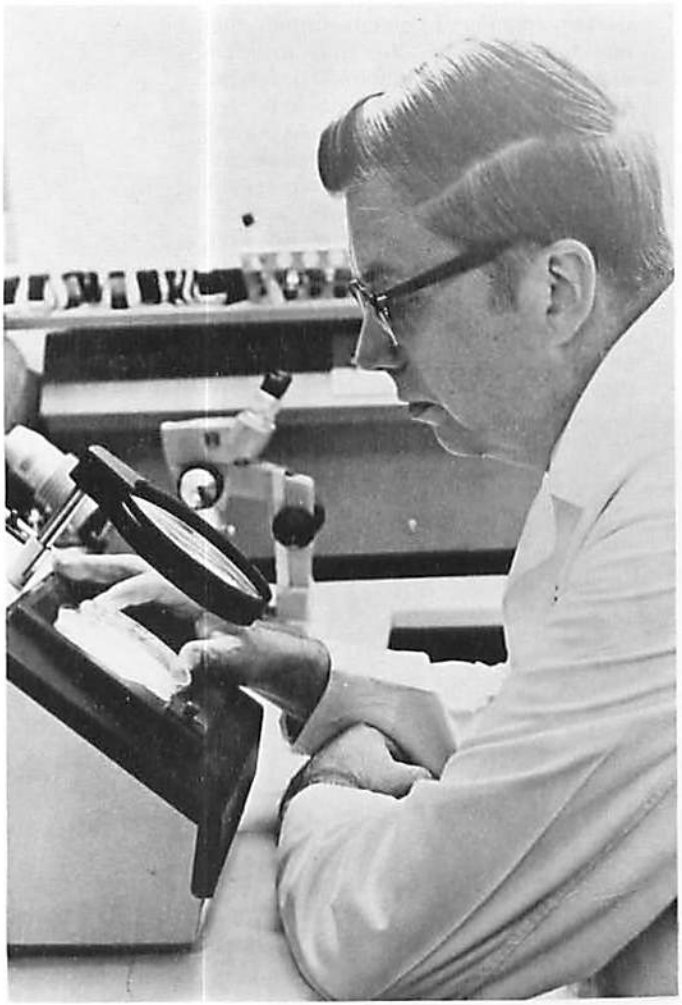
Another aspect of the project was to inform and aid groups concerned with parasitological problems. Some of these groups consisted of students,



A pleasant sight? The cysts on this sheepshead minnow contain parasites that weaken the host. Most fish parasites do not harm man, but would you want to eat a fish that looks like this?

teachers, fishery personnel, and medical personnel. Others who will benefit from the knowledge gained from this project are those who raise fish and wish to know how to identify and control diseases in their stocks. Similarly, buyers and sellers of fish will benefit.

To determine sources of ciguatera fish poison, Dr. Norman Doorenbos and his research team studied more than 2,000 fish specimens.



Also relating to the possible harm which comes to man from eating diseased fish, another Sea Grant project is looking into ciguatera fish poison. This is frequently considered the most important marine toxicity problem in the world today because of its impact on human health and development of reef fisheries.

Over 400 species of ciguatoxic fish have been noted, and all are either bottom feeders or they consume bottom feeders. Ciguatera has been found in some of the species we value most highly as food: groupers, jacks, eels, flounders, snappers, and croakers.

Fish seem to tolerate the ciguatera toxins, but humans who eat ciguatoxic fish may develop abdominal pain, nausea, vomiting, diarrhea, numbness, headaches, muscle aches, and feeling hot and cold in reverse. Can death occur from ciguatera poisoning? Yes, especially in the Pacific.

The project collected, isolated, and examined specimens of ciguatoxic fish to determine the sources of the toxins. To do so, two stations for ciguatera studies were established in the Caribbean Ocean: one on Cayman Brac; the other on Virgin Gorda, an area infested with many ciguatoxic fish.

Hopefully, information from this project will lead to developing methods for treating and preventing ciguatera poisoning. Thus, fishermen can harvest safe fish.

socio-economic & legal studies

What could be so intriguing? Dixie Criddle and research associates analyze many legal problems concerning the coastal zone.

Research Briefs

To whom can you turn with coastal legal problems? If Sea Grant cannot help directly, it can at least tell you where help can be found. This continuing Sea Grant project concerned with legal problems of the coastal zone has certainly proved helpful to many people.

One aspect of the project involved questions about the various rights of commercial fishermen. To answer those questions, research on several laws was conducted and resulted in establishing a basic guide to these rights. The National Labor Relations Act was analyzed to determine if fishermen can unionize and, if so, what the requirements would be. The Fair Labor Standards Act was examined to find how, if at all, the minimum wage and maximum working hour laws affect fishermen. Also, in an effort to determine what compensation is available to fishermen recovering from job-related injuries, the Jones Act and workmen's compensation laws were studied.

Sea Grant attorneys felt that a brief paper analyzing the jurisdiction of the United States over the oceans was needed. Because of the growing importance of ocean resources due to shrinking supplies of food and energy, jurisdiction is an urgent matter. Many detailed books have been published on this subject. However, there was a demand for a condensed version for people needing a basic background on our jurisdiction over particular ocean zones. This paper included a historical background of jurisdictions held by the United States in the past and a discussion of present and future seaward jurisdictions.

As in previous years, legal researchers compiled an index of all 1976 Mississippi laws affecting the coastal zone. This index is a guide to ocean users and coastal, state, and city agencies.

Besides these research projects, Sea Grant attorneys aided various state agencies with problems related to the coastal zone. For example, they assisted the Attorney General's office with legal research on international law problems.

Many other coastal legal questions were referred to Sea Grant attorneys by Sea Grant Advisory agents. One such query was, "Whose rights are paramount — those of the state under the public trust theory or those of the riparian owner?" After thorough research, an informative paper was prepared for distribution by the Sea Grant Advisory Service. Information about administrative appeal and appeal through the courts system was also provided for coastal users wishing to appeal a decision of the Mississippi Marine Conservation Commission.

The Sea Grant Advisory Service asked Sea Grant attorneys to help with a problem that existed among seafood processors. Are oyster shuckers and crab pickers employees, or are they independent contractors? If a shucker or picker is an independent contractor, the processor is saved much paper work, time, and money, for he does not have to withhold taxes. Research by Sea Grant attorneys outlined procedures for a legal decision on this problem. Seafood processors have now formed a group to promote legislation making oyster shuckers and crab pickers independent contractors.

Attorneys also aided the Mississippi Marine Resources Council. They analyzed powers available to certain agencies. These data were necessary for the Council to fulfill its responsibility of organizing a coastal plan for Mississippi. The agencies examined were the Air and Water Pollution Control Commission, Board of Water Commissioners, Department of Archives and History, Mineral Lease Commission, Oil and Gas Board, and the Marine Resources Council.

Sea Grant attorneys will continue to work toward supplying pertinent information relative to legal problems of the coastal area. This information will provide coastal leaders with recommendations to aid in solving many complex coastal problems.

Fish in Focus

That can of tuna you ate for lunch yesterday — was that really 100 percent tuna? Was it made up of parts of other fish, or was it really a can of soybeans?

Sea Grant researchers worked to perfect methods to determine what fish species and how much soybean are in precooked fishery products. So far, they have successfully used isoelectric focusing to speciate samples of precooked breaded fish sticks and canned tuna. Experiments are continuing on canned salmon.

One of the objectives of the project was to develop a vertical gel slab system of isoelectric focusing. This was accomplished and found superior to other isoelectric techniques. A major advantage of the vertical gel slab system is that it is commercially available to any laboratory wishing to use it. Preprepared gels can be supplied to laboratories; and because the newer system uses far fewer chemicals and reagents, analysis costs are cut by about 60 percent. This makes the technique inexpensive and readily available.

marine technology research & development

American eel	Flounder	Sea catfish
Atlantic bonita	Haddock	Sea drum
Atlantic croaker	Jack marvel	Sea trout
Blue crab	Mullet	Sheepshead
Bluefish	Oyster fish	Silver perch
Brown shrimp	Fin fish	Spotted trout
Channel mullet	Pollock	White shrimp
Cod	Redfish	White trout
Dolphin fish	Red snapper	

Table 2: Fish Whose Isoelectric Focusing Profiles are Now Established.

Another major effort of the project was to compile a data bank of isoelectric focusing profiles of fish. These were filed for use in identifying suspect fish in fishery products. Profiles on 25 fish commonly found in the Gulf of Mexico were established (Table 2).

What about detecting soybean in fish products? Adding plant protein to a variety of food products is a widely expanding practice due to the rising demand for meat and meat products. But little attention has been given to techniques for quality control. Such techniques would assure uniform consistency of supplemental soybean products. This, too, was a concern of the Sea Grant researchers.

They felt that an evaluation of a number of techniques was necessary to find a method which would quickly, easily, and inexpensively calculate the amount of soy protein in a variety of fisheries products. The method that most closely met these qualifications was a technique called rocket-immunoelectrophoresis. Like the isoelectric system of speciating fish samples, this one does not involve complicated chemical procedures. Also, it is rapid enough that one technician could easily perform over 100 analyses per day at a minimal cost.

The data these techniques provide will no doubt be useful to personnel in markets that manufacture mixed seafood products. Not only may these methods be used for routine quality control but for labeling purposes as well.

Several techniques, including a form of isoelectric focusing, were considered for detecting hepatitis antigens in oyster products. The main purpose of another Sea Grant project was to compare and to predict an optimum method of extracting and detecting certain enteroviruses seeded into raw oyster tissue.

Three methods of extraction were thoroughly reviewed. Researchers preferred the one established in 1973 by K. D. Kostenbader and D. O. Cliver for two reasons: The recovery percent was higher (35 to 75%) than the other two methods, and it required less equipment, solutions, and time.

The examined oysters collected along the Mississippi Gulf Coast were naturally contaminated. Although the researchers did recover virus, they felt that their results did not truly represent the level of virus content because the Kostenbader-Cliver method gives poor recovery with low levels of contaminations.

In future studies, the project members plan to employ the Kostenbader-Cliver technique to study virus extraction from shrimp, crab, and fish tissues. Data generated by this research project will help the seafood processor to establish better quality and safety controls over raw oysters and, hopefully, other shellfish and finfish.

marine environmental research

Maps and Monitors

Map making sounds easy, but if you've ever tried to draw even simple directions on scratch paper, you know that it's not easy at all. Researchers on Alabama's coast faced even harder and more numerous tasks. Their job was to produce a map of Alabama marshes with quantitative data and descriptions.

The project concerned assessing Alabama coastal marshes for coastal zone management planning. Its main purpose was to inventory the extent of Alabama's coastal marsh resources and to redefine them by physical and vegetational parameters. How did they handle it?

First, information about Alabama's entire coastline was gathered by aircraft. This information helped researchers select a number of sites which would provide the broadest coverage of geographic areas, vegetation types, and environmental settings. After careful examination, 26 marsh stations were established.

Then these areas were marked off with flagged and labelled stakes and were sampled during various months covering the entire growing season. A 30-meter line transect was laid between these stakes and coverage along the line for each species present was recorded. Vegetation profiles for each station were compiled from cumulative seasonal data throughout the growth period. Profiles and transect data were provided to the Alabama Coastal Area Board, the agency developing Alabama's coastal zone management plan.

Information collected during this project was provided to area environmental agencies and boards. Further research will help these groups advise coastal leaders on future uses of marsh resources.

In a similar Sea Grant project occurring in Mississippi, investigators explored the capabilities for coastal resource development. One researcher summarized the purpose of the project when he said, "In order to decipher the natural resources and hazards for the decision-making public, it is necessary to obtain a complete understanding of the natural environments."

As a means of accomplishing such an understanding, the research team has prepared an atlas written in nontechnical terms. Besides information, the atlas includes illustrations and a variety of color-printed maps. The maps cover more than thirteen specific characteristics of the environment:

1. Environmental Geology
2. Physical and engineering Properties
3. Biologic Assemblages and Environments
4. Soils
5. Mineral and Energy Resources

Assessing Alabama's coastal marshes is a first step toward planning for future uses of coastal resources. Judy Stout and student investigators collect samples of marsh life.

6. Topography and Bathymetry
7. Ground and Surface Water Resources
8. Current Land Use
9. Climatology and Meteorology
10. Natural Hazards
11. Salinity Patterns of Mississippi Sound
12. Chemical Characteristics of Mississippi Sound
13. Active Processes

Following the publication of the atlas, a series of seminars is planned by the researchers and by Sea Grant Advisory Service personnel. These seminars will help educate coastal leaders to use the atlas and learn how to begin predicting environmental effects of land and water developments in the coastal zone.

An outgrowth of this particular project was the development of remote sensing techniques to help locate natural resources in a coastal plain terrain. Experimenting with these techniques, investigators plotted tectonic features along the Gulf Coast, even those buried thousands of feet below the surface. Remote sensing has also been used to map areas filled with gravel, a raw material in critically short supply along the Mississippi coast. Evaluation of such features is essential to understand the potential for gravel mining and gas and petroleum production.

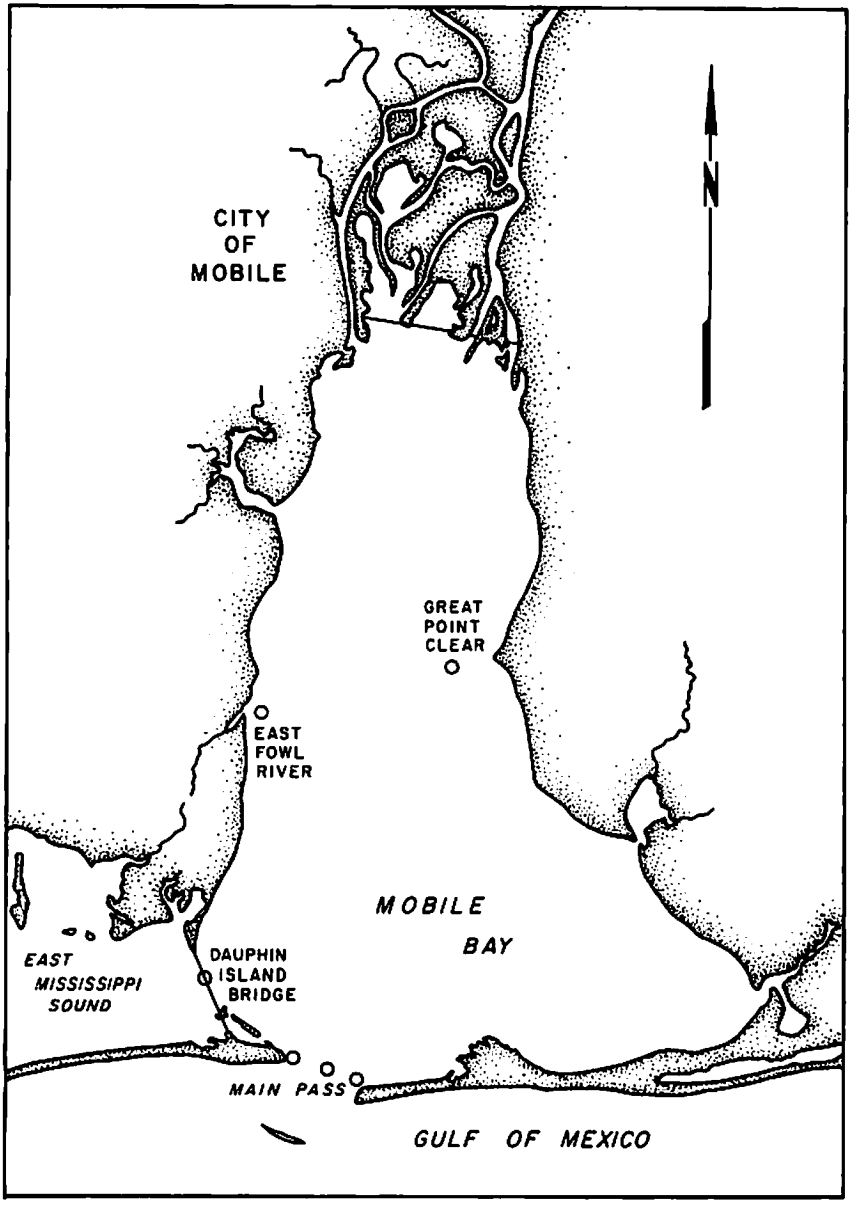


Figure 2. Locations of Sampling Stations Used to Describe Mobile Bay.

When someone is asked to describe an area of the environment, the first thing they are likely to do is to think of adjectives. However, *description* did not mean colorful words to the investigators of another Sea Grant project. This description entailed gathering data on the physical environment of Mobile Bay and East Mississippi Sound.

At Main Pass in Mobile Bay, fifteen 26-hour surveys were completed, yielding vertical profiles of temperature, conductivity (salinity), and dissolved oxygen. In lower Mobile Bay, nine distribution surveys were conducted at slack high water periods during high river discharge and slack low water periods during low river discharge. This data also included vertical profiles of temperature, conductivity, and dissolved oxygen (Figure 2).

In addition, several surface current drogue releases, both single and multiple, were completed. Thirteen of these were in lower Mobile Bay, but the most significant drogue release occurred at Grants Pass. It resulted in the conclusion that future release points must be west of the western channel of Grants Pass because of the extensive shallows.

Also at Grants Pass, a data collecting platform was operated for 50 weeks and monitored temperature and conductivity of both surface and bottom waters. Similarly, refractometer-thermograph units were operated at East Fowl River and Great Point Clear to monitor temperature and salinity. Meteorological data were collected at the Dauphin Island Sea Lab.

Perhaps the most important outcome of this project was the publication, "Physical Environment Atlas of Coastal Alabama." This atlas should aid local, state, and federal agencies, private industries and various organizations to deal effectively with water quality, fisheries management, and use of coastal resources.

What A Waste!

Without wasting energy and money, what is the best way to treat waste water from seafood processing plants? According to investigators in one project, the answer may be electrolysis. The objective was to develop an economically operating system. Work done in previous years showed electrolysis of sewage to be successful but uneconomical. However, current studies show electrolysis to be highly effective and less expensive for treating concentrated shrimp processing wastes than previously demonstrated.

Experiments with electrode material and a number of small flow-through systems revealed that using aluminum electrodes and either alternating or direct current produced significant BOD (Biochemical Oxygen Demand) reductions. Also, an increase in quantity of waste water treated did not require a linear increase in electrical energy to accomplish the same BOD reduction.

Because it was so difficult to acquire and retain volumes of waste water large enough to be treated in the laboratory, a field apparatus was constructed that could operate at seafood processing plants. This unit had refrigerated storage tanks for collecting and preserving the waste material prior to its treatment. It was also designed so that the electrode configurations could be changed. Not only were AC and DC variable voltage supplies included, but the unit also contained three electrolysis chambers that could be connected in either a series or parallel arrangement. Following the installation of larger pumps, the unit's treatment capacity was almost 10 gallons per minute.

The unit was tested during the shrimp season to verify the operation of the pilot plant and to gain experience needed to mate the apparatus to a number of different seafood processing

plants in Biloxi. Although mainly qualitative, the results indicated that electrolysis is feasible. Hopefully, further testing will prove that a full-scale electrolysis system for treating waste water may be employed in seafood processing plants in the near future.

Chitin. That's what shells are made of, right? Well, chitin does form part of the hard outer shell of some sea creatures; but it also forms outer shells of insects, not to mention eye lenses, tendons, and intestinal and respiratory linings of insects and shellfish.

Chitin wastes and chitin derivatives produced into marketable products was a major concern of another Sea Grant project. Since chitin is a natural polymer, investigators were interested in this seafood waste material as an essential component of plastic molding compounds and additives for paints and coatings.

Crude chitin used in the experiments was obtained from food processing plants in the form of dry unprocessed ground crab, shrimp, and lobster carcasses. This material underwent various treatments to determine its capabilities as a reinforcing agent in polymer products.

As a result of various tests and research,

A strange contraption, this field unit was constructed to investigate electrolysis as a method of economically treating seafood processing waste water.

several conclusions were reached. Chitin may be used as a structural reinforcing agent in engineering plastics. Chemical treatment of chitin to remove tightly bound protein improves its capacity to reinforce nylon polymers. Chitin also reinforces polymers with high hydrogen bonding capabilities to a greater extent than it does those with poor hydrogen bonding capabilities. In addition, chitin may be employed with emulsions, organic solutions, and polymer melts to form reinforced products.

As a result of this project, many industrial firms have established research and development programs using chitin as a raw material. These studies should continue to demonstrate viable ways of making profitable consumer goods. Likewise, chitin-containing seafood wastes may be supplemented for other raw materials in the polymer industry.

While the subject is focused on seafood wastes and chitinous material, it may be interesting to note another Sea Grant project. This particular project was concerned with collecting seafood processing wastes and separating them into marketable components. The project originated in a search to alleviate the financial burden on seafood processors regarding the disposal of solid wastes generated during the shrimp processing operation. The major outcome was the possibility of still another use of chitinous waste.

In the early stages of the project, plans

Who would think that shrimp hulls could be transformed i made from chitin-reinforced acrylic resin. The pen holder

nto useful items? Instructor Gail Davis examines a coaster is made of chitin-reinforced polyester.

were made to sell and transport chitinous wastes from Gulf Coast processors to a firm in southern Texas. However, before economical treatment of the waste and a means to transport it were determined, that firm had gone out of business. This presented a problem.

Why was it a problem? Imagine a sanitary landfill into which 3,000 tons of shrimp processing waste is dumped each year. Not only are the odors from the decomposing wastes offensive, but consider this as well: Of the fifteen shrimp processing plants on the Mississippi coast, thirteen of them are located in Biloxi. Each firm is charged $300 to $400 per month for the waste pickup service. If this cost was to be lessened, an alternate use of the chitinous waste would have to be found — especially since the firm in Texas had been the only facility engaged in the production of chitin and chitosan.

After considering the facts, investigators arrived at another practical use of the waste: It could be employed as a soil amendment for greenhouses. Investigations of this use are in progress, and thus far the results are encouraging.

The provision of a chitosan-producing plant for solving the waste problem in Alabama and Mississippi still lies in the future. In the meantime, chitin's agrobiological possibilities as soil conditioners, fertilizers, and disease control agents should help increase the productivity of the land.

sea grant advisory service

This beam trawl developed by Captain Joe Ross of Biloxi shows promise as an energy saving design for commercial fishermen in Mississippi and Alabama.

Coastal Information Channel

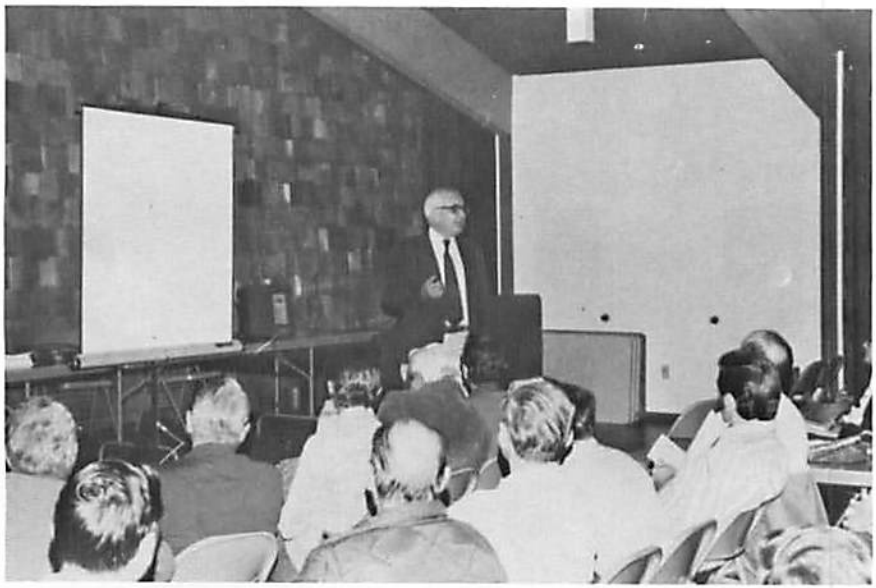
In a statement, the mission of a Sea Grant Advisory Service is to provide a mechanism to transfer useful information to and from those interested in marine affairs. The Sea Grant Advisory Service provides a two-way communications channel between the various marine audiences and investigators who seek to solve marine problems. Useful information from the researchers is directed to those in the coastal area who need it, and identified problems are referred to the researchers for investigation.

Just how does an Advisory Service accomplish this mission? As a start, Mississippi and Alabama qualified their audiences into four target groups: public education, primary and secondary education, the tourism and recreation industry, and the seafood industry.

In Mississippi, the Sea Grant Advisory Service staff made 30 publications available to the general public. In addition, "Sea Grant Newsletter" and "Gulf Coast Fishermen" were published. A quarter million copies of these publications were distributed. More than 30 radio and television programs were broadcast to discuss topics of local interest. Numerous presentations and discussions were held in public schools. With the help of 4-H agents, work continued on an educational television series concerning weather.

The Sea Grant Advisory Program sponsored several meetings for sport fishermen and commercial fishermen to get together to iron out their differences. Similar meetings were held for live bait dealers to discuss opinion differences with the Mississippi Marine Conservation Commission. With the aid of the Charter Boat Captains Association, the Advisory Service participated in the second annual "Travel Mississippi '76" exhibit, which was visited by more than 40,000 people.

The greatest degree of work done by the Advisory Service staff was in the area of fisheries. One of the products of its efforts was a publication by the Internal Revenue Service of a booklet on taxes for the commercial fisherman.



Fishermen hear promising evidence on the merits of the beam trawl.

Sanitation workshops were held for personnel from local seafood processing plants, and lively discussions and feedback indicated positive results. Two of the processing firms requested management audits. These were performed by Advisory Service personnel and staff members from Cooperative Extensionn Service, and the two firms are now following the team's recommendations. Examination by an outside interest would have cost each firm many thousands of dollars.

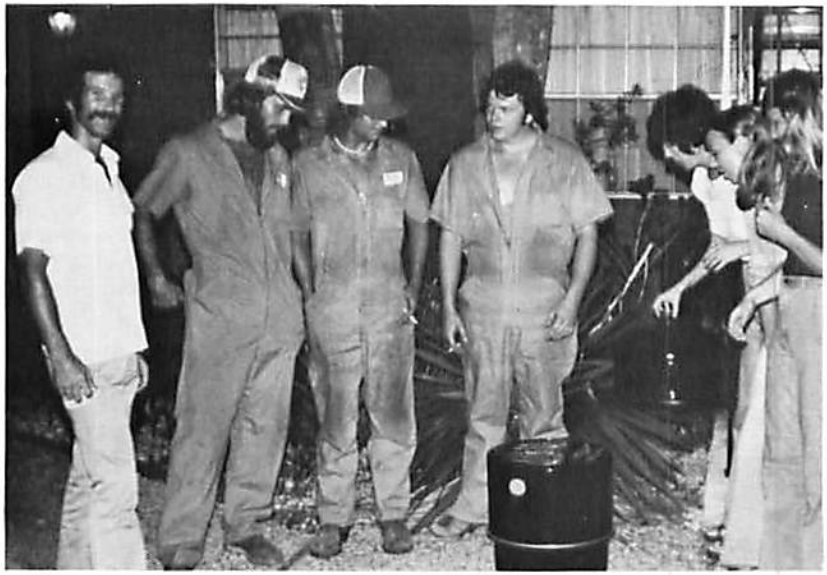
Market development, product promotion, and new product development were strong areas of concentration regarding the seafood industry. The Advisory Service discovered potential markets in America and various parts of the world for many kinds of Mississippi seafood products. The promotion of smoked mullet has been successful. Many Gulf Coast restaurants that have added it as an entree to their menus profess its rising popularity.

The Mississippi and Alabama Sea Grant Advisory Service prompted legal research to define oyster shuckers and crab pickers as self-employed to save shop owners much time, paper work, money, and frustration. These studies will hopefully promote legislation for such a definition.

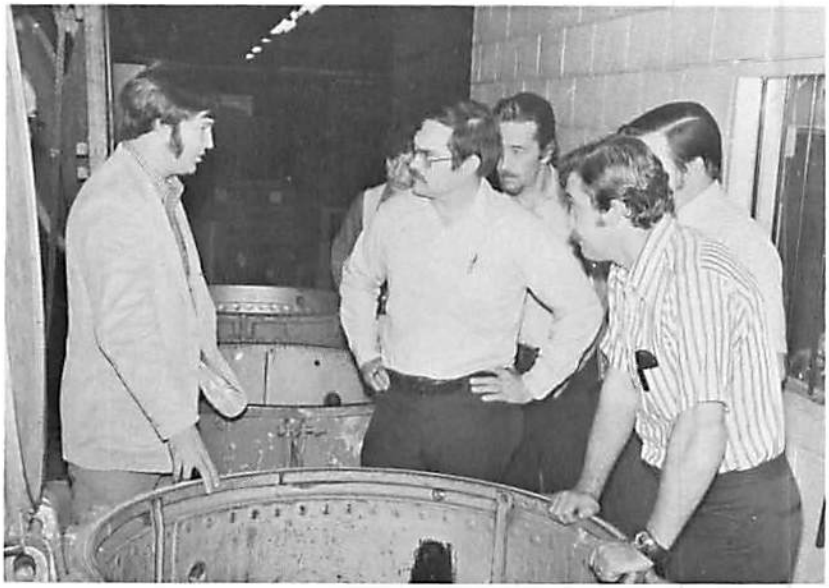
As an outgrowth of the effort on the employment status question, processors realized a need for a Gulfwide shellfish association to help provide and accomplish orderly change and development in the seafood industry. Mississippi and Alabama are working together to organize this group. In addition, the Advisory Services from both states are helping to finalize management plans for the menhaden and shrimp fisheries within their states.

The Mississippi and Alabama Sea Grant Advisory Services conducted two beam trawl seminars for fishermen. One seminar was held in each state. This beam trawl shows promise as an energy saving design. During one overnight tow, this 16-foot beam trawl caught more than 60 percent as many shrimp as a 50-foot otter trawl. In addition, the beam

A quarter million copies of various publications were distributed by the Sea Grant Advisory Service.



Ever smoked a mullet? Zach Lea, Marine Economics Specialist, demonstrates the process to local citizens.



Seafood processors learned more effective methods of sanitation from David Veal, Mississippi Sea Grant Advisory Leader. The Advisory Service conducted several workshops to promote improved sanitation techniques.

trawl caught only one-fifth as many baskets of fish and trash as the other trawl.

One of the most pressing needs of Alabama's seafood industry is a new public processing facility, as the former one was built in 1937 and will soon be closed. Studies are being conducted on the possibility of a new plant and an industrial fishing port in Mobile.

In the interest of tourism and recreation, the Gulf Shores area in Alabama wished to stabilize an existing channel between Little Lagoon and the Gulf. Such action would reduce pollution problems in the Lagoon, allow creation of public facilities adjacent to the channel, and improve access to the Gulf and shelter to small boats. The Alabama Advisory Service is helping Gulf Shores to conduct a feasibility study so that the stabilization may be accomplished at minimal costs with maximum results.

The public was made aware of tourist and recreational facilities through television broadcasts. There were also educational presentations. In addition, circulars on policy alternatives for land use planning were delivered to various coastal committees and leaders.

The Specialists Support portion of the Mississippi Advisory Services Program offered a great deal of help. This program made meeting arrangements with federal, multi-state, and state personnel concerning a project to control the flow of fresh water into the Gulf to enhance seafood productivity. The program also organized detailed studies to examine the charter boat industry, train crab pickers, and estimate the actual costs for two months of oyster relaying.

The Sea Grant Advisory Services have been well accepted in Alabama and Mississippi. Staff members will continue to distribute useful information to individuals, communities, and statewide factions concerning all marine interests.

Mac Rawson (left), Alabama Marine Resource Specialist, discusses concerns of Gulf States Shellfish Association with an Alabama seafood processor.

budget summary

	NOAA Grant Funds	Matching Funds
MARINE RESOURCES DEVELOPMENT		
Living Resources Other than Aquaculture	$105,952	$109,080
SOCIO-ECONOMIC & LEGAL STUDIES		
Ocean Law	27,500	24,145
MARINE TECHNOLOGY RESEARCH & DEVELOPMENT		
Resources Recovery & Utilization	24,000	24,885
MARINE ENVIRONMENTAL RESEARCH		
Research and Studies in Direct Support of Coastal Management Decisions	42,177	48,292
Pollution Studies	48,970	26,744
Applied Oceanography	30,000	20,101
ADVISORY SERVICES		
Extension Programs	100,949	73,868
Other Advisory Services	15,130	7,758
PROGRAM MANAGEMENT & DEVELOPMENT	73,396	14,090
TOTAL	**$468,074**	**$348,963**

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.

1976 publications

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Your Rights Under the Mississippi Loan Law. Pamphlet. MASGP-76-016.

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Gulf Coast Fisherman. September 20, 1976. MASGP-76-025-1.

Gulf Coast Fisherman. December 8, 1976. MASGP-76-033.

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McIlwain, J. B. ed. 1976. Mississippi Public Meeting Series on Geographic Areas of Particular Concern and Priority of Uses, *Proceedings.* August 1976. Mississippi-Alabama Sea Grant Consortium MASGP-76-029.

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Seward, Joe E., Jr. ed. 1976. *Sea Grant Publications, 1971 through 1976* Mississippi-Alabama Sea Grant Consortium. MASGP-77-005.

1976 program summary

N = New
C = Continuing
F = Final

PROGRAM MANAGEMENT AND DEVELOPMENT

C Program Management and Development
James I. Jones, Mississippi-Alabama Sea Grant Consortium

RESEARCH

MARINE RESOURCES DEVELOPMENT

C-F Development of Gulf Coast Artificial Reefs
George F. Crozier, University of Alabama in Birmingham
Lewis R. Brown, Mississippi State University
Donnie L. Daniel, University of Southern Mississippi
David M. Dean, University of South Alabama
Norman J. Doorenbos, University of Mississippi
Thomas D. McIlwain, Gulf Coast Research Laboratory
Robert L. Shipp, University of South Alabama

C Parasites of Marine Animals in the Northern Gulf of Mexico
Robin M. Overstreet, Gulf Coast Research Laboratory

C Ciguatera Fish Poison
Norman J. Doorenbos, University of Mississippi

SOCIO-ECONOMIC AND LEGAL STUDIES

C Legal Problems of the Coastal Zone
James W. Zirkle, University of Mississippi
Dixie A. Criddle, University of Mississippi

MARINE TECHNOLOGY RESEARCH AND DEVELOPMENT

C-F Applications of Isoelectric Focusing
Paul M. Toom, University of Southern Mississippi
Gary J. Blomquist, University of Southern Mississippi

N-C Enterovirus Detection in Raw Oysters
Rudolph D. Ellender, University of Southern Mississippi
B. L. Middlebrooks, University of Southern Mississippi

ENVIRONMENTAL RESEARCH

C-F Assessment of Alabama Coastal Marshes for Coastal Zone Management
Judy P. Stout, University of South Alabama

C-F Mississippi Coastal Zone Capability Analysis
Velon H. Minshew, University of Mississippi
Thomas H. Waller, University of Mississippi

C Treatment of Shrimp Processing Waste Water by Electrolysis
Richard D. Benton, Mississippi State University
Glenn D. Bryant, Mississippi State University

C-F Utilizing Seafood Wastes to Form Marketable Commodities
Gary C. Wildman, University of Southern Mississippi
Billy George Bufkin, University of Southern Mississippi

N-F Collection of Seafood Processing Wastes and Separation into Marketable Components
Lewis R. Brown, Mississippi State University

C Descriptive Characterization of the Physical Environment of Mobile Bay and East Mississippi Sound
William W. Schroeder, University of Alabama

SEA GRANT ADVISORY SERVICES

C Mississippi Sea Grant Advisory Services
C. David Veal, Mississippi Cooperative Extension Service

C Alabama Advisory Services Program
A. Ray Cavender, Alabama Cooperative Extension Service
R. Warren McCord, Alabama Cooperative Extension Service

C Mississippi Advisory Services Program: Specialist Support, University of Southern Mississippi
David J. Etzold, University of Southern Mississippi
D. C. Williams, University of Southern Mississippi
Nell Murray, University of Southern Mississippi