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**GULF STATES MARINE
FISHERIES COMMISSION**

**FIFTEENTH ANNUAL REPORT
1963-1964**

To The

CONGRESS OF THE UNITED STATES

And To The

GOVERNORS AND LEGISLATORS

of

**ALABAMA
FLORIDA
LOUISIANA
MISSISSIPPI
TEXAS**

ACKNOWLEDGEMENT

In submitting this fifteenth annual report the Commissioners wish to express their most sincere gratitude for the splendid cooperation of the members of the Congress and the Governors and Legislators of the compacted States. The Commission fully appreciates that such measure of success as has been attained in the past fifteen years could not have been possible without such valued assistance. This acknowledgement is also extended to the directorates and staffs of federal, state and interstate agencies and to representatives of all organizations and individuals who have contributed toward the realization of the objectives of the Gulf States Marine Fisheries Commission.

Respectfully submitted,

Ted Millette, Chairman

Walter O. Sheppard, Vice-Chairman

W. Dudley Gunn, Director

FIFTEENTH ANNUAL REPORT (1963-1964)
OF THE
GULF STATES MARINE FISHERIES COMMISSION

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CONGRESS OF THE UNITED STATES

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Of

ALABAMA
FLORIDA
LOUISIANA
MISSISSIPPI
TEXAS

Presented in compliance with the terms of the Compact and the state enabling acts creating such commission and Public Law 66-81st Congress assenting thereto.

GULF STATES MARINE FISHERIES COMMISSION
312 Audubon Building
New Orleans, Louisiana 70112

IN MEMORIAM
JAMES N. McCONNELL
CONTINUING CONFERENCE COMMITTEE CHAIRMAN
1946 - 1949

GULF STATES MARINE FISHERIES COMMISSION

ROSTER — OCTOBER 1964

Ted Millette
Chairman

Walter O. Sheppard
Vice-Chairman

W. Dudley Gunn, Director
Ellen S. Hoover, Office Secretary

* COMMISSIONERS

Alabama

Claude D. Kelley, Director
Alabama Department of Conservation
Montgomery, Alabama

L. W. Brannan, Jr., Senator
State of Alabama
Foley, Alabama

Will G. Caffey, Jr.
Mobile, Alabama

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W. Randolph Hodges, Director
Florida State Board of Conservation
Tallahassee, Florida

Bruce J. Scott, Representative
State of Florida
North Fort Myers, Florida

Walter O. Sheppard
Fort Myers, Florida

Louisiana

Joe D. Hair, Jr., Director
Louisiana Wild Life and Fisheries Commission
New Orleans, Louisiana

Spencer G. Todd, Representative
State of Louisiana
Franklin, Louisiana

James H. Summersgill
Golden Meadow, Louisiana

Mississippi

Charles Weems, Chairman
Mississippi Marine Conservation Commission
Biloxi, Mississippi

Ted Millette, Representative
State of Mississippi
Pascagoula, Mississippi

Joseph V. Colson
Waveland, Mississippi

Texas

J. Weldon Watson, Executive Director
Texas Parks & Wildlife Department
Austin, Texas

Richard H. Cory, Representative
State of Texas
Victoria, Texas

Virgil Versaggi
Brownsville, Texas

* Order of listing - Administrator - Legislator - Governor's Appointee

SUCCESSIONS ON THE COMMISSION DURING THE YEAR

Joe D. Hair, Jr.	vice	L. D. Young, Jr.
Spencer G. Todd	vice	Alvin Dyson
James H. Summersgill	vice	Feltus Daigle
Charles Weems	vice	George A. Brumfield
Ted Millette	vice	Stanford E. Morse, Jr.
Joseph V. Colson	vice	Hermes Gautier

**COMMISSION OFFICERS ELECTED OCTOBER 16, 1964
FOR YEAR 1964-65**

Chairman: Ted Millette, succeeding Richard H. Cory
Vice-Chairman: Walter O. Sheppard, succeeding
Ted Millette

STANDING COMMITTEES

ROSTER — OCTOBER 1964

Committee to Correlate Fishery Laws	(Committee 1)
Committee To Correlate Research And Exploratory Data	(Committee 2)
Shellfish Committee	(Committee 3)
Estuarine Technical Coordinating Committee	(Committee 4)
Committee Membership	
George W. Allen Alabama Department of Conservation Dauphin Island, Alabama	(3-4)
William J. Demoran Mississippi Marine Conservation Commission Biloxi, Mississippi	(2)
Charles R. Chapman Bureau of Commercial Fisheries Galveston, Texas	(4)
Theodore B. Ford Louisiana Wild Life and Fisheries Commission New Orleans, Louisiana	(4)
Gordon Gunter Gulf Coast Research Laboratory Ocean Springs, Mississippi	(3-4)
Walter A. Gresh Bureau of Sport Fisheries and Wildlife Atlanta, Georgia	(4)
Robert M. Ingle Florida State Board of Conservation Tallahassee, Florida	(2-3-4)
Joseph C. Jacobs Assistant Attorney General Tallahassee, Florida	(1)
Terrance R. Leary Texas Parks and Wildlife Department Austin, Texas	(2-3-4)

- Jack C. Mallory (2-4)
Alabama Department of Conservation
Dauphin Island, Alabama
- Cleburne A. Schultz (4)
Mississippi Game and Fish Commission
Jackson, Mississippi
- Lyle S. St. Amant (2-3-4)
Louisiana Wild Life and Fisheries Commission
New Orleans, Louisiana
- Paul E. Thompson (4)
Bureau of Sport Fisheries and Wildlife
Washington, D. C.
- James E. Sykes (4)
Bureau of Commercial Fisheries
St. Petersburg Beach, Florida
- H. Eugene Wallace (4)
Florida Game and Fresh Water Fish Commission
Tallahassee, Florida

COMMISSION ACTIVITIES

OCTOBER 1963 - OCTOBER 1964

The Gulf States Marine Fisheries Commission met twice in regular session during the past year. The spring meeting was scheduled for April 9-10, 1964 at New Orleans, Louisiana, while the annual session was held at Brownsville, Texas, October 15-16.

One day prior to the April meeting representatives of the legal departments of the cooperating state fishery agencies met to study a Commission-assembled consolidation of laws, licenses and taxes affecting the commercial fisheries of the Gulf area. The meeting resulted in the Commission adopting a resolution which recommends that each member state enter into reciprocal agreements with each other with reference to commercial fishing license requirements and with a view toward the elimination of distinction between resident and non-resident license requirements.

The shrimp biological research committee, composed of state and federal marine fisheries scientists, met in July at New Orleans and again at Brownsville in October. The purpose of these sessions was to study the present extent of knowledge of the three leading commercial species of Gulf shrimp, the brown (*Penaeus aztecus*), the pink (*Penaeus duorarum*) and the white (*Penaeus setiferus*), with the objective of possibly up-dating the Commission's Informational Series. The committee recommended that a third bulletin in the Series be prepared and published. The Commission acted favorably upon the recommendation and it is expected that the publication will be available in the spring of 1965. Whereas, Informational Series Numbers 1 and 2 contain information only on the brown and white shrimps, the new bulletin will include also the pink of the species.

At the April 1964 meeting the Commission adopted a resolution, which was sponsored by the National Fisheries Institute, requesting the U. S. Coast Guard not to take action with respect to any changes in the specifications and requirements for lights and fog signals on offshore platforms until an advisory panel having fishing interests represented could be appointed and have had an opportunity to study any suggested changes. In August, such a group met informally at Eighth Coast Guard District Headquarters, New Orleans. The Coast Guard an-

nounced that any decision on proposed changes would be delayed until May 1965, and suggested that a permanent panel be formed which would be representative of the various segments of the fishing industry and which would meet from time to time with the Commander of the Eighth Coast Guard District to consider problems of common concern. Such an advisory panel was formed and held an organizational session during the Commission's October meeting at Brownsville. Another session held during the Brownsville October meeting was one in which a Bureau of Commercial Fisheries representative discussed with state fisheries directors the regulations pertaining to Public Law 88-309, The Commercial Fisheries Research and Development Act of 1964.

The Commission has been very much interested in the pesticides problem for several years and has encouraged both state and federal research to determine the effects of such materials on fish and shellfish. In this connection, the Commission will sponsor a symposium of technical people a day prior (March 17) to its spring meeting in Mobile.

Subjects of a wide variety relative to the fisheries of the Gulf of Mexico are heard and discussed at each of the Commission meetings. Presented for consideration at the past two regular sessions were such diverse subjects as; Progress reports on studies of: The Estuarine Environment, Pesticides, Menhaden, Shrimp, Blue Crab, Shellfish Sanitation, Shellfish Purification and Bottom Industrial Fishes. Also reported upon were; Salt Water Sports Fishing Survey-Texas, Conference of Interstate Agencies Activities, Commercial Fishery Association Activities, Shrimp Explorations in the Southwestern Caribbean, The 1963-64 Composite Resume of State and Federal Fishery Activities, Projected Oceanographic Studies of the Gulf of Mexico, and others.

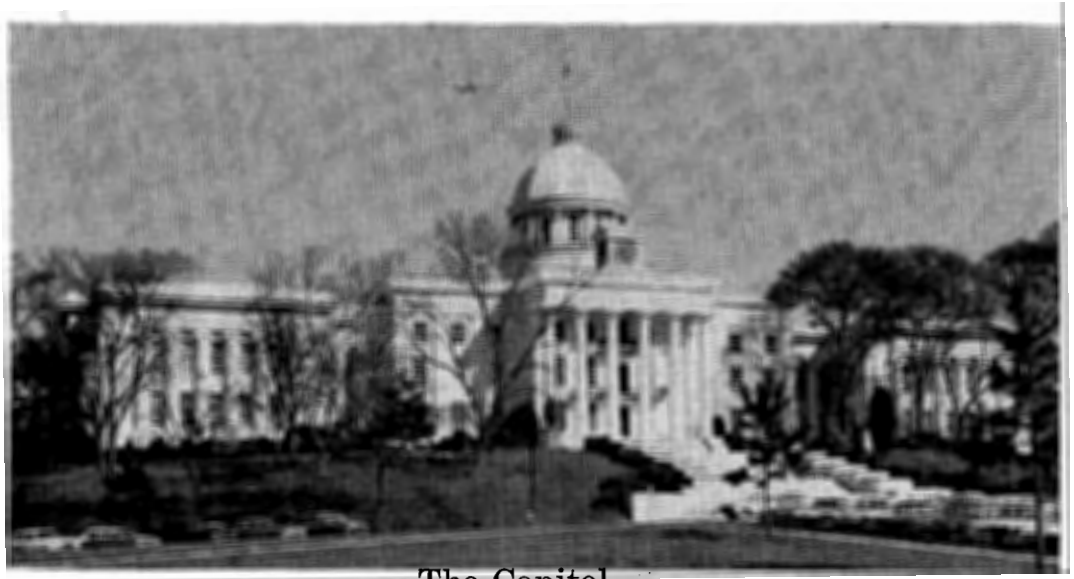
An ever increasing amount of research suggested by the Commission during its fifteen years of operation has been undertaken by the cooperating agencies. The pages which follow present in summary certain 1963-64 activities of the cooperators; including, The Alabama Department of Conservation, The Florida State Board of Conservation, the Louisiana Wild Life and Fisheries Commission, the Mississippi Marine Conservation Commission, the Texas Parks and Wildlife Department, the U. S.

Bureau of Commercial Fisheries and the U.S. Bureau of Sport Fisheries and Wildlife.

Continuing the rotation of meetings among the member states, Mobile, Alabama has been selected as the site for the spring 1965 session while the annual meeting is to be held at Miami, Florida. The latter meeting is expected to be held jointly with the Atlantic States Marine Fisheries Commission and the Pacific Marine Fisheries Commission.

STATE ACTIVITIES
OCTOBER 1963 - OCTOBER 1964

ALABAMA



The Capitol
at
Montgomery

The seafood program of the Alabama Department of Conservation during the past year has been an expansion of the programs already in progress together with extension into new fields of research. With the completion of the new Marine Resources Laboratory on Dauphin Island research into the mass populations of marine life in Mobile Bay and Mississippi Sound was undertaken.

As a result of this effort there has been completed four major projects on the basic marine biota of our coastal waters. In addition to these reports there was also completed a preliminary survey of pesticidal pollution in the marine environment which brought forward some interesting data. The work on the artificial fish havens has continued and a cooperative program with the Bureau of Commercial Fisheries on the effect of "polystream" on the control of the oyster drill was undertaken. Final observations were made on September 18, 1964. The report on this project should be forthcoming from the Bureau of Commercial Fisheries during the near future.

SHRIMP

This year has seen a duplication of the high catch of shrimp in Alabama. While the total catch was not an accumulation of sporadic high yield periods, the harvest has remained steady and the price has remained fairly high. Tax returns from the industry together with dockside statistics reveal a very small reduction in total catch. At the present time it is predicted that Alabama will have a strong harvest of white shrimp from this period through the late fall.

OYSTERS

History repeated itself again this year in a prolonged siege of fresh water over areas of maximum production. Total mortality was not as high as in 1961 and there should be enough oysters of good commercial quality to carry the industry to a limited degree through the Christmas-New Year high market demand period. In addition to this, plantings made by the State during the past year in areas with no fresh water die-off history have increased the total area of commercial oystering to the extent that such areas should be supplying considerable oysters later in the season.

A cooperative agreement with the State of Mississippi enabled the State of Alabama to transport seed oysters from one of the Mississippi seed oyster areas into planting areas in Alabama. These areas were adjacent to the Mississippi-Alabama state line and both states should benefit from this cooperative effort.

FLORIDA



The Capitol
at
Tallahassee

STATE BOARD OF CONSERVATION—MARINE LABORATORY
ST. PETERSBURG, FLORIDA

RED TIDE STUDIES

Chemistry: Vitamin B-12 measurements indicated that a sufficient amount is normally present to support large concentrations of dinoflagellates. This conclusion is supported by pertinent literature.

Attempts are being made to find a microorganism suitable for available iron bioassay.

Routine samples are being analyzed for sulphides, total iron, carbohydrates and amino acids. Salinities are titrated.

Phytoplankton: Diatoms and dinoflagellates are identified

and density estimated on routine samples over a 400 mile range of the west coast.

Artificial cultivation of prominent phytoplankton organisms consists of isolation, preparation of bacteria-free cultures, mass cultures and development of defined media for each species.

Bacteriology: Routine samples of mud and water are checked weekly throughout the Red Tide range for seasonal and ecological fluctuations in abundance of the various species encountered.

FISHERIES

Oysters: (Laboratory) Preliminary findings that glucose prolongs life has stimulated renewed efforts to completely remove the possibility that bacterial growth, induced by the added nutrient, was not a source of error. Experiments under way presently should establish definitely if oysters can absorb dissolved glucose in sufficient amounts to affect quality.

(Rehabilitation) At the end of the fiscal year there were 246 oyster leases containing a total of 7,861 acres.

Approximately 25,000 bushels of oyster shells were planted in North Bay near Panama City. Nearly 65,000 bushels were planted in Apalachicola Bay.

(Depuration) Studies were inaugurated during the year on the commercial purification of shellfish from waters sullied by sewage pollution. Results were encouraging and the research continues.

Fishes: Tagging and recovery studies state-wide were continued with a heavy emphasis on offshore species. Life history studies were made on the red grouper with particular attention being paid to spawning.

A paper was prepared covering the potential dangers of accidental introduction into Florida of the South American piranha and an annotated check list was prepared covering all fishes in the ichthyological collection.

Exploratory Fishing: Algae. With some private support a survey was launched into the species and abundance of algae in the waters of the west coast.

Several cruises inaugurated what is planned to be a long term project to better identify, by species and quantity, the unrecog-

nized resources of Florida's offshore waters. Emphasis will be on various species of spiny lobsters and fishes. On May 2, 1964, a new 72 ft. shrimp boat, the M/V Hernan Cortez, was given to the Board of Conservation for offshore research.

Spiny Lobsters: Work continues on the possible Caribbean origin of Florida's spiny lobster species. Efforts have been reactivated to attempt the rearing of lobster larvae from known parentage. Success will greatly advance our ability to identify larvae captured offshore that presently cannot be named.

Studies on post larval ecology have been pursued at the Stuart Field Station.

Plankton: A sorting section continues to select crab larvae, spiny lobster larvae, fish larvae and immature shrimp from all plankton samples obtained in offshore and inshore net sampling. Analysis has begun of all species encountered except crab larvae. The latter will begin to receive attention during the next fiscal year.

Library: Through exchange arrangements world-wide reprints and other publications continue to be received and accessioned. Books and periodicals add to a growing supply of reference material.

Shrimp: Two manuscripts were in preparation during the fiscal year. One, to be published in October 1964, deals with extensive studies carried out for two years in northeastern Florida, including the St. Johns River. The other is concerned with spawning and early life history of the pink shrimp in the Tampa Bay area and offshore as far as 70 miles. The latter probably will be published before the end of 1964.

LOUISIANA



The Capitol
at
Baton Rouge

Marine research activities of the Louisiana Wild Life and Fisheries Commission in 1964 were continued along the same pattern as in 1962 and 1963 with certain intensifications of the shrimp research. The construction program at the laboratory is now complete and suitable housing and dormitories are available for laboratory personnel. At present construction of a jetty leading to the docking facilities is in progress.

SHRIMP STUDIES

1. Shrimp studies in 1964 followed the pattern of previous years and involved rather extensive postlarval studies which started in January and have continued throughout the year.

Results of postlarval studies in 1964 differ somewhat from previous years. Peak postlarval activities occurred in February several weeks in advance of previous findings. Cold water temperatures occurred several weeks later than normal. In this instance large numbers of postlarvae were subjected to relatively low water temperatures for extended periods of time. The density of postlarva in 1964 exceeded that of any previous year and initially seemed indicative of high shrimp production.

2. Studies of subadult brown shrimp in March and April failed to show density similar to the postlarval movements. Indications were that considerable losses of postlarva had occurred between late February and early April. Furthermore, cold water temperatures prevented rapid growth of the subadults so that many of the shrimp were smaller than at the same date on previous years. The net result of these findings indicated that the shrimp season should be opened as late as possible and in all probability would not be as good as in 1963. Production figures available now show that production was off by perhaps 20 to 30 percent.

3. White shrimp postlarval studies throughout the summer followed a pattern similar to those of brown. In 1964 greater densities of white postlarva were evident yet the subadults expected to appear later in July and August did not reach densities corresponding to those of the postlarva.

In final analysis it would appear that shrimp production in Louisiana will be less than in 1963, and there is evidence to indicate that losses occurred between postlarval arrivals and the appearance of subadults and juveniles.

HYDROGRAPHIC STUDIES

The hydrographic studies at Grand Terre laboratory continued in an intensive manner and in some instances have expanded. The types of data collected have been described in detail in the 13th and 14th Annual Reports. A similar tabulation of data is now available for the year 1964 and it is expected that such hydrographic information will be available for the central Louisiana coast on a continuous basis.

The contract study of the Mississippi River-Gulf Outlet Project area is approaching completion and should be completed by November 1964.

OYSTER STUDIES

Work on oysters in Louisiana has been continued in a fixed pattern and degree of activities commensurate with the demands of the industry. Again in 1964 it was not deemed necessary to plant shells as cultch. Sister Lake Oyster Reservation, managed on an alternate year basis, has again been opened in 1964 and some 50,000 barrels of oysters were harvested in the first 20 days. This gives further evidence that alternate years' harvesting is the best approach to a sustained yield on natural reefs. Calcasieu Lake production in 1963-64 was down by 50 percent, or some 60,000 sacks.

A considerable amount of field work has been necessary in 1964 to determine the effects of numerous pipelines being constructed along the Louisiana coast.

MISSISSIPPI



The Capitol
at
Jackson

GULF COAST RESEARCH LABORATORY

The second year of the quantitative study of postlarval and juvenile shrimp was started in November. There was a great influx of small brown shrimp in the early spring and on the basis of postlarval numbers it looked as if it would be a very fine season. However, cool weather and heavy rains which filled the bays with fresh water either killed these small shrimp directly or killed their food, because they did not survive and instead of a fine brown shrimp season in the spring there was a poor one. It is plain that studies of juvenile shrimp will have to be made along with the studies of postlarvae before authoritative predictions can be made.

Work was continued on the trawl sampling of Mississippi Sound and on a collection of abnormal fishes. A bibliography of anomalies of fishes covering possibly 85 per cent of the titles that have been published was printed as Gulf Research Reports

Vol. 1, No. 6. Some additions were made to the list of euryhaline fishes of North America and a note on the predatory habits of a small *Gobiosoma* was published. Other studies concerned dispersal of planktonic diatoms in salt water and the effect of fresh water on the red blood cells of fishes. One paper was published on the relation of small shrimp distributions in the bays to the salinity of the water. The relation of the menhaden fishery to the sports fishery was analyzed in all its aspects. The distribution of waterdogs in the State of Mississippi was described. Sixteen research papers and notes were published by staff members, including Technical Report No. 1 of the Laboratory and Volume I, No. 6 of Gulf Research Reports.

The oceanographic program was considerably enhanced this year when the M/V Gulf Researcher was finally renovated and equipped for offshore work. This occurred in February. The oceanographers published papers on sea level changes along the northern Gulf coast and the surface circulation in the northeastern Gulf was described in Technical Report No. 1. Additionally, the oceanography division enlisted the aid of the Coast Guard and the U. S. Navy in cruising the northern Gulf and taking pictures of the water with infrared cameras which give the surface temperature. Some beautiful isotherm lines were worked out for thousands of square miles. This information is now being distributed to oceanographic agencies all over the world.

During the summer the M/V Hermes made trips almost every day for five days a week carrying students on field trips. Since last September this boat made 33 field trips with approximately 642 college students and teachers from Mississippi and some from adjacent states.

Construction on the new research building got off to a slow start in November and at the present writing it is some three months behind schedule. During the year the National Science Foundation awarded the Laboratory \$86,000 for the technical and scientific equipment of this building.

During the 1964 summer session 14 students took two courses in Marine Geology, 9 students took a course in Marine Botany, and 78 students took five courses in Zoology, including problems courses. There were 107 college enrollees in all, but three dropped, leaving 104. There were also 33 high school students and seven teachers under a NSF program operated by LSU. The

schedule was arranged so that numbers of students were more evenly distributed over the summer session than in the past.

A grant for summer research in the amount of \$11,100 was given to the Laboratory by the National Science Foundation. Stipends were given to twelve people. The room and board for several of the candidates was paid as they first took courses preliminary to selection of grantees.

During the year the Legislature appropriated \$263,000 for a new dormitory and it is hoped that this will be ready by next summer.

MISSISSIPPI MARINE CONSERVATION COMMISSION

During the year the Commission hired one new warden and intensified its patrol activities. An LSM landing barge was purchased and is being converted and decked over for shell planting and seed oyster moving. During the year Mississippi enjoyed another good oyster harvest. During the harvest period not as many barrels of oysters were taken as in 1962-63, the total being about 175,000 barrels. However, the quality of the oysters was so good that they yielded 3 gallons to the barrel and the number of pounds harvested (4,463,000) exceeded that of 1962-63. It was the best year since 1939.

Mississippi retained the same high shellfish sanitation rating as it did the previous year. Mississippi furnished the State of Alabama seed oysters for planting in an area on the Alabama-Mississippi line, after the destructive freshets in Mobile Bay this spring, so that both states could derive benefit from the oysters. The Commission is still engaged in the sale of dead reef shell from submerged deposits in Mississippi Sound. Shell planting and seed oyster moving activity were carried on early in the summer. The numbers of shells and seed oysters planted were small in comparison to previous plantings, but with new and better equipment it is hoped that all previous plantings will be exceeded.

TEXAS



The Capitol
at
Austin

SHRIMP PROJECT

The coastwide study by the Texas Parks and Wildlife Department of commercial shrimps during the estuarine and inshore Gulf phases of their life history is being continued. The project (now in its fifth year) is designed to examine growth, apparent abundance, movements and habitat requirements of shrimp. The findings are used to predict fishing success and determine proper management procedures. Sampling methods used in past years are being employed, however, the frequency of sampling in the spring and the number of tertiary bay stations were increased in all areas. The purpose of intensifying sampling is, mainly, to follow closely, the spring growth and movement of postlarval and juvenile brown shrimp *Penaeus aztecus* in the bay systems.

Evidence of a large wave of 1964 Year-Class brown shrimp was detected in early spring. Further evidence was offered by large samples of postlarvae entering the Aransas Bay area. On this basis an abundant brown shrimp crop was predicted. Ap-

parently the growth of the young brown shrimp was retarded, (probably due to low water temperatures) and a possible egression from the bays at an abnormal late date was suspected. Despite this, growth accelerated as the waters warmed and the juvenile brown shrimp left the bays on schedule. The early slow growth appeared to lead to high mortality in the upper coastal bays, but not on the lower coast where late spring and early summer commercial landings were high.

Postlarval and juvenile white shrimp *P. setiferus* appeared in moderate numbers in early June. At this time little can be said about the success of the 1964 white shrimp season since, unlike brown shrimp, later broods are often larger than the first.

OYSTER PROJECT

The study of oyster populations in several coastal bay areas was continued. Routine sampling of public oyster reefs provided data on spat setting, spat survival, growth rates and mortality in relation to environmental factors. Oyster disease studies conducted under contract with Texas A&M University were continued for a second year. Groups of oysters were held in trays at special platforms in Galveston and Aransas Bays and were sampled at regular intervals to determine disease organisms present and their effect upon the oyster stocks.

In late summer and early fall, 1963, heavy mortalities among seed and market oysters were observed in Aransas Bay, upper San Antonio Bay and Lavaca Bay. Since the incidence of *Dermocystidium marinum* was low during the mortality period, it was not believed to be the primary causative agent. The Texas A&M studies indicated that the mortality in Aransas Bay was due to "Malpeque Bay" disease caused by a slime mold. It is presumed that the mortalities in San Antonio Bay and Lavaca Bay were caused by the same organism.

Heavy mortalities were again observed at the Aransas Bay platforms in April and, by June, all tray oysters had died. Malpeque Bay disease was again indicated. Similar mortalities among seed and market oysters were noted in lower San Antonio Bay in May and June but the causative agent was not determined.

No appreciable oyster mortalities were observed in Matagorda Bay although the incidence of *D. marinum* increased well above epidemic level in some areas during the year. To provide

better utilization of the oyster resources in this bay, the Parks & Wildlife Commission issued proclamations allowing oyster dredging on all natural reefs in the east arm of Matagorda Bay and in Lavaca Bay regardless of water depth. These proclamations become effective on September 1, 1964.

The oyster harvest in Galveston Bay attained a record high during the season. Increased fishing pressure, more available market oysters with the reduced legal size limit of three inches and a continued high demand for oysters were factors responsible for the increased harvest.

Although Galveston Bay market oysters remained abundant throughout the year, serious losses among the seed oysters were noted in late winter and early spring. Survival of the spring spat set appeared to be low in the middle and lower bay areas; setting was very scarce in the upper bay. *D. marinum* infection was well above epidemic level in most areas and further losses, especially among the market oysters, could be expected in late summer and early fall. As a consequence, the outlook for future oyster harvests is not encouraging.

SHELL MANAGEMENT

A controlled shell dredging program was established in Galveston and Trinity Bays. The purpose was to obtain maximum shell production with minimum damage to marine resources, primarily oysters and oyster reefs. To accomplish this supervision, silt check stations were established on reefs in the vicinity of shell dredging operations to determine whether such operations are or will cause serious siltation damage to the live oyster reefs.

During the fiscal year, shell dredging companies in Galveston Bay area were issued 10 special permits which authorized the removal of small towhead reefs. Approximately 12.8 acres of reefs were stripped and dredged. A total of 1,122 barrels of live oysters were transplanted on existing reefs.

CRAB PROJECT

The study of the blue crab populations of the Texas coast has been conducted since September 1961, and the aims of this study are to determine seasonal abundance, movement and migrations, growth rates, and the effects of hydrographic and en-

vironmental conditions. Trends in seasonal abundance, movement, migration, and environmental effects are being studied. The growth rate was determined to be ten to sixteen millimeters per month, with the average being thirteen millimeters per month. Continued study is being conducted to better substantiate present data.

Crab tagging is being conducted in all areas of commercial harvest to increase data on movement and migration. The internal dart tags used on immature crabs has been discontinued due to extensive tagging mortality, and poor tag return results. The method now used is the Peterson disc tags attached to the carapace of adult crabs. The largest percentage of tag returns were from adult crabs 140 to 180 millimeters in carapace width. No tags were returned that had been placed more than 237 days, or had moved more than 15 miles.

Data indicates only one spawn of crabs during 1963, that being in late June or July. In 1962 data indicated three spawns may have occurred.

The drought conditions that existed in 1963 have persisted into 1964, and salinities continue to be high in most areas of the Texas coast.

Commercial production was near three million pounds in 1963. Indications are that production will be slightly higher in 1964 even though unfavorable climatic conditions exist.

FINFISH PROJECT

The year was again marked by strong prolonged southeast winds and below normal rainfall and river flow. Salinities were relatively high with a maximum of 75 ppt. recorded in Baffin Bay; but slight decreases were noted in Aransas Bay, Corpus Christi Bay, and the Lower Laguna Madre. The winter was windy but mild, and no major freezes were recorded.

Redfish of the 4-8 pound class were scarce all along the coast in biological samples, and this scarcity was noted by both sports and commercial fishermen. This decrease in numbers was caused by spawning failure in 1962-63 and had been predicted by coastal biologists. Trout populations appeared to be down in bays along the upper coast and up in bays along the lower coast. Large trout reappeared in the Laguna Madre although not as abundant as

before the major freezes of 1962 and 1963. Black drum was notably scarce in many bays, but sheepshead were abundant.

A preliminary examination of juvenile game fish data indicated very successful spawning and high survival of redfish, drum, flounder, and sheepshead and at least a normal spawn of trout. The heavy redfish spawn should be reflected in increased catches in late 1964 and 1965.

Use of longer nets by biologists in 1964 resulted in more representative samples of trout and drum and possibly less representative catches of redfish.

Analysis of forage fish data gathered in 1962 and 1963 showed no correlation between forage species abundance and predator abundances and this type sampling was terminated. The time thus saved was used to increase the number of juvenile game fish samples.

In accordance with the provisions of the laws of the State of Texas, 22 permits were issued for the taking of black drum from the waters of Cameron and Willacy Counties. The use of contract nets for the taking of black drum under rules and regulations of the Parks and Wildlife Department was allowed from November 1 to March 31 in Cameron County and December 1 to March 31 in Willacy County. Of the 22 permits issued, only 13 were fished. Due to a shortage of drum within the project area and the shortage of enforcement personnel assigned to the project area, the 1963-64 contract drum season in both counties was terminated on March 5, 1964.

In the 125 calendar days during which fishing was allowed, these 13 permit holders removed a total of 315,334 pounds (live weight) of black drum from the two-county area, reflecting a 50 percent drop from the previous season. The catch declined from 638 pounds per contractor per day during the 1962-63 season to 454 pounds per contractor per day during the 1963-64 season.

The drop in total drum landings was due to the comparative scarcity of drum within the permit area, poor netting conditions during part of the season, reduction in length of season and size of the permit area, and a shortage of capable fishermen.

GENERAL

A new laboratory and office building was completed in January, 1964, on Department property at Seabrook. The build-

ing provides office and laboratory space for five marine biologists and one chemist that work the Galveston Bay area plus office space for four wardens, two secretaries and one statistical agent.

The lower floor of this two floor, reinforced concrete structure, provides dry storage for equipment and vehicles plus a workshop for the eight maintenance personnel assigned.

A new section was added to the Gulf fishing reef off Galveston in October, 1963. The new section was constructed of three hundred reinforced concrete pipe (30 inches by 4 feet) strapped together into units of three pipes each.

Additional material was placed on the Port Aransas Artificial Reef in October, 1963. This consisted of two barge loads of mixed concrete and clay pipe weighing approximately 800,000 pounds. This reef has apparently attracted large numbers of sand trout, pompano, spadefish, snapper, mackerel and kingfish and has received very favorable comment from area sportsfishermen.

Maintenance of buoys on offshore reefs continued to pose problems during the year. Buoys have been damaged by persons unknown and have been replaced.

U. S. FISH AND WILDLIFE SERVICE ACTIVITIES

OCTOBER 1963 - OCTOBER 1964



The Capitol
at
Washington, D. C.

Bureau of Commercial Fisheries

Funding of Bureau of Commercial Fisheries activities in the Gulf States was adequate to maintain research programs and in addition included nearly \$1.5 million to replace the M/V Oregon, veteran of over 14 years' exploratory fishing throughout the Gulf, Caribbean, and Atlantic waters off northeastern South America. Also, bids were issued for construction of a new 95-foot oceanographic research vessel for the Galveston laboratory as designed by a New Orleans marine architectural firm. These programs are directed by the Regional Office at St. Petersburg Beach, Florida. This office also coordinates program activities with recommendations from the Gulf States Marine Fisheries Commission to orient the research and services toward timely solution of important problems in the area. A summary of Bureau activities for the year ended September 30, 1964 follows:

EXPLORATORY FISHING AND GEAR RESEARCH BASE PASCAGOULA, MISSISSIPPI

Assessment of Continental Shelf, Slope, and pelagic fisheries resources of the Gulf was continued on four extended cruises of

the exploratory fishing vessel Oregon. Two additional cruises were devoted to the completion of the preliminary survey of the outer Continental Shelf and Slope zones between Cape Hatteras, North Carolina, and Fortaleza, Brazil. This encompasses the general coverage of trawlable areas from 10 to 500 fathoms in depth and a linear distance of approximately 7,200 miles.

Several changes have been made in program assignments: The Silver Bay charter was terminated; the Oregon was temporarily transferred to Brunswick to function in the Caribbean and Tropical Atlantic Program; the Gulf Program staff was reduced to a two-man professional planning and evaluation team; and the Faunal Survey Program has been expanded to include a resource atlas preparation, species distribution, ADP operation, and distributional analyses. The staff was increased to nine members to accelerate results.

Drawings and specifications for the Oregon replacement have been completed and are under review prior to bid invitation. The design calls for a vessel with overall length of 170 feet, draft 14 feet, speed 13.5 to 14 knots, and cruising range approximately 10,000 miles. There will be accommodations for eleven scientists and fourteen crew members. Construction is estimated at 18 months with completion set for the end of 1966.

SHELLFISH

Shellfish explorations were not conducted in the Gulf this year. Commercially significant exploration was made off the Gulf of Paria, north of Venezuela, where catches of scallops resembling the Gulf of Mexico calico scallop were made.

ROYAL RED SHRIMP

Most of four cruises were devoted to ascertaining the seasonal abundance and fluctuations of the royal red shrimp (*Hymenopenaeus robustus*) stocks in the areas of the Tortugas, and the northwest and central Gulf Slope areas. During December, 28 drags in the Tortugas area produced 1,200 pounds as compared with 5,000 pounds caught in 31 drags in the same area during August. February catches off Brownsville produced only 87 pounds in 30 drags. In the north Gulf, south of Louisiana, light catches again were experienced during March, the largest produced 26 pounds in a two-hour drag. The best catches, 340

pounds of heads-on from three, 3-hour drags, were made during April off the Mississippi Delta in 220-230 fathom depths.

WHITE, PINK, AND BROWN SHRIMP

One hundred fifty drags, using standard 40 and 65-foot shrimp trawls, made during the off-season, late fall, winter, and early spring in the western, northwestern, and central Gulf produced light catches of these three species. In February, 30 drags along the Texas coast in 5 to 50 fathom depths yielded 35 pounds of white, 7½ of pink and 86 of brown shrimp. A March cruise along the Louisiana coast produced similar results.

BOTTOMFISH

While none of the cruises were scheduled exclusively for bottomfish explorations, promising finds made in conjunction with shrimp catches were reported to the industry. Favorable signs of snapper and grouper stocks were discovered during a Caribbean exploration off Venezuela. This area, between the Gulf of Venezuela and Golfo de Treste, lies outside the 12-mile territorial limit, and is available to U. S. fishermen.

PELAGIC FISH

An initial trial was made with a 6-inch mesh, 1,500-foot-long by 60-foot-deep monofilament gillnet. No catch resulted, but the ease of retrieving the net with a west coast net hauler shows promising applications. Trolling lines were fished whenever weather conditions allowed. Bridge lookouts were kept throughout daylight hours, and all surface fish observations were recorded for future reference. In cooperation with government agencies and private institutions, 118 plankton tows were made during three of the cruises.

MENHADEN STUDIES

A portion of four cruises, totaling 65 sampling stations, was devoted to verifying the occurrence of menhaden (*Brevoortia patronus*) in the Gulf during the off-season November to April, and comparing fishing capabilities of monofilament and multi-filament netting. Thirty-three sets were at the surface and 32 were bottom sets. The surface catches yielded a greater number of specimens, however, menhaden were caught in eight bottom sets in depths of 6 to 20 fathoms. The monofilament netting

was more efficient in catching fish in clear water, in one instance showing a catch ratio in excess of 8 to 1. Twenty-two gillnet sets made from a power skiff along inshore waters showed the same results as the deeper water tests by the Oregon.

A supplemental project included five aerial scouting missions in search of surface schools and measuring water temperatures with infrared radiation thermometer. The scouting track covered areas from the shoreline outward to the 20 fathom curve and from the Florida Keys to Galveston Bay. Over 90 schools were sighted in western Florida waters during November and December, none elsewhere.

OFFSHORE GEAR RESEARCH

Seven submarine photographic stations were made during three of the cruises. In depths of over 200 fathoms, 1,200 feet of movie and 2,000 still photographs were taken. These have been analyzed for population density patterns, bottom configuration, fish behavior and net escapement studies. A bottom photographic atlas of the Continental Slope will be compiled when more negatives become available.

A new deep-water motion picture camera system, designed to withstand pressures at depths of three miles, is in the construction stage. Field tests are planned for mid 1965.

FAUNAL ASSESSMENT

In November 1963, automatic data processing of summary sheets of station and species data was started. Analyses have been completed for the industry and scientific institutions in evaluation of exploratory shrimp ground coverage, evaluation of species distribution of several important food fishes, listing of red snapper and grouper trawl catches—to name a few. The 14-year backlog of station data from the Oregon and Silver Bay cruises have been entered on ADP system cards.

A total of 88 lots of fishes and invertebrates were shipped to cooperative taxonomists for identification.

GEAR RESEARCH AND DEVELOPMENT STATION PANAMA CITY, FLORIDA

GEAR RESEARCH PROGRAM

Emphasis on the program has been on the field testing of a prototype electrical shrimp trawl and on pink shrimp burrow-

ing and electrical response studies. Work on trawl mechanics instrumentation, initiated last year, has been deferred. Initial field tests with the electrical trawl demonstrated that this gear was capable of taking shrimp unavailable to standard trawls during daylight hours. Testing has been conducted under two general types of conditions: (1) soft mud bottom where shrimp were taken with standard gear in significant quantities during daylight hours and (2) mud-sand bottom where shrimp were not taken in standard gear during daylight. Generally, results on both bottom types were similar in two respects. The electric gear caught significantly more shrimp during daylight hours than the standard trawl, but not all that were available, while the standard gear produced slightly more at night.

Indications are that the electrical stimulation is moving the shrimp out of the bottom but significant numbers are avoiding the trawl. Direct observations indicate that this is the result of the shrimp attaining a position on their sides immediately upon clearing the bottom, and subsequent pulses then move them laterally. This problem is presently under study.

Preliminary electrical response experiments have been completed and a publication is in preparation. Shrimp orientation with respect to the electrodes and pulse width are the two factors which most significantly affect threshold response levels at normal water temperatures. Burrowing behavior work has revealed that this pattern under normal environmental conditions is influenced largely by light level.

BIOLOGICAL LABORATORY, GALVESTON, TEXAS SHRIMP BIOLOGY PROGRAM

A 3-year study defining the spawning seasons and areas of the commercially important white, brown, and pink shrimp in the northwestern Gulf of Mexico neared completion. The final report is being prepared. Similar research under contract with the University of Miami continued in southwest Florida waters.

Two species of shrimp, including the important brown shrimp, were successfully hatched and reared in the laboratory to the juvenile stage, providing valuable descriptive information which is being processed for publication.

Following completion of reports describing the results of preliminary phases, more detailed investigation of the survival

and abundance of larval shrimp in offshore waters of the northern Gulf was undertaken, as were refined studies of bottom circulation and temperature as they characterize the larval shrimp's environment. One of the most useful accomplishments during the period covered by this report was the plotting of monthly oceanographic and meteorological observations, particularly those of bottom temperature.

A study of the ecology of young pink shrimp in Florida Bay was initiated in mid 1963. As an adjunct to this and other research projects underway in the Florida area, a detailed investigation of bottom currents on the Tortugas fishing grounds began in February 1964 in cooperation with the University of Miami.

SHRIMP DYNAMICS PROGRAM

During 1963, mark-recapture experiments were conducted on populations of each of the three commercially important species of shrimp. Resulting estimates of growth and mortality provided necessary information concerning the expected range of these factors.

Catch samplers stationed in Texas, Louisiana, and Florida began comprehensive studies of shrimp fisheries located in each area. Particular attention is being given seasonal and geographic variation in the practice of discarding small shrimp at sea.

Results of the continuing survey of the abundance of post-larval and juvenile shrimp in Galveston Bay pointed toward a somewhat reduced harvest of brown shrimp along the upper Texas coast this year as compared to production in 1963. Similarly, the relative abundance of postlarval white shrimp at Sabine Pass indicated a generally lower harvest for that species than last year in the east Texas-western Louisiana area.

Studies were initiated to determine the selective characteristics of shrimp nets constructed of various materials. Attention is also being directed toward the benefits which may accrue to fishermen through the use of nets with larger webbing than is commonly employed.

EXPERIMENTAL BIOLOGY PROGRAM

This program produced important new information about the effects of controlled environmental conditions on commercial-

ly important shrimps. A month-long growth and survival experiment in which young white shrimp were held at known levels of temperature and salinity yielded the first measurements of this species' response to variations in such environmental factors. When compared with findings from similar experiments with brown shrimp, these results suggest what may be important differences between the ecological requirements of the two species. For example, white shrimp exhibit better survival than do brown shrimp at 90°F. but poorer survival at 52°F. This observation suggests a physiological basis for seasonal dissimilarities in the occurrence and abundance of these species in Gulf estuaries.

A new approach to shrimp ecology involves the study of a parasite life cycle. The discovery of a previously unknown stage in the life history of a shrimp parasite has provided a new lead concerning natural predation on shrimp. A tapeworm commonly infecting brown and white shrimp frequenting Galveston Bay has also been found in the common sting ray of that area. Since the worm reaches adulthood in the ray, this fish is implicated as a natural shrimp predator, for such tapeworm infections can only be acquired through ingestion of infected intermediate hosts. The host of this parasite's first intermediate stage, undoubtedly an important organism in the natural diet of shrimp, awaits detection.

ESTUARINE PROGRAM

From research progress in the Galveston estuary seasonal patterns of distribution as well as the size composition and abundance of many commercially important fish and shellfish species can be predicted with a reasonably high degree of reliability. Accordingly, it is now possible to identify those parts of the estuary which constitute the most important nursery areas, the ultimate objective being to establish a measure of the relative value of each.

Knowledge of the role of stream discharge in relation to the capacity of an estuary to sustain commercial and recreational fishery resources at desirable levels of productivity is becoming increasingly important. It has been estimated, for example, that Texas estuaries will lose, on the average, half of their supply of fresh water by the year 2010. Expectations are that during

subsequent dry years more than 80 percent would be diverted. The Texas Basins Project, a construction undertaking of enormous proportions, would be responsible for about one-third of these losses. In discharging its responsibility to evaluate the probable effects of such large-scale projects to develop upland water resources, the Bureau is directing considerable attention toward that area of research which will provide basic biological and hydrological information.

Initial efforts to establish the role of stream discharge have not progressed far enough to specify with certainty the minimum discharge requirements of each estuary. Representing the first phase of such efforts, preliminary estimates which indicate the relative contribution of fishery resources in each Texas estuary to the State's overall commercial seafood harvest have been developed. It is evident therefrom that estuaries in the eastern part of the State, which receive relatively large amounts of tributary water, contribute much more to the total harvest than do the estuaries and coastal lagoons of the semi-arid southwest. It must be emphasized that considerable study will be required to find answers to the many problems posed by the Texas Basins Project.

INDUSTRIAL BOTTOMFISH FISHERY PROGRAM

Landings of miscellaneous bottomfishes for reduction to meal and animal food decreased slightly during the period covered by this report. Preliminary review of fishery statistics disclosed, however, that the total effort expended by the industrial trawler fleet rose moderately, suggesting that available bottomfish supplies in the north central Gulf were somewhat less than those calculated for a preceding period. The Atlantic croaker remained the dominant species, but the ratio to other species was somewhat smaller. Accompanying the reduced catch of croaker was a corresponding increase in the relative contribution of spot.

The small-scale studies on the biology of unutilized bottomfish resources in the western Gulf were terminated in July as an operational economy. A comprehensive report summarizing the results of this work since its inception in late 1960 is in the initial stages of preparation.

EIOLOGICAL LABORATORY, GULF BREEZE, FLORIDA
PESTICIDES PROGRAM

The laboratory program is stressing projects concerned with the effects of pesticides on commercial fisheries and the estuarine environment. Methods for evaluating toxic effects of pesticides to marine animals under controlled laboratory conditions have been standardized and recommendations made to the chemical manufacturers so that they or private laboratories can test their products in a uniform manner. Sufficient data have been collected on the toxic effects of endrin and related compounds so that the Bureau could recommend strict limitations on the use of these chemicals.

Progress continues in the project to develop an estuarine monitoring system. Oysters and mussels have the ability to accumulate pesticides present in only trace amounts in the water, and then to excrete them when the pollution stops. For this reason, periodically-replaced trays of oysters appear to be ideal for gauging small amounts of pesticide pollution in bays and estuaries. Other methods for monitoring pesticide pollution in estuaries being tested include detailed studies on population fluctuations in two common fish species, chemical analysis of fish brains to determine fluctuations in enzyme levels, and periodic residue studies of migrant fish and plankton populations.

There is the probability that pesticides are influencing the direction or at least the speed of evolutionary changes in fish and amphibia. Limited field experiments are underway to determine if pesticide-resistant fish can transmit this trait to their offspring.

Studies on the storage of DDT in oysters demonstrate that significant amounts of DDT are stored directly in the eggs and sperm and consequently would be passed on to the developing oyster larvae. This has been shown to cause mortalities in birds but its effect on oysters is still unknown.

Studies on the beneficial uses of a pesticide are now underway in conjunction with the University of Alabama and the Alabama Department of Conservation. A chemical, polystream, related to moth flakes has been found toxic to the oyster drill. Bare cultch and reef oysters were planted on barren bottoms in Mobile Bay and Pensacola Bay where drills were prevalent. These were treated with Polystream in July and observations

should be complete this fall to show whether this method can be effective in protecting Gulf oyster populations.

The modernized chemistry laboratory in addition to its regular program has been able to provide pesticide residue analyses for commercial fisheries cooperative associations, and for state conservation agencies who have been investigating unexplained fish and crab mortalities.

BIOLOGICAL STATION, ST. PETERSBURG BEACH, FLORIDA ESTUARINE PROGRAM

Analysis of sediments was completed for Tampa Bay and biota partially sorted for use in relating species diversity and quantity to habitat. The purpose is to detect the degree of engineering impact upon the productivity of estuaries. A special biological study was conducted in a large area proposed for dredge-fill and real estate development. One of the chief functions of the program is to supply scientific evidence to forecast the degree of biological loss by industrial activity. Other large areas in Tampa Bay are slated for modification. The station staff has recorded biological, chemical, sedimentological, and productivity data for use of county, state and federal agencies as needed and has included Charlotte Harbor and Pine Island Sound for comparative purposes. The results of these pre-engineering studies are useful in evaluating harmful engineering plans. They describe biological production prior to engineering for comparison with the results of studies subsequent to alteration.

RED TIDE PROGRAM

An annotated bibliography was completed under contract interpreting red tide research to date. Automatic data processing of plankton and environmental data from a series of years was initiated to determine the degree of dependence of *G. breve* upon recorded oceanic conditions. Nine months of hydro-plankton data were obtained on offshore transects covering 100 miles of the Florida coast to investigate the succession of plankters associated with *G. breve*. This is affording detection of normal and abnormal plankton population change on a long-range basis.

TECHNOLOGICAL LABORATORY, PASCAGOULA, MISSISSIPPI PESTICIDE RESIDUE PROGRAM

A program entitled Pesticide Residues in Fishery Products was initiated in July. A survey is being made of consumer fishery products intended both for human and animal consumption, in order to pinpoint any possible trouble areas involving pesticide residues. An additional ecological survey of the bottom mud, water, and marine animals in an area encompassed by Vermillion Bay on the west to Mobile Bay on the east is underway. The study will reveal the distribution of any residues, increases or decreases in total amount, connection with water runoff and sediment disposition, and something of the manner in which the residues enter the food chain.

CHEMISTRY PROGRAM

The proximate composition of the blue crab (*Callinectes sapidus*) was shown to vary with the reproductive cycle—the highest oil content being during the time of egg formation in November. The total amino acid content of the body meat was found to be at a high in the late summer while that of the claw meat was highest in the winter. A study of the amino acids essential to human nutrition shows that crab meat is equal or superior to other sources of protein (with the exception of egg protein) and that a 100 g portion provides well over the minimum daily requirement. Studies will be continued on brown shrimp, dungeness crab, alewife, and ocean perch during the ensuing year.

Studies are in progress on the chemical changes in brown shrimp during iced storage. A protein fractionation scheme has been worked out for the shrimp so that changes in the structure of these proteins can be studied and correlated with changes in texture.

MICROBIOLOGY PROGRAM

The biochemistry and physiology of *Clostridium botulinum* and the importance of amino acids and vitamins in spore germination, growth and spore formation have been studied. No single acid or vitamin seems to be absolutely necessary. A study of the role of these agents in toxin formation will begin shortly. It is hoped that basic studies of this nature will reveal methods

by which the problems associated with the incidence of *Clostridium botulinum* in fishery products can be lessened.

STANDARDS AND SPECIFICATIONS PROGRAM

An in-plant study was initiated to determine the variables involved in the processing of frozen raw breaded shrimp. These include variations in weight of shrimp material due to different packages, styles of breaded shrimp, breading methods, freezing facilities, fresh versus frozen shrimp, and domestic versus foreign shrimp. The effects of continued storage on these factors were also studied. The experimental work has been completed and a statistical analysis of the results is being made.

A project to study the incidence of *Salmonella* in fish meal was initiated. A constant surveillance of the environment near plants, the water, utensils, and equipment used in the processing operation, and the finished product is being made in an attempt to pinpoint sources of contamination. Serotypes of *Salmonella* were determined in collected samples and an attempt will be made to correlate the serotype with its origin.

INSPECTION PROGRAM

The USDI Inspection and Certification Program furnished continuous inspection on a record amount of seafood products in the Gulf area. A substantial increase in lot inspection activities resulted when (1) the Chicago Mercantile Exchange entered shrimp in the futures trading market and (2) more states required inspection on seafoods purchased under bids for state agencies.

RIVER BASINS STUDIES, ST. PETERSBURG BEACH, FLORIDA

Initiated in 1962, the full-time services of a biologist, working in close cooperation with the Bureau of Sport Fisheries and Wildlife, are devoted to the problems arising from man's alteration of the marine environment.

STATISTICS

A measure of the status and general trends in Gulf fisheries was provided through the collection of fishery statistical data under the direction of the supervisory office in New Orleans. Major emphasis continued with the supplying of detailed statis-

tics on the commercial shrimp fishery for use in the intensive research programs of both the Bureau and state agencies. Realignment of duties permitted closing of the statistical office at Port Sulphur, Louisiana.

Many requests were received for catch statistics in connection with proposed Corps of Engineers projects affecting fisheries production. Data for 1959 and subsequent years have been compiled and deposited at strategic Branch of Statistics offices as an aid in answering inquiries of this nature.

In cooperation with each of the states, publication of monthly landings bulletins continued on a timely basis to supply the need for current fishery statistics. A quarterly breaded shrimp bulletin was developed and is being issued as an aid in evaluating trends in this important and rapidly growing segment of the seafood processing industry which is centered in the Gulf States.

MARKET NEWS

Marketing information vital to the fishing and allied industries continued with the issuance of daily and monthly Fishery Products Reports by the New Orleans Market News Office to over 1,200 subscribers. While the major portion of the report is devoted to supplies, market conditions, and prices at many Gulf ports, conditions and prices for major Gulf species at the large distribution centers also are included. At the request of Gulf producers, arrangements were made to include soft-shell crab wholesale prices at Baltimore, a major distribution center for this commodity.

MARKETING

Marketing efforts involving Gulf-produced fishery products were intensified and included four special promotional programs.

In the fall of 1963, prices for shrimp drastically decreased. A special promotion was immediately begun. This was effective in helping to alleviate the severe marketing problems facing the shrimp industry.

A special promotional program on canned shrimp was undertaken jointly by the Gulf Shrimp Cannery and the Bureau. About 100,000 copies of a Special Fisheries Marketing Bulletin on canned shrimp were distributed by industry and government.

Nationwide coverage on canned shrimp was obtained over radio, on television, and through the newspapers.

At the request of industry, a special promotion was conducted on oysters. Nearly all the major newspapers devoted considerable space to it. Good newspaper coverage also was obtained during the Thanksgiving and Christmas holidays when "Stuffing the Turkey with Oysters" was featured. Considerable publicity was obtained on radio and television where oysters were featured on the outdoor barbecue grill.

At the request of the industry, a special market promotional program on Spanish mackerel was conducted in Georgia and the Carolinas which was most successful in expanding demand for this species produced in the eastern Gulf.

A pilot program was undertaken with the military in the Gulf States. Twenty fish cookery demonstrations at various military bases in Florida, Georgia, Alabama, Mississippi, and Louisiana proved the need for more of this type work.

FINANCIAL ASSISTANCE

The commercial fishing industry has actively participated in the Bureau's financial assistance programs during the past 12 months. This was particularly true in the relatively new mortgage insurance activity which has been instrumental in helping to finance the construction of new fishing vessels.

Twenty-five mortgage insurance applications were received requesting insurance for more than \$1 million. Also, twenty fishery loan applications were received requesting direct loans amounting to over \$420,000.

There is approximately \$6 million remaining in the Fisheries Loan Fund which can be loaned to qualified commercial fishermen.

Bureau of Sport Fisheries and Wildlife

Primary activities of the Bureau of Sport Fisheries and Wildlife as they relate to the Gulf States Marine Fisheries Commission have continued to be work conducted under the authority of the Fish and Wildlife Coordination Act. Investigations under this authority have resulted in appraisal of project-occasioned effects on fisheries in all significant coastal projects. All investigations continue to be conducted cooperatively with the

Bureau of Commercial Fisheries and the appropriate State agency.

Activities meriting attention in this report include:

MISSISSIPPI RIVER AND TRIBUTARIES REVIEW REPORT

The purpose of this report was for the Corps of Engineers to review all aspects of the Lower MRT project and make such recommendations necessary to update needs within the lower valley. One item included in the report recommended construction of water-control structures to divert and provide flows from the Mississippi River to adjacent coastal marsh areas east and west of the river. Such flows would be regulated by the Louisiana Wild Life and Fisheries Commission and would be utilized for fish and wildlife management purposes. The MRT report has been released by the Bureau of the Budget and does include the recommendation that the structures be authorized by the Congress.

CENTRAL AND SOUTHERN FLORIDA WATER NEEDS

The Corps of Engineers' review of water requirements for Central and Southern Florida is underway. Requirements for the Everglades National Park, Tortugas shrimp fishery, and other marine interests are being defined for inclusion in the construction agency's plan.

COMPREHENSIVE RIVER BASIN STUDIES

The comprehensive studies to develop future water plans for the Red, Pearl, and Pascagoula drainages have been initiated by the Corps of Engineers. Projection of water needs should include fresh-water inflow requirements into estuarine areas necessary to both the commercial and sport fishery interests.

INTERSTATE HIGHWAY PLANNING

The Bureau of Public Roads requires that fish and wildlife needs be considered in planning for the interstate roads system. To date, the Interstate-10 crossing of Mobile Bay is under consideration as it relates to the fishery interests. Efforts are underway to preclude project-occasioned damages to the fisheries of this area.

PEAT, MARWICK, MITCHELL & CO.
(Combining Barton, Pilié, Hughes & Jones)
Certified Public Accountants
535 Gravier Street
New Orleans, La. 70130

ACCOUNTANTS' REPORT

Commissioners

Gulf States Marine Fisheries Commission:

We have examined the statement of income and expenses of Gulf States Marine Fisheries Commission for the year ended June 30, 1964 and related statement of resources as of that date. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statements of income and expenses and resources present fairly the results of the financial transactions of Gulf States Marine Fisheries Commission for the year ended June 30, 1964 and its resources at that date, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year. Also, in our opinion, the accompanying supplementary information to accounts is stated fairly in all material respects when considered in conjunction with the financial statements taken as a whole.

Peat, Marwick, Mitchell & Co.

New Orleans, Louisiana
July 9, 1964

GULF STATES MARINE FISHERIES COMMISSION

Statement of Income and Expenses

Year ended June 30, 1964

Income—member states' contributions:

Alabama	\$ 3,500.00
Florida	4,500.00
Louisiana	5,000.00
Mississippi	1,500.00
Texas	6,000.00
Total income	<u>20,500.00</u>

Expenses:

Salaries	\$13,888.00	
Traveling	1,327.12	
Office rent	1,080.00	
Stationery, printing and supplies	558.16	
Telephone and telegraph	437.76	
Postage	241.24	
Electricity	41.09	
Equipment maintenance	44.29	
Accounting	250.00	
Insurance	247.95	
Meeting expense	259.22	
Publication expense	585.77	
Payroll taxes	316.73	
Depreciation	69.47	
Sundry	56.26	
Total expenses		<u>19,403.06</u>
Excess of income over expenses		<u>\$ 1,096.94</u>

Statement of Resources — June 30, 1964

Cash (note 1)	\$ 8,801.76
Traveling advance	250.00
Meter deposit	10.00
Prepaid insurance premiums	120.40
Equipment—at cost less allowance for depreciation, \$2,506.42 (note 2)	530.93
	<u>9,713.09</u>
Less member's (Louisiana) contribution collected in advance	6,000.00
Resources (net)—note 3	<u>\$ 3,713.09</u>

For notes see accompanying supplementary information to accounts.

GULF STATES MARINE FISHERIES COMMISSION
Supplementary Information to Accounts
Year ended June 30, 1964

- (1) The changes in cash balances during the year are summarized as follows:

Cash receipts:		
Income (see accompanying statement)		\$20,500.00
Excess of advance contribution from member (Louisiana) at June 30, 1964 (\$6,000.00) over amount collected in advance at June 30, 1963 (\$5,000.00)		1,000.00
Total cash receipts		21,500.00
Cash disbursements:		
Expenses (see accompanying statement)	\$19,403.06	
Equipment purchases	92.60	
	19,495.66	
Less adjustment for expenses not representing cash outlay:		
Decrease in prepaid insurance45	
Depreciation	69.47	
Total cash disbursements		19,425.74
Excess of receipts over disbursements		2,074.26
Cash balance at beginning of year		6,727.50
Cash balance at end of year		\$ 8,801.76
Comprised as follows:		
National American Bank of New Orleans, checking account		8,801.70
Petty cash06
		\$ 8,801.76

- (2) The changes in investment in equipment during the year are summarized as follows:

	Cost	Allowance for depreciation	Net
Balances at beginning of year:			
Automobile	\$1,436.38	1,436.38	—
Furniture and fixtures	1,508.37	1,000.57	507.80
	2,944.75	2,436.95	507.80
Additions to furniture and fixtures....	92.60	—	92.60
Depreciation allowance for year	—	69.47	(69.47)
	\$3,037.35	2,506.42	530.93
Balances at end of year:			
Automobile	\$1,436.38	1,436.38	—
Furniture and fixtures	1,600.97	1,070.04	530.93
	\$3,037.35	2,506.42	530.93

- (3) The change in resources during the year is summarized as follows:

Resources of the Commission at beginning of year	\$2,616.15
Excess of income over expenses during the year	1,096.94
Resources of the Commission at end of year	\$3,713.09

- (4) Fidelity bond insurance of \$10,000.00 each is carried on the chairman, vice-chairman and director of the Commission.

BUDGET

GULF STATES MARINE FISHERIES COMMISSION

Fiscal Year 1964-65

Salaries	\$14,000.00
Traveling	1,600.00
Office rent	1,080.00
Stationery, printing and supplies	585.00
Telephone and telegraph	450.00
Postage	250.00
Electricity	45.00
Equipment maintenance	50.00
Accounting	250.00
Insurance	250.00
Meeting expense	300.00
Publication expense	1,200.00
Payroll taxes	319.00
Depreciation	60.00
Sundry	60.00
	<u>\$20,499.00</u>

(Approved October 16, 1964)