GULF STATES MARINE FISHERIES COMMISSION

ELEVENTH ANNUAL REPORT
1959-1960

To The

CONGRESS OF THE UNITED STATES

And To The

GOVERNORS AND LEGISLATORS

Of

ALABAMA
FLORIDA
LOUISIANA
MISSISSIPPI
TEXAS

ACKNOWLEDGEMENT

In submitting this eleventh 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 eleven 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,
Walter O. Sheppard, Chairman
L. D. Young, Jr., Vice-Chairman
W. Dudley Gunn, Secretary-Treasurer

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OF THE

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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 16, Louisiana

GULF STATES MARINE FISHERIES COMMISSION

ROSTER — OCTOBER 1960

Walter O. Sheppard
Chairman

L. D. Young, Jr.
Vice-Chairman

W. Dudley Gunn, Secretary-Treasurer

Emily C. Carr, Office Secretary

* COMMISSIONERS

Alabama

William C. Younger, Director,
Alabama Department of Conservation,
Montgomery, Alabama

Will G. Caffey, Jr., Senator
State of Alabama,
Mobile, Alabama

W. C. Holmes, M. D.,
Foley, Alabama

Florida

Ernest C. Mitts, Director,
Florida State Board of Conservation,
Tallahassee, Florida

Walter O. Sheppard, Representative,
State of Florida,
Fort Myers, Florida

Vern Merritt,
Tarpon Springs, Florida

Louisiana

L. D. Young, Jr., Director,
Louisiana Wild Life and Fisheries Commission,
New Orleans, Louisiana

Alvin Dyson, Representative,
State of Louisiana,
Cameron, Louisiana

James H. Summersgill,
Golden Meadow, Louisiana

Mississippi

Wiliam G. Simpson, President,
Mississippi Marine Conservation Commission,
Biloxi, Mississippi

Stanford E. Morse, Jr., Senator,
State of Mississippi,
Gulfport, Mississippi

Hermes Gautier,
Pascagoula, Mississippi

Texas

Howard D. Dodgen, Executive Secretary,
Texas Game and Fish Commission,
Austin, Texas

Wilson Southwell,
San Antonio, Texas

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

SUCCESSIONS ON THE COMMISSION DURING THE YEAR

L. D. Young, Jr.	vice	Rudolph P. Easterly
Alvin Dyson	vice	E. J. Grizzaffi
James H. Summersgill	vice	A. O. Rappelet
William G. Simpson	vice	Chester Delacruz

COMMISSION OFFICERS ELECTED OCTOBER 21, 1960 FOR YEAR 1960-61

Chairman: Walter O. Sheppard succeeding Hermes Gautier

Vice-Chairman: L. D. Young, Jr., succeeding Walter O. Sheppard

STANDING COMMITTEES

ROSTER — OCTOBER 1960

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 (3-4)
Alabama Department of Conservation
Bayou La Batre, Alabama

Will G. Caffey, Jr. (1)
Senator, State of Alabama
Mobile, Alabama

Howard H. Eckles (4)
Bureau of Commercial Fisheries,
Washington, D. C.

Theodore B. Ford (4)
Louisiana Wild Life and Fisheries Commission,
New Orleans, Louisiana

Gordon Gunter (2-3-4)
Gulf Coast Research Laboratory,
Ocean Springs, Mississippi

Walter A. Gresh (4)
Bureau of Sport Fisheries and Wildlife,
Atlanta, Georgia

Robert M. Ingle (3-4)
Florida State Board of Conservation,
Tallahassee, Florida

Ellis C. Irwin (1)
Louisiana Wild Life and Fisheries Commission
New Orleans, Louisiana

Joseph C. Jacobs (1)
Assistant Attorney General,
Tallahassee, Florida

Howard T. Lee (2-3-4)
Texas Game and Fish Commission,
Rockport, Texas

Jack C. Mallory (2-4)
Alabama Department of Conservation
Bayou La Batre, Alabama

Howard T. Odum (4)
University of Texas Institute of Marine Science,
Port Aransas, Texas

Cleburne A. Schultz (4)
Mississippi Game and Fish Commission,
Jackson, Mississippi

F. G. Walton Smith (2)
Marine Laboratory, University of Miami,
Coral Gables, Florida

Lyle S. St. Amant (3-4)
Louisiana Wild Life and Fisheries Commission,
New Orleans, Louisiana

Paul E. Thompson (4)
Bureau of Sport Fisheries and Wildlife,
Washington, D. C.

Seton H. Thompson (4)
Bureau of Commercial Fisheries,
St. Petersburg Beach, Florida

Percy Viosca, Jr. (2)
Louisiana Wild Life and Fisheries Commission,
New Orleans, Louisiana

H. Eugene Wallace (4)
Florida Game and Fresh Water Fish Commission,
Tallahassee, Florida

COMMISSION ACTIVITIES

OCTOBER 1959 - OCTOBER 1960

The Gulf States Marine Fisheries Commission met twice in regular session during the past year. The spring meeting was held at Mobile, Alabama, March 16-17, while St. Petersburg Beach, Florida, was selected as the site for the fall session, October 20-21. The Commission continues the rotation of meetings from state to state. The next regular session is scheduled to be held at Biloxi, Mississippi, March 16-17, 1961 and the October 19-20, 1961 meeting will be convened at New Orleans, Louisiana.

A wide variety of subjects relative to the fisheries of the Gulf are heard and discussed at each of the Commission meetings. Presented for consideration at the past two sessions were such subjects as: The national significance of the marine sport fisheries; Plans of the United States Study Commission—Southeast River Basins; The value of cooperation between commercial and sport fishing interests; The oyster fishery development programs of Alabama and Louisiana; Progress in menhaden biological research; The Gulf menhaden industry and its products; New developments in industrial fish utilization in Mississippi; The detailed shrimp statistical program; Shrimp fishery production, research, merchandising and diversification potential; Recent developments in the field of intergovernmental cooperation as regards natural resources; The fruitful possibilities of a cooperative program including sportsmen, commercial fishermen and outdoor writers; Inter-agency cooperation in Florida; Marine resource information education in Texas; Implementation of the Marine Sport Fishery Act of 1959; Biological aspects of the expanding Gulf fishery for industrial species; The Florida seafood promotional program; Activities of the shrimp associations; The 1959-60 composite resumé of state and federal research and associated activities; and others.

During the year, the Commission's Committee to Correlate Research and Exploratory Data prepared a State of Knowledge Chart of the Gulf Fishes in order to compare data on migrations, identification of stocks, growth rate, mortality rates (natural and fishing), reproduction (spawning habits and number of eggs deposited), other causes of abundance change (variations in survival, environmental changes, predators and competitors), and state of statistics, with that which was charted six years

ago. It appears from study of the Chart that the advances in overall knowledge since 1954 have been considerable but the need for much more study of a number of the species is indicated. There was agreement at the meeting of the committee with other biologists that more publications should be prepared which would gather related information under one cover; such as was done in the case of the Commission's Technical Summary No. 1 on the sea trout or weakfishes.

The Shellfish Committee is following with much interest: The Alabama fall cultch planting program to determine if fall set spat will survive predation better than the spat which normally results from spring and early summer shell plantings; The Florida pilot planting of seed oysters in Wakulla County for demonstration purposes and to encourage private activities; The Louisiana work on oil pollution with relation to taste, effects of dredging and silting in the coastal environment, setting peaks of snails and oysters, and food preference of oyster drills; The Mississippi fall shell plantings in Portersville Bay to compare results with the previously mentioned Alabama cultch plantings; The Texas cultch planting program aimed at establishing new public beds; and the clam raising program of the Gulf Breeze Biological Laboratory of the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service.

A Sub-committee of the Estuarine Technical Coordinating Committee was appointed at the March meeting to make a continuing study of the possible effects of insecticides upon the fisheries. It is hoped the estuarine maps which were prepared of the seaboard of the Gulf by the Estuarine Technical Coordinating Committee can be reproduced and compiled into a single Atlas during the current year. A meeting of the whole committee has been scheduled for early February 1961, at which time the group will study projects which might be proposed by any of the member states. Supplement No. 1 to the Bibliography Of Unpublished Estuarine Research In The Gulf of Mexico, which contains 130 entries, was published and distributed in October.

Adopted at the fall meeting was a resolution which requests the Bureau of Commercial Fisheries to extend its exploratory effort to the shoreline of the Gulf in search of stocks of blue crabs, stone crabs, calico scallops, bay scallops and clams. A second resolution requests the Bureau to broaden the Gulf

Shrimp Biological Research Program and to make available such statistical data as the additional studies may yield. Another resolution expresses opposition to any fishery law of member states that might unreasonably restrict the time or manner of obtaining licenses. A fourth resolution inquires into jurisdiction over interstate compacts. A final resolution resulted in a committee of five Commissioners being appointed to study the possibility of reciprocal Acts which would eliminate check-out controls of fishery products of the member states; such committee to report its findings at the spring 1961 meeting.

Information resulting from the various state and federal research programs is continuously exchanged among the agencies either directly or through the Commission. The pages which follow present in summary certain 1959-60 activities thought to be of general interest, of 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 Game and Fish Commission, the U. S. Bureau of Sport Fisheries and Wildlife, and the U. S. Bureau of Commercial Fisheries.

STATE ACTIVITIES

OCTOBER 1959 - OCTOBER 1960

ALABAMA

Research work at the Department of Conservation Marine Laboratory at Cedar Point has continued with the expiration of the contract with the Gulf Coast Research Laboratory. The work is being continued through a cooperative agreement with the University of Alabama. Most of the work has been directed towards ecological studies of the major producing oyster reefs of the area. Research on the use of chemical barriers and control of the conch has been carried on and although too early to predict or suggest an efective control, hopes are still high that something practical can be forthcoming.

As of September 1, 1960 mortality on the seed oysters planted in producing areas show a mortality of 30%, while shell plantings show a very large catch with the new oysters now reaching the size of a quarter. Mortality in this catch has been very low and as a result severe competition and crowding among the small oysters is present.

The last session of the legislature passed into law a number of proposals concerning the oyster industry. These laws in brief did the following:

1. Established specific procedures and requirements in the leasing of non-productive oyster bottoms by private individuals.
2. Established relationship of legal oyster sizes on private and public reefs.
3. Established enforcement procedures on patroling private oyster beds and legal marking of same.

Regulations by the Director of Conservation has declared it illegal to use double trawls in inside waters and changed the count requirements on brown shrimp from 50 to 68.

The system by which one half of the shrimping area was open for daytime activities, and one half open for night shrimping was continued with Mobile Bay being used during the period of one hour before sunrise to one hour after sunset, and Mississippi Sound being opened during the period of one hour before sunset and one hour after sunrise.

FLORIDA

Research work of the Florida State Board of Conservation continues to be carried on by the Board's laboratory at St. Petersburg and through contract with the Marine Laboratory of the University of Miami.

Research Performed
by the
St. Petersburg Marine Laboratory

Shrimp Parasites

Suported in part by a grant from the U. S. Public Health Service, the department laboratory is investigating the parasites of shrimps from southeastern United States and the Caribbean. Notice is taken of the protozoa, helminths and other, incidental types encountered. So far, the studies have been broad and concerned primarily with occurrence of the various types in each area. Later, life history studies are planned.

Aside from the basic biological information derived which will yield understanding of debilitation, mortality and perhaps abundance of shrimp in some cases, it is hoped that one or more of the parasites may serve as natural tags. If they do not serve this purpose as they naturally occur, there is a possibility that they may be made to identify migrating shrimp through artificial introduction in some cases.

Basic Shrimp Biology

Data collected over a four year period were analyzed and several publications were prepared. All of this work is aimed at a greater elucidation of the basic dynamics of shrimp populations. The final analysis will provide quantitative evaluation of migration, growth, natural mortality and loss due to fishing. With this understanding, administrators will have more detailed facts which can form the background for regulations.

Reports presently being prepared cover investigations made in Tortugas, Tampa Bay and Apalachicola.

Reef Fishes

Studies are being made on the growth, migrations and population densities of the fishes of relatively shallow water reefs in the Florida Keys and Tampa Bay areas.

It is hoped that light will be shed on several old and perplexing problems. Among these are: effects of fishing on reef

populations; importance of homing instinct; effects of spearfishing on success of hook and line efforts; seasonal changes in population characteristics; rate of colonization of new, artificial reefs.

Emphasis during the first year was on barracuda.

Taxonomy of Minor Fish Species

Because of their bulk and the vital role they play in the basic dynamics of several fish habitats, efforts were begun to clarify the taxonomic status of several of the more common small sized fishes. Because of their size, they are of no direct importance for either sportsmen or commercial fishermen, but they form important parts of the population and dynamics of grassy flat nursery areas and reefs.

Algae and Submerged Spermatophytes

Several reports were prepared on previous work on coastal water flora. Much of this revealed hitherto unknown facts about some of the dominant botanical organisms that serve as cover in Florida's salt water nurseries. Plans were completed for pilot plantings to determine the efficacy of rehabilitation projects. Coastal changes wrought by rapid urbanization have damaged much of Florida's "under-water meadows." It is hoped that anticipated studies will reveal methods by which these sanctuaries can be reestablished.

Red Tide

Records continue to be made of aerial inspections and density of concentrations of *Gymnodinuim breve.*

These will serve in later analyses to demonstrate occurrences of red tide with meteorological phenomenon such as rain fall, temperature and sunlight. Such correlations will improve methods of prediction.

Basic Estuarine and Coastal Ecology

In the course of studies made in the areas of proposed dredging and construction projects, detailed ecology data are obtained. This information provides the basis of recommendations and advice the Conservation Department gives to legally constituted authorities to aid in deciding the disposition of government owned submerged acreage.

All data is placed on specially designed cards which are kept for later analysis. Eventually all of this will be organized

into a compendium of material covering the hydrology and habitat characteristics of all animals and plants encountered.

Research Performed
by the
University of Miami Marine Laboratory

SPECKLED TROUT

Studies originally begun in Cocoa, and later transferred to northwest Florida, were continued near Fort Myers.

Information presently being sought includes migration, growth, reproduction and regional size characteristics.

Projected studies will heavily emphasize tagging in an effort to derive facts concerning population dynamics.

FLORIDA BAY ECOLOGY

Studies were continued on the basic productivity of a relatively pristine, coastal habitat. Basic hydrographic data were obtained and population and growth studies were made on typical, common and important index organisms.

Chemical checks were made to establish the salient features of the area. An effort will be made later to relate these to population fluctuations and relative success of various organisms basic to the over-all habitat.

SHRIMP GROWTH AND MIGRATIONS

Useful information has been obtained on the growth and migration of the pink shrimp, *Penaeus duorarum,* on the Tortugas grounds. Petersen tags were placed on shrimp over a two year period and released at various stations on and near the fishing grounds.

Data obtained will be useful later as an aid in a better understanding of population dynamics.

STATISTICS

Accurate reports on landings were sought on all commercial species.

Fish tickets, providing information on gear, number of hours of fishing, type of boat, number of men per crew, etc., were used in greater numbers than in the previous year. Again, use of these tickets was on an individual and voluntary basis.

Facts obtained from the tickets aided in establishing catch per unit of effort for several species in widely separated localities and will also serve in many ways in future evaluations of the various fisheries.

LOUISIANA

The Division of Oysters, Water Bottoms and Seafood of the Louisiana Wild Life and Fisheries Commission, through its Seafood Section, has continued to give priority to shrimp studies, but there has been somewhat of a shift from the basic biology of the better known white species, *Peneus setiferus,* to that of the less well known, but now equally important brown shrimp, *Peneus aztecus.*

Shrimp Tagging Program

In connection with these brown shrimp studies, the various sections and divisions and the Bureau of Commercial Fisheries of the U. S. Fish and Wildlife Service have pooled their knowledge and resources in order to initiate an extensive shrimp marking program for Louisiana.

Prior to the field opreations, an experieneed Bureau technician spent two days in New Orleans teaching the various procedures involved. This briefing enabled the state biologists to avoid the many pitfalls which might otherwise have evolved in an operation of this specialized nature. In the last phase of the operation, the biologists were able to stain 10,000 shrimp within two days time.

Three key points in the coastal area were selected, and approximately 11,000 juvenile brown shrimp, *Peneus aztecus,* were released at each site. The mortality was extremely small, being less than ten percent.

The program was initiated in the Grand Pass area in St. Bernard Parish on June 6, 1960 and within five days, this phase of the operation was completed. Here, the Grand Pass Camp was used as headquarters. "Fast green" analine dye was injected into the shrimp at this station. The stained shrimp were then held for from 8 to 12 hours to check mortality and then released into a penned area from which natural enemies had been removed by seining. The pen was opened after nightfall to release the marked shrimp.

The second phase of the project was conducted in the Barataria Bay area in Jefferson Parish, using the newly completed Grand Terre Marine Laboratory as headquarters. Here, operations were begun on June 20, and "trypan blue" dye was used to mark the shrimp. They were held and released in the same manner as at the first station, and operations here were completed on June 24.

The third and final phase of the staining project was conducted in west Vermilion Bay, Vermilion Parish, using the State Wildlife Refuge headquarters. The equipment was installed on the afternoon of June 27 and the operation was completed by noon on June 29. As at the Grand Pass station, "fast green" dye was used in the Vermilion area. It was believed that no integration of the two similarly stained populations would result, because these stations are over 300 miles apart as the shrimp swims, and they are also separated by the Mississippi River Delta which protrudes well out on the Continental Shelf.

By the middle of June, a publicity campaign was started to inform the commercial shrimpers, bait fishermen and processors that shrimp with colored gills were being released and might be seen in their catches. A reward of fifty cents was offered for each shrimp returned. Rewards on 636 stained shrimp have been paid to date, which is close to two percent of the shrimp released. It is yet too early to assess the final results of the operation, but it is safe to say that there was, in all cases, a definite migration to offshore waters. No shrimp were taken any significant distance inland from the point of release. The greatest depth in the Gulf at which a stained shrimp was taken is about twelve fathoms. The greatest distance from the point of release is about 100 miles, this for a shrimp taken southeast of Sabine Pass, Texas, in eight fathoms of water. Other returns of 20 to 40 miles were obtained. Most returns were from the vicinity of the release, since the season was open and trawling occurred near the release area. It is expected that a similar number of white shrimp (33,000) will be stained in the fall of 1960.

The Shrimp Kill of November 1959

As in the staining program, quick appraisal of a shrimp and fish kill in November 1959, resulted from coordinated action by the commission's available human and physical resources. At the time, over half a hundred reports filtered into the commission regarding widespread shrimp, crab and fish kills in the coastal area.

The reports came from an area which extended eastward and southward from St. Tammany Parish to the flanks of the Delta of the Mississippi River, thence westward to the west side of Vermilion Bay. Some kills were observed by the biologists during their routine studies and immediately investigated.

When the overall investigation was completed, the scientists and their aides had identified some 18 species of fishes and four kinds of crustaceans from 57 distinct localities. The common crab, the white shrimp and the brown shrimp were among the crustaceans affected. The hardhead catfish and some of the shallow water minnows were the hardest hit of the fishes. Relatively few of the fishes were commercial or sport species. The widespread scope of the dieoff completely ruled out local factors, such as pollution, dredging, et cetera as the basic cause. It was the unanimous opinion of the commission scientists that the primary cause of the kill was the passage of a severe cold front over the coastal area on the early morning of November 6, 1959. This produced drastic physical changes in shallow waters, and some of the marine life which happened to be in these places during the preceding warm spell, could not quickly acclimatize themselves, so became trapped. Animals numbed by the sudden cold wave were then exposed to reduced salinities, terrific wave action and excessive turbidity. The water was of a soupy consistency in most of the shallow bays, due to both mineral and organic contents derived from bottom materials. The gills of the dead shrimp, crabs and fishes examined were clogged with such materials. However, population sampling in the general areas affected by the freeze brought up relatively few dead specimens as compared to living specimens of the same species. Large popuations of young shrimp, crabs, pogies and other species were found to be overwintering in deeper waters, indicating that only a minor percentage of the marine life was actually trapped by the sudden change. Although killing freezes are unusual in Louisiana coastal waters, they are not unprecedented. Perhaps the worst mortalities of record occurred during the deep freeze of January 23, 1940, which was witnessed by many persons. At the time tremendous mortalities occurred along the New Orleans lake front and in other places along the Louisiana coast.

Other Activities of Seafood Section

The activities of the Seafood Section are concerned primarily with the species involved in the commercial fisheries, with emphasis on their ecology. Studies are being made of the nature of their environments (biologically, physically and chemically) the cyclic changes in these environments due to natural factors, and the effects of man-made factors. In addition to these diverse

ecological investigations, this section is engaged in some exploratory fishing and gear development in estuarine waters. There is also some statistical research and evaluation of the fishery statistics gathered by this commission, as well as by the Bureau of Commercial Fisheries and the Gulf States Marine Fisheries Commission.

During 1959-60 the Research Section has continued to progress in a limited field of research. An expanded research program has not yet materialized because of an inability to secure adequate technical personnel and because there was some delay in completing the new Marine Laboratory at Grand Terre Island.

The new laboratory building was completed and occupied on July 1, 1960. Equipment is now being moved into the building where it is being tested and calibrated. Full use of the laboratory is expected by September 1, 1960.

During the year research and development has involved the following: Again in 1960, approximately 50,000 cubic yards of shells were planted as oyster cultch in the Lake Fortuna and in the Lake Borgne-Mississippi Sound area. The initial set in Lake Fortuna was between eighty and eighty-five percent. The 1959 planting in Black Bay was an outstanding success. An extensive set occurred. Since the entire bay was closed for 15 months to protect the planted area, oysters, over the whole bay were undisturbed with the opening of the season and exceptional quantities of seed oysters are reported.

Studies of mortality and growth rate in South Carolina oysters as compared to Louisiana stock, indicate that there is no immunity to *D. Marinum* in South Carolina stock. Growth is approximately the same when oysters are held in the same environment. Other studies included oyster and oyster drill setting rates and times, oyster growth in relation to food volume, and food preferences of oyster drills.

A five year compilation of data from Sister Lake, indicates that for a sustained yield, harvesting should be on alternate years. This plan was initiated in 1959 and the first dredging under this plan was allowed in September 1960.

Shrimp investigations have been initiated at the new laboratory in cooperation with the shrimp research carried on by the Seafood Section.

A cooperative research program in shrimp and oysters with

Louisiana State University was continued. Various educational activities also have been added to the regular schedule. Notable among the latter is a program of field trips and short courses in marine biology for high school teachers and their science classes. College groups and visiting scientists are also making use of the facilities of the new laboratory.

MISSISSIPPI

Quantitative sampling of the bottom fauna and the plankton and the collection of fouling organisms off the Louisiana coast in the Grand Isle region was discontinued at the end of January 1960. The specimens, data and personnel were transferred to Ocean Springs. The data are now being worked up.

Investigations of the life history of the menhaden, especially the young and smaller stages, have continued in Mississippi waters, but the remaining field work has been discontinued and the data are being processed. An annotated bibliography of menhaden was published by the Fish and Wildlife Service during the current year, and the paper on other fishes caught in the menhaden fishery, referred to in the Tenth Annual Report, was also published. A manuscript which constitutes a review of published material on menhaden biology has been submitted to the U. S. Fish and Wildlife Service. Racial studies of Gulf menhaden based upon analysis of meristic characters have been made. One paper has been submitted to the Fish and Wildlife Service and another set of data are being analyzed. The chief conclusions to date are that central Gulf menhaden are probably racially distinct from those of Florida and Texas.

Studies have been completed of all marine mollusks of Mississippi covering 163 species. The paper is now in process of publication.

A member of the staff of the Gulf Coast Research Laboratory acted as marine biologist for the Seafoods Division of the Department of Conservation of the State of Alabama for a period of a year until May 1960, when the Department of Conservation employed its own biologist. Experimental planting of 1,000 barrels of oysters in Portersville Bay was accomplished during the fall of 1959. The set was very successful and the oysters grew well. It is hoped that fall plantings along the Gulf coast may be superior to spring plantings because the young spat are not subject to so much predation or parasitism during the winter months when they are small and relatively helpless.

The summer school at the Gulf Coast Research Laboratory was carried on during 1960 and the following courses were taught: Introduction to Marine Zoology, Marine Invertebrate Zoology, Marine Vertebrate Zoology and Ichthyology, Marine Geology, and Problems courses in Zoology. In addition, a summer work institute for specially selected high school students from the states of Louisiana, Arkansas, Mississippi and Alabama was carried on at the Laboratory under the auspices of Louisiana State University and supported by the National Science Foundation. Seventy students were in attendance at the Laboratory during the summer. During the summer ten research workers from various parts of the south carried on work at the Laboratory, and these were all supported by the National Science Foundation.

During the 1959-60 oyster season the State of Mississippi waters produced over 100,000 barrels of oysters, which is the largest production for this state in sixteen years. This situation was evidently the result of an extremely wet year and a dearth of conchs and parasites due to low salinities.

The Mississippi Seafood Commission was abolished by the State Legislature early in 1960 and a totally new set of laws was passed. A new commission called the Marine Conservation Commission and consisting entirely of new members was appointed by the Governor. A member of the Laboratory staff is a member of the Commission and acts as the biologist. A new system in law enforcement has been undertaken and the Commission has busied itself particularly with conserving the shrimp resources by opening and closing the bays after the areas were sampled. The Commission has also concerned itself with planting oyster shell on depleted reefs. A total of 33,000 barrels of shell was planted in the spring of 1960.

The Gulf Coast Research Laboratory is now engaged in a study of the distribution of the fresh waters from the eastern mouths of the Mississippi River, supported by the Office of Naval Research.

TEXAS

In general the established program of the Marine Division of the Texas Game and Fish Commission has been continued throughout the year. Some alteration has been necessary in order to adapt available personnel to investigational needs; however,

the purposes and direction of the work have remained unchanged.

The primary function of this division is considered to be the study of marine forms in relation to their environment so that sound management practices may be evolved. Protection of the environment from unnecessary encroachment by civilization is no small item in this work and is, in fact, probably the only way in which the fishery resources can be perpetuated. The pernicious effect of sometimes remote activities is a very real and disturbing problem.

Creation of impoundments along the major streams of Texas results in diminished flow to the bays and thus gradually effects the marine fishery environment. Since the amount of reduction in flow by proposed structures is seldom known, the rate and degree of environmental change is difficult to assess. However, by working with the Fish and Wildlife Collaboration Group of the U. S. Study Commission—Texas, the sites of proposed reservoirs have been determined and some degree of general awareness has been attained. Several meetings of the group have been attended and a better understanding (by all concerned) of the potential changes has resulted.

Development of submerged shallow bay bottoms along the Texas shoreline is gradually reducing the area available for use as nursery grounds by fish populations. The value of these areas to marine organisms has been established by numerous studies in many states as well as in Texas. Any consideration of disposition or utilization of such areas must take into account the effect on the marine resources.

Much has been said in past years about the need for legislation which would prohibit the use of nets in our bay waters. The same reasons are being used today as were in vogue in 1881 when an editorial in the Galveston News stated "Plentiful a few years ago fish in the bays are becoming scarce by the destruction of spawn by seines in shallow waters." This quotation appeared in the 1937-38 Annual Report of the Game, Fish and Oyster Commission. The question is still unsolved and no doubt will remain so until factual data are obtained by actual measurements of some sort. This is presently being undertaken.

Since 1937 fishery statistics have been compiled which reflect variations in the commercial harvest. Not included, however, are any indications of the effort required to make the

catch or the market price at which it was sold. Both factors will influence the quantity landed as much as will the supply of fish. It is humanly impossible to determine the number of fish present in our coastal waters at any given time, however, it is possible to measure the catch and the effort required to make the catch. By comparing the catch per unit of effort on a periodic basis, it is possible to determine whether or not there has been an increase or decrease in the supply of fish available for harvest.

The first such comprehensive measurement was undertaken in September 1958. The results of that statewide survey were summarized very briefly in the report for fiscal 1958-59. A second such poll is planned for early fiscal 1960-61. It is hoped that the results of that study will be available prior to the January convening of the Legislature.

In connection with the problem of evaluating fishery harvests a creel census of sport-fishermen has been conducted as a part of the activity in Region M-8 (upper Laguna Madre). Since the work has just been completed, no attempt to evaluate the results has as yet been made but it is expected that this will be done before completion of the statewide poll so that results may be compared.

For the purpose of obtaining catch per unit of effort measurement of commercial crews new report forms called "fish tickets" have been put into use by a few dealers. Information called for includes the specific area fished, type, size and quantity of gear used, number in crew, time spent fishing, pounds of each species and unit price paid by the wholesaler. Tabulation of results is being done manually at the present time but it is anticiptaed that as the number and quality of the reports increases punchcard machines will be used. Only ten firms are using these new forms but returns are improving and as the purpose of the program becomes better understood it is hoped that more complete coverage will result.

The commercial harvest of oysters from all bays on the coast was the largest since statistical reporting began in 1937 at 1,275,743 pounds of oyster meat. Most of this production was from San Antonio, Mesquite and Espiritu Santo Bays. This high yield has again stimulated considerable interest in the leasing of bay bottoms for oyster culture and over 2,700 acres were under lease as the year ended. In adition to the production reported above there was a sizeable quantity of oysters har-

vested in Galveston Bay area and transported to Louisiana. Since these were not handled in any way by Texas dealers an accurate measure of the amount is not possible.

Due to the decimation of the Aransas Bay oyster population by the fungus parasite *Dermocystidium marinum* the harvest of oysters was stopped in that area in December. Although the population is still too low to allow a harvest this season, the number has increased considerably and appears promising. In an effort to supplement the natural production and enlarge the area susceptible for oyster growth some 5,000 cubic yards of mudshell was placed in an area of Aransas Bay near St. Joseph Island. Seed oysters (150 barrels) were obtained from Copano Bay. Since the work was not accomplished until midsummer no attempt will be made to evaluate the success of the effort at this time.

In 1959 the 56th Legislature enacted a bill which allowed the Commission to enter into contracts and issue special permits to certain bonded fishermen to use various prescribed gear in removing black drum fish from the Laguna Madre of Willacy County. An earlier enactment had allowed a similar program in the adjoining waters of Cameron County. This action was deemed desirable since the pressure directed toward drum harvest was inadequate to maintain a proper population balance. Contracts were completed and permits issued to sixteen fishermen, however, only thirteen actually participated. In both counties during the entire period a total of 515,353 pounds of dressed drum was reported landed. Periodic inspections of nets by biologists revealed that 3.4 per cent of the total catch by the nets checked was made up of trout, redfish, flounder and pompano. All of these were returned to the water since the fisherman is not allowed to process these forms. The number found dead was only 0.74 per cent of the total catch in inspected nets.

U. S. FISH AND WILDLIFE SERVICE ACTIVITIES

OCTOBER 1959 - OCTOBER 1960

Bureau of Sport Fisheries and Wildlife

Activities of the Bureau of Sport Fisheries and Wildlife as they relate to Gulf fisheries continue to be confined primarily to investigations conducted under the authority of the Fish and Wildlife Coordination Act on specific civil works projects. All project reports have been coordinated with the Bureau of Commercial Fisheries and the appropriate state agency.

The increasing competition for agricultural and industrial use of coastal waters and lands demands coordinated efforts toward multiple-use planning by federal, state, and local interests. In addition to coastal-water competition, the problems associated with fresh water discharges necessary to sustain estuarine areas should be observed with caution by the fisheries interests. This is applicable to both shortages and over-supply of fresh water.

Investigations which warrant attention in this report include:

NAVIGATION PROJECTS

Mississippi River - Gulf Outlet Project, Louisiana: Pilot channel construction is partially completed from New Orleans to Chandeleur Sound. Requirements included in the construction contracts to contain dredging spoil within ponding areas appear to have been efective in reducing the silt spread which normally occurs with a hydraulic dredge operation. Hydrological and vegetative studies necessary to establish with-the-project water-exchange requirements within the marsh area are continuing.

Freshwater Bayou Navigation Project, Louisiana: This project was authorized by the current session of Congress. Channel alignment will traverse the coastal marsh west of Vermilion Bay. Coordinated studies with the Bureau of Commercial Fisheries and the Louisiana Wild Life and Fisheries Commission must be initiated to ascertain project-occasioned changes to this estuarine and fresh-water complex and to devise remedial measures to protect the resource.

Barataria Bay Waterway: As in the case of the Mississippi River-Gulf Outlet project, recommendations have been furnished the construction agency requesting ponding of spoil where

practicable. Where open-water areas preclude ponding, the construction agency has been requested to utilize bucket-type draglines for channel construction.

Intracoastal Wateray — Caloosahatchee River to Anclote River, Florida: Partial agreement has been obtained from the construction agency on location of spoil sites along the alignment of this project.

FLOOD CONTROL PROJECTS

Lake Okeechobee Regulation: Commercial fishery interests are concerned with the effects of South Florida flood-control projects upon the estuarine resources. Principal among these projects are the existing and proposed outlets for regulating Lake Okeechobee. The Caloosahatchee River now discharges to the lower Gulf coast, and the tentatively proposed South Florida Floodway would discharge through Everglades National Park into Florida Bay. With the cooperation of the Bureau of Commercial Fisheries and other conservation agencies, a comprehensive study is being initiated to provide for regulation of fresh water discharges necessary to protect the Tortugas shrimp fishery and other major fishery industries. These studies will also consider possible contributory effects of discharges upon the red tide outbreaks.

HURRICANE PROTECTION PROJECTS

Lake Pontchartrain Hurricane Protection Project, Louisiana: While several hurricane protection investigations are in process by the Corps of Engineers, the most noteworthy for this report is the Lake Pontchartrain hurricane protection project. Consideration is being given to a gated, barrier structure across the lake's outlets. The construction agency is conducting a model study of the project to ascertain gate sizes needed to maintain required salinity exchange between the lake and the Gulf of Mexico.

NAVIGATION PERMITS—PRIVATE CONSTRUCTION

The Corps of Engineers issues a great number of permits to private developers for a variety of projects ranging from pipe lines and bridges to dredge and fill projects. The Bureau attempts to comment only on the largest of these developments. While the individual effects of these developments are usually slight, their cumulative effects are significant. The bait shrimp fishery, in a few of the Florida bays, has been most affected.

Bureau of Commercial Fisheries

Activities of the Bureau of Commercial Fisheries along the Gulf coast have been directed and coordinated by the Regional Office in St. Petersburg Beach, Florida. The following summarizes these activities for the year:

Pascagoula Exploratory Fishing and Gear Research Base

During the inclusive period of October 1959 to September 1960 work was continued on the following exploration and gear research projects: Sardine-like fish survey, distant water shrimp explorations (Puerto Rico, Virgin Islands, and Trinidad), deep sea commercial type trawling studies (80 to 1000 fathoms), exploration for tuna stocks (SE Caribbean), industrial fish survey, scallop exploration, and underwater shrimp trawl studies utilizing SCUBA divers, underwater photography and submersible vehicles.

Two vessels were operated in connection with the projects listed above—The M/V Oregon, and the M/V George M. Bowers. The M/V Silver Bay, also assigned to the Pascagoula base, carried on experimental snapper trawling and industrial fish and scallop explorations along the east coast of Florida.

Sardine-Like Fish Survey

This project utilizes mid-water trawls with depth determining telemeters, lampara seines and scoop-lift nets with mercury and incandescent light attractors. Four mid-water trawl cruises and one lampara-lift net cruise was conducted by the M/V Oregon during the period of this report. The first successful commercial scale midwater catches were accomplished on cruise #63, in the north Gulf when 3,000 to 5,000 pounds of bumpers, *Chloroscombrus chrysurus,* were taken with a 65-foot trawl in one hour tows. This survey is principally confined to the continental shelf from Cape Romano, Florida, to Brownsville, Texas.

Distant Water Shrimp Exploration

The M/V Oregon devoted one cruise exclusively to shrimp exploration in the area of Puerto Rico and the Virgin Islands. Sixty-six drags were made in depths of 17 to 380 fathoms and extremely poor trawling conditions were found to exist in the area surveyed. During the course of Oregon operations in the

vicinity of Trinidad, between 61° and 66° west longitude, exploratory drags for royal red shrimp were made, but little success was achieved.

Deep Sea Commercial Type Trawling Studies

Deep water trawling trials were limited to one cruise by the M/V Oregon in the north-central Gulf. Ten drags were attempted along the 1000 fathom contour using 60-foot and 40-foot shrimp trawls. The major problem encountered was bogging of the gear in soft mud bottom which occurred on six of the drags. Catches were not significant, but additional information was obtained regarding the technical aspects of gear design and handling.

Exploration for Tuna Stocks

In cooperation with Woods Hole Oceanographic Institute and the American Museum of Natural History, the M/V Oregon completed a cruise to the southeastern Caribbean to determine species composition, availability to long-line gear and distribution of tuna stocks. An additional objective was to obtain further information on bluefin tuna migrations throughout the Caribbean area. Twelve long-line sets were made during the cruise. The quantity of the catch in itself was not significant, but useful data were obtained concerning species composition and migrations.

Industrial Fish Survey

The M/V Oregon continued midwater and bottom trawling operations for industrial fish in the north central and western Gulf of Mexico to obtain additional information on the seasonal occurrence and available of stocks.

Scallop Exploration

Commercial concentrations of calico scallops have been reported in the course of two cruises by the M/V Oregon in 16 fathoms between Pensacola and Mobile.

Underwater Shrimp Trawl Studies

The M/V George M. Bowers completed five cruises devoted to underwater shrimp trawl studies. SCUBA divers and underwater camera equipment were utilized to record the actual operation of various shrimp trawls and obtain data concerning the optimum towing speed of the vessel involved. As a result of

this study, the first in a series of films was produced showing the performance of a common type Gulf shrimp trawl. In addition, a survey of highline shrimp vessels operating in the region was compiled and valuable information suitable for further study was obtained.

GULF BREEZE BIOLOGICAL LABORATORY

The research program is concerned primarily with problems of commercial shellfisheries including the scallop, clam and oyster. Recently investigations have been undertaken to study also the problems of pollution and primary production in estuaries.

Studies on oyster predators occupy an important part of the program. It is probable that the current oyster harvest can be at least doubled when economical ways to control the drill, crab and flatworm are discovered.

Experiments conducted for the past three years to develop methods for increasing the natural incidence of a natural parasitic disease of the oyster drill have been terminated. Only limited success was obtained, apparently because of inherent host resistance. The method could not be practical unless massive infections were obtained.

In an effort to develop some other method of drill control, preliminary experiments have been underway the past half-year to determine the effects of X-rays on snails. With suitable amounts of radiation, it has been found possible to interfere with the normal reproductive cycle and limit the production of eggs. This program will be expanded to determine the possibilities of developing some type of control similar to the Department of Agriculture's screwworm project which has been so successful.

Pilot plantings of clams are being protected by the regular use of poisoned baits which are attractive to crabs, their major predator. This work is undergoing analysis to determine the cost of labor and materials necessary to protect a planting of clams until it can be harvested.

There are many kinds of pollution threatening the natural estuarine environments; two of these are being investigated. Of increasing importance in the south is the industrial and recreational development of waterfront property adjacent to shellfish areas.

Near the laboratory, a small bay which produces scallops and could be useful for propagating hard clams is being de-

veloped as a resort area and boat marina. A "before and after" inventory is being conducted here to show changes in the animal populations due to man's dredging of channels and filling in the surrounding tidal marsh. It is hoped that the study will demonstrate on a small scale the immediate and long range effects of such activities and whether it is possible, with proper control, for similar bays to be developed commercially and still be used for shellfish cultivation.

Inevitably, some of the billion pounds of pesticides in use annually on crop and forest land is being washed into the marine environment. Investigations this past year have demonstrated that several of our most widely used insecticides are harmful even in very low concentrations to oysters. Growth may be decreased by half in a few days and longer exposures may cause death. It is possible that indirect effects are even more serious and might affect the food quality of shellfish produced in contaminated estuaries. Techniques are being standardized for the evaluation of the effect of these chemicals in the marine environment.

A continuing study to determine the year to year importance of the fungus disease *Dermocystidium* to oysters has shown that it is of no importance here now. In the past it has caused extensive mortalities. There is evidence that this disease is of cyclic nature and, currently, is of less importance along the entire Gulf coast as compared to 5 or 10 years ago when serious losses were attributed to it.

Galveston Biological Laboratory

The Galveston Biological Laboratory with field stations at Miami, St. Petersburg Beach, and Pascagoula is conducing research on shrimp, industrial fishes, red tide, and estuarine problems, including the effect of engineering projects.

Shrimp Investigations

Three areas of study concerned with measuring some portion of the shrimp resource, commanded attention during the year. These were: (1) *larvae and post-larvae;* (2) *juveniles;* and (3) *adults.* An understanding of the dynamics of each population phase constitutes the basis for establishing sound resource management. Such programs embrace the goals of (1) predicting yield and, correspondingly, (2) apportioning exploitation so that, under prevailing and anticipated environmental conditions,

commercial shrimp populations will sustain themselves at maximum production levels.

A major impediment in studying larvae and post-larvae has been an inability to distinguish between species. Significant advances in specific identification of penaeid larvae can be reported for the past year. Early larvae derived from known parents have been described for two species at this laboratory, and for another at the University of Miami, the latter work having been done under contract. At this writing prospects of obtaining comparable results with several other species appear very good.

Juvenile commercial shrimp occur in estuarine environments where they are exploited for sale as sport fishing bait. A survey of bait shrimping in Galveston Bay is providing information on (1) the numbers caught, and (2) their numbers relative to those before and after occupying the so-called nursery areas. An estimate of early natural mortality appears possible.

By marking and releasing juvenile shrimp on known nursery areas, and noting where they are later recaptured, boundaries of the nursery areas for the pink shrimp supporting the important Sanibel-Tortugas (Florida) fishery are gradually being set. This technique offers promise of circumscribing habitats and hence populations of commercial shrimp in other Gulf areas.

Analyses of the detailed statistics on shrimp catches and fishing effort collected since 1956 for the entire Gulf of Mexico are nearing completion. For the Sanibel-Tortugas area, which has just been finished, there are some indications that heavy fishing on the smaller sizes of shrimp decreases the total yield from any given brood.

Laboratory studies of the effects of salinity on growth and survival of shrimp were initiated because of need for factual knowledge on the possible effects of higher salinities that might occur in bays from reduced flows of fresh water.

Industrial Fishes

The great potential yield of the industrial fishery of the Gulf is shown by the large catches of the trawl fishery in the small area now exploited by the fishery for pet food.

Three species comprise three-quarters of the trawl-caught fish. In order of importance they are the croaker, *Micropogon undulatus;* the white trout, *Cynoscion nothus;* and the spot, *Leiostomus xanthurus,* all small members of the drum family.

Perhaps the greatest potential for the future is to be found in the numberous herring-like fishes which occur in immense schools in the Gulf. We are currently studying samples of these fishes furnished by the Oregon in connection with exploratory and gear research work.

INSECTICIDES

Full-time studies of the effects of chemicals used as insecticides on a broad spectrum of estuarine and marine animals were commenced. Work carried on last year was preliminary in nature. The current program has been coordinated with studies of effects of insecticides on molluscs in Service laboratories at Gulf Breeze, Florida, and Milford, Connecticut.

Of the four insecticides tested thus far on post-larval shrimp, endrin and lindane were particularly toxic, as reflected by 14-hour TL/m values of 0.5 and 2 parts per billion, respectively. In less than 48 hours 100 percent mortality occurred at concentrations of 0.3 parts per billion (endrin) and 2 parts per billion (lindane). Heptachlor and dieldrin were only slightly less toxic with 24-hour TL/m values of 11 and 15 parts per billion, respectively. Post-larval shrimp deserve particular attention because they are commonly found in the brackish, upper waters of the estuarine systems and would be, therefore, the size group most likely to be affected by chemicals washing out from treated areas.

RED TIDE

In a year marked by heavy rainfall large numbers of the red tide organism, *Gymnodinium breve,* and some fish mortality, the methodical planning which produced the field study project for Tampa Bay and adjacent Gulf waters has shown its value. This systematic sampling program is providing the most informative series of data on record with respect to the hydrographic and planktonic conditions within a red tide area. The complex sequence of hydrographic events preceding, accompanying, and following red tide outbreaks has never been clearly defined. The Tampa Bay area field project represents an essential first step toward obtaining this type of information.

Several new environmental factors are now being followed —alkalinity, total nitrogen, calcium, and silicon. The first three constituents are definitely important to the metabolism of *G. breve.* The analysis of field water samples should indicate to what extent these factors may be growth-limiting or stimulating in nature.

Research at the Galveston Laboratory has progressed steadily in regard to defining the vitamin and trace element requirements of *G. breve*. Work on the nutrition of the organism has been considerably facilitated by the development of a virtually inorganic medium. This important step makes possible critical experiments to determine the importance of carbon and/or nitrogen-containing compounds to the growth and reproduction of this protist. We have also continued to investigate the effects of temperature, light, and salinity in terms of growth and survival of *G. breve*.

The screening of organic compounds has been continued in an effort to find a substance which will have practical value as a poison for the red tide dinoflagellate. During the year over 4,000 compounds have been tested for toxicity to *G. breve* cultures. A number of these seem to be even more toxic (per unit weight) than copper sulphate, the classical algaecide.

Engineering Projects

Value of the estuarine areas as nursery grounds for many major marine species is well established. Biological effects of water development practices will likely be extensive. Unfortunately, our present state of knowledge does not permit an accurate prediction of the effects on marine fishery resources resulting from changes in the natural conditions of the estuaries.

Though they cannot be evaluated with assurance, it may be appropriate to mention several foreseeable changes to be wrought by water development projects and presage estuarine effects. The most obvious alteration of present conditions will be reduction of streamflow through greater consumptive use and increased evaporation rates owing to the exposed surface area of reservoirs. A reduced influx of fresh water may alter the suitability of estuarine areas by increasing salinities; by varying salinity, circulation, and interchange patterns; by reducing inflow of land-derived nutrient materials needed for primary productivity; by lessening silt load and deposition; by diminishing turbidity; and by draining of ambient marsh area through lowering of river levels. As the population increases and industrial and agricultural interests expand, it is logical, in view of present facilities, to anticipate an increase in pollutants entering the estuaries with the remaining runoffs and waste waters. Influence of the inshore waters on the hydrography and food cycles of offshore waters is not clearly defined but presents yet an-

other factor to be considered in assessing the effects of drastic modification of river systems and their associated estuaries.

A further reflection of the expanding population and economy is illustrated by the increasing numbers of navigation and general construction projects which also modify the Gulf of Mexico estuaries and their suitability as marine habitat. Addition, realignment, and maintenance of navigational channels associated with the Intracoastal Waterway are projects frequently submitted for evaluation of effects on marine fishes. General construction projects is a term encompassing such items as small fills, mineral drilling facilities, pipeline crossings, wharf construction, and others generally having minimal effects on marine fishery resources.

Research on the Mississippi River-Gulf Outlet project is being continued under contract with the Texas A. and M. Research Foundation. Last year they concentrated on determining the hydrography of the large area to be traversed by the channel. They are now attempting to determine the composition and abundance of the fauna in the different habitats in order to predict the biological effects of hydrographic changes.

Pascagoula Technological Laboratory

This laboratory is headquarters for two principal functions in this region: (1) Technological research on fishery products, and (2) U.S.D.I. voluntary inspection service on seafoods.

With a staff of eight including chemists, technologists, and technicians, the laboratory is conducting research on four major projects. These are canning and preservation of marine products, chemistry of marine products, bacteriology of seafoods, and development of voluntary standards for seafoods.

Notable progress has been made in research on the inhibition of mold on smoked fish. Through use of a weak solution of potassium sorbate as a dip and proper packaging, successful storage of smoked mullet was demonstrated up to 14 weeks without mold formation. Proximate composition of various species of Gulf of Mexico industrial fish has been determined on a seasonal basis and periodic publications issued for industry guidance in this important fishery.

Experimental canning projects have shown some promise for utilization of mullet and sardine-like species as a canned commodity although this is still in a preliminary stage.

Samples of seafoods produced in the Gulf of Mexico have been examined for bacteriological factors and reports made to processors.

Eighteen firms and 20 plants have contracted for U.S.D.I. seafood inspection and certification service in the region, and 23 employees are identified exclusively with this activity. Production in plants under U.S.D.I. inspection has more than doubled in the past year, and already totals 1,600,000 pounds per week. Further growth is expected as standards for additional products become available.

Statistics

The detailed survey of the shrimp fishery of the Gulf of Mexico, which encompasses the collection of both biological and economic data, was continued. The importance and value of the economic data thus far collected was well demonstrated as it formed the basis of reports which were prepared by agencies and individuals in connection with proposed legislation to control shrimp imports. A general survey was again completed to ascertain the number of fishermen and operating units, and the volume and value of the catch of the commercial fisheries in the Gulf of Mexico and coastal areas of the Gulf States. Monthly landings bulletins were prepared and issued in cooperation with the States, as in past years.

Market News

The daily Fishery Products Reports, as well as the monthly and annual summaries of landings at principal Gulf ports, are being mailed currently to approximately 1,200 firms and individuals in the fishing and allied industries. They are available upon request. Included in these reports are such data as daily prices paid for shrimp at certain Gulf ports, quantity and kind of seafood packed under Department of the Interior Inspection, and market conditions in several large consuming areas of the United States.

The Bureau is active in fish and shellfish market development and administers the Government's fishery loan program.

PEAT, MARWICK, MITCHELL & CO.
Certified Public Accountants
Hibernia Bank Building
New Orleans 12, La.

ACCOUNTANTS' REPORT

Commissioners

Gulf States Marine Fisheries Commission

New Orleans, Louisiana

We have examined the statement of income and expenses of Gulf States Marine Fisheries Commission for the year ended June 30, 1960 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, 1960 and its resources at that date, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

New Orleans, Louisiana
July 7, 1960.

GULF STATES MARINE FISHERIES COMMISSION

Statement of Income and Expenses

Year ended June 30, 1960

Income:		
Member states contributions:		
Alabama		$ 1,000.00
Florida		3,500.00
Louisiana		5,000.00
Mississippi		1,000.00
Texas		6,000.00
Total income		16,500.00
Expenses:		
Salaries	$ 11,900.05	
Publication expense	486.06	
Traveling	980.06	
Office rent	1,080.00	
Stationery, printing and supplies	331.44	
Telephone and telegraph	325.83	
Postage	149.84	
Electricity	95.53	
Accounting	225.00	
Insurance	265.71	
Meeting expense	150.54	
Payroll taxes	239.74	
Depreciation	442.23	
Sundry	81.49	
Total expenses		16,753.52
Excess of expenses over income		253.52
Resources of the Commission, June 30, 1959		1,788.21
Resources of the Commission, June 30, 1960		$ 1,534.69

Statement of Resources — June 30, 1960

Cash (note 1)	$ 973.58
Traveling advance	250.00
Meter deposit	10.00
Prepaid insurance premiums	124.59
Equipment—at cost less allowance for depreciation, $2,293.63 (note 2)	176.52
	$ 1,534.69

(For notes see accompanying supplementary information to accounts)

GULF STATES MARINE FISHERIES COMMISSION

Supplementary Information to Accounts

June 30, 1960

(1) Cash:

Cash receipts (see accompanying statement)			$16,500.00
Cash disbursements:			
Expenses (see accompanying statement)		$16,753.52	
Equipment purchase		124.20	
		16,877.72	
Adjustment for expenses not representing cash outlay:			
(Decrease) in prepaid insurance	$(4.21)		
Depreciation	(442.23)	(446.44)	16,431.28
Excess of receipts over disbursements			68.72
Cash balance June 30, 1959			904.86
Cash balance June 30, 1960			$ 973.58
Comprised as follows:			
National American Bank of New Orleans checking account			$ 963.16
Petty cash			10.42
			$ 973.58

(2) Equipment:

	Cost	Depreciation	Net
Amount at beginning of year:			
Automobile	$1,436.38	1,077.29	359.09
Furniture and fixtures	909.57	774.11	135.46
	2,345.95	1,851.40	494.55
Additions to furniture and fixtures	124.20	—	124.20
Depreciation allowance for year	—	442.23	(442.23)
	$2,470.15	2,293.63	176.52
Amount at end of year:			
Automobile	$1,436.38	1,436.38	—
Furniture and fixtures	1,033.77	857.25	176.52
	$2,470.15	2,293.63	176.52

(3) Fidelity bond insurance carried—$10,000.00 each on chairman, vice-chairman and secretary-treasurer of the Commission.

BUDGET

GULF STATES MARINE FISHERIES COMMISSION

Fiscal Year 1960-61

Salaries	$13,000.00
Publications	500.00
Travel expenses	1,000.00
Rent of office	1,080.00
Stationery, printing, supplies	375.00
Telephone and telegraph	350.00
Postage	150.00
Electricity	95.00
Accounting	225.00
Insurance	260.00
Meeting expenses	85.00
Payroll taxes	250.00
Sundry	30.00
Depreciation	70.00
	$17,470.00

(Approved October 21, 1960)