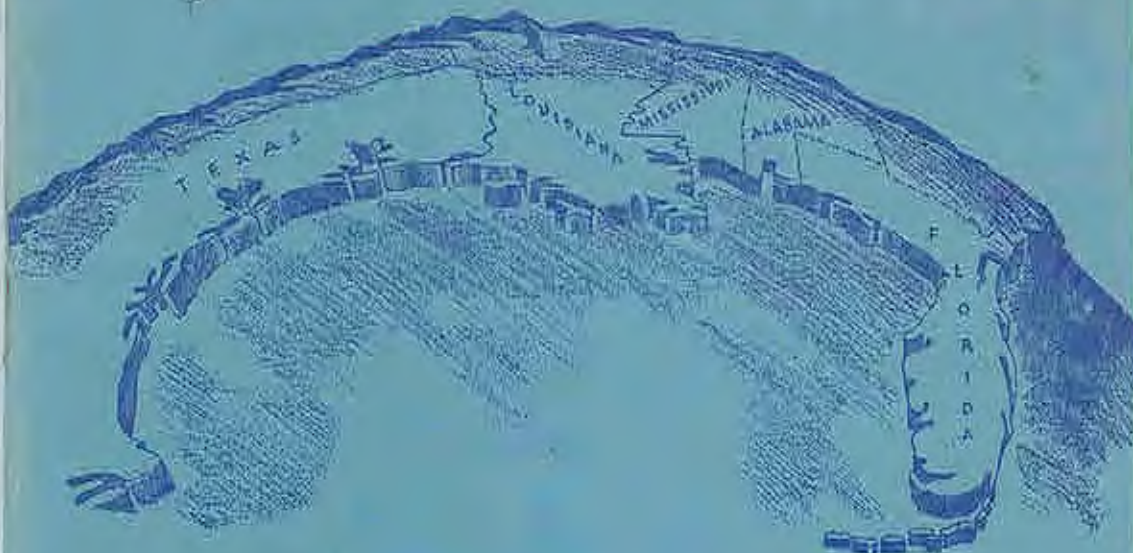


✓ 505.3  
400-1

OFFICE COPY ONLY



# GULF STATES MARINE FISHERIES COMMISSION

THIRD ANNUAL REPORT  
1951 - 52

To The

CONGRESS OF THE UNITED STATES

And to the

GOVERNORS AND LEGISLATORS

of

ALABAMA  
FLORIDA  
LOUISIANA  
MISSISSIPPI  
TEXAS

**THIRD ANNUAL REPORT (1951-52) OF THE  
GULF STATES MARINE FISHERIES COMMISSION**

To The

**CONGRESS OF THE UNITED STATES**

And To The

**GOVERNORS AND LEGISLATORS**

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 Con-  
gress assenting thereto.**

**Gulf States Marine Fisheries Commission**

**312 Audubon Building**

**New Orleans 16, Louisiana**

**GULF STATES MARINE FISHERIES COMMISSION**

**ROSTER—OCTOBER 1952**

**Howard D. Dodgen**  
Chairman

**Hermes Gautier**  
Vice-Chairman

**W. Dudley Gunn**—Secretary-Treasurer

**Ellen S. Hoover**—Office Secretary

**\* COMMISSIONERS**

**ALABAMA**

**Earl M. McGowin**, Director,  
Alabama Department of Conservation,  
Montgomery, Alabama

**Thos. A. Johnston, III**, Senator  
State of Alabama, Mobile, Alabama

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

**FLORIDA**

**George Vathis**, Supervisor,  
Florida Board of Conservation, Tallahassee, Florida

**William J. Hendry**, Representative,  
State of Florida, Okeechobee, Florida

**LOUISIANA**

**Ernest S. Clements**, Commissioner,  
La. Department of Wildlife and Fisheries,  
New Orleans, Louisiana

**E. J. Grizzaffi**, Representative,  
State of Louisiana, Morgan City, Louisiana

**Leander H. Perez**, District Attorney,  
Plaquemines and St. Bernard Parishes,  
New Orleans, Louisiana

## MISSISSIPPI

**Walter J. Gex**, President,  
Mississippi Seafood Commission, Biloxi, Mississippi

**Hermes Gautier**, Senator,  
State of Mississippi, Pascagoula, Mississippi

**Louis Simmons**, President,  
Gulf Coast Shrimpers and Oystermen's Assn.,  
Biloxi, Mississippi

## TEXAS

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

**Jimmy Phillips**, Senator,  
State of Texas, Angleton, Texas

**Lawrence A. Kurtz**, Colonel, U. S. Army (Retired),  
Seadrift, Texas

\*Order of listing—Administrator—Legislator—Governor's  
Appointee

## COMMITTEES

### COMMITTEE TO CORRELATE FISHERIES LAWS

**A. J. Harris, Jr.**, Chairman, Attorney,  
Alabama Department of Conservation,  
Montgomery, Alabama

**Mary Schulman**, Assistant Attorney-General,  
State of Florida, Tallahassee, Florida

**Charles J. Lange**, Attorney,  
La. Department of Wildlife and Fisheries,  
New Orleans, Louisiana

**Reece O. Bickerstaff**, Representative,  
State of Mississippi, Gulfport, Mississippi

**Erma Baker**, Attorney,  
Texas Game and Fish Commission, Austin, Texas

**COMMITTEE TO CORRELATE RESEARCH AND  
EXPLORATORY DATA**

**J. L. Baughman**, Chairman, Chief Marine Biologist,  
Texas Game and Fish Commission, Austin, Texas

**Harold C. Loesch**, Biologist,  
Alabama Marine Laboratory, Bayou LaBatre, Alabama

**F. G. Walton Smith**, Director,  
Marine Laboratory, University of Miami,  
Coral Gables, Florida

**Harry E. Schafer**, Acting Chief Biologist,  
La. Department of Wildlife and Fisheries,  
New Orleans, Louisiana

**A. E. Hopkins**, Director,  
Gulf Coast Research Laboratory,  
Ocean Springs, Mississippi

**IN MEMORIAM**

The loss of the scholarly advice and genial fellowship of James Nelson Gowanloch will be sorely felt by this Commission. Dr. Gowanloch, in serving as chairman of the scientific committee from the inception of the Commission until his death in May of this year, contributed immeasurably to the successful development and initiation of the various research programs now in progress.

## ACKNOWLEDGEMENT

In submitting this third 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 three 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,

Howard D. Dodgen, Chairman  
Hermes Gautier, Vice-Chairman  
W. Dudley Gunn, Secretary-Treasurer

## COMMISSION ACTIVITIES

OCTOBER 1951 - OCTOBER 1952

The proper utilization and development of the fisheries of the Gulf of Mexico are the objectives of the Gulf States Marine Fisheries Commission. In order for the Commission to accomplish its aims this fisheries body must depend largely upon the several states to supply information concerning the fisheries. When sufficient information has been made available and properly interpreted, the Commission is placed in the position of being able to draw conclusions and make recommendations. The procedure is for the Commission's recommendations to be directed to the proper state authorities. If recommendations receive favorable action <sup>venues</sup> ~~revenues~~ are opened which normally should lead to the better management and development of the fisheries concerned.

When the Commission came into existence some three years ago a survey was made to determine the amount of material available on the life history of the Gulf fishes. The survey disclosed that there was not sufficient information available to determine the merits of existing statutes or to recommend changes.

At the third annual meeting of the Commission, October 16-17, 1952, resolutions were adopted recommending to the marine fishery administrators of the member states that comprehensive investigations be made of the oyster and blue crab fisheries. The second annual report of the Commission stated that the states had been requested during the year to conduct research into the life histories of the fin fishes of interest to both commercial and sports fishermen, such as the spotted trout, red and black drum, flounder, mullet and catfish. The shrimp fishery, as has been previously reported, is a continuing study.

It can be said that the states as a whole are making good progress in the development of essential basic information. Some of the results of the investigations will appear in publications during the year 1952-53 and will supply foundation material heretofore not available for consideration by the Commission.

The following is a resume of biological, oceanographic and technological research accomplished by the compacted states during the past year, and plans for future investigations:

**Alabama**—The marine laboratory of the Alabama Department of Conservation, Bayou LaBatre, conducted a survey of all the state's oyster producing acreage during the past year. This area, about 84 square miles, included the lower portion of Mobile Bay and the eastern part of Mississippi Sound, which includes Portersville Bay. The total acreage of producing oyster bottoms has increased from about 5,000 acres according to surveys in 1890 and 1912 to about 6,000 acres in 1951. The percentage of depleted bottoms is still about 45% of the total area. Some of the reefs have changed greatly in size and shape, while others have remained the same.

Densities of oysters on the existing reefs were estimated. Records were made of the amount and size of spat, of the presence and abundance of predators and fouling organisms, and of the general condition of the shell. Mortality was estimated by use of box counts. Temperature and salinity data were tabulated in table form for each of the reefs. Other information gathered included reef location, area of reef in acres, acres depleted, depth on reef, depth off reef, growth density, and type of oysters.

Plans for the coming year call for studies on growth and mortality, spatfall, predators and fouling organisms of oysters. Hydrographic conditions of the area will also be recorded. The areas of most intensive study will be those areas which seem to have good potential oyster producing bottoms but may not be producing because of lack of necessary cultch. Experimental seed oyster and shell plants will be made in these areas if hydrographic conditions seem suitable for successful oyster cultivation.

Commercial plantings of seed oysters and shell will be made after experimental areas are proven. Commercial plantings of shell will also be made on proven existing reefs that are in need of cultch.

It is hoped that within the next year a survey of the oyster parasite **Dermocystidium marinum** will be started.

**Florida (West Coast)**—Biological and technological research has been conducted by the Marine Laboratory of the University of Miami on Florida's fisheries for the State Board of Conservation. Emphasis has been placed on the mullet and shrimp fisheries, which are the most valuable of the many marine species exploited in Florida.



In the mullet fishery particular attention has been paid to the northwest region of Florida. Tagging has been continued and results indicate that only a limited amount of migration occurs, most tagged mullet being recovered within twenty miles of the place of release. Other data tend to confirm the differentiation of the mullet stocks along the coast; time of spawning, size at first maturity, and average size of mullet caught are different for four different areas from St. Marks to Pensacola. Some changes in regulations will be suggested as a result of these studies.

Improved methods of refrigerated holding and transport of shrimp have been investigated. Increased length of voyages by the shrimp boats has caused present methods of transport of fresh shrimp in ice to be unsatisfactory. Experiments using refrigerated seawater show promise, shrimp held at 30-31°F. in this medium showing satisfactory taste panel scores after at least 21 days, compared to about 14 days for iced shrimp. Details of the method, including the usefulness of changing the seawater, the optimum temperature, and the usefulness of certain chemicals have also been investigated.

A small echosounder was used in an attempt to locate Spanish mackerel, in order to increase the efficiency in this fishery. Results were negative, but further work is projected.

Studies were conducted on the preservation of fish netting. It was found that Quebracho was the most effective preservative tested. Bluestone and alum, used as cleaning agents, weakened nylon netting, if not rinsed off thoroughly.

Investigations of smaller scope included studies on the biology of silver mullet, testing of Japanese-model longline gear, red snapper biology, fish mortalities, and a consumer study on the acceptance of Florida fish in midwest markets.

The oyster division of the State Board of Conservation has conducted research on Florida oyster resources. Biological studies and a shell planting program have been carried out, as well as surveys of potential producing areas.

In the coming year several of the investigations mentioned above will be continued. The mullet study will be expanded to include more detailed observations in the area from Tampa to Steinhatchee. An experiment has been started to find from close

examination of body form whether separate races exist in the mullet populations. Some gear experiments with mullet will be carried out and an educational bulletin describing all common types of Florida fishing gear is in preparation. The shrimp technology experiments will continue in an attempt to establish whether the seawater-holding system is actually feasible.

The experiment designed to test the reaction of fish and shrimp to electrical currents, which was begun late in the past year, will be continued. The snapper study will be terminated, and the mackerel gear work will be resumed again.

It is hoped to commence a study of the value of the marine sport fishery of the state and a biological study of the weakfish, provided personnel and funds are available.

**LOUISIANA**—The marine biological program has been two-fold. One aspect has been the continued process of the preparation and submission of final reports resulting from a biological research program conducted from June, 1947, through August, 1950. A second phase of the program, the active research, has been primarily in the direction of increasing the supply of oysters within the state seed oyster reservations. This program has been initiated on a permanent long-term basis.

During the coming year the program instituted to increase the production of oysters will continue and will be expanded to include oyster growing areas outside the seed oyster reservations. Facilities available will include a marine biological research vessel, a field laboratory at Sister Lake, and a combined office and laboratory located in Waveland, Mississippi.

Recently, in addition to the continued oyster investigations, a commercial shrimp division has been established. This division is in the orientation stages and the program in this direction is yet to be outlined and initiated. These developments give cause to be of greater expectations in marine fisheries during the next decade.

**MISSISSIPPI**—The Gulf Coast Research Laboratory at Ocean Springs has done considerable work for the Mississippi Seafood Commission on the oyster fishery. Restoration of the former productivity of the oyster reefs in Mississippi Sound has been the object of the work. Experimental plantings of shells were made

on five one-acre tracts on the major natural reefs at the end of August, 1951, to determine whether it is feasible to catch seeds at the end of the spawning season. The results were most favorable and encouraging and suggest that commercial shell plantings might well be made in later summer to supplement the usual plantings in May and June.

In June, 1952, two 10-12 acre plots were dredged as completely as possible to remove live oysters and empty shells, leaving the hard reef bottom. Half of each cleaned area was planted with cannery shells and the other half left without cultch other than the reef material. The purpose was to check the often repeated idea that the reefs need to be cleaned and allowed to restore themselves. It is too early now to evaluate the results, but they will be of definite importance by next summer.

Continuous records have been kept of the salinity, temperature, and pH of the water at some places. The salinity has been excessively high, even in the inshore waters. This favors such predators as the conch and the boring clam, and such parasites as **Dermocystidium**. The mortality caused by these enemies has been unbelievably high on the major reefs, rendering difficult an accurate analysis of the results of experimental shell planting.

Maintained unfavorably high salinity suggests that efforts be made to establish new reefs closer inshore where there is more drainage from the land. Studies have, therefore, been made of the nature of the upper 12-15 inches of the bottom throughout the Sound and adjacent regions to determine the physical and chemical characteristics of the bottom material with respect to existing oyster reefs and to potential planting ground. A preliminary report on this work has been prepared, and it is planned to study next summer the fate of oyster shells planted on the different types of bottom which have been analyzed. This information is important also with respect to shrimp nursery grounds.

In addition to observations on the predators and parasites, a study was made of the boring clam, its abundance with respect to size of the oysters and to locality, the number of actual penetrations of the shells, and other factors. The initial report on this is in preparation and suggests that this usually ignored pest may be a very important cause of mortality of oysters.

Other research planned by the laboratory includes a shrimp investigation which will be undertaken in the near future.

In addition, a start has been made on a study of the life history, feeding and breeding habits, growth and ecology of the spotted trout and flounder. It is planned to continue this work on a year-round basis.

Data so far obtained on these and other commercial fishes are preliminary only. However, a very thorough list has been compiled of the numerous species found in the coastal waters of the State with respect to the specific environmental conditions.

**TEXAS**—The basic program of the Texas Game and Fish Commission's laboratory, Rockport, for the coming year differs little from that carried on during the year 1951-52.

Investigations directed toward developing the life histories and habits of such inshore species of particular interest to sports and commercial fishermen as the spotted or speckled trout, the red drum or redfish, and the black drum will continue. Information which has been secured on these species will appear in bulletin form with tables and graphs in the near future. A preliminary paper on the flounder is likewise expected to be completed shortly.

Exploration of the continental shelf will continue as effort is being made to gather complete data relative to populations of the fishes and information on the molluscan and crustacean living thereon. The extent of the offshore migratory habits of various species, including shrimp, will be further studied. A bulletin on shrimp was issued during the year but the need for an extension of the shrimp tagging program is indicated and will be undertaken.

Investigations of the oyster and shell resources of Galveston Bay will be continued but extended to some degree with experimental plantings. An attempt will be made to evaluate the effect of shell dredging on fishing. Basic data on the blue crab fishery will be supplemented as that fishery is subject to further study. A publication entitled "Marine Food & Game Fish of Texas" will be published in the near future. The publication will include plates of many other species but only food and game fish will be discussed.

Aside from the interest of the Commission in the effort being made by the states to gather basic information concerning the fisheries, a number of subjects relating to the compact's objectives have received attention during the year.

The current statistical program is a vast improvement over that of three years ago but is yet considered inadequate. The Commission hopes in the coming year to have more complete landing records made available, included in which would be a breakdown of shrimp production by areas of catch and by species. A resolution requesting the proper state authorities to render statistical compilations to conform with minimum U. S. Fish and Wildlife specifications for the Gulf area, which includes the mentioned shrimp data, was adopted at the third annual meeting.

A program designed to bring about better conservation of the marine fisheries through an educational program directed to various age groups is an aim of the Commission. However, after considering the matter it was decided such a program could not be undertaken until more information relative to the fisheries became available.

Attention was given during the year to the inaugurating of an oceanographic survey of the inshore waters of the Gulf. As was reported in the second annual report, the project was suggested as a joint state and federal program. Both the state and federal agencies have approved the plan but its initiation cannot be expected in the near future because of the lack of personnel and funds.

The status regarding fishing privileges among the Gulf Coast states has changed somewhat within the year. Louisiana passed a law allowing non-resident fishermen the same fishing privileges as resident fishermen. It has been previously reported that Texas has such a statute in effect. A similar bill was placed on the calendar at the 1952 Mississippi legislature but did not come up for vote. Mississippi has had a reciprocal fishing agreement of several years standing with Louisiana but did not consummate one with Alabama until this reporting year. That Alabama and Florida have a reciprocal shrimp fishing agreement has been perviously reported.

A meeting of the Commission's legal and scientific committees was held at Pensacola in July 1952, the purpose of which was

to review an exhibit of the fishery laws and regulations of the compacted states with view of recommending to the Commission such changes as were deemed to be of benefit to any of the fisheries. The joint session recommended the extension of open season for the taking of oysters to May 15 of each year and the extension of the closed season to include the month of September each year. It was also recommended that existing fishing restriction on the blue crab fishery be abolished. The thinking behind each recommendation was that of increasing poundage production. The recommendations were decided to be deserving of further study. To assist in the development of necessary data the Commission adopted resolutions at the October, 1952 Brownsville meeting requesting the cooperation of the marine fishery administrators of the several member states.

The Commission completed its study of dead oyster shell production and revenues during the year and at the spring meeting in New Orleans adopted a resolution which recommended to the state authorities handling the shell sales that consideration be given to increasing the per cubic yard prices and that monies so derived be expended in furtherance of oyster and marine fisheries work. The resolution also recommended that the taking of dead oyster shells be strictly regulated by the member states.

In a resolution adopted at the third annual meeting and directed to the congressional delegations of the Gulf Coast States, the Commission indicated its opposition to such legislation as would make federal funds available for the purchase of surplus fishery products. In the same resolution the Commission expressed its approval of such legislation as would result in a direct and recurring allocation to the Department of the Interior of a portion of the monies derived from duties collected on imported fishery products. The resolution approved the diversion of such funds for use in educational work designed exclusively to gain a wider acceptance of products of the American fisheries and for providing complete and current fishery statistical records.

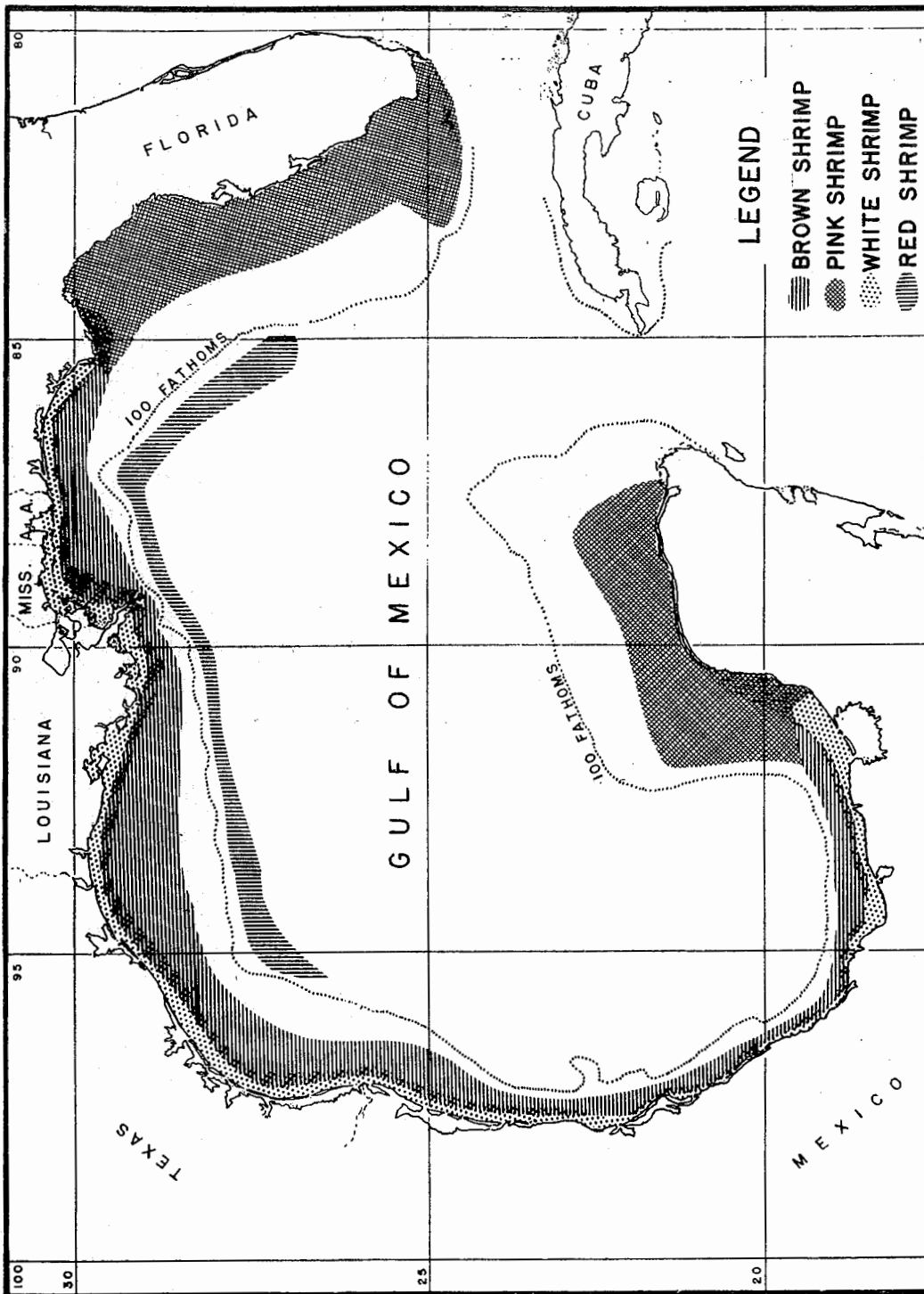
It was stated in the second annual report of the Commission that consideration was being given to requesting the several states to increase annual membership dues since it had been found that the \$13,000.00 total and initial contribution was inadequate to meet current operating expenses. At the 1952 spring meeting of the Commission the following schedule of annual dues

was decided upon as an equitable allocation of the amount necessary for operating expenses, and the states were requested to consider the making of such amounts available for the fiscal year beginning July 1, 1953:

Alabama .....	\$ 2,000.00
Florida .....	3,500.00
Louisiana .....	5,000.00
Mississippi .....	2,000.00
Texas .....	4,000.00
	<hr/>
	\$16,500.00

Mr. Howard D. Dodgen of Texas was re-elected Chairman and Mr. Hermes Gautier of Mississippi Vice-Chairman of the Commission for the year 1952-53.

The Commission continues with its policy of three years' standing in rotating meetings from state to state in order to obtain on-the-ground information relative to the fisheries. The next regular meeting of the Commission will be held in the Mobile area April 17, 1953.



A composite chart prepared by the U. S. Fish & Wildlife Service showing the kinds of marketable size shrimp most common to each Gulf area. The ranges of some species are overlapping, and commercially-important quantities do not occur throughout the range of any of these species. (Drawn from all available sources).



the vicinity of Brownsville and it is hoped that some additional work can be done south of Trinity Shoal off the coast of Louisiana and off Apalachee Bay on the coast of Florida before the end of the year. Although these areas may not prove to be fruitful, useful additions to data on the distribution of shrimp with respect to temperature, depth, and good trawling bottom will be obtained.

One of the points of special interest in data from the **Oregon** catches is the occurrence of shrimp in relation to the temperature patterns of the water. Unfortunately the problem is complicated by seasonal change, by changes which may be due to the life cycle of the shrimp, and by the fact that three or more species of shrimp are involved. In the fall and late summer **Oregon** records for the north Gulf show that, when moving progressively offshore, surface water temperatures generally increase and bottom temperatures decrease. During this period concentrations of brown grooved shrimp occur in a definite temperature range which becomes quite clear cut late in the season. This situation may be temporarily, but quite drastically, disrupted by a hurricane or severe storm which apparently scatters or moves the shrimp concentrations. During the fall the brown grooved shrimp are larger from deeper and cooler water.

Spring temperature patterns have been found to be quite different. **Oregon** records from the Louisiana and Texas coasts during April 1952 show only a slight range of variation (6° Fahrenheit) in the temperature at the bottom in depths from 10 to 50 fathoms and furthermore, some of the warmer bottom water temperatures were encountered further offshore, particularly near the continental shelf.

In the fall when temperature stratifications become clearly associated with depth, the fishermen find areas of good production by trial and error. When shrimp are located fishermen hold to that particular depth range in dragging as long as good catches continue. This is relatively simple and effective and it is probable that determination of bottom temperature at that time would be no additional help.

Data obtained on water temperatures are limited to areas outside the 10 fathom curve. The few data available from shallow water have been disregarded. Temperatures inside the 10 fathom

curve are likely to be influenced by special local conditions, such as the cooling effect of the flow of rivers into the sea or the warming effect of the sun on extensive shallow bays. A special condition exists at the mouth of the Mississippi River where the cool water flows outward on the surface for a considerable distance. During periods when the bottom water temperature is progressively cooler as one moves to deeper water, and the temperature pattern may be said to be regular, the distribution of the brown grooved shrimp, as shown by catches of the **Oregon**, also follows a more or less regular pattern becoming quite clear cut when the condition persists. The shrimp are progressively larger in the deeper and colder water with a tendency toward better catches at some particular depth or temperature.

Actually the productivity of the fishery for brown shrimp in the northern Gulf is much greater in the fall than in the spring, and it is in the fall that temperature patterns are more often regular as shown by the short series of data available. In the spring also there is some evidence of offshore wandering on the part of scatterings of pink and white shrimp. There are undoubtedly many factors that influence the movement of shrimp and their tendency to congregate or to scatter. The direct value of the determination of bottom water temperature by the fishermen for finding shrimp is not now clear. It is important to remember that the data gathered by the **Oregon** is spread very thin and covers a very wide area.

On the other hand the chances are excellent that determinations of water temperatures at the bottom would prove valuable to fishermen for location of shrimp in the spring or at any season presenting an unusual or an irregular temperature pattern at the bottom. The determination of surface temperature is apparently useless. Although the methods of getting bottom temperatures are comparatively simple, inexpensive, and require little time, it is probable that the use of temperature patterns to locate shrimp would require considerable skill and experience. Some elaboration on this is to be included in the Exploratory Section's completed shrimp report but any satisfactory testing of the method would require more time than has been available.

It has not been practical for the **Oregon** to stay with a particular concentration of shrimp for weeks or months in an attempt to learn the conditions under which they move, scatter, or disap-

pear. Such data as have been collected are not complete and at this time ideas expressed on bottom temperature correlations are tentative. When the results of oceanographic work carried on by the M/V **Alaska** are available a better understanding of the relationship of shrimp concentrations to temperatures will be possible. The **Oregon's** program for the remainder of this calendar year is designed to supplement and recheck results todate.

In the report on exploration for shrimp in the Gulf of Mexico to be prepared at the end of this calendar year it is likely that three principal areas having possibilities for further commercial development will be discussed. These areas are in the 200 to 300 fathom depth range near the mouth of the Mississippi River where red shrimp, **Hymenopeneus robustus**, have been taken; in shallower waters on the coast of Florida between St. Joseph Bay and Tampa Bay, and in the 25 to 50 fathom depth range between the meridians of Freeport, Texas, and Timbalier Island, Louisiana. In each instance there are apparent obstacles to profitable shrimp fishing, and it is hoped that the results of the work of the **Oregon** will show ways to surmount them.

**TUNA**—At the beginning of exploratory work in the Gulf by the **Oregon** in 1950 the little tuna, **Euthynnus alletteratus**, was well known in the Gulf where it is commonly called bonito.

In August, 1951, the **Oregon** sighted large schools of tuna in the central Gulf very generally distributed on a course from the northern edge of the Campeche Bank to the mouth of the Mississippi River over depths of 200 fathoms or more but only a few specimens were collected. The specimens taken proved to be blackfin tuna, **Parathunnus atlanticus**. Additional records of the capture of blackfin tunas were obtained in 1951 and 1952 from the **Alaska**, from the snapper fishing vessel **Argus** and blackfins were collected by the **Oregon** including one small specimen taken near the continental shelf off Louisiana in November 1951.

In 1952 more emphasis was placed on tuna explorations. The work accomplished may be conveniently divided into two parts. One objective was to find out what kinds of tuna exist in the Gulf, the quantities available, size, seasonal and geographical movements and as much as possible of their behavior. The second objective was to find the practical ways to catch them. Some unsuccessful purse seining was done both for the little tuna and for

blackfin tuna. Successful fishing for little tuna was carried out in the Tortugas area in May and June using shrimp trawl trash for chum and fishing with handlines and jackpoles. Catches of tuna on trolling lines confirmed the identity of schools of fish observed off the shelf of Tortugas as *Katsuwonus pelamis*, the white skipjack or oceanic bonito. In late August additional schools of tuna were located about 70 miles south of Pensacola. Blackfin tuna were by far the most common fish observed but mixed schools were present and specimens of the white skipjack were taken in addition to blackfin tuna. Also a single yellowfin tuna, presumably *Thunnus argentivittatus*, weighing 51 pounds was taken in the area. Several fair sized schools of these large tuna were worked but only a few strikes were obtained. Two specimens of the little tuna were taken from schools apparently made up chiefly of blackfin tuna and white skipjack. This is the only time that the species has been taken off the continental shelf by the **Oregon**. The poor showing in catches of blackfin tuna by the **Oregon** by trolling seems to result from the fragile jaws and gills of the species. They strike readily at ten knots but not so well at below seven knots. At these speeds the jaws, gills or opercles generally pull out. Even when these fish were hooked well enough to pull they were often lost to sharks.

The question of whether many or any of the larger tuna observed by the **Oregon** are blackfins remains unanswered. Some of them must have been yellowfins, since one of this species was caught.

To augment data on the tuna one of the Section's representatives visited the tuna fishery on the south coast of Cuba in late August and spent several days on "bonito" boats. He found that the catch was made up of about 85 per cent blackfin tuna and about 15 per cent white skipjack, averaging less than five pounds each. He also obtained considerable details of the methods used in this interesting live bait fishery.

Some progress has been made in the collection and identification of feed of the tuna in Gulf Waters which will help in bait problems.

**MISCELLANEOUS OBSERVATIONS**—During 1952 the **Oregon**, working out of its Pascagoula base, has spent proportionately more time off the continental shelf in deep water than in

1951, and it is possible that for this reason the impression has been gained that the offshore waters support an extremely varied fauna that at certain seasons seems quite rich. In July and August, 1952, in the deep water bight south of Pensacola and off the continental shelf south of Mobile, the water contained a large amount of large plankton organisms and very small fish such as jacks (Caranx). Jelly fishes, stomatopod larvae, and other organisms were also common. At this time, trolling captures of wahoo, barracuda, and strikes by tuna were not uncommon. Jumping sailfish were seen and some fish were recorded in the **Oregon** watch log as marlin. On several occasions medium and large size finback whales were seen and a few sperm whales were noted. 1952 observations by the **Oregon** would indicate that the larger whales are fairly common in the Gulf. Whether the mentioned fishes or whales are more or less common than in preceding years cannot be established at this time because of the lack of sufficient recorded observations.

### FISHERY INVESTIGATIONS

Considerable progress is being made in the analysis of chemical and biological data as well as in some important investigations on the fundamental make-up of sea water.

An important piece of work has been accomplished by the Galveston laboratory in proving the presence of ascorbic acid, vitamin C, in small quantities of natural seawater. It has also been demonstrated that another complex carbohydrate known as a rhamnoside is in some cases present in surprisingly large quantities. Its concentration appears to be variable and ranges from 0 to approximately 0.4 of a gram per liter, or 11 ounces per cubic yard of seawater. Other important compounds are being isolated from the water and will be reported in due time.

The significance of these discoveries is in that they open a new road to the exploration of the biology of the ocean. The Galveston laboratory may be expected to be able to produce these sugars and other compounds in sufficient quantity to study their effects on the behavior, survival and growth of immature fish, and eventually, maybe even mature fish.

An exhaustive study of the distribution of these compounds in the Gulf is in progress and will be aided by the most modern chemical equipment available.

In any consideration of the ocean and its depths it must be remembered that all knowledge gained must of necessity come from indirect observation. The number of fish beneath the surface of the water can only be estimated by spot sampling. The same mass of water from which a sample may be taken will not remain in the same location due to the influence of tides and currents. Accordingly, an important activity at the Galveston laboratory has been the development of apparatus for improving the scope and quality of indirect observations at sea.

Since the activity is primarily interested in the distribution and survival of young fish, much of this effort has centered on the improvement of plankton collecting techniques. Three pieces of apparatus have been designed and built by various members of the staff. A simplified version of a so-called "high-speed" plankton sampler (originated at the Scripps Institute of Oceanography) has been built and successfully operated. An all-metal half meter net designed for deep water tows has been built and operated with marked success. A third sampler for the continuous sampling of plankton whenever and wherever the ship is running has been constructed and is now being used.

The significance of these items is that they represent progress towards a more thorough and representative sampling of the small plants and animals on which fishery production ultimately depends. In addition they help in the understanding of the animals as they move up and down, or back and forth with drifts or currents. The continuous sampler has yielded information concerning a night time movement of copepods to the surface. As analysis proceeds there will probably be much more to say about this movement. The other samplers are catching larger specimens of the young fish. This facilitates the filling in of the gaps between the very young and the older fish which is necessary to identify many of the unknown larvae.

The analyses of water samples for nitrate and phosphate have established for all tropical waters, that is to say a low concentration of these units from surface to bottom follows the pattern established for all tropical waters, that is to say a low concentra-

tion at the surface, a maximum at 600 to 800 meters below, and a depression from there down. In the Gulf it has been found that the first 40 to 100 meters is almost destitute of nutrients. A more intensive study of the first 200 meters is planned in the near future.

The data from the first coverage of the Gulf (April-August, 1951) point to two interesting facts insofar as the distributions of fish larvae and fish eggs are concerned. First and most important is that the major concentrations of both eggs and larvae appear to be within the 100-fathom curve. Within this shelf area the highest concentrations of eggs and larvae occurred along the lower Texas coast and the upper Mexican coast. There were less extensive concentrations on the Campeche Bank, in the Galveston area, and the Florida Gulf coast.

In May and June, 1952, cruise III-2 in the eastern portion of the Gulf gave the same picture relative to the distribution of eggs and larvae on and off the continental shelf. This "inshore" concentration as it might be termed was centered just east of Cape San Blas and fell off sharply to the south, and tapered off gradually to the west. It could be said that the more localized centers of distributions were in the Mobile region and an area just east of Cape San Blas.

The full significance of these distributions of fish eggs, larvae, and juveniles cannot be known until all of the species involved can be recognized and the large masses of individuals segregated into their various kinds. The G-III all metal sampler was towed as deep as 200 meters (approximately 100 fathoms) in waters beyond the continental shelf. In shallower waters it was towed from a point near the bottom.

In this connection the observation is offered that by far the majority of the adult fish caught by trolling were taken inside of the 100-fathom contour.

Another problem on which something can be offered is that of the so-called "deep scattering layer." This layer is a stratum of some peculiar biological and/or physical property which causes it to partially reflect sound waves back to a fathometer to give on the record the effect of a false bottom. Its most interesting attribute is its migration towards the surface at night and return to the depths at daybreak. This scattering layer was first discov-

ered by some workers in the Pacific Ocean and has since been found in most of the world's oceans, and the Gulf is no exception. An analysis of the **Alaska's** fathometer records has been completed and it represents the most complete study yet made in the Gulf.

There is no doubt about its existence, but the obscurity of its causes is manifest in the many diverging theories purported to explain it.

In this connection preliminary results from the continuous plankton sampler can be reported. It has been found that a very pronounced migration of copepods (one of the most important forage organisms for fish) to the surface takes place at night. Since the automatic sampler gives hourly reports twenty-four hours a day it has been determined at what hour the copepods came up and what hour they went back down. The migrations of the animals may or may not have something to do with the deep scattering layer. It is the knowledge that these animals do have a definite diurnal migration that led the original discoverers of the deep scattering layer to believe that the layer reflected the movements of copepods, or at least the movements of animals associated with them.

An important function was added to the Galveston laboratory when the Red Tide Investigation was moved to Galveston from Sarasota. This was done both in the interest of economy and the increased rate of progress inherent in the close collaboration between the scientists of the two groups. The solution to the red tide problem and an understanding of the survival of baby fish have many mutual elements. Investigation of the one can admirably complement investigation of the other.

The principal progress in the red tide problem has been in the development of a theory concerning the hydrographic stage setting required before an outburst can take place. The artificial growing of organisms similar to those causing the 1947 outbreak is just now getting underway.

With this brief digest of tentative findings in mind a review of plans for future work is presented:

First of all the staff is faced with the problem of the survival of young fish during the days immediately following hatching



from the egg. This is a most crucial time in the life of the fish and in the case of commercial species may well determine the success of the fisherman in the years when the fish of a given spawning will have reached a marketable size. To know whether or not a given spawning will be successful is to understand the nutritional requirements of the baby fish, to recognize the tolerable limits of such physical factors as temperature and density and such chemical factors as salinity and dissolved oxygen.

These and associated problems will be attacked in the Laboratory first, because in the Laboratory progress can be more rapid by the use of controlled experiments. An important phase of this work is the study of the organic compounds found to occur naturally in seawater as already mentioned. These compounds will be isolated and concentrated in quantities sufficient to use experimentally.

In order that the results from this experimental work can be applied to field studies effort will be made to improve the plankton gear. Special consideration will be given to that segment of the water column between 500 to 1,000 meters.

It is expected the general survey of the Gulf will continue for another year. This will permit the identification of areas most likely to yield useful information, and which should be intensively studied.

A new instrument for the accurate recording of salinity and temperature has been finally tested and is ready to be installed on the **Alaska**. This instrument will be used in conjunction with the continuous plankton recorders and will be of invaluable aid in understanding the environmental conditions which favor, or are hazardous to, baby fish. The data provided by this instrument will also be invaluable in the water mass analysis so vital to an understanding of such phenomena as the "red tide."

In preparation for the intensive sampling required by the biochemical program, a complete set of Nansen bottles and reversing thermometers is being obtained.

## OCEANOGRAPHIC SURVEY

The Department of Oceanography through the Texas A. & M. Research Foundation is conducting several studies of an ocean-

ographic nature in the Gulf of Mexico. Among these is Project No. 24, an Oceanographic and Meteorological Survey. This research project is being sponsored jointly by the Geophysics Branch of the Office of Naval Research and the Bureau of Ships. It has been conducted chiefly in cooperation with the U. S. Fish and Wildlife Service, using its **Alaska**. The project has as its purpose the analysis as well as the collection of physical and meteorological oceanographic data.

Prior to October 1951, the **Alaska** made three cruises of an oceanographic nature in the Gulf. These cruises constitute the first full scale coverage of this area at all depths. On these cruises, accurate determinations of temperature and salinity were made for selected depths. From these data (using the dynamic topography based upon water density distribution) a preliminary pattern of currents was computed. Using the results as a basis for planning, two additional cruises were made to provide data for further current analysis.

Horizontal distributions of temperatures at selected depths have been plotted on base maps. Both reversing thermometer and bathythermograph observations were used in drawing these charts. Sea surface isotherms have been drawn for all five cruises to-date. It is of interest to note that these isotherms indicate that considerable variation from mean sea surface isotherms previously published exists in the Gulf.

In addition to the two cruises mentioned above, project personnel and other department members took part in two cruises in the area of the Bahamas and Bermuda during the past year. These cruises were sponsored by the Office of Naval Research. Moreover project personnel accompanied the U. S. Fish and Wildlife Service on two cruises aboard the **Oregon**, to the Campeche Banks and to the mouth of the Mississippi, respectively.

In February, 1952, Technical Report No. 4, **Physical Oceanography of the Gulf of Mexico, A Brief Review**, was distributed. This report contains a survey of previous work done in the Gulf and points out the importance of a continuing oceanographic program in this area. A similar review was prepared concerning the meteorology of the Gulf.

A report containing all data collected on the first three cruises of the **Alaska** is being prepared and will be ready for distribu-

tion at an early date. This report will contain values of temperature and salinity for both observed and standard depths at each station, phosphate values where obtained, dynamic calculations and meteorological data for each station. The salinity and phosphate values obtained on these three cruises were determined by the Fish and Wildlife Service. Similar reports will be published for Cruises 4 and 5.

The project has undertaken a preliminary survey of Mobile Bay where, over an 8 day period, detailed measurements of temperature, salinity and current have been made both at the surface and bottom at various stages of the tide.

A study has been initiated to determine a reference level of no motion for the Gulf of Mexico using the data obtained on the **Alaska** cruises. When this reference is determined, it will then be possible to obtain absolute current velocities. To date, a reference level of 1000 meters has been used for this work.

#### OYSTER INVESTIGATIONS

The experimental program designed to investigate inherited characters in the oyster has occupied a major portion of the Pensacola laboratory's research time. The results so far, while promising, have been mostly negative because of the technical difficulties involved in raising the oyster larvae. Success in this project is, of course, dependent upon the raising of larvae through the setting stage at will. The difficulty apparently lies in providing the larvae with the proper kind and amount of food. Although cultures survive for many days in the laboratory, and some larvae metamorphose and set, the majority fail to grow normally and eventually starve to death.

One culture of larvae survived metamorphosis and enough spat were obtained for experimental purposes, even though the mortality was very great. This culture was obtained from a group of ten oysters which spawned naturally in a large tank of standing water. The parent stock was transferred to Pensacola from Chesapeake Bay at an early age. The Laboratory intends to rear the offspring for use in determining the validity of the hypothesis that different races of commercial oysters exist along the coast.

The corollary of this problem on heredity is the study of environmental factors which produce well-defined characteristics

in the oysters. This work is progressing well and some phases, such as the effect of crowding and diminished food supply, are practically complete.

Studies of the normal pattern of oyster growth in the Pensacola area have been completed. These observations cover the period from setting until the oysters were three years old. The results are interesting in that they show the continuity of growth during all twelve months of the year. However, this growth is not necessarily a matter of increases in length and width. In mature oysters, for example, there is little or no increase (there may be significant decreases) in these dimensions during the warm summer months. But in this same period, there are important increases in thickness and, correspondingly, in total volume. In the summer, while the oyster may not appear to grow larger, the amount of internal space available for the meat increases significantly.

These studies have revealed striking differences in the timing of growth increases as oysters grow older. The pattern during the first year of life is different from the second, and the second-year growth pattern differs from the third year. In the first twelve months, growth is continuous in all dimensions and very rapid. During the second year, growth increases become more seasonal in their timing, that is, slowing down during the reproductive season in the warm summer months and speeding up in the winter months when presumably there is more food available. In the third, and probably succeeding years, there is an increased tendency for a majority (85%) of the growth to take place during three or four winter months.

The fourth season of continuing observations on larval abundance and spatfall is now completed. Techniques have been devised and are now in use for the collection of spat which permit mathematical exactness in recording spatfall in terms of unit area of cultch. This greatly facilitates statistical analysis of the results. The Laboratory's data show a progressive three year decline in the abundance of oyster spat which was halted in the season just passed by a decided increase in abundance. It will be of great importance if natural cycles of abundance in the local environment can be identified. The reasons underlying "good" spat years are as yet unknown although of the greatest importance to the oyster industry. It is hoped that the continuation of this

project will reveal direct relationships between spatfall and predictable or controllable environmental factors. Such information will be of value not only in the Gulf area but may also apply to the northern oyster industry.

The investigations of snails and other oyster predators have been curtailed during the past year for lack of time. Additional details in the life cycle of the drill were observed, and, with the exception of one stage, complete information on its life cycle and rate of growth has been obtained. The length of the free-swimming larvae stage is still unknown and it is important, for this governs the amount of dispersal possible from an infested locality. Evidence points to a free-swimming planktonic life of as much as sixty days. This would be unusual and, if true, would make control operations far more difficult. Cultures of larvae have been maintained in the Laboratory for thirty days but these larvae at the time of death were less than half as large as the youngest crawling snails observed.

Collections of material for study of the seasonal changes in the gonads of several animals have been made. These animals include the commercial oyster, the little "tree" oyster, the oyster drill and the boring clam. The recent appointment of a laboratory aid skilled in histological technique will facilitate this material being prepared for study during the coming months.

Three manuscripts covering different phases of oyster growth are now in preparation. During the past year, a manuscript describing the Laboratory's field work in Mississippi Sound in reference to the Bonnet Carre Spillway has been reviewed and published as the Service's Research Report No. 31.

In the forthcoming year, the major research effort will be spent on the problem of rearing oyster larvae. The remaining time will be devoted to the analysis and preparation for publication of results obtained so far in the oyster investigations being conducted at the Service's Pensacola Laboratory.

## **FINANCIAL REPORT**

**MOSES, RITTLER & COMPANY**

**Certified Public Accountants**

**Audubon Building**

**New Orleans, La.**

July 14, 1952

To the Commissioners,  
Gulf States Marine Fisheries Commission,  
New Orleans, Louisiana.

Gentlemen:

We have examined the accounts of the Gulf States Marine Fisheries Commission, New Orleans, Louisiana, for the year ended June 30, 1952. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other procedures as we considered necessary in the circumstances.

We now submit our report on the examination, together with the following statements:

Exhibit "A"—Balance Sheet as at June 30, 1952

Exhibit "B"—Statement of Revenue and Expenditures for the year ended June 30, 1952

Exhibit "C"—Statement of Cash Receipts and Disbursements for the year ended June 30, 1952

### **ORGANIZATION**

The Gulf States Marine Fisheries Commission was organized pursuant to the provisions of Public Law No. 66 of the Eighty-First Congress of the United States, to promote the better utilization of the fisheries, marine, shell and anadromous, of the seaboard of the Gulf of Mexico, by the development of a joint program for the promotion and protection of such fisheries and the prevention of the physical waste of the fisheries from any cause.

The states entering the compact were Florida, Alabama, Mississippi, Louisiana, and Texas.

The compact was approved on May 19, 1949 and was ratified by the legislatures of the member states.

### FINANCIAL CONDITION

The financial condition of the Commission as at June 30, 1952 is set forth in the balance sheet submitted as Exhibit "A".

The cash in the National American Bank, New Orleans, Louisiana, was confirmed by a certificate obtained by us direct from the bank.

All recorded cash receipts were traced to deposits in the bank and the expenditures were verified by inspection of cancelled checks, properly approved authorizations, and other data.

The addition of \$124.55 to the furniture and fixtures account during the year ended June 30, 1952 was found to be proper. Provision for depreciation of \$490.73 was made for the year at the following annual rates:

Ford Automobile	25%
Furniture and Fixtures	<u>10%</u>

### OPERATIONS

Details of the operations for the year ended June 30, 1952 are given in the statement of revenue and expenditures, Exhibit "B", and are summarized as follows:

Revenue	\$13,000.00
Expenditures (including depreciation)	<u>13,225.22</u>
Excess of Expenditures over Revenue	<u>\$ 225.22</u>

Under the provisions of Public Law No. 66, the several member states are to make annual contributions for defraying the expenses of the Commission. The amounts of these contributions and their annual due dates are as follows:

	Amount	Annual Due Date
Florida	\$ 3,500.00	July 1st
Alabama	1,000.00	October 1st
Mississippi	1,000.00	July 1st
Louisiana	5,000.00	July 1st
Texas	2,500.00	September 1st
 Total	 <u>\$13,000.00</u>	

### CASH RECEIPTS AND DISBURSEMENTS

Particulars of the cash receipts and disbursements for the year ended June 30, 1952 are given in the statement of cash receipts and disbursements, Exhibit "C". A summary of this statement is as follows:

Cash Balance as at July 1, 1951	\$ 4,517.54	
Add: Cash Receipts	19,440.80	\$23,958.34
	<hr/>	
Less: Cash Disbursements		14,656.84
		<hr/>
Cash Balance as at June 30, 1952		<u>\$ 9,301.50</u>

### GENERAL

**Fidelity Bond.** The officers of the Commission are covered under a fidelity bond in the amount of \$30,000.00.

Appreciative acknowledgment is made of the courtesies extended our representatives during the examination.

Respectfully submitted,

s/ Moses, Rittler & Company  
Certified Public Accountants.



Exhibit "A"

**BALANCE SHEET**  
**GULF STATES MARINE FISHERIES COMMISSION**  
**As at June 30, 1952**

**ASSETS**

**Current Assets:**

Cash in Bank and on Hand:

National American Bank	\$ 9,285.88	
Cash on Hand	15.62	

Total Current Assets	\$ 9,301.50
----------------------	-------------

**Other Assets:**

Revolving Travel Fund—W. Dudley Gunn	250.00	
Meter Deposit	10.00	260.00

**Fixed Assets:**

Automobile	1,645.80	
Furniture and Fixtures	855.09	

	2,500.89	
Less Reserve for Depreciation	735.62	1,765.27

**Prepaid Expenses:**

Bond and Insurance Premiums	89.16
-----------------------------	-------

Total	\$11,415.93
-------	-------------

**LIABILITIES AND NET WORTH**

Liabilities	none
Net Worth	\$11,415.93

Total	\$11,415.93
-------	-------------

Exhibit "B"

**STATEMENT OF REVENUE AND EXPENDITURES  
GULF STATES MARINE FISHERIES COMMISSION**

For the year ended June 30, 1952

**Revenue:**

Contributions from Member States:

Alabama	\$ 1,000.00
Florida	3,500.00
Louisiana	5,000.00
Mississippi	1,000.00
Texas	2,500.00

Total Revenue	13,000.00
---------------	-----------

**Expenditures:**

Salaries	\$ 9,200.00
Rent—Office	1,080.00
Bond and Insurance Premiums	188.84
Accounting Fees	175.00
Telephone and Telegraph	380.20
Electric Lights	56.31
Travel—Personal and Auto	1,055.56
Postage	62.35
Stationery, Printing and Office Supplies	536.23
Depreciation—Automobile	411.45
Depreciation—Furniture and Fixtures	79.28

Total Expenditures	
(including depreciation)	13,225.22

Excess of Expenditures over Revenue	\$ 225.22
-------------------------------------	-----------

Exhibit "C"

**STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS  
GULF STATES MARINE FISHERIES COMMISSION**

For the year ended June 30, 1952

Cash in Bank and on Hand as at July 1, 1951 \$ 4,517.54

**Cash Receipts:**

Contributions from Member States:

Alabama	\$ 1,000.00
Florida	3,500.00
Louisiana	5,000.00
Mississippi	1,000.00
Texas	7,500.00

Total Contributions from  
Member States 18,000.00

Collections of Federal Withholding Tax 1,440.80

Total Cash Receipts 19,440.80

Total to be accounted for 23,958.34

**Cash Disbursements:**

Salaries	9,200.00
Rent—Office	1,080.00
Bond and Insurance Premiums	238.00
Accounting Fees	175.00
Telephone and Telegraph	380.20
Electric Lights	56.31
Travel—Personal and Auto	1,071.30
Postage	62.35
Stationery, Printing and Office Supplies	536.23
Federal Withholding Tax Remitted	1,732.90
Purchase of Furniture and Fixtures	124.55

Total Cash Disbursements 14,656.84

Cash in Bank and on Hand as at June 30, 1952 \$ 9,301.50

## BUDGET

### GULF STATES MARINE FISHERIES COMMISSION

Fiscal Year 1952-53

Salaries	\$ 9,800.00
Rent—Office	1,080.00
Bond and Insurance Premiums	238.00
Accounting Fees	175.00
Telephone and Telegraph	380.00
Electric Lights	56.00
Travel—Personal and Auto	1,500.00
Postage	65.00
Stationery, Printing and Office Supplies	540.00
Furniture, Fixtures and Maintenance	100.00
Subscriptions	10.00
Reserve for Depreciation	500.00
	<hr/>
	\$14,444.00
	<hr/>

Approved by the Commission October 17, 1952.