

# RESEARCH AND EXPLORATORY FISHING IN GULF OF MEXICO

(The writer of the following account of fisheries research and Robert F. Inger, Assistant Curator of Fishes, recently returned with collections for the Museum made possible by their participation, at the invitation of the U.S. Fish and Wildlife Service, in a 1,500-mile exploration cruise aboard a government motor-vessel.)

By LOREN P. WOODS  
CURATOR OF FISHES

**T**HE GULF OF MEXICO, in spite of its ready accessibility and its long shoreline in the southern United States, has received no over-all or detailed study from oceanographers and biologists, particularly ichthyologists, until quite recently. The reasons for this are not hard to find. The oceanographers studying the Gulf Stream concentrated on the Caribbean Sea and the Florida Straits, while the ichthyologists were content to sample the interesting reef fishes of the Florida Keys and the abundant fauna of Mississippi Sound, just east of the Mississippi River delta, and of Laguna Madre along the shore of southwestern Texas. To carry on work away from the shore required large boats as well as considerable financial support.

Within the past ten years, however, a great need for information, both physical and biological, had been discovered by several different though curiously inter-related industries. The oil industry had extended its fields into the tidelands and desired information on the substratum and general geomorphology of the Gulf Basin. This industry also supported research on the chemistry and general physical oceanography of the northern Gulf and was interested in such research as the present and past distribution of the foraminifera over the entire Gulf.

The paper mills and plastic mills located near the mouths of several navigable rivers as well as the oil refineries were vitally interested in the effects of their effluent pollution on the animals living in the estu-

aries and sounds. The oysters along the entire Gulf Coast have diminished at an alarming rate during the past few years and lawsuits between the oyster, oil, and paper industries involving enormous sums are perpetually in the courts.

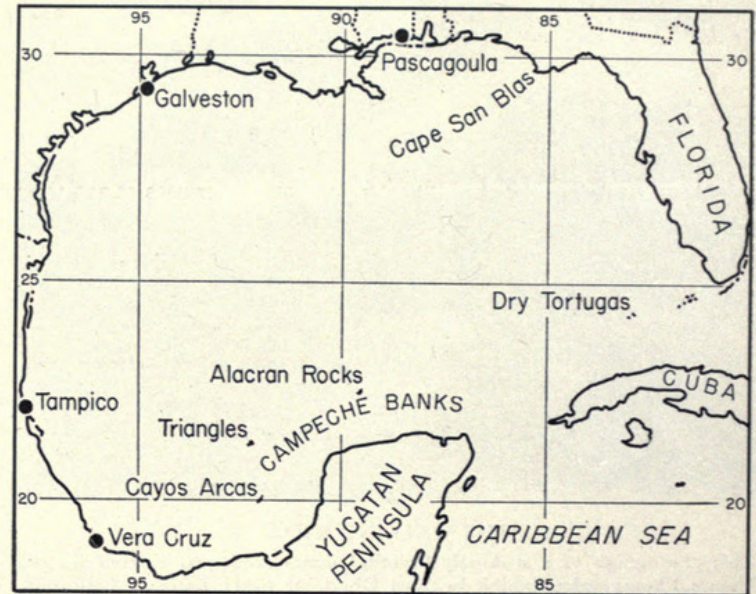
The menhaden processing-plants for fish oil and fish meal have been enlarged since 1946, and new plants have been built all along the Gulf coast. Menhaden are fishes famous for maintaining fabulous schools for several years and then suddenly disappearing. The life-histories of these fishes, which belong to the herring family, are almost unknown. The spawning and nursery areas, the parasite that is supposed to cause sterilization in the males, and even the food are unknown. There is still no adequate knowledge in spite of the fact that the menhaden fishery has for the past few years ranked first in volume of the United States East Coast fisheries with a catch in 1948 of more than a billion pounds. It was only in 1948 that the five species of North American menhaden were distinguished.

Most of the shrimping and fishing in the Gulf was previously carried on in the shallow waters near shore. This zone has always in the past been subject to considerable fluctuation in production resulting from natural causes as well as the direct influence of man. The outstanding natural catastrophes affecting fisheries have been the fish kills along the Texas lagoons and coasts. These are caused by sudden cold northern winds that chill the shallow water, even to the extent of forming ice, thus killing the fish to considerable depth. The coastal fisheries require from two to three years to recover from severe "norther" kills.

Another natural calamity is the "red tide" that affects not only the beach and tourist business along the Florida west coast but to some extent the fisheries by killing surface and shallow-water organisms including young shrimp and the young of some commercially important species of fishes. A "red tide" results from periodic increase of microscopic one-celled organisms that contain reddish-brown pigment. The great numbers of such animals are sufficient to give a reddish cast to the sea. The long-range effects on fisheries by the "red tides" is not known. Unknown also is the basic un-

derlying cause of the upset in balance that makes a "red tide" possible.

Since 1946, the white-shrimp fishery, which had been carried on in the northern Gulf, has declined. Fortunately, however, pink shrimp were discovered in fairly deep waters in the Florida Keys and brown shrimp off the Texas coast. This gave a great impetus to the construction of shrimp boats and gear that were capable of working in deep water. The availability of larger



MAP OF GULF AREAS REFERRED TO BY CURATOR WOODS

boats and experienced men then, in turn, made possible the exploitation of the extensive and extremely productive shrimp beds of Campeche Banks in the southern Gulf of Mexico. These banks, lying to the north and west of the Yucatan peninsula, had previously been frequented by United States fishermen only for red snappers.

All of the large coastal industries mentioned previously plus the rapidly expanding fisheries (including fish processing-plants for menhaden and tuna), creating and facing many oceanographic and biological problems, have pointed out again and again the pressing need for exploration and information on the Gulf. The oil and oyster industries had long supported research relating to their immediate and specific problems; the shrimp fishermen had done considerable exploration for new grounds and had experimented with new gear at their own expense but had reached their limits.

Sporadic oceanographic research was carried on from time to time by various private and government institutions off the mouth of the Mississippi. Shore-based inshore biological research limited in time, scope, and financial support has long been the concern of the states bordering the Gulf and of the United States Fish and Wildlife



'ANCHORS AWEIGH!'

Motor Vessel "Oregon" of U. S. Fish and Wildlife Service leaves harbor at Pascagoula, Mississippi, for fishing grounds. Large roofed tank astern carries a supply of bait. On cruise, two Museum ichthyologists were aboard to collect specimens.

Service. It is only recently that the requirements of broader basic information over large areas have become crucial to the understanding, predictions, control, and perpetuation of the many industries and food sources in the Gulf.

This need is being met by some conference and co-ordination among the research workers and institutions along the Gulf coast and especially by the work of two large research vessels brought into the Gulf in 1951 by the Fish and Wildlife Service. These are former tuna clippers, converted for various types of research, the sister ships *Alaska*, based at Galveston, Texas, and *Oregon*, based at Pascagoula, Mississippi. The *Alaska* is equipped and staffed for doing all types of oceanographic research: the chemistry and physics of the seas and related biological problems concerning plankton and larval fish. The *Oregon*, on the other hand, devotes its efforts to discovering and exploring new shrimp beds and extending the area and determining the

fishes and these have been discovered on Campeche Banks in unlimited quantities at certain seasons, although their distribution and occurrence throughout the year are not yet known.

Bait is notoriously scarce and generally close inshore in shallow water along the Pacific coast of Central America, and it is carefully conserved by the countries there. The tuna bait-fishes of the Gulf have been determined, and their abundance and occurrence on Campeche Banks are being studied by the *Oregon* staff. Surveys have been made in the Gulf and are to be made in the Caribbean to determine the amount and kinds of tuna available there. Through the courtesy of the Fish and Wildlife Service, the writer and Robert F. Inger, Assistant Curator of Fishes, have been permitted to participate on behalf of the Museum in cruises of the *Oregon*.

Incidental to this exploration, which has extended into every part of the Gulf, is the landing of large quantities and a great

collections have been made bearing on this little-known subject.

Most important to the Fish Division of Chicago Natural History Museum and to ichthyologists in several other museums who are working on various aspects of the fish life of the Gulf has been the accumulation of very large collections and a great deal of data regarding the ecological and geographical distribution of the fishes of the Gulf. Our studies of offshore fishes of the northern Gulf have greatly increased our knowledge of the environmental factors that influence the distribution of a given species in depth. The collections have given us a pretty clear idea of the kinds of fishes that live together and make up the fish community at various depths and over particular kinds of bottom. The members of the *Oregon's* staff have concerned themselves with obtaining and tabulating quantitative information on shrimp and fish.

The fishes of Campeche Banks were very poorly known until the *Oregon* began its periodic surveys of the shrimp beds there. From preliminary study it now appears that in the offshore regions, considering the bottom fishes from 8 to 50 fathoms, the fauna is essentially the same as at these depths off the coasts of Mississippi, Louisiana, and Texas, with very few additional tropical species present. It seems very likely that at these depths the fauna is continuous from the northern portion of Campeche Banks westward along the adjoining coasts of Mexico and Texas as far east as Cape San Blas, Florida.

This continuous distribution does not appear to be the case with fishes living in shallow water. There are some tropical elements entering into the southern Gulf area that are not found along the northern Gulf. It is believed that somewhere along the Mexican coast, probably between Tampico and Veracruz, shore fauna characteristic of the northern Gulf gradually becomes dominated by tropical species. In lagoons and estuaries of the Yucatan peninsula there are several kinds of fishes, such as silversides, top minnows, and a halfbeak, whose nearest relatives live in similar habitats near the southern tip of peninsular Florida. On the shallow coral reefs of the Cayos lying near the western edge of Campeche Banks the fish fauna has been found to be practically identical with that of the coral reefs of the Dry Tortugas, Florida.

It is believed that when the data obtained on our two collecting trips to Campeche Banks (made in August, 1951, and December, 1952) are combined, we will have sufficient information to understand the geographical distribution of the fishes of these banks and the extent of the relationship of this fauna to that of the rest of the Gulf of Mexico and, to a lesser degree, to the adjacent banks and reefs lying in the Caribbean Sea.



#### SORTING CONTENTS OF A TRAWL CATCH

Members of the crew begin task of segregating many kinds of fishes and shells dumped on deck of "*Oregon*" from a single haul of one of the big dragnets. From such catches Museum curators garnered many specimens.

productivity of known beds. Along with shrimp exploration goes the search for additional kinds of fishes, such as tuna, hake, flounder, and tilefish, that may be exploited commercially, and the development and testing of new and better types of gear both for shrimping and fishing.

#### SOURCE OF TUNA

The discovery by tuna fishermen that the Gulf coast was actually nearer to the source of tuna in the tropical East Pacific than was California resulted in the construction of a tuna cannery on the Gulf coast and the building of two vessels to serve it. This enterprise requires live bait-

variety of fishes from every kind of habitat from 7 to 500 fathoms and from within sight of shore to the center of the Gulf. There have been also accidental side trips up a Mexican River, to escape a hurricane, and investigations of the faunas of unexplored coral reefs lying 60 to 90 miles offshore on the Campeche Bank. These explorations led to the finding of bones of the nearly extinct West Indian seal. Time would never have been spent on these reefs had the *Oregon* not been forced to take shelter from storms in the lee of the Cayos. Also, while cruising in both north and south portions of the Gulf during the spring and fall bird-migrations, many observations and



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