Recent Explorations for Yellowfin in the Gulf of Mexico

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Prior to the inception of the Gulf Exploratory Fishing Program in 1950, the meager information available on tuna in the Gulf gave little indication of the presence of commercially valuable stocks. The occasional captures of blackfin tuna *(Thunnus atlanticus)* and the infrequent observations of schools of this species constituted the sum of our knowledge. The incidental sport-trolling capture of white skipjack *(Katsuwonus pelamis)* sparked few imaginations. It was a species of known cosmopolitan distribution in warm seas, something to be expected, but of no local commercial importance. The known range of Atlantic yellowfin tuna *(Thunnus argentivittatus)* extended through the tropical and subtropical Atlantic and Caribbean. It could have been assumed that this species extended into the Gulf of Mexico, seasonally at least, as was indicated by its widespread distribution, but there were no published records of its capture or observed occurrence in that area. So when the exploratory investigation of the possibilities of a Gulf of Mexico tuna fishery was incorporated in the Gulf Program, it was given secondary priority.

In 1950 and 1951 activities were devoted primarily to exploratory shrimp fishing along the continental shelf. During this period a tuna log was maintained, and all surface signs of fish and trolling captures were noted. It was hoped that eventually a summary of these notes would suggest the methods and gear most useful in exploration. This running account of observations was spectacularly climaxed in the late summer of 1951. On the morning of August 29, at a position approximately midway between the Campeche Banks and the Mississippi Delta, small, wild schools of yellowfin tuna were sighted. The schools were under constant observation throughout the day, as the *Oregon* ran north. Several of these schools responded to the spray of the fire-hose (a method used in the Asiatic tuna fisheries to attract fish) and came to the vessel. These fish appeared to range between 30 and 70 pounds in weight, with an average of about 60 pounds; however, none were taken on trolling lines. Two weeks later, while trawling for red shrimp off the Mississippi and Louisiana coasts along the 200-fathom curve, nine schools of blackfin tuna, with estimated sizes of 100 to 500 tons per school, were seen during one day. Thus, within two weeks we had observed two different species, both present in large numbers, and both suggesting a different type of exploratory approach.

It was essentially from these two observations, supplemented by numerous less spectacular records, that our present two-phase exploratory tuna program evolved. Phase I, instigated in 1952 and to be completed in 1955 has two principal objectives: to determine which species are present in commercial concentrations, and to determine the best gear and fishing techniques for commercial production. To achieve these objectives Phase I was designed to devote one year of fishing effort to each of the three major commercial tuna fishing methods, purse seining, live-bait fishing, and long-lining, in that order.

Phase II was to be dependent on the previous results, with the basic objective to be a concentrated year-round application of the gear found to be most successful during Phase I.

During the 1952 meetings of the Gulf and Caribbean Fisheries Institute, Stewart Springer, Chief of the Gulf project, presented a report on the problems of tuna exploitation in the Gulf and Caribbean area. In his paper he summarized the results of the first year's work on purse seining. During the summer months of 1952 many small schools of blackfin tuna and white skipjack were sighted. However, all the schools were loosely grouped, fast moving, and were found in clear water. This combination of unfavorable factors proved to be insuperable, and no successful sets were made. Cruise 18, the following winter, was spent investigating the availability of live bait in the Gulf and methods of bait capture. Quantities of *Jenkensia lamprotaenia,* and *Sardinella anchovia,* two bait species used in the local Cuban tuna fishery, were found in large numbers on the Campeche Banks, along the Florida west coast, and in the Florida Keys. Also, two species of anchovies were found in quantities around the islands off Alabama and Mississippi. Baiting operations by the *Oregon* throughout 1953, using the trap lift net described by Siebenaler (1953), demonstrated a readily available bait supply in the Gulf.

Cruises 19 and 20, spanning the period of April to October, 1953, were devoted to live-bait and pole and line fishing in the eastern Gulf. In general, fewer tuna were sighted during this period than in any of the three preceding summers. However, contact was made with several small schools of mixed white skipjack and blackfin tuna from the Mississippi Delta to the Florida Straits, permitting several trials of live bait fishing for these species. Small numbers of fish were taken from several schools but few could be held at the stern long enough for satisfactory catches. The largest catch from any one school was 28 fish, mixed blackfins and white skipjack. Most distracting was the occasional occurrence of four-pole yellowfin tuna under the five to 15 pound fish. They accounted for several lost rigs. None appeared when heavy gear was overboard and none were captured during the live bait operations. However, of interest and possible significance was the capture of several small bluefin tuna *(Thunnus thynnus)* from a school of mixed species off the Louisiana coast—our only record of this species in the Gulf.

Phase I has been concluded this year with the completion of five successful long-lining trips. (Long-line gear has been extensively discussed in several Fish and Wildlife Service publications. Niska, Murray, and Shapiro describe and illustrate several of the infinite varieties of this gear employed in different tuna fishing areas of the world.)

Cruise 23 to the western Gulf of Mexico and the Gulf of Campeche during May and June yielded yellowfin tuna at 14 out of 20 long-line stations fished, for a total catch of 37 yellowfin tuna with an average weight of 118 pounds. Cruise 24 in the northeastern Gulf in July produced 112 yellowfin averaging 99 pounds each. Cruise 25 in August in the north-central Gulf caught 146 large yellowfin. And, in late September and early October, on an 11-set east-west transect at one degree intervals through the central Gulf, 102 large yellowfin were caught. The total catch for these four trips amounted to some 43,000 pounds of yellowfin. As a product of exploratory fishing this catch leaves little question of commercial possibilities.

Test packs of these first catches have been made at four commercial canneries and at the Service's Technological Laboratory at College Park. Reports received to date indicate that these Gulf-caught yellowfin are of better quality in regard to color, texture, and yield than are the yellowfin caught

in the principal fishing grounds off the Galapagos and Peru, or those imported from Japan.

There are a few aspects of that figure of 43,000 pounds that deserve mention. First, about 20 per cent of these fish were badly mutilated by shark bites. An additional 10 per cent were slightly scarred, but were considered satisfactory for canning. Since most of the shark damage occurred while the hooked fish was traveling the last hundred yards before being brought to gaff, several shark disposal techniques were tested. Two effective methods were chumming and shooting them, and hanging a row of baited shark hooks in the water along the stern. Caught sharks were allowed to hang along the stern until the long line was completely hauled, then fins and liver were removed. As many as 25 large white-tip sharks *(Pterolamiops longimanus)* have been taken in this manner at one station.

Second, during the first two long-line cruises, 134 gangions (leaders) were parted and the fish lost. It was estimated that approximately 90 per cent of these losses were yellowfin tuna. Broken gangions were usually found in groups adjacent to a caught tuna. On several occasions tuna were seen parting the line while the gear was being hauled in. Subsequent changes in gear reduced these losses to less than 10 per trip.

With the experience of the Service's Pacific Oceanic Fisheries Investigations to draw on, several of our major gear problems have been quickly solved. We have gradually increased the amount of gear per set until at present our "standard set" is 50 baskets, or some 45,000 feet of mainline fishing 500 hooks. This amount of gear is perhaps only half of what could be run by an experienced commercial crew.

An analysis of long line results to date, and estimates of the seasonal occurrence and distribution of yellowfin tuna in the Gulf would be premature. However, the few facts now at hand indicate commercially valuable stocks of large yellowfin tuna widely distributed beyond the edges of the continental shelf. Comparable to those of the central Pacific, these deep swimming tuna are rarely seen at the surface. The few surface observations have been of wild, rapidly moving fish in small schools, occasionally mixing with other tuna species of smaller sizes. Length and weight records of tuna captured this year show the presence of several well defined size groups. Sizes of individuals in the catch have ranged from 9 to 183 pounds with an average of approximately 110 pounds. The fish caught on the May-June cruise to the western Gulf were sexually mature, either ripe or partially spawned out. These observations and the collection of post larval and juvenile yellowfins at night-light stations throughout the Gulf conclusively show the Gulf to be at least one spawning area for this species.

Phase II, as programmed for 1955, has four objectives:

1. To learn if profitable fishing concentrations of yellowfin tuna are present in the Gulf throughout the year and locate the areas of highest catch rate.
2. To determine optimum gear depths.
3. To compare the effectiveness of several potential bait species.
4. To determine the continuity of catches and variation of catch rate between the Gulf of Mexico and the Western Caribbean.

The selection of these objectives has been influenced to a large extent by

the interest that currently exists in this new development apparent throughout the Gulf area and on the east and west coasts of the United States. In September the first commercial catch of Gulf tuna was made by the *Santo Antonino,* a west coast purse seiner converted to multi-purpose tuna fishing.

Starting out with 15 baskets of long line gear and fabricating new gear each day until some 45 baskets were being fished during the final week, 25,000 pounds of yellowfin were landed. This catch took place within 100 miles of the Mississippi Delta. At the present time there are two additional longliners working this area. Another is being rigged and should be on the grounds within the next few weeks. The success or failure of these pilot fishing ventures and finding answers to the exploratory objectives previously outlined will play an important part in determining the rate at which this potential Gulf tuna fishery will develop.

Exploraciones Recientes para Atunes de Aleta Amarilla en el Golfo de México

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Abstracto

Se presenta un resúmen de las exploraciones por atún, hechos por el Fish and Wildlife Service, en el Golfo de México en los últimos tres años. Pesca por medio de redes, cebo vivo y espineles fué llevada a cabo durante los veranos de 1952, 1953 y 1954 respectivamente. Los resultados, con redes y con carnada viva, fueron malos y no se hicieron pescas que se pueden llamar comerciales. Las pescas exploratorias hechas con espineles en 1954 han producido más de 43,000 libras de atún de aleta amarilla, y han despertado interés en el Golfo para empezar producción en pequeña escala.

Exploitation of Deep-Water Shrimp of the Gulf of Mexico

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Commercial shrimp fishing fleets of the Gulf of Mexico operate in inshore waters of fifty fathoms or less, and most of the present shrimp production comes from a relatively small portion of the area of the Gulf's broad continental shelf. Some shrimp of one or more of the commercially important species are found in all waters of the Gulf out to fifty fathoms or more, but there are large areas in which shrimp are not present in sufficient concentration to permit profitable catches. Since 1950 the U. S. Fish and Wildlife Service's exploratory fishing vessel *Oregon* has carried out a systematic search for shrimp concentrations on the Gulf continental shelf (Springer and Bullis, 1951 and 1954) which has resulted in important discoveries. This phase of