SUMMARY OF TUNA OBSERVATIONS IN THE GULF OF MEXICO ON CRUISES OF THE EXPLORATORY FISHING VESSEL OREGON, 1950-63

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ABSTRACT

A resume of work done on tuna by the exploratory fishing vessel Oregon during 14 years of exploratory fishing in the Gulf of Mexico is given. Prospects for commercial exploitation of tuna in the Gulf are discussed. Surface observations of tuna logged on the Oregon are summarized. Blackfin and skipjack tuna are the tuna most frequently found at the surface in the Gulf; their abundance indicates a commercial potential.

INTRODUCTION

Because of the increasing world demand for tuna, a few restricted populations of that fish have become subjected to tremendous fishing pressures which may exceed the limits for a maximum sustainable yield. In the case of the yellowfin tuna in the tropical eastern Pacific, efforts already are being made to limit the size of the catch on an international basis. It becomes evident that other stocks of tuna must be found and harvested to distribute fishing pressures and to satisfy future commercial and conservation needs.

The Gulf of Mexico has long been a source of wealth in terms of shrimp, snapper, menhaden, oyster, and many other marine products. Explorations by the U. S. Bureau of Commercial Fisheries research vessel Oregon indicate the existence of potentially commercial stocks of offshore tuna in the Gulf.

The potential for a long-line fishery in the Gulf of Mexico and Caribbean Sea for deep-dwelling yellowfin tuna has already been reported by Bullis and Captiva 1955 and Wathne 1959. Information obtained on the R/V Oregon indicates an excellent potential for exploiting surface-occurring schools of tuna in the Gulf; however, specific data on surface occurrences of tuna in that region have not been published.

Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon.

The purpose of this report is to summarize the Gulf of Mexico tuna investigations conducted on the Oregon, with emphasis on the occurrence of tuna at the surface.

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BACKGROUND

EARLY TUNA SIGHTINGS: In 1950, the Fish and Wildlife Service began an exploratory fishing program in the Gulf of Mexico with the motor vessel Oregon. From the beginning of the program, tuna schools were sighted from the Oregon in large numbers. Scattered reports by merchant vessels and tugs also indicated that sizable populations of tuna were present. Occasional troll captures by the Oregon showed the schools to be composed of yellowfin (Thunnus albacares), blackfin (T. atlanticus), and skipjack tuna (Katsuwonus pelamis). During September 1951, Bullis (1955) reported sighting 9 schools of blackfin in 1 day off Mississippi and Louisiana, with the schools averaging an estimated 100-500 tons each. Through the years similar sightings of tuna schools have been made by Oregon personnel. The report for Oregon cruise 24 in the northeast Gulf states: "Observations of surfacing tuna paralleled those made in preceding years during the summer months. Schools of blackfin, yellowfin, and white skipjack, sometimes mixed together, were seen every day during the trip" (Springer 1954).

Fig. 2 - A blackfin tuna caught on a trolling jig is hoisted aboard the Oregon. Trolling lines are set out during all daylight running hours.

EARLY FISHING ATTEMPTS:

Purse Seine: A few attempts at purse seining were made during 1952 with linen nets. The results of the few sets made from the Oregon with this gear are inconclusive. The weather was highly unfavorable during this time, and the tuna schools were wild and not in a good condition for seining. Purse seining for tuna, other than bluefin, was a relatively new innovation at the time the trials were made, and the revolution resulting from the development of the nylon net and power block that ultimately saw the mass conversion of the California clipper fleet in 1959, 1960, and 1961, was still in the infant stage (McNeely 1961).

Live-Bait: In 1953 an attempt was made at live-bait fishing, a method that was predominant in the tuna fisheries at that time. The Oregon was ideally suited to this method, for it was a tuna clipper specifically designed for the West Coast live-bait tuna fisheries. Results of the live-bait trials were summarily poor. Live bait was plentiful and easily caught in the Gulf (Siebenaler 1953). Surface schools were readily found and could be attracted to the vessel with live-bait chum and spray from the fire hose. The tuna could not,

Fig. 3 - A mixed catch by the Oregon of troll-caught blackfin tuna (Thunnus atlanticus), little tuna (Euthynnus alletteratus and rainbow runners (Elagatis bipinnulatus).

however, be held at the stern of the vessel long enough for satisfactory catches to be made.

Long Lines: Preliminary results of fishing Japanese long lines in early 1954 showed this to be an effective method for harvesting the deeper running tunas, notably the yellowfin tuna (Thunnus albacares). After 1954, fisheries personnel at Pascagoula emphasized the use of long-line fishing.

TUNA LONG-LINE OPERATIONS: Areas of Tuna Concentrations: OFF THE MISSISSIPPI RIVER: During the early exploratory phase of the tuna long-lining program, two areas with notable concentrations of subsurface tuna were discovered. One area was the northern Gulf of Mexico off the Mississippi River delta along the 1,000-fathom curve. Yellowfin were found during every month in that area although they were present in commercial quantities only from July through December. An interesting find was large bluefin tuna (Thunnus thynnus) in the 300- to 700-pound class during March and April. Those large fish caused much damage and loss of gear. Because a market for them did not exist at the time, commercial ventures for the large bluefin were not deemed feasible.

CAMPECHE GULF: Another area was found in the Gulf of Campeche where yellowfin were apparently present in commercial quantities during all seasons. That area extends northward through the middle Gulf and intergrades with the first area. The two areas were fished on a commercial scale with long lines during three cruises of the Oregon in 1955 and 1956. The average catch rates for the three cruises were 5.0, 4.4, and 4.5 yellowfin per 100 hooks, with individual station highs up to 12.9 yellowfin per 100 hooks (Wathne 1959). The yellowfin caught in the Gulf of Mexico averaged over 100 pounds apiece; most of the first were between 60-150 pounds (Bullis 1955).

Commercial Long-Line Ventures: EARLY ATTEMPTS: During the years that the Oregon made tuna long-line investigations, several boats were converted to fish that gear in the Gulf. Catch rates of a few of the vessels indicated a good potential, although the operators were fishing far less gear than they were capable of and were generally disregarding much of the proven methodology recommended by Bureau personnel. Unfortunately, the lack of a suitable local market for tuna made the venture unprofitable because storage of catch and cost of transshipment to Puerto Rican or West Coast canneries proved prohibitive.

PRESENT STATUS: Since 1958, United States fishermen have done very little with Gulf of Mexico tuna. No American vessels are now known to fish tuna commercially in the Gulf. The Japanese are known to have recently made several sizable tuna long-line cruises, possibly on a seasonal basis, in the southwest Gulf. Firm catch figures are not available, but catch rates are rumored to have been high. The Cuban live-bait tuna fishery, operating since 1940, is still believed to be in existence. This fishery is based in the northern section of Cuba and operates quite close to shore. The catch, comprised of small blackfin and skipjack tuna, averaging 3-4 pounds, is canned and consumed domestically (Rawlings 1953).

PRESENT PROSPECTS FOR A GULF TUNA FISHERY

LONG-LINE METHOD: The long line is now the only available commercial gear used for harvesting deep-dwelling tuna (Bureau of Commercial Fisheries 1963). That gear has serious limitations, however, because its manpower requirements are quite high. In a society, such as Japan's, where labor costs are low, the long-line method is economically feasible. The rapid rise in the last decade in Japanese tuna production can be attributed to the use of the long line. The method dominates their tuna fleet to this day. To the United States fisherman, the high cost of labor may make the difference between a commercially feasible venture and an unprofitable one; thus, the use of long lines for tuna remains marginal in this country today. It is now being used to a limited degree in the East Coast tuna fishery where swordfish long liners seasonally switch to tuna to supplement their incomes. The economic problems involved in using that method in the Gulf of Mexico fishery remain unsolved. Under present conditions, other gear fishing surface tuna appear to hold greater promise.

PURSE-SEINE METHOD: Because of economic difficulties due to increased foreign competition and lowered market prices for tuna in the 1950's, the United States tuna industry was forced to look for improved methods to reduce the cost of its operations. The nylon purse seine and the power block proved to be the answer to the industry. This strong and easily handled gear made possible huge catches of entire tuna schools. Single sets of over 20 tons of fish are common in the Eastern Pacific tuna fishery. The substantial increase in fish-per-man-days at sea resulting from the use of the purse seine offset the initial high cost of the conversion to this gear.

The change of the fleet from predominantly bait vessels to primarily purse-seine vessels took place at a rapid pace in the late 1950's, reaching a peak in 1960 (McNeely 1961). Since then, purse seiners have been the paramount producers of tuna in the United States fleet. In 1962, 139 purse seiners were reported operating out of United States ports, including Puerto Rico, compared with 36 bait vessels (Schaefer 1963). Predictions are that bait vessels will have only limited use in the United States tuna fleet unless radical improvements are made toward obtaining greater efficiency. In the foreseeable future the purse-seine vessel will continue to dominate the United States tuna fleet.

SURFACE-SCHOOLING TUNA OFFER BEST COMMERCIAL POTENTIAL: The prospects for harvesting surface-occurring tuna in the Gulf of Mexico with purse seines appear quite favorable. This outlook is based mainly upon the fact that great numbers of large schools of tuna, predominantly of two species, the blackfin tuna and the skipjack, were sighted throughout the Gulf during the Oregon's exploratory fishing. Those two species are often found mixed together in large dense schools and take trolled lures quite readily. The incidences of Oregon troll captures of blackfin are quite small, however, because the trolled hooks are easily torn out of their delicate mouths. Also, the Oregon cruises too fast for trolling to be very effective.

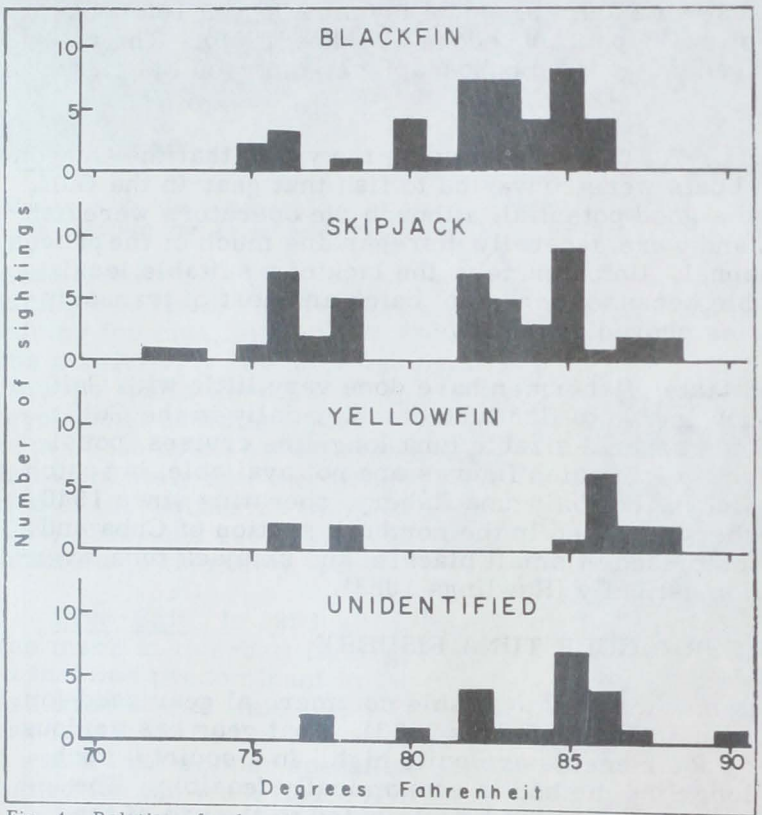

Fig. 4 - Relation of surface temperature to number of surface tuna sightings in the Gulf of Mexico.

BLACKFIN TUNA: The blackfin (Thunnus atlanticus) is confined to the western Atlantic and ranges from Rio de Janiero, Brazil, to southern New England (Mather and Day 1954). It is not known to be caught commercially anywhere except in Cuba. It is rarely caught on long lines although sets using that gear have been made in areas where blackfin were quite abundant on the surface. Indications are that the species generally remains in the upper mixed layers of the ocean and is not a deep swimmer.

Blackfin tuna have several characteristics that are advantageous to commercial exploitation by purse-seine methods:

1. They are frequently found in large dense schools, and thus are easily captured by purse seines.

2. They tend to remain near the surface in the mixed layer and are often sighted feeding on the surface; this is, of course, a prime requisite as the purse seines are set on the sur-

face by sight, and not blind as are long lines and some types of nets. Surface activity by the tuna makes them more susceptible to direct detection or to indirect detection by the presence of bird flocks.

3. Their relatively small size, less than 25 pounds, is desirable because of the ease of handling them, both on the fishing vessel and in the cannery. (Blackfin tuna caught by the R/V Oregon averaged about 9 pounds--ranged 2-25 pounds.)

4. Blackfin are an excellent food fish and can be packed as a lightmeat tuna, giving them a high potential market value.

SKIPJACK TUNA: The skipjack tuna (Katsuwonus pelamis) is a cosmopolitan oceanic species thought to be the most abundant tuna in the world. Next to the yellowfin tuna, it comprises the largest portion of the tuna catch brought into United States ports. The catch of that fish is increasing annually, and it seems probable that skipjack will eventually dominate the tuna catch. This future dominance becomes especially apparent when one considers the Eastern Pacific tuna fisheries in which the yellowfin stocks are being overexploited while the skipjack stocks are barely being touched (Inter-American Tropical Tuna Commission 1963).

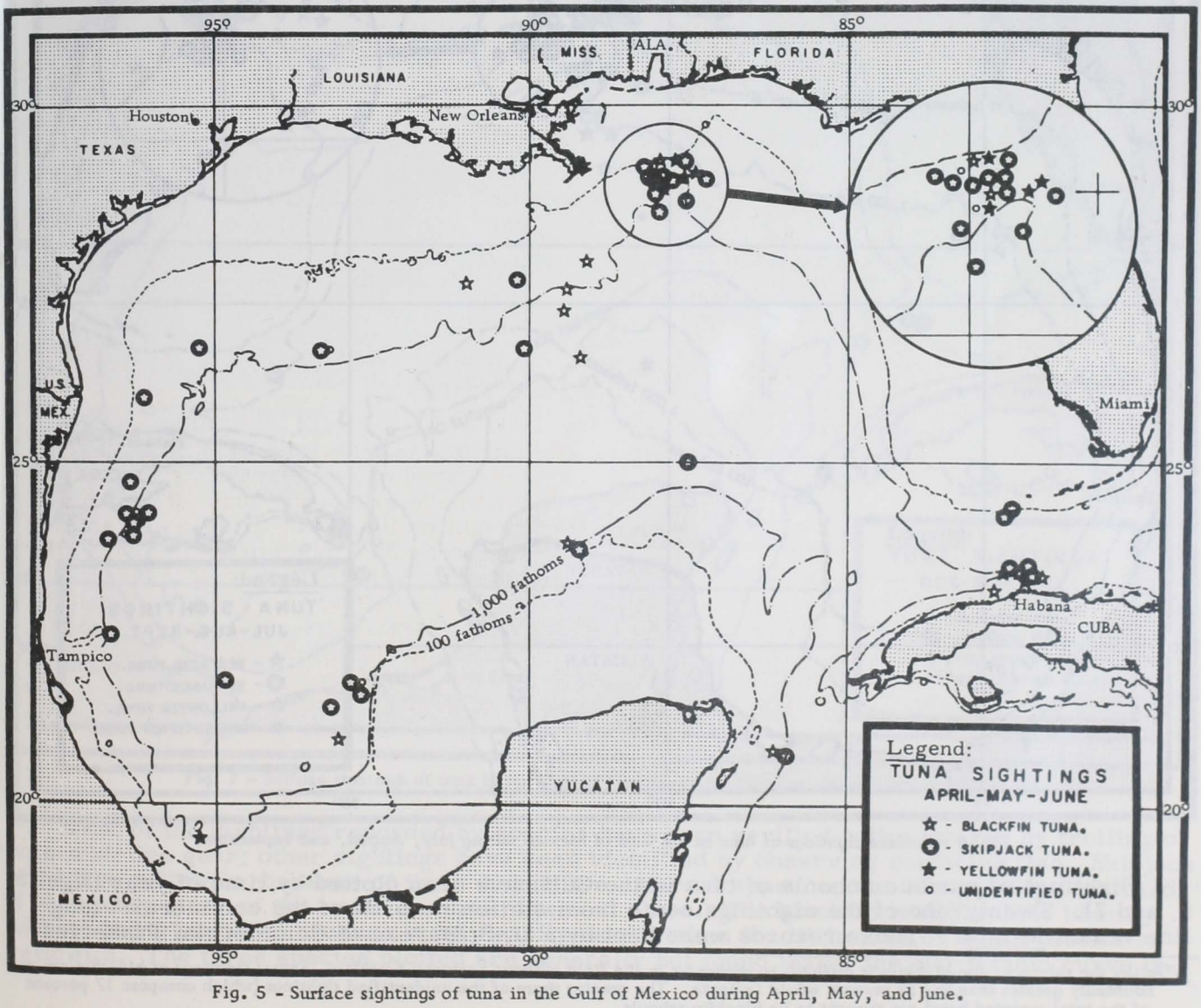

Fig. 5 - Surface sightings of tuna in the Gulf of Mexico during April, May, and June.

The skipjack's habits are similar to the blackfin's, and its marketable value is already proven. The average weight of the skipjack caught from the Oregon in the Gulf was 11 pounds--ranged 3-30 pounds. Surface-school sightings in the Gulf indicate the skipjack may be present in quantities just slightly below the blackfin population. Of the sightings recorded, 34 percent were identified as skipjack, whereas 36 percent were identified as blackfin.1/

OCCURRENCE DATA: Surface tuna schools have been found throughout the year in the southern Gulf but rarely in the northern Gulf from January through March. Surface schools have been found most abundant during summer and fall when the surface water temperature climbs above 75° F. (fig. 4). Although sightings of yellowfin and bluefin tuna have been recorded on the surface in the Gulf, their recorded occurrences there are fragmentary and never in the large quantities reported for blackfin and skipjack.

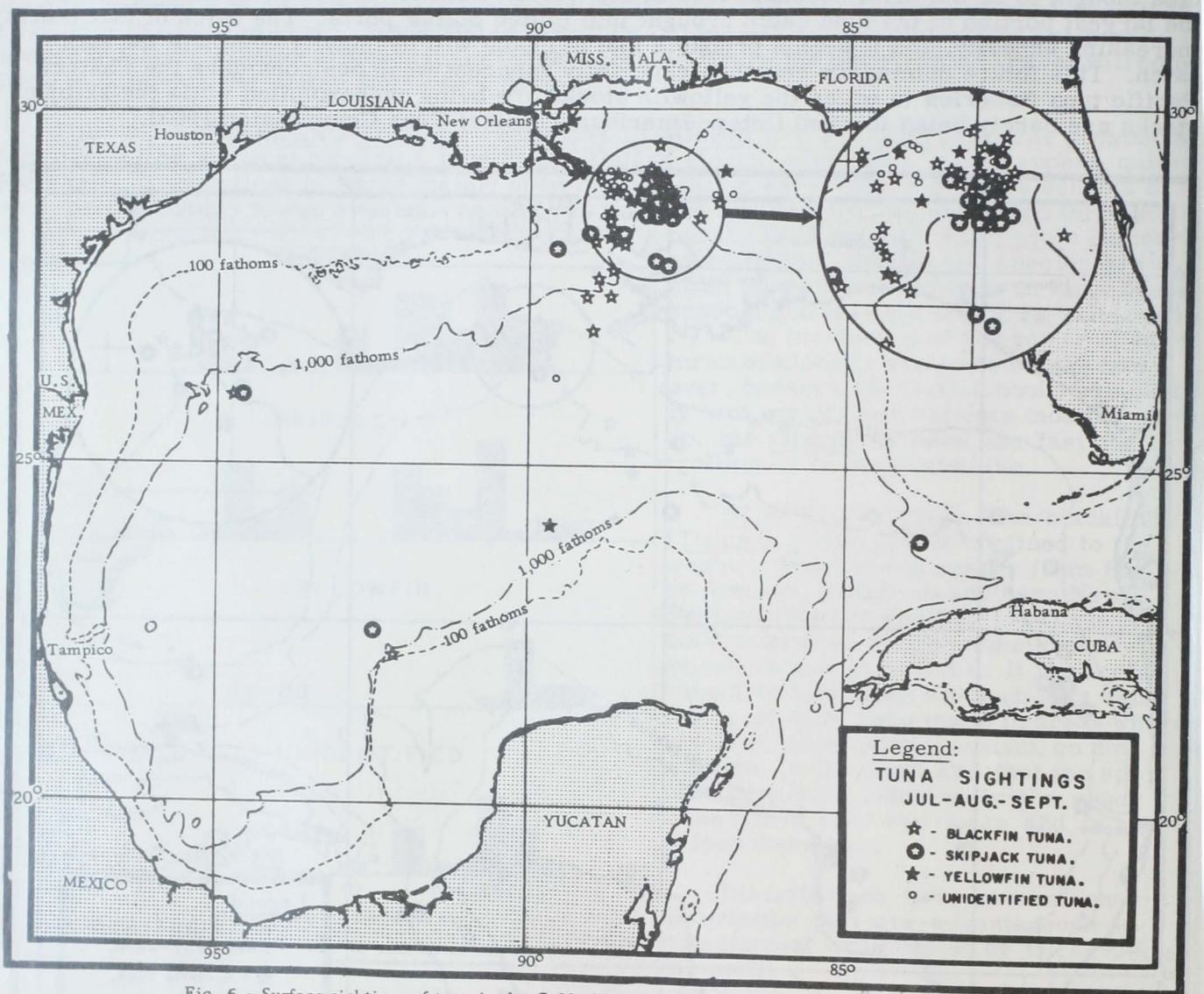

Fig. 6 - Surface sightings of tuna in the Gulf of Mexico during July, August, and September.

Sightings of surface schools of tuna in the Gulf have been plotted by time of year (figs. 5, 6, and 7). Twenty-one of the sightings come from station records of the commercial long-line vessel Milmar. Those records were kept by a U. S. Bureau of Commercial Fisheries

1/Unlike the skipjack, the blackfin is difficult to recognize in the field without captures; therefore, actual sightings of blackfin are undoubtedly greater than the 36 percent would indicate. The greater share of the unidentified sightings (which compose 17 percent of the total reported here) are thought to be blackfin schools.

observer during three of the vessel's cruises in April, May, and June 1958. All other sightings come from station logs of the R/V Oregon. The only species of tuna shown in the figures are the three that constitute the tuna with the greatest commercial potential in the Gulf. Although little tuna (Euthynnus alleteratus) are frequently found in large numbers, their commercial value is less than marginal (Chilton 1949). The albacore (Thunnus alalunga) and the big-eyed tuna (T. obesus) have not been reported from the Gulf. Since blackfin and skipjack tuna are most frequently found on or near the surface, long-line capture records have been plotted when no surface activity was evident in the area at the time of capture. Incidences of their capture with this gear are not numerous. During January, February, and March, tuna sightings have numbered less than a dozen and are, therefore, not shown.

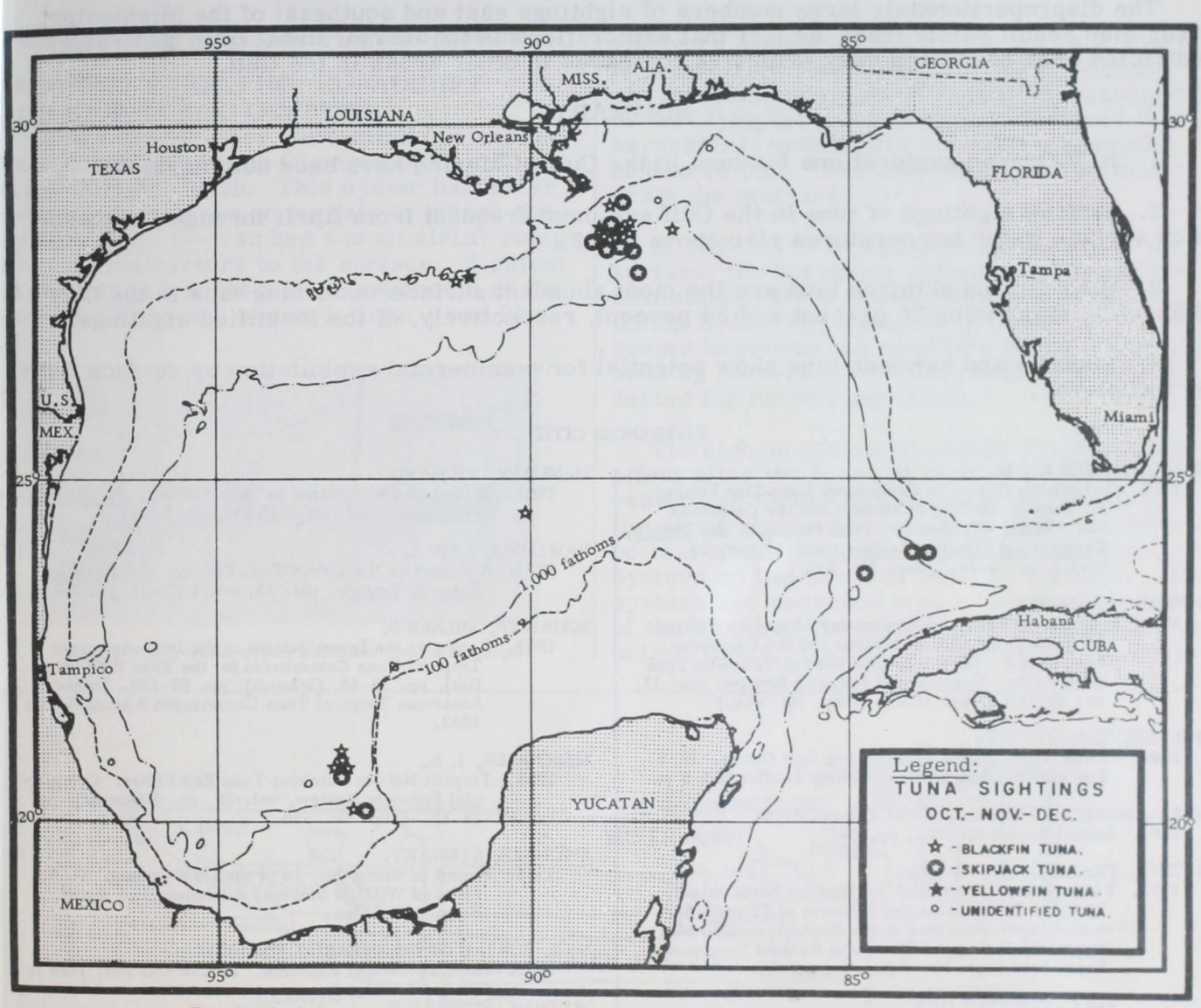

Fig. 7 - Surface sightings of tuna in the Gulf of Mexico during October, November, and December.

Most of the sightings recorded by species have been verified with captures by trolling or pole-and-line gear; other sightings have been identified by observing surfacing fish. Skipjack and large yellowfin, because of their distinctive external appearances, are readily identified if they jump clear of the water and are observed close. The blackfin is difficult to identify without being captured because it may easily be mistaken for little tuna or small bluefin or yellowfin. The three species plotted are generally not found inside the 100-fathom curve in

would offer suitable sockeye habitat for an expanded program.

Willamette System is Key

The new program is geared principally to the Willamette System because the Columbia River basin has lost extensive sockeye spawning grounds to hydroelectric development.

Insufficient escapement over the dams and poor passage of downstream migrants have drastically reduced the runs. The commercial fishing season on Columbia sockeye was limited to five days in 1964; for the first time in the fishery, commercial fishing for it was not allowed in 1965. The closure was based upon poor escapement in 1961--less than one-fourth the established goal.

UNIQUELY-SHAPED NORTHERN QUAHOG SPECIMEN DISCOVERED

A uniquely-shaped, three-inch long specimen of the northern quahog, Mercenaria mercenaria, was found this past winter in the Wickford Cove area of Narragansett Bay by a high school senior who is an amateur shell collector. The discovery was reported by Dr. Carl N. Shuster, Jr., Director of Northeast Shellfish Sanitation Research Center, U. S. Public Health Service, Narragansett Bay, R. I.

The odd shape of the shell raised a number of questions. How often does this shape occur among quahogs? Are there records of other such specimens? Since quahogs are burrowing mollusks, how well could such an asymmetrical specimen dig? Would this shape affect its ability to survive?

An initial search for information indicated that there are a few such specimens in museum collections, but the ones seen thus far are not as asymmetrical as the Narragansett Bay specimen. The only scientific article about such a shell dealt briefly with the southern quahog, M. campechiensis. It is assumed, therefore, that such shells if not rare are certainly not common.

Burrowing bivalves, of which the quahog is one, tend to have right and left valves matched in size and shape, whereas non-burrowing mollusks like the oyster have unequal valves. It is surmised, therefore, that an asymmetrical specimen like the one found would have difficulty in burrowing.

The Narragansett Bay specimen resembled closely some ancient fossilized genera of non-burrowing mollusks, especially Exogyra and Gryphaea. Whatever happened to the present quahog specimen perhaps triggered a latent genetic mechanism for shell shape that has been dominant in the oyster family for millions of years.

Dr. Shuster would appreciate hearing from any reader who has seen a misshapen quahog of this type and would be particularly interested in obtaining a live specimen. (Maritimes, vol. X, no. 2, Spring 1966.)