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A Review of the Yellowfin-Skipjack Tuna Fishery of the Atlantic Ocean and American Participation, 1956-75

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INTRODUCTION

Over the past 2 decades the tropical tuna, or combined yellowfin tuna, *Thunnus albacares,* and skipjack tuna, *Katsuwonus pelamis,* fishery of the Atlantic Ocean has increased from a few hundred metric tons in 1956 to approximately 174,000 metric tons in 1975 (Fig. 1). It is currently the largest tuna fishery in the Atlantic Ocean and supports an international fleet of more than 800 vessels.

The vessels employed in the fishery are mainly longliners, baitboats, and purse seiners. They range in size from a few metric tons to 2,000 metric tons in carrying capacity. Longliners generally fish well offshore with longline gear (Shapiro, 1950) and catch deep-swimming tunas of frequently large size. Baitboats employ the pole-and-line with live-bait chum technique (Cleaver and Shimada, 1950), and purse seiners employ purse seine nets (McNeely, 1961). Both baitboats and purse seiners operate relatively close inshore and purse seiners also operate far offshore. They capture tunas, frequently of small size, that occur near the surface. Because of this difference in the type of tunas exploited by the different gears, the fishery is often divided for convenience into a longline fishery, consisting of longliners, and a surface fishery, consisting of baitboats and purse seiners.

The longline fishery extends throughout the tropical Atlantic, whereas the surface fishery is concentrated primarily off Africa (Fig. 2). Some areas in the western Atlantic, such as in the Caribbean Sea and off Venezuela, support a small surface fishery that is probably underdeveloped (Juhl, 1971; Ramos and Guerra, 1976; Wagner, 1974).

In this report we review the development of the tropical tuna fishery of the Atlantic from 1956 to 1975, and discuss the current condition of the stocks. Special attention is given to analysis of data from the American[1] tropical tuna fleet because this fleet is a relative newcomer to the fishery but ranks fourth in total production. Data sources for this study are: ICCAT (1976a) for data on catch and number of

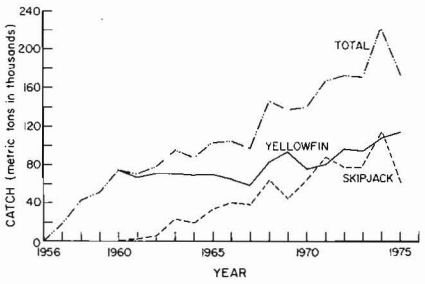
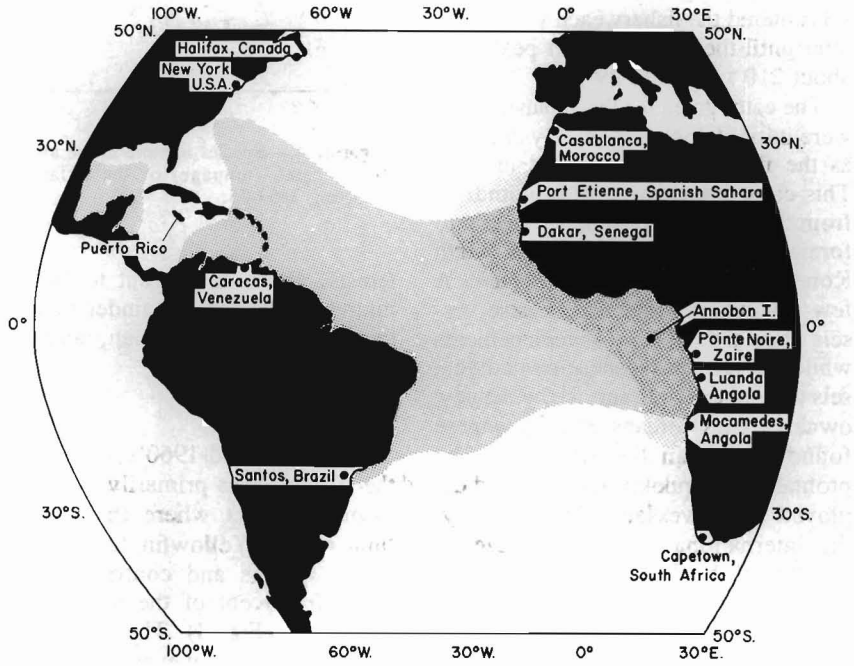


Figure 1.—Total Atlantic catches of yellowfin and skipjack tunas.

[1]The combined tropical tuna fleets of Canada, Netherlands Antilles, Panama, and the United States are monitored as a unit. "American" in this report refers to this combined fleet, which during 1968-75 consisted of at least 83 percent U.S. vessels.

Figure 2.—Areas in the Atlantic Ocean where the longline fishery and surface fishery (speckled area in the eastern Atlantic) for tropical tunas are concentrated.



fishing vessels; Fishery Agency of Japan (1968-75) for data on longline catch and effort; and ICCAT (1973a, b, 1974a, b, 1975a, b) for data on sizes of fish caught and catch and effort of the surface fleets.

LONGLINE FISHERY

The longline gear is particularly effective in catching pelagic fishes that are widely dispersed in the open ocean. It is a multispecies gear but can be deployed to catch more of one species than another. In longline tuna fishing, albacore (*T. alalunga*), bigeye (*T. obesus*), bluefin (*T. thynnus* and *T. maccoyii*), and yellowfin tuna are primarily caught along with incidental catches of billfishes (Istiophoridae and Xiphiidae). Skipjack tuna is normally not caught on longline gear.

Longline fishing for tunas in the oceanic regions of the Atlantic Ocean was pioneered by the Japanese in 1956. In that year a few Japanese longliners conducted test fishing for tunas off the northeastern coast of South America (Shiohama et al., 1965). Fishing was excellent particularly for yellowfin tuna, and in the following year the fishery began in earnest with 26 Japanese longliners fishing throughout the tropical Atlantic. Additional Japanese vessels entered the fishery each year thereafter until the Japanese fleet peaked at about 210 vessels in 1965.

The catch rates for the Japanese fleet were initially high but quickly declined as the fleet rapidly increased in size. This caused some vessels to withdraw from the fishery and some to be sold to foreign interests, primarily to South Korean and Taiwanese fishermen. A few new, more efficient Japanese vessels entered the fishery as replacements while the former Japanese-owned vessels were placed into service by the new owners. The Koreans and Taiwanese found fishing in the Atlantic to be profitable and quickly acquired and deployed more vessels. Consequently, the international longline fleet grew rapidly in the late 1960's and early 1970's (Fig. 3). Currently, more than 500 longliners participate in the Atlantic tuna fishery with about 50 percent belonging to Korean and Taiwanese interests, about 40 percent to Japanese interests, and the remainder to Brazilian, Cuban, Panamanian, and Venezuelan interests.

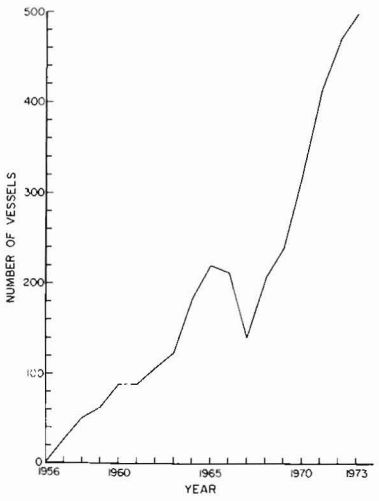


Figure 3.—Number of vessels in the longline fishery of the Atlantic Ocean, 1956-73.

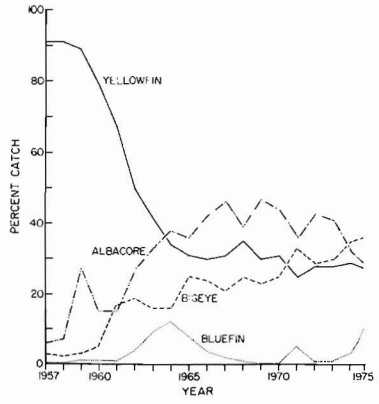


Figure 4.—Species mixture in the longline catch (tonnage) of the Atlantic Ocean, 1957-75.

Species Mixture

Before the mid-1960's, longlining in the Atlantic was primarily confined to tropical waters where the yellowfin tuna occur. Yellowfin tuna was the target species and contributed more than 30 percent of the total longline tuna catch (Fig. 4). The catch rate of yellowfin tuna, however, declined during this period and the fleet gradually shifted its operations to temperate regions in search of other species such as albacore and bigeye tuna (Shiohama et al., 1965). The species mixture of the catch, consequently, changed from primarily yellowfin tuna to primarily temperate tunas. Yellowfin tuna presently contributes less than 30 percent of the total longline tuna catch and albacore and bigeye tuna constitute more than 60 percent of the catch.

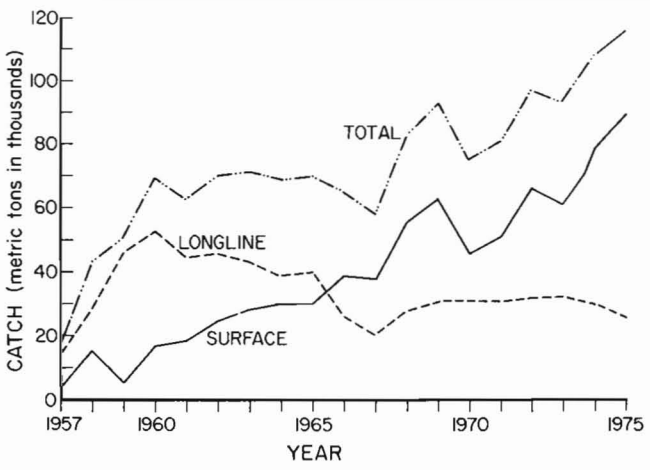
Yellowfin Tuna Catch and Catch Rates

Longliners were responsible for most of the catch of Atlantic yellowfin tuna before 1966 (Fig. 5); since then the surface fishery has produced most of the yellowfin tuna. The longline catch peaked at about 53,000 metric tons in 1960 and slowly declined to 21,000 metric tons in 1967. It then increased to about 30,000 metric tons in 1969 where it has remained.

More than 50 percent of the longline catch of yellowfin tuna was annually caught in the eastern Atlantic (east of long. 30°W) during 1957-64 (Fig. 6). About equal amounts were caught from the eastern and western Atlantic during 1965-69 and the bulk from the western Atlantic (west of long. 30°W) during 1970-75.

If there are two principal subpopulations (Honma and Hisada, 1971; Hayasi[2]), eastern and western subpopulations, of yellowfin tuna in the Atlantic Ocean, the longline catch rates suggest that the eastern subpopulation is more depressed than the western subpopulation (Fig. 7). The catch rate in the eastern Atlantic fell sharply from about 3.6 metric tons/1,000 hooks in 1958 to about 0.8 metric ton/1,000 hooks in 1962, and then gradually declined to less than 0.1 metric ton/1,000 hooks in 1975. In the western Atlantic it fell precipitously from about 3.3 metric tons/1,000 hooks in 1958 to about 0.7 metric ton/1,000 hooks in 1961 and then drifted lower to 0.4 metric ton/1,000 hooks in 1975.

[2]Hayasi, S. 1973. A hypothesis on population structure of yellowfin tuna in the Atlantic Ocean, mainly based on longline data. ICCAT Collective Vol. Sci. Pap., 2 (SCRS-1973), p. 40-48.



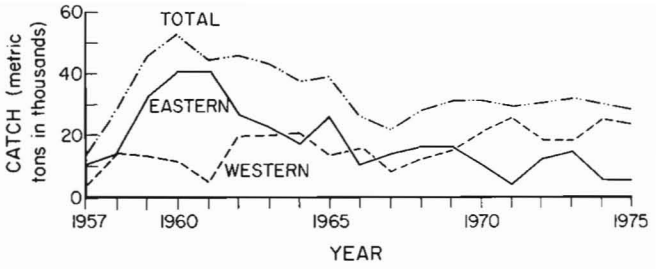


Figure 6.—Longline catches of yellowfin tuna from the eastern and western Atlantic, 1957-75.

Figure 5.—Atlantic catches of yellowfin tuna for the longline and surface fisheries, 1957-75.

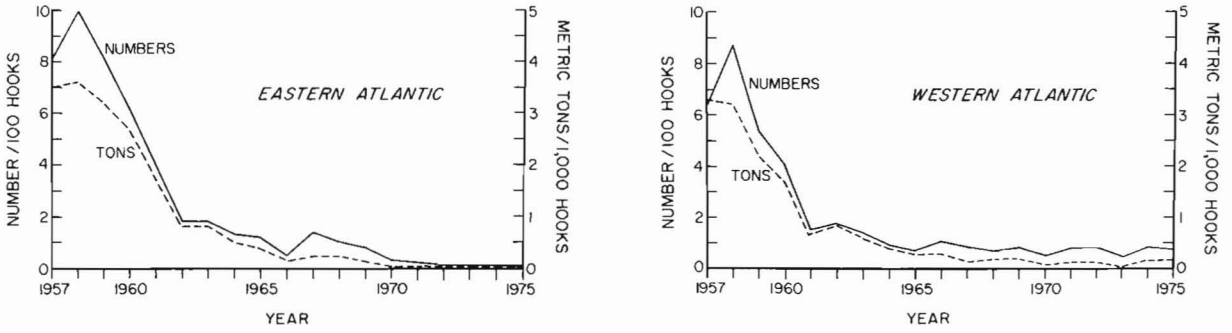
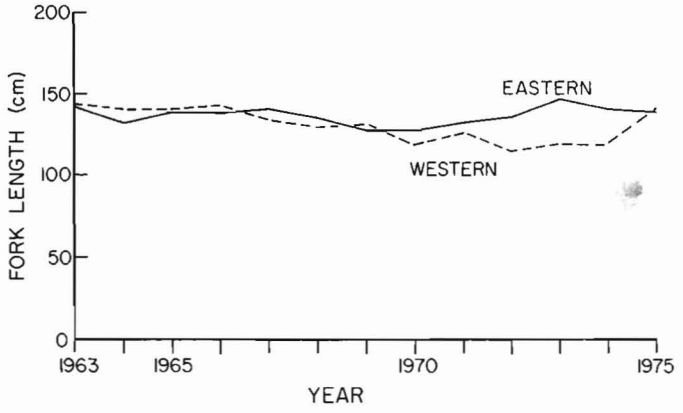


Figure 7.—Catch rates of yellowfin tuna for the Japanese longline fleet by eastern and western Atlantic.

Size Composition of Yellowfin Tuna

Before 1970, yellowfin tuna caught in the eastern and western Atlantic by the longline fishery were, on the average, about the same size (Fig. 8). Since the, the average size of fish caught in the western Atlantic has consistently been smaller. The average size of fish caught in the eastern Atlantic furthermore has remained quite constant despite the competition from the surface fishery that lands substantial numbers of large yellowfin tuna (>85 cm, Fig. 9). These data suggest the possibility that the longline and surface fisheries do not exploit the same stock (Lenarz and Zweifel, in press) and that in the western Atlantic the longline fishery is exploiting greater amounts of yellowfin tuna from the surface stock than the deep-water stock.

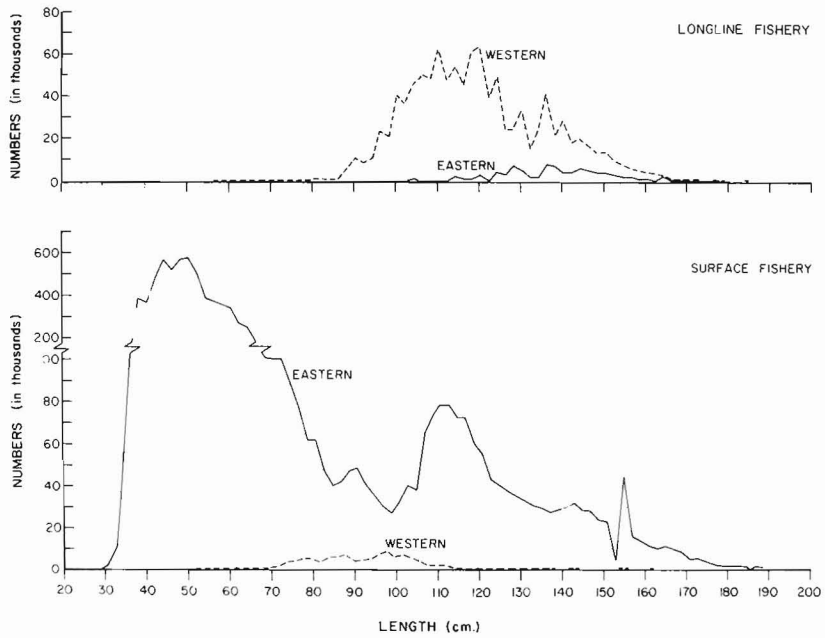
Figure 8.—Average fork length of yellowfin tuna caught in the longline fishery of the eastern and western Atlantic.



SURFACE FISHERY

Yellowfin and skipjack tunas are caught with surface gears in both the eastern and western Atlantic. The principal fishing areas are within 200 miles of the coast and currently most of the

Figure 9.—Estimated length composition of yellowfin tuna caught in the longline and surface fisheries of the Atlantic Ocean in 1974.



Atlantic catch is caught in the eastern Atlantic off Africa.

The eastern Atlantic surface fishery was an artisanal fishery up to about 1955. In that year, French baitboats from southern Europe moved into the Dakar, Senegal, region to fish for yellowfin tuna during November to May, when the boats were not employed in the albacore fishery off the Iberian peninsula (Champagnat, 1968). The boats were successful and baitboats of other countries soon entered the fishery. The fishery quickly expanded into southern waters and by 1960 the fleet was operating year-round from about Port Etienne, Spanish Sahara, to Pointe Noire, Zaire.

Purse seine fishing for tropical tunas, which was developed by U.S. Pacific coast tuna fishermen in 1956 (McNeely, 1961), was first tested in the Atlantic in the late 1950's. The technique was not seriously used in the Atlantic tropical tuna fishery, however, until 1961 by the French. Seiners of other countries soon thereafter entered the fishery. Currently more than 300 baitboats and purse seiners belonging to 12-15 countries participate annually in the eastern Atlantic fishery (ICCAT, 1976a). The largest fleet currently belongs to the combined French, Ivory Coast, and Senegal (FIS) countries.

Table 1.—Number of American tuna purse seiners[1] and their catches from the eastern tropical Atlantic, 1967-75.

Year	No. of vessels	Catch (t) Yellowfin tuna	Catch (t) Skipjack tuna	Catch rate (t/day's fishing) Yellowfin tuna	Catch rate (t/day's fishing) Skipjack tuna
1967	3	920	480	7.8	3.8
1968	8	5,830	3,180	23.3	12.0
1969	27	19,760	4,890	10.9	2.4
1970	25	9,810	11,790	4.0	5.1
1971	24	3,830	16,830	2.7	10.0
1972	36	12,100	12,250	3.3	3.7
1973	24	3,300	22,290	2.2	17.0
1974	26	5,620	19,970	2.8	8.7
1975	32	13,960	7,370	5.6	2.7

[1]The combined tropical tuna fleet of Canada, Netherlands Antilles, Panama, and the United States are monitored as a unit. "American" refers to this combined fleet which in 1968-75 consisted of at least 83 percent U.S. vessels.

Significant American participation in the Atlantic fishery began in 1967. In that year, three American tuna purse seiners fished off Africa and caught 1,450 metric tons of tuna in little over 2 months of fishing (Sakagawa and Lenarz, 1972). Their success attracted other American seiners into the fishery (Table 1). In 1975, 32 American tuna seiners participated in the eastern Atlantic fishery and their total catch was 13,960 metric tons of yellowfin tuna and 7,370 metric tons of skipjack tuna.

In the western Atlantic, the surface fishery for tropical tunas is small and not well developed. A few thousand metric tons are produced annually, principally by Cuban and Japanese baitboats, and French, Spanish, and American seiners. Cuban baitboats have fished primarily skipjack tuna in the Caribbean since 1932 (Suárez-Caabro and Duarte-Bello, 1961), whereas the other fleets are more recent participants and only occasionally fished in the western Atlantic for tropical tunas. American seiners of the tropical tuna fleet normally fish in the western Atlantic only while crossing the region enroute to Puerto Rico (to unload their catch) or fishing grounds in the eastern Atlantic and eastern Pacific. These vessels, therefore, do not spend many days searching for tunas in the western Atlantic. Because the surface fishery of the western Atlantic is small, this report does not attempt to fully discuss this fishery.

Species Mixture

Yellowfin and skipjack tunas are target species for the surface fishery. Yellowfin tuna, however, have traditionally been preferred by tropical tuna fishermen because it commands a higher market price. In fact, until recently some fishermen, particularly French fishermen, avoided the capture of skipjack tuna and caught them only incidentally with yellowfin tuna.

During the 1960's, when the catch rates of yellowfin tuna were high, an average of 56 percent of the total yellowfin-skipjack tuna surface catch from the eastern Atlantic was yellowfin tuna. As more units of fishing effort were applied to the fishery, the catch rates plummeted and the fishermen began relying more on skipjack tuna to fill their boats. The average percentage of yellowfin tuna in the catch declined to 42 percent during 1970-74.

Similar events occurred in the American catch (Table 1). Yellowfin tuna dominated the catch during 1967-69 and skipjack tuna during 1970-74. In 1975, however, skipjack tuna were

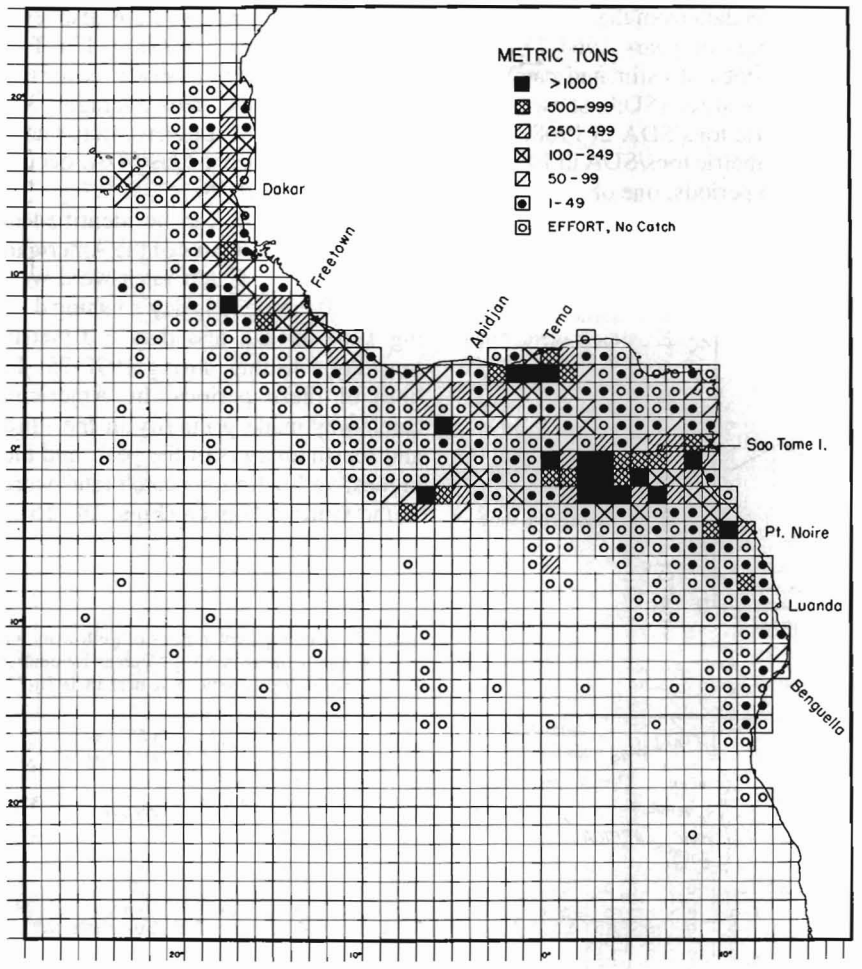


Figure 10.—Yellowfin tuna catch in 1° × 1° areas of the eastern tropical Atlantic. Logbook catches from the combined French, Ivory Coast, Senegalese, and American fleets for 1975 are shown.

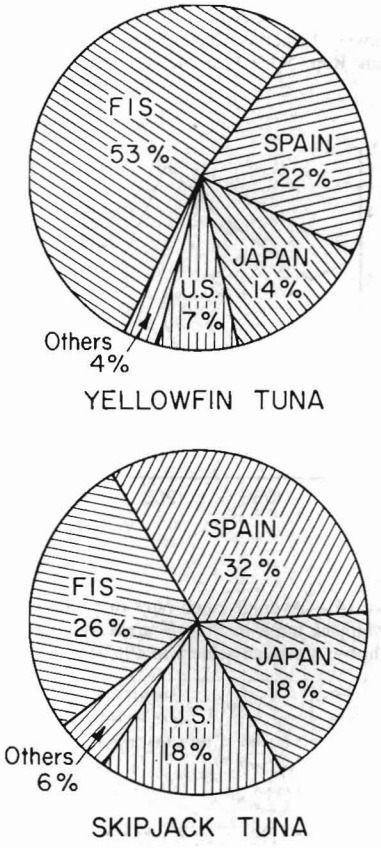


Figure 12.—Percentage of 1974 Atlantic catch of yellowfin tuna and skipjack tuna landed by major fleets. FIS fleet refers to French, Ivory Coast, and Senegalese boats.

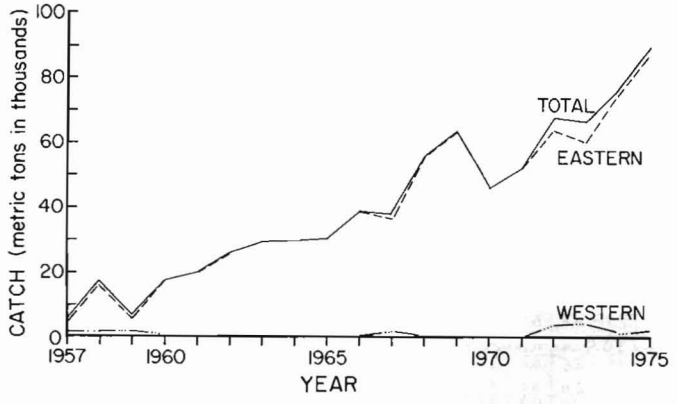


Figure 11.—Surface catches of yellowfin tuna from the eastern and western Atlantic, 1957-75.

scarce and American fishermen concentrated on catching yellowfin tuna. About 66 percent of that year's total catch was yellowfin tuna.

Yellowfin Tuna Catch and Catch Rates

The Atlantic surface catch of yellowfin tuna has fluctuated upwards at an average rate of 4,800 metric tons/year from 1957 to 1975 (Fig. 5). Since 1965 the catch has exceeded that of the longline fishery, and averaged 66 percent of the total Atlantic catch of yellowfin tuna.

Most of the Atlantic surface catch of yellowfin tuna is caught in the eastern Atlantic off Africa (Fig. 10). In 1975, about 99 percent of the catch was taken in the eastern Atlantic, primarily in the Gulf of Guinea (Fig. 11). About 96 percent of this catch was landed by the combined fleets of FIS, Spain, Japan, and the United States (Fig. 12).

Standardized catch rates for the eastern Atlantic fishery for yellowfin tuna

were estimated by Coan and Fox[3]. Their estimates for the surface fishery are based on data from the FIS fleet and for the series of years 1964-75 (Fig. 13). The series of estimated catch per standard day at sea (SDA) show a peak of 4.7 metric tons/SDA in 1968, and a low of 2.1 metric tons/SDA in 1973 and 1975. Two periods, one of high and the other of low catch rates are also evidenced in the time series (Fig. 13). The period of high catch rates was during 1964-69 when the rates averaged 3.6 metric tons/SDA. Lower catch rates, averaging 2.3 metric tons/SDA, occurring during 1970-75.

Similar periods can be identified in the nominal catch rates of the American fleet (Fig. 13). Catch rates were well above 6.0 metric tons/day's fishing during 1967-69 and less than 6.0 metric tons/day's fishing during 1970-75. In both of these periods the American catch was made primarily in the third and fourth quarters of the year, and the highest yellowfin tuna catch rates were in the Gulf of Guinea (Figs. 14, 15).

[3]Coan, A. L., and W. W. Fox. 1976. A production model analysis of the status of yellowfin tuna in the Atlantic Ocean, 1964-1975. NMFS, Southwest Fisheries Center, La Jolla, Calif., Admin. Rep. No. LJ-76-24, 16 p.

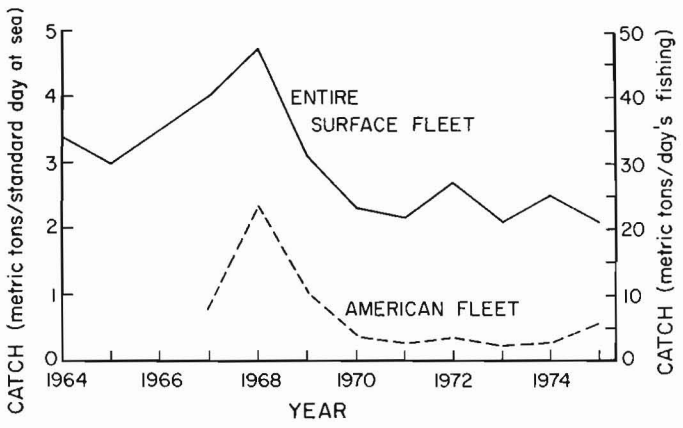


Figure 13.—Catch rates of yellowfin tuna caught in the surface fishery of the eastern Atlantic. Catch rates for the entire surface fleet (in metric tons/standard day at sea) and the American fleet (in metric tons/day's fishing) are shown.

Figure 14.—Average catch rates of yellowfin and skipjack tunas in 5° × 5° areas by quarter caught by American seiners in 1967-69.

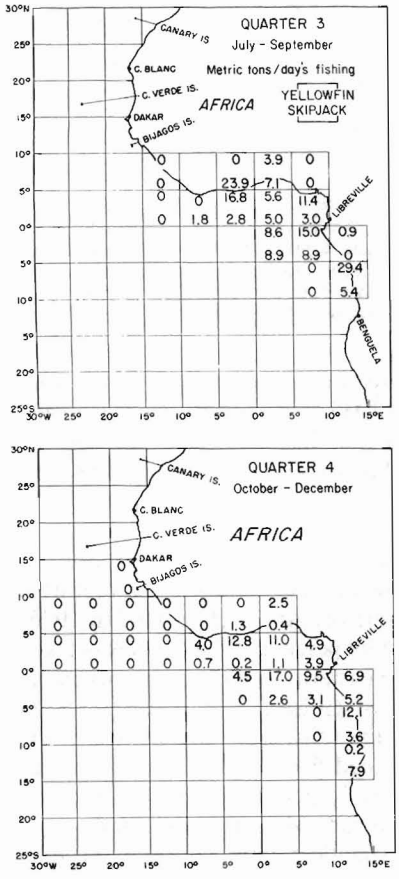
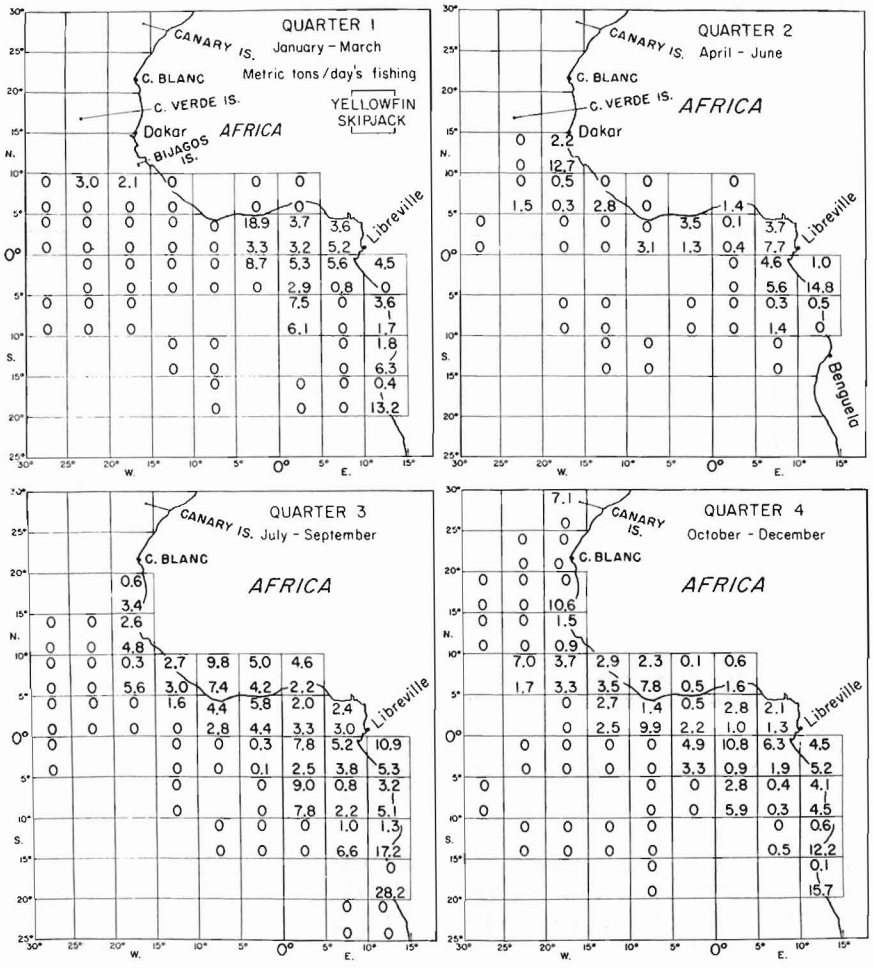


Figure 15.—Average catch rates of yellowfin and skipjack tunas in 5° × 5° areas by quarter caught by American seiners in 1970-75.



Yellowfin Tuna Size Composition

Size and age composition of yellowfin tuna in the surface catch of the eastern Atlantic was estimated by Coan[4]. His estimates show that fish between 31 and 125 cm long, or 1- and 2-year-olds made up the bulk of the catch in 1966-75. The dominant age group in most years was the 1-year-old (31 to 95 cm long—Fig. 9).

The average length of yellowfin tuna in the American catch ranged from 65 cm in 1971 to 111 cm in 1969 (Fig. 16). In all years except 1969, the dominant age group was the 1-year-old. In 1969 the dominant age group was the 2-year-old, probably resulting from the high percentage of catch from pure yellowfin tuna schools in that year (Sakagawa et al., 1976).

Skipjack Tuna Catch and Catch Rates

The catch of skipjack tuna from the Atlantic Ocean increased markedly between 1961 and 1975 (Fig. 17). The average rate of increase was about 10,000 metric tons/year with over 90 percent of the catch being taken in the eastern Atlantic. In 1975, the catch suddenly declined to approximately 59,500 metric tons from a peak in 1974 of about 114,700 metric tons. The cause of this sharp decline is believed to be due to poor availability, particularly off Angola in 1975.

Wide fluctuations in the catch have also been reported for other skipjack tuna fisheries, and they appear to be due to changes in availability and strength of year classes (Joseph and Calkins, 1969; Uchida, 1976). Oceanographic conditions are currently believed to be a major controlling mechanism for the fluctuations in availability of skipjack tuna (Williams, 1972).

Spanish, FIS, American, and Japanese tuna boats account for 94 percent of the total Atlantic catch of skipjack tuna (Fig. 12). Most of the catch is made in the Gulf of Guinea, off Senegal, and Angola (Fig. 18). In 1975, 70 percent of the total Atlantic catch of skipjack tuna was made in those areas.

Catch rates for skipjack tuna are

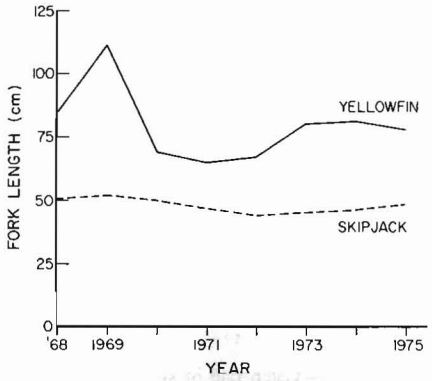


Figure 16.—Average fork length of yellowfin and skipjack tunas caught by American seiners in the eastern Atlantic.

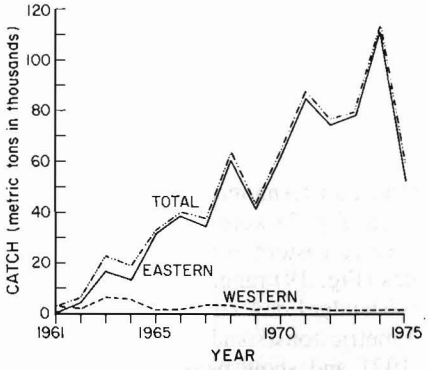
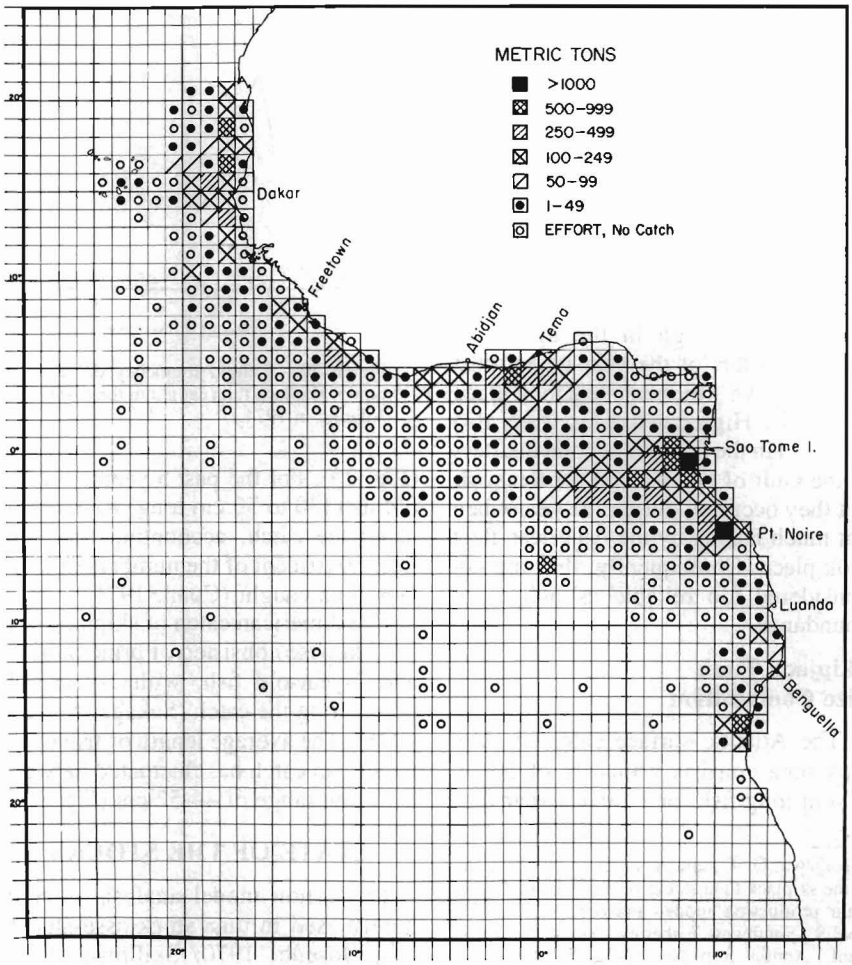


Figure 17.—Surface catches of skipjack tuna from the eastern and western Atlantic, 1961-75.

Figure 18.—Skipjack tuna catch in 1° × 1° areas of the eastern tropical Atlantic. Logbook catches from the combined French, Ivory Coast, Senegalese, and American fleets for 1975 are shown.



[4]Coan, A. L. 1976. Length and age composition of yellowfin tuna from the Atlantic Ocean, 1966-1975. NMFS, Southwest Fisheries Center, La Jolla, Calif., Admin. Rep. No. LJ-76-22, 23 p.

quite variable. They are affected by the fishing gear, time and area fished, and whether skipjack tuna and not yellowfin tuna is the principal target species. A representative catch rate for the fishery is therefore difficult to estimate. Sakagawa and Coan[5] calculated standardized catch rates for the skipjack tuna fishery based on stratified nominal catch rates by vessel type and month, and by assuming that catch rates in the central part (Annobon) of the Gulf of Guinea (Fig. 2) were representative for the entire eastern Atlantic. Their estimates (Fig. 19) range from 1.2 metric tons/standard day's fishing in 1967 to 3.0 metric tons/standard day's fishing in 1971 and show peaks in 1971 and 1974. The 1975 estimate is 1.2 metric tons/standard day's fishing, or 43 percent below the estimate for 1974. This decline is less than the 52 percent decrease observed in the catch (Fig. 17), indicating that the stocks were not fished as hard as the decline in catch suggests.

Skipjack tuna catch rates for the American fleet are quite variable, but the trends are generally similar to those noted for the standardized catch rates of Sakagawa and Coan (Fig. 19). Most of the American catch of skipjack tuna since 1970, however, was made off Angola rather than in the Annobon region. The catch rates off Angola were exceptionally high in the third and fourth quarters of the year when most fishing by the American fleet took place (Fig. 15). High catch rates were also recorded in the first and second quarters in the Gulf of Guinea and off Senegal, but they occurred during the year when not much fishing by the American fleet took place. Consequently, they are not considered too reliable as indices of abundance.

Skipjack Tuna
Size Composition

The Atlantic surface catch of skipjack tuna consists primarily of 30- to 60-cm long fish, or 1- and 2-year-olds

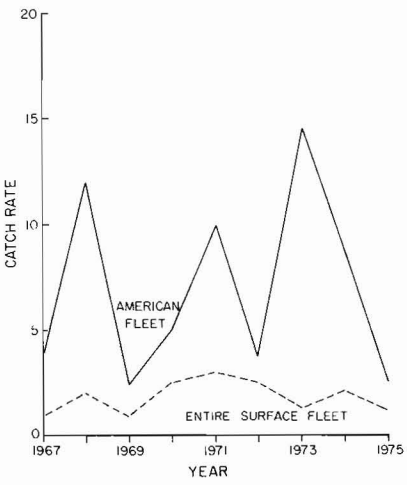


Figure 19.—Catch rate of skipjack tuna caught in the surface fishery of the eastern Atlantic. Catch rates for the entire surface fleet (in metric tons/standard day's fishing) and the American fleet (in metric tons/day's fishing) are shown.

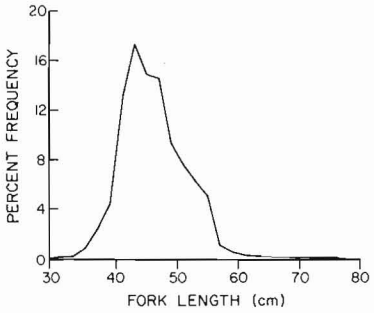


Figure 20.—Length frequency distribution of skipjack tuna caught in the eastern Atlantic in 1974.

(Fig. 20). For the past 5 years, 1-year-old fish (30 to 50 cm long) have dominated the catch, accounting for more than 50 percent of the numbers of skipjack tuna caught (Coan, 1976).

The American catch of skipjack tuna has likewise consisted of principally 1- and 2-year-old fish, with 1-year-olds dominating the catch (Sakagawa et al., 1976). The average length of fish in the American catch has fluctuated between a narrow range of 44-52 cm (Fig. 16).

STATE OF THE STOCKS

Production model analysis is commonly used in tuna stock assessments (e.g. Joseph, 1970; Skillman, 1975; ICCAT, 1976b). The analysis is usually based on catch-and-effort data from the fishery and relies on several assumptions, including: the model is applied to a closed, distinct, self-sustaining population; the concept of equilibrium conditions holds; and the age groups being fished remain constant. These assumptions rarely hold for tuna populations. Results from the analyses are consequently evaluated together with other information to determine the state of the stock.

Annual appraisals of the condition of Atlantic yellowfin and skipjack tuna stocks and fisheries are conducted by the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT). The appraisals have been based to a large extent on production model analysis.

Yellowfin Tuna

The most recent appraisal of the state of Atlantic yellowfin tuna stocks was made in 1976 (ICCAT[6]). The appraisal showed the stocks to be healthy and the catch increasing primarily because of offshore expansion of the surface fishery and strong recruitment of fish into the fishery. The maximum sustainable average yield (MSAY) was estimated to be 116,100 metric tons for the entire Atlantic fishery and 95,700 metric tons for the eastern Atlantic surface fishery only (Coan and Fox, footnote 3). These estimates were derived from a broad, flat-topped production model which indicate that only a negligible increase in equilibrium yield would result from further increases in fishing effort (Fig. 21). This conclusion has also been reached with yield per recruit models (Lenarz et al., 1974). The model also implies that at infinite fishing effort MSAY will be sustained from a reduced stock. This, of course, is impossible so conclusions drawn from extrapolation of the equilibrium yield curve too far to the right should be viewed with caution.

[5]Sakagawa, G. T., and A. L. Coan. 1976. State of the skipjack tuna stocks of the Atlantic Ocean from production model analysis, 1969-1975. NMFS, Southwest Fisheries Center, La Jolla, Calif., Admin. Rep. No. LJ-76-25, 14 p.

[6]ICCAT. 1977. Proceedings of the fourth regular meeting of the council (Provisional), November 17-22, 1976. Int. Comm. Conserv. Atl. Tunas, Madrid, Spain, 121 p.

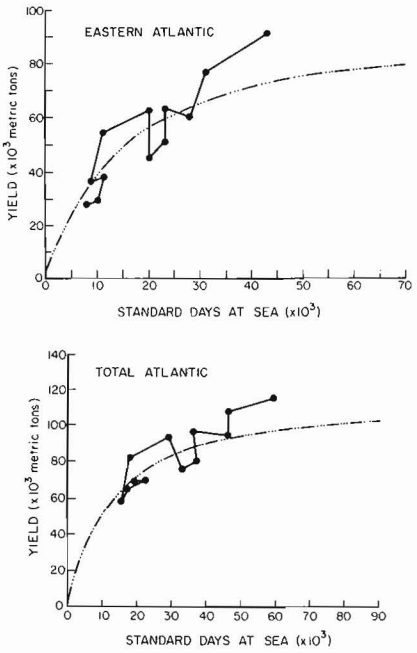


Figure 21.—Average yield curves and observed data, 1964-75, for the Atlantic fishery for yellowfin tuna.

A minimum size regulation is currently in effect for Atlantic yellowfin tuna that prohibits the taking of large numbers of fish less than 3.2 kg in size in excess of an incidental catch of 15 percent. The regulation was approved by ICCAT in 1972 to prevent reduction in the long-term yield through heavy exploitation of small fish. By 1974, most ICCAT countries had taken necessary legal action to implement the regulation. About 11,000 metric tons in 1974 and 4,000 metric tons in 1975 of undersized yellowfin tuna were caught by the eastern Atlantic surface fishery (ICCAT, footnote 6). The estimated losses to future yields from the removal of these undersized fish are approximately 10,000 and 4,000 metric tons. In other words, if the undersized fish were not caught in 1974 and 1975, they would have provided a total of 21,000 metric tons and 8,000 metric tons to the fishery in later years.

Skipjack Tuna

The catch of skipjack tuna from the Atlantic Ocean increased markedly during 1961-74, approaching crude estimates of potential skipjack tuna yields for the Atlantic (Sakagawa and Murphy, 1976). In 1975, however, fishermen experienced poor fishing for skipjack tuna and the catch reversed its upward trend, declining sharply by 47 percent. This was the largest decline recorded for the fishery and seemed to signal a decrease in stock abundance owing to fishing.

In 1976, ICCAT (footnote 6) reviewed the situation and concluded that the sharp decline in 1975 was due not to a decrease in stock abundance but to poor availability. It predicted that the catch would again be low in 1976 (about 40,000 to 50,000 metric tons) owing to fishing effort being diverted to catching yellowfin tuna.

Current estimates of MSAY for Atlantic skipjack tuna range from 89,300 to 118,400 metric tons for the eastern Atlantic surface fishery (Sakagawa and Coan, footnote 3). These estimates were derived from production models and are crude because satisfactory procedures to adjust the data to assumptions of the model have not yet been developed for Atlantic skipjack tuna. Nevertheless, the estimates indicate the general magnitude of the sustainable yield from the stock and that the yield can be quite variable because the fishery depends heavily on year classes that are available for only 1 or 2 years. Apparent natural mortality (biological and emigration), especially for fish older than 2 years, consequently, is high and there is no current need for instituting size or catch regulations for conservation purposes.

SUMMARY

The tropical tuna fishery is the largest tuna fishery in the Atlantic Ocean. In 1975, it produced approximately 174,000 metric tons of yellowfin and skipjack tunas.

The yellowfin tuna fishery is concentrated in the eastern tropical Atlantic. Growth of the fishery has been principally in the surface fishery since 1969, when the longline catch stabilized at about 30,000 metric tons. The stocks currently appear to be in good condition and capable of yielding larger catches but probably at a reduced catch-per-unit of effort.

The skipjack tuna fishery is also concentrated in the eastern tropical Atlantic. The catch reached a record high of 114,700 metric tons in 1974 then suddenly decreased to 59,500 metric tons in 1975. This decline apparently was due more to reduction in availability rather than reduction in abundance. The stocks currently appear to be in good condition. However, future catches can be expected to vary markedly, simply because skipjack tuna characteristically fluctuate widely in availability; the fishery is largely dependent on one or two year classes, which causes instability in production; and the amount of fishing effort exerted on skipjack tuna is dependent on availability and abundance of the co-target species, yellowfin tuna.

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