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HISTORY OF THE WESTERN ATLANTIC U.S. YELLOWFIN FISHERY

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SUMMARY

The history of fishing activity relative to yellowfin tuna is explored. Catch areas and gear employed are described. Time series of catch and ex-vessel price are presented. Directed fishing for yellowfin tuna in the western North Atlantic has become a significant part of the effort of a U.S. fishing fleet only in recent years. Previously, catches of western Atlantic yellowfin were opportunistic while in the primary pursuit of other species: bluefin and skipjack tuna or swordfish. U.S. yellowfin catches in the western North Atlantic are compared to the rest of the western Atlantic yellowfin catch and the yellowfin catch of the entire Atlantic.

RESUME

Ce document passe en revue l'histoire de la pêche en ce qui concerne l'albacore. Les zones et engins de capture sont décrits, et les séries temporelles de captures et de prix au déchargement sont présentées. L'effort visant l'albacore dans l'Atlantique nord-ouest n'est devenu que ces dernières années un élément significatif de l'effort américain à la senne. Antérieurement, les prises d'albacore ouest-atlantique étaient accessoires à la pêche d'autres espèces, thon rouge et listao ou espadon. Les prises américaines d'albacore dans l'Atlantique nord-ouest sont comparées au reste des prises ouest-atlantiques de l'espèce et aux prises d'albacore dans tout l'Atlantique.

RESUMEN

El documento trata sobre la historia de la pesca del rabil. Se describen los caladeros y los artes empleados. Se presentan series temporales y el precio (una vez desembarcado el pescado). En los últimos años, la pesca dirigida al rabil en el Atlántico noroeste ha llegado a constituir una parte importante del esfuerzo de la flota pesquera de Estados Unidos. Con anterioridad, las capturas de rabil en el Atlántico oeste eran circunstanciales y se obtenían en la búsqueda de otras especies, como el atún rojo, listado o pez espada. Se establece una comparación entre las capturas norteamericanas de rabil en el Atlántico noroeste con las de la misma especie en el resto del Atlántico oeste y en todo el Atlántico.

INTRODUCTION

Yellowfin tuna have been included in U.S. landings statistics since at least the early 1960s, but did not become a significant component of landings until recently (Fig. 1). Commercial fishing has occurred in three areas: along the U.S. east coast, in the Caribbean, and in the Gulf of Mexico. The primary gear employed in the capture of yellowfin tuna has been the purse seine, the longline, and the rod and reel. Recreational fisheries for yellowfin exist along the U.S. east coast and in the Gulf of Mexico. Table 1 shows the U.S. catch of yellowfin from 1986 through 1989, by area and gear (recreational and commercial rod and reel catches are shown separately).

Consumer demand for fresh tuna has strengthened the market and increased the value of yellowfin tuna in the past few years. The longline industry, in particular, has responded to the new incentive to harvest yellowfin. Table 2 shows the average ex-vessel price of yellowfin for the Northeast and Southeast Regions of the National Marine Fisheries Service for a series of years. In the Northeast Region, the price includes both tuna sold as fresh fish and tuna sold to canneries. Most tuna caught in purse seines is sold to canneries. In the Northeast, the increase in average prices not only reflects an increased value of yellowfin but also an increased proportion of landings being sold as fresh fish. Handling and storage are extremely important in determining the price per unit weight for yellowfin (Otwell 1988). Season of the year also affects the price, as does the size of the fish (Wilson 1988), which influences fat content. At 1 to 1 1/2% in the Gulf of Mexico, even the larger yellowfin have a relatively low fat content compared to the cold-water tuna (Wilson op. cit.). The lower fat content makes yellowfin less desirable than bluefin on the Japanese market, but may make it more attractive to health-conscious U.S. consumers (Wilson op. cit.). "Blackened" yellowfin recently has become a popular dish in Cajun cuisine (Wilson op. cit.).

PURSE SEINE FISHERIES

Catch statistics indicate yellowfin tuna have been caught by U.S. purse seine vessels off the northern Atlantic coast and in the Caribbean historically. The two fisheries are distinct and do not involve the same vessels.

Northern Atlantic coast

A purse seine fishery for bluefin tuna (Thunnus tynnus) developed on the U.S. continental shelf from Virginia to Massachusetts in the early 1960s (Wilson 1965). This fishery originated from exploratory fishing activity partly funded by the U.S. Bureau of

Commercial Fisheries (precursor of the National Marine Fisheries Service) beginning in 1951 (Wilson op. cit.). According to Wilson (op. cit.) raw tuna supplies at New England canneries initially consisted almost entirely of local bluefin from purse seines, traps, harpoons, and hand lines. But what was originally a Cape Cod Bay effort almost exclusively for bluefin expanded in 1962 to become an Atlantic coast tuna fishery that also caught significant quantities of skipjack (Katsuwonus pelamis). By 1963, the fishing area extended south to Cape Hatteras and included waters to the 100-fathom curve. The advent of larger vessels and the use of spotter aircraft facilitated the southward expansion and capture of skipjack (Wilson op. cit.). Small amounts of yellowfin also were caught in this fishery, which, by 1964, included 21 vessels 92-363 metric tons in carrying capacity (Sakagawa 1975). Landings were taken to local canneries or canneries in Canada or Puerto Rico.

The Atlantic Coast purse seine fishery now consists of five vessels permitted to catch large bluefin tuna. Yellowfin remain a small component of the catch. According to one vessel captain (L. Ingrande, pers. comm., March 1991), this is because yellowfin do not school in economic quantities on the shelf like skipjack. Market changes may allow yellowfin caught in purse seines to sometimes be sold as fresh fish, which may make smaller catches more profitable. New England and Canadian canneries now are closed. In 1986 and 1987, some of the Atlantic coast catch of yellowfin and skipjack was landed at Puerto Rican canneries. This practice, however, was short-lived because more favorable prices can now be obtained elsewhere (L. Ingrande, pers. comm.). Some of the catch is sold to petfood canneries in the U.S. and Canada. The yellowfin catch by this fishery is small compared to that of other U.S. fisheries (Table 1).

Caribbean

Yellowfin tuna sometimes are caught in the Caribbean Sea by U.S. purse seine vessels that normally fish in the Pacific Ocean. These vessels are in transit to canneries in Puerto Rico to unload their catch. If their storage compartments are not loaded with Pacific tuna, they "top them off" with Atlantic yellowfin and skipjack. Until recently, the eastern Tropical Pacific was a major fishing ground for U.S. purse seines. From the late 1960s until 1982, some of the vessels that fished in the eastern Tropical Pacific also participated in a large fishery in the Gulf of Guinea in the eastern Atlantic off Africa (A. Coan, NMFS/SEFC, LaJolla, pers. comm.). The Caribbean was directly between these two main fishing areas, and the vessels landed their catches at Puerto Rican canneries. Vessels fishing in the eastern Tropical Pacific continued to land their catches at Puerto Rican canneries after U.S. participation in the Gulf of Guinea fishery ended and also continued to top off their loads with Caribbean tuna. The annual magnitude of Caribbean catches by these vessels was largely a function of fishing conditions in the Pacific, rather than the abundance of yellowfin in the Caribbean. Pacific vessels accounted for a significant component of the U.S. western Atlantic yellowfin catch through 1986 (Table 1). Most Pacific vessels now fish in the southwestern Pacific under a treaty signed in June, 1988, and unload their catches at canneries in American Somoa (A. Coan, pers. comm.). The recent policy of U.S. canneries of refusing to purchase tuna caught with dolphins has increased the incentive for a move in purse seine operations from the eastern Tropical Pacific to the southwestern Pacific. The Caribbean purse seine catch is expected to be very limited in the future because of this change. There were no Caribbean catches of yellowfin tuna by U.S. purse seines in 1988 and 1989, although three vessels may have fished in the Caribbean in 1990 (M. Hinton, IATTC, pers. comm.).

LONGLINE FISHERY

Based on relative weight of landings, the pelagic longline is the principal gear for the capture of yellowfin tuna by U.S. vessels in the western North Atlantic (Table 1). Longline vessels operate in four major areas: off the northern Atlantic coast from Cape Hatteras to the Grand Banks, off the southern Atlantic coast to the Florida Straits, in the Caribbean, and in the Gulf of Mexico. The largest volume of yellowfin in U.S. landings comes from longline operations in the Gulf of Mexico.

Yellowfin and other tuna species were always a component of the catch of longline vessels. But beginning in about 1985, some operators began directing their effort at tuna and fishing for them year-round (Hoey and Bertolino 1988). Other vessels switched back and forth between swordfish and yellowfin. Dramatic increases in market demand and the price of tuna, coupled with declines in swordfish catch rates, led to the increased effort toward yellowfin (Hoey and Bertolino 1988).

Until 1990, the target species of the set was not indicated in logbook reporting by longline captains. But the composition of the catch suggests that the yellowfin component of the longline fleet is much more important in the Gulf of Mexico than in the northern Atlantic fishery. Farber et al. (1988) classified longline sets in the longline data base for the period from October, 1986, through September, 1987, according to the percentage of tuna taken. Sets in which the catch consisted of more than 50% tuna were classified as tuna sets, whereas the rest of the sets (including those taking no fish) were classified as swordfish sets. By this criterion, roughly 18% of sets in the northern Atlantic (north of 35°N) were tuna sets, whereas 72% of those in the Gulf of Mexico were tuna sets. Swordfish sets predominated in the southeast coast and Caribbean fisheries.

Different gear configurations and fishing strategies are necessary for fishing swordfish and yellowfin, but some gear modifications can readily be made. Descriptions of the gear commonly used by longliners fishing for yellowfin in the Gulf of Mexico are given by Pollack (1987), Lawlor and Adams (1988), and Wilson (1988). Swordfish are best caught at night, but yellowfin bite best at dawn and dusk (Wilson 1988), and effort directed at yellowfin is scheduled accordingly. Live bait is very effective in catching yellowfin and is used by some longliners in the Gulf of Mexico, particularly the Vietnamese Americans there (D. Fable, pers. comm.). Longliners believe that fishing near ocean

thermal fronts in waters of certain temperatures may enhance yellowfin catches. The use of water thermometers and expendable XBTs, as well as access to satellite-derived sea surface temperature data produced by the National Oceanic and Atmospheric Administration in Miami, helps longliners direct their effort at locations where they expect greater fishing success.

Fishing permits were granted by the National Marine Fisheries Service to 584 longline vessels in 1989, slightly less than the 604 permitted in 1988. Logbook submissions confirm that at least 364 longline vessels actively fished in 1988 and 464 fished in 1989.

New England

U.S. and Canadian vessels began to use pelagic longline gear on swordfish in the early 1960s (Hoey and Casey 1987). By 1970, the longline had replaced the harpoon as the dominant swordfish gear in the western North Atlantic, and swordfish catches were rising. After a decline in the 1970s due to mercury restrictions, the U.S. fishery expanded, beginning about 1978. The original New England fishery operated along the edge of the Continental Shelf from Cape Hatteras to Georges Bank in May and June and then progressed to the Scotian Shelf and the Grand Banks during summer and fall (Hoey and Casey 1987). The Cape Hatteras to Grand Banks region continues to be an important longlining area, but many vessels from this region migrate to the Caribbean in the winter.

Southern Atlantic Coast

A longline fishery using a new type of gear configuration began targeting swordfish in the Florida Straits in the 1970s (Hoey and Bertolino 1988, Berkeley 1989). The new gear configuration was very successful and the fishery expanded. Versions of the gear were adopted throughout the U.S. Atlantic longline fishery. During the year examined by Farber et al. (1988), roughly 10% of the sets in the longline fishery along the east coast from Florida to North Carolina appeared to be directed at tuna.

Gulf of Mexico

Yellowfin longline landings in the Gulf of Mexico grew from 352 metric tons (mt) in 1984 to 7,764 mt in 1988. 1989 catches were lower--5,724 mt. According to Deborah Fable, port agent for the National Marine Fisheries Service (NMFS) in Panama City, the original Gulf of Mexico longline fishery for yellowfin developed in the eastern Gulf and involved vessels that had been bottom longlining for yellowedge grouper. A strengthened demand and higher price for tuna, coupled with a decline in grouper catch rates, led to the switch to pelagic gear and yellowfin. The improved market for yellowfin also provided an incentive for swordfish longliners in the Gulf of Mexico to switch to yellowfin tuna, either totally or partially. Until 1983, domestic yellowfin tuna landings in the southeast region came mainly from the by-catch of swordfish longliners (Wilson 1988). Florida was initially the major state where yellowfin were landed, but Louisiana landings increased rapidly after 1984, and, by 1987, Louisiana was outproducing Florida (Table 4). Texas also became a major producing state. The average size of fish in the catch decreased substantially in 1989. A shift back to the eastern Gulf and larger sizes may be occurring in 1991 (D. Fable, pers. comm.).

In terms of number of yellowfin caught, the U.S. longline fishery replaced the Japanese longline fishery that operated in the Gulf of Mexico from 1963 through 1980 (Browder et al. 1991). The estimated number of fish caught by U.S. longliners in 1988 exceeded any annual catch by the Japanese (155,600 fish, compared to a maximum of 92,300 caught by the Japanese in 1971) (updated from Browder et al. 1991).

Caribbean

A U.S. longline fishery has developed in the Caribbean. The vessels fishing in the Caribbean are thought to be primarily New England vessels migrating to the Caribbean for the winter, but Florida and Gulf of Mexico vessels may also participate in this fishery. Thus far, yellowfin landings are small; the orientation appears to be toward swordfish.

OVERVIEW

U.S. Western Atlantic Catch in Perspective

In less than 5 years, yellowfin tuna grew from a relatively insignificant component of the U.S. western Atlantic tuna catch to the dominant tuna species in landings (Fig. 2). U.S. landings now represent a substantive component of total yellowfin landings in the western Atlantic (Fig. 3). They still are very small, however, in comparison to yellowfin catches in the entire Atlantic (Fig. 4).

Future Trends

It may be difficult to further expand the U.S. fishery in the Gulf of Mexico. Maximum yellowfin catches were reached in the Gulf of Mexico in 1988, but were not sustained in 1989. The magnitude of the 1988 catch exceeded that attained by the Japanese during more than 20 years of experience in the area.

Vessels migrating between the Grand Banks and the Caribbean appear to be fishing

successfully along the Mid-Atlantic Ridge. An expansion of effort into this area between 1987 and 1989 has been observed. This trend may continue as U.S. captains learn how to fish the new area.

The purse seine catch in 1986 suggests that sizeable quantities of yellowfin accessible to U.S.-flag vessels occur in the Caribbean. One might think this would be an area of future expansion by the U.S. longline fleet or by other nations. But the Caribbean catch of yellowfin by U.S. longliners is low compared to that in other regions and has changed little the past three years (Table 1).

ACKNOWLEDGMENTS

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Table 1. Yellowfin landings (metric tons whole weight), by gear and area, from compilations prepared for reporting to ICCAT).[1]

Area and gear	Year 1986	1987	1988	1989
Northern Atlantic coast				
Longline	392.30	446.79	490.52	384.33
Purse seine	82.84	107.12	0.00	93.89
Handline	171.46	312.98	150.50	68.31
Trawl	0.72	0.09	0.05	0.91
Gill net	5.67	0.82	2.40	13.88
Harpoon	0.10	0.00	0.00	0.00
Commercial rod & reel	69.86	179.62	28.53	36.97
Recreational rod & reel	934.85	1,526.04	439.00	707.73
Total	1,657.80	2,573.44	1,111.00	1,306.02
Southern Atlantic coast				
Longline	123.15	127.44	13.40	158.42
Handline	1.53	1.22	0.99	1.23
Commercial rod & reel	156.99	207.10	304.27	95.42
Recreational rod & reel	unk	unk	unk	unk
Total	281.67	335.76	318.66	255.07
Gulf of Mexico				
Longline	3,202.75	3,969.59	7,764.48	5,724.41
Handline	0.04	1.73	1.84	3.27
Commercial rod & reel	1.43	0.00	14.59	0.00
Recreational rod & reel	unk	unk	unk	unk
Total	3,204.22	3,971.32	7,780.91	5,727.68
Caribbean				
Longline	66.20	138.09	149.93	151.32
Purse seine	614.20	20.88	0.00	0.00
Total	680.40	158.97	149.93	151.32
GRAND TOTAL	5,824.09	7,039.49	9,359.50	7,440.09

[1] Purse seine catches and, possibly, some other figures are updates of those actually reported to ICCAT.

Table 2. Average ex-vessel prices for yellowfin tuna and landings on which the prices were based in the Northeast and Southeast Regions of the National Marine Fisheries Service (from unpublished data of the National Marine Fisheries Service in Miami, Florida, and Washington, D.C.).

Year	Southeast Region Price[a]	Southeast Region Metric Tons	Northeast Region Price[a]	Northeast Region Metric Tons
1976			0.42	4.8
1977			0.31	1.1
1978			0.41	9.7
1979	0.52	10.5	0.33	7.2
1980	1.37	54.4	0.81	22.7
1981	1.31	36.0	0.52	87.6
1982	1.26	62.5	0.59	163.6
1983	1.30	147.8	0.70	196.7
1984	0.97	496.1	0.90	173.1
1985	1.25	1,563.1	0.54	375.9
1986	1.44	3,485.9	1.15	713.2
1987	2.08	4,307.4	1.25	941.2
1988	1.67	8,099.6	1.46	748.3
1989	1.99	8,208.0	1.34	552.2

[a] Dollars per pound. (1 pound = 4.536^{-4} mt.)

Table 3. Total number of U.S. longline sets in logbook data and estimated number and proportion directed at yellowfin for the year from October, 1986, through September, 1987 (computed from Farber et al. 1988).

	Number of sets			
	Directed at tunas	Directed at swords	Total	% tuna
Caribbean	113	1,574	1,687	6.7
Gulf of Mexico	3,768	1,436	5,204	72.4
Florida east coast to South Atlantic Bight	350	3,466	3,816	9.2
Mid-Atlantic Bight to Grand Banks	945	2,456	3,401	27.8
Unknown	66	222	288	22.9
	5,242	9,154	14,396	36.4

Table 4. Gulf of Mexico yellowfin tuna landings (metric tons whole weight), by state (from unpublished data of the National Marine Fisheries Service, Miami, Florida).

Year	Alabama	W. Florida	Louisiana	Mississippi	Texas
1980	0.00	5.82	0.00	0.00	17.51
1981	0.31	6.35	0.00	0.00	5.58
1982	0.09	22.72	0.00	0.00	3.08
1983	0.00	67.07	0.00	0.00	2.45
1984	1.04	346.38	0.02	0.00	4.89
1985	4.60	1,306.54	102.93	0.00	60.66
1986	12.67	1,755.08	1,104.52	0.00	331.95
1987	16.53	780.78	2,551.69	137.05	622.63
1988	39.02	506.45	5,621.00	0.00	1,477.40
1989	5.71	505.85	3,778.28	40.91	1,397.09

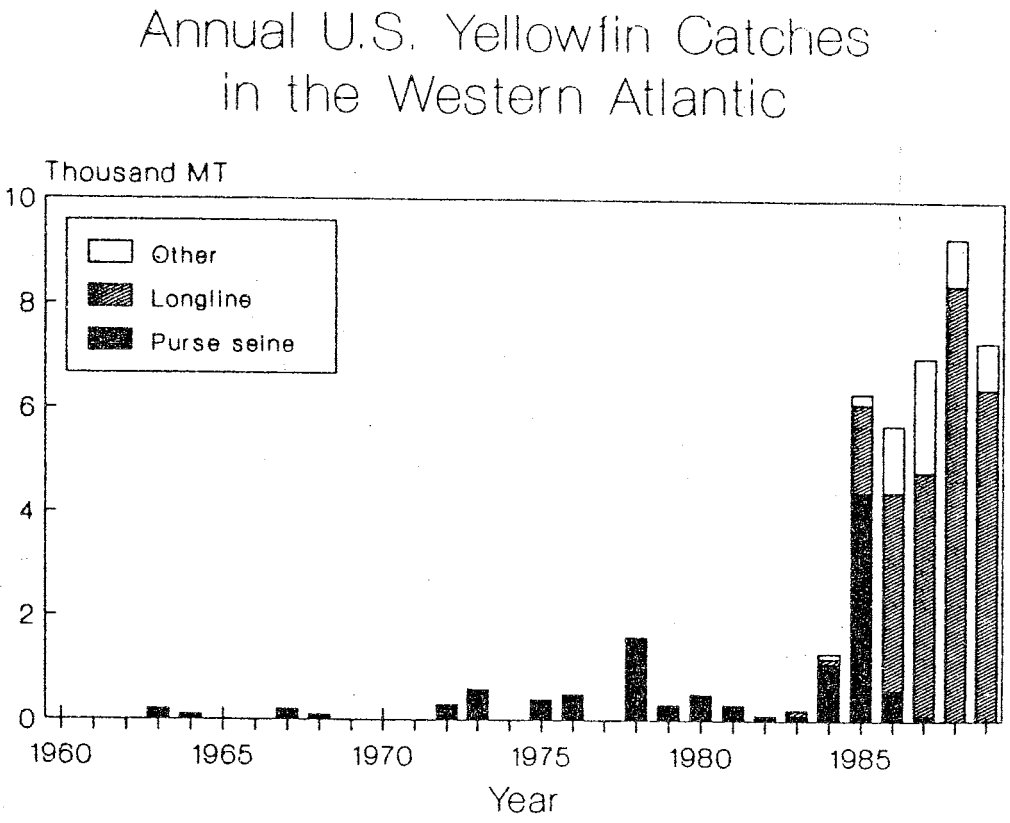

Figure 1. Annual U.S. yellowfin catches in the Western Atlantic (from ICCAT 1990).

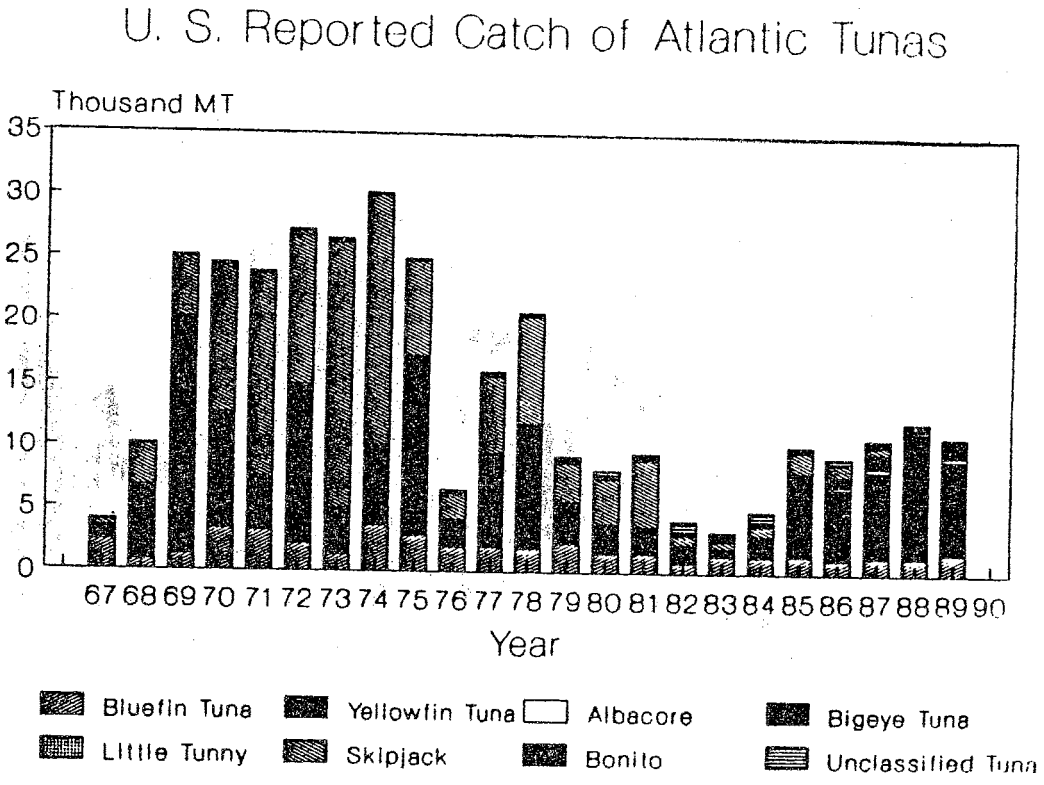

Figure 2. Reported U.S. catch of Atlantic tunas, by species (from ICCAT 1990).

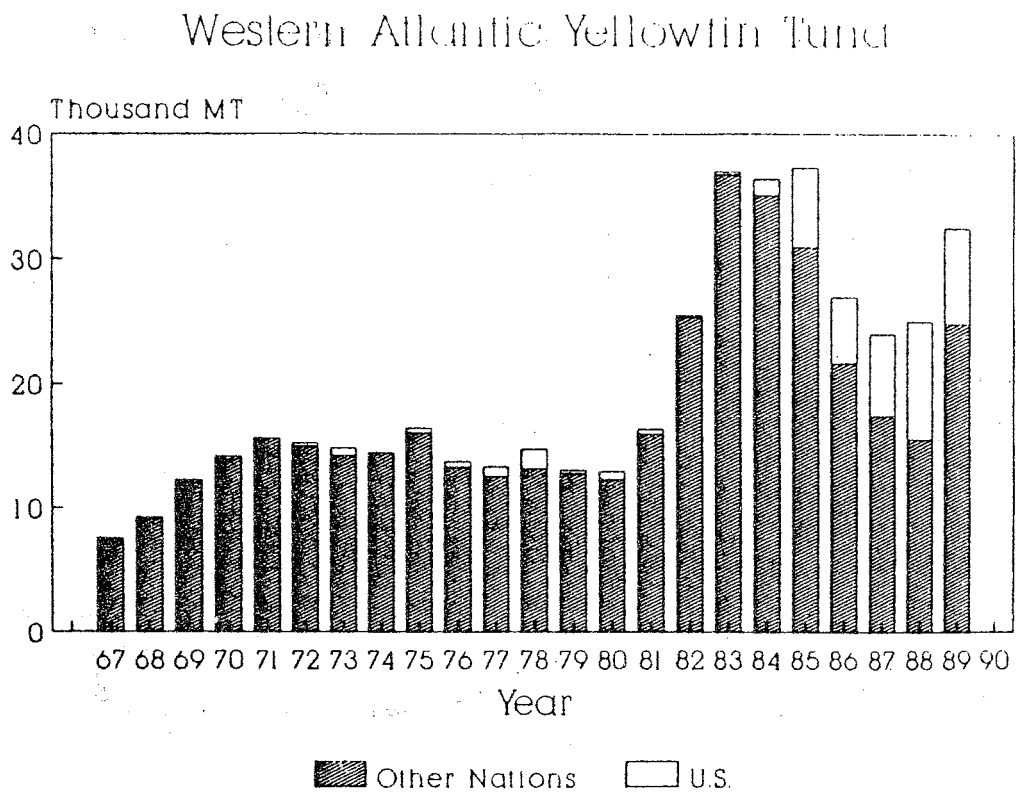

Figure 3. Western Atlantic yellowfin catches by the U.S. and other nations (from ICCAT 1990).

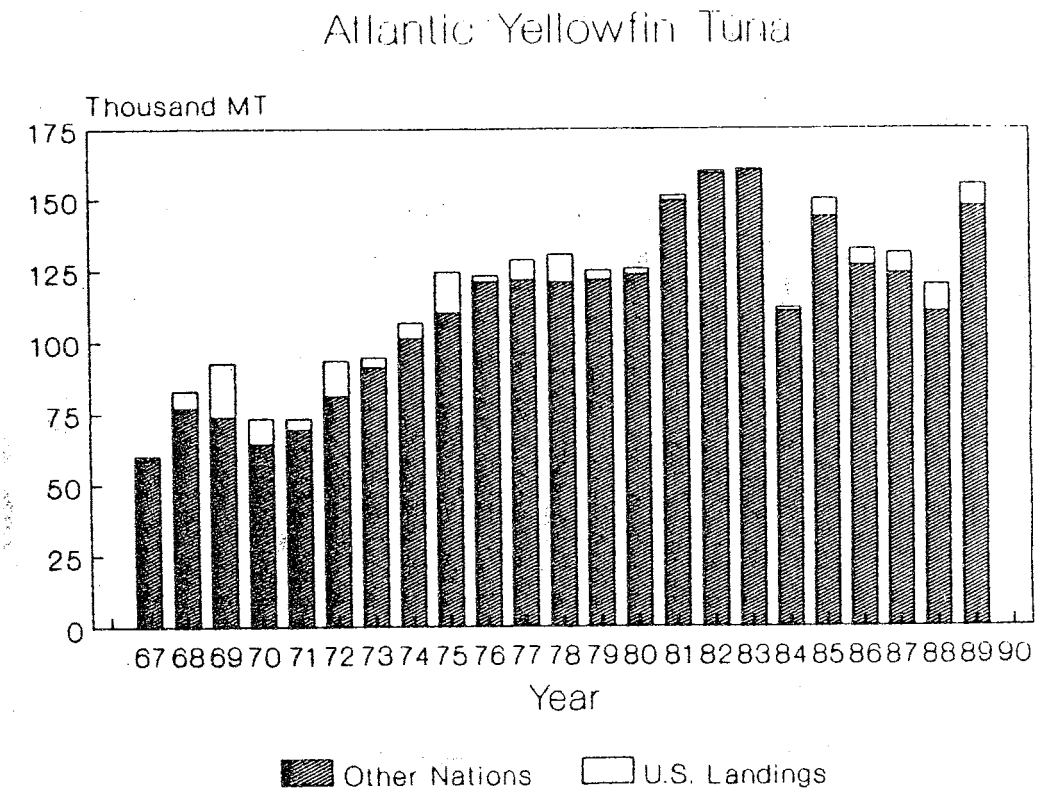

Figure 4. Atlantic yellowfin catches by the U.S. and other nations (from ICCAT 1990).