AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

Other Proposals

A. PROPOSAL

Inclusion of the western Atlantic population of Thunnus thynnus in Appendix I and of the eastern Atlantic population in Appendix II.

B. PROPONENT

Sweden.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Osteichthyes

12. Order: Scombriformes

13. Family: Scombridae

14. Species: Thunnus thynnus

15: Common Names:

English:	bluefin tuna
French:	thon rouge
Spanish:	atún
Portuguese:	atúm
Danish:	tunfisk
Finnish:	tonnikala
German:	roter thun
Icelandic:	túnfiskur
Japanese:	kuromaguro
Korean:	cham-da-raeng-i
Dutch:	tonijin
Norwegian:	makrellstørje
Polish:	túnczyk
Swedish:	tonfisk
Taiwanese:	hey we
Russian:	tunec

16. Code Numbers:

2. Biological Data

21. Distribution: The bluefin tuna is found on both sides of the Atlantic and both eastern and western Pacific. The Atlantic bluefin tuna is one of the largest animals in the world, reaching sizes of well over a thousand pounds and ages of twenty years or more. In the western Atlantic it ranges from Labrador to Brazil and perhaps farther south (see Figure 3 from ICCAT 1990). In the eastern Atlantic it ranges from western north Africa to the North Sea. It is also found in the Mediterranean (Mather, 1974). There is some movement of bluefin tuna

across the Atlantic Ocean, but the two stocks are considered by the International Commission for the Conservation of Atlantic Tunas (ICCAT) to be separate for management purposes. In the eastern Pacific, bluefin tuna occurs from Shelikof Strait, Alaska, to southern Baja California, but they are usually found south of Los Angeles. They occur in the western Pacific as well, where there is an active fishery for them.

The bluefin tuna has occurred, but may no longer occur, in the Black Sea, in the Baltic Sea (Georgsson, 1989), off Norway (Georgsson, 1989) and much of the North Sea (Tiews, 1978), in nearshore waters of Rhode Island, USA (Anderson, pers. comm. 1991), and close along the beaches of Long Island, New York, USA (D. Scopper, pers. comm. 1991). The body entrusted with monitoring and management of the Atlantic bluefin tuna is the International Commission for the Conservation of Atlantic Tunas (hereafter referred to as ICCAT).

22. Population: Although some trans-oceanic migration is known to occur (there is "evidence of limited mixing from tag releases and hard part analysis" ICCAT 1990), bluefin tuna in the western and eastern Atlantic are considered to be essentially separate populations: "For management purposes SCRS considers Atlantic bluefin to be composed of an eastern and a western stock" (ICCAT 1990; see Figure 3 from ICCAT 1990).

Bluefin tuna populations have undergone tremendous declines throughout the species range on both sides of the Atlantic.

Western Atlantic

The breeding population in the western Atlantic has been in continual decline for two decades. The population of 'giant', adult fish (age 10+ years) in the western Atlantic is estimated by ICCAT to have declined nearly 95% since 1970 (Figure 1; data from ICCAT 1990 Table 7). During this period, the fishing mortality index (usually denoted as 'F') has increased 2,236% (Figure 1; data from ICCAT 1990 Table 6). Fishing mortality in adult fish is nearly three times the natural mortality. The decline in the breeding population may be affecting larval abundance. Western Atlantic larval abundance indices since 1987 have ranged from 9 to 24% of what they averaged in 1977 and 1978 (the only 2 years during the 1970s for which there are data; ICCAT 1990).

In addition to the decline of age 10+ adults, from 1970-1990, fish aged 1-3 years declined an estimated 88%, fish aged 4-6 years declined 73% (see attached ICCAT Figure 10 and Table 7; ICCAT 1990). These decline estimates are based on ICCAT's estimated population sizes (ICCAT 1990 Table 7).

In addition to estimates of absolute numbers (ICCAT 1990 Table 7), ICCAT has plotted population changes on a relative scale for age groupings 1-5, 6-7, and 8+ (ICCAT 1990 Figure 10). In reference to this graph, ICCAT 1990 states that "the January 1, 1990 large fish abundance (ages 8+) is about 10 percent of the 1970 value; ages 6 to 7 approximately 50%; ages 1 to 5 for 1987 (last year with useful estimates of young fish) approximately 20% of the 1970 value. The estimates of abundance of large fish have continued to decline since 1970." [Until 1990, ICCAT considered adult bluefin tuna to be those at least 10 years old. In 1990 ICCAT changed its criteria and now considers adult bluefin tuna to be those eight years or older ("the large fish that were aged 10+ are now considered ages 8+, the medium fish have changed from ages 6 to 9 to ages

6 to 7 and the small fish have not changed their age grouping of ages 1 to 5," ICCAT 1990].

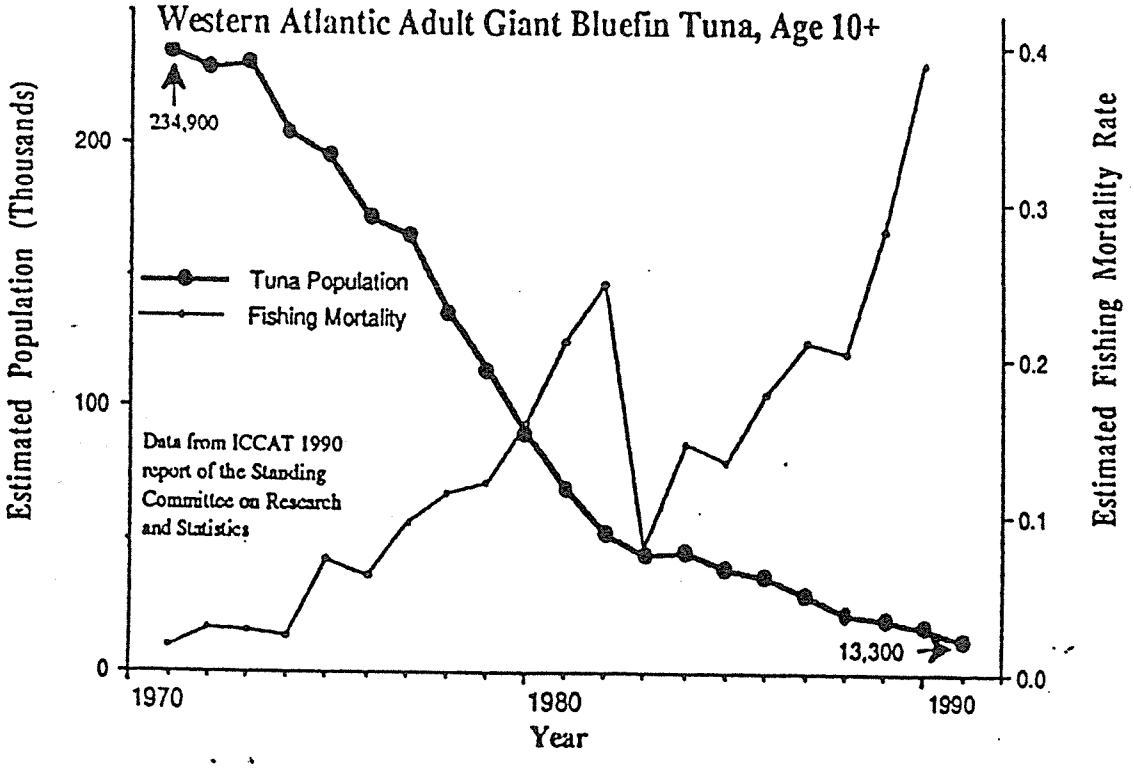

Figure 1. By 1990, the population of adult (giant) bluefin tuna (age 10+ years) had declined more than 94 percent from 1970 estimated levels, under relentlessly intensifying fishing pressure.

These declines and the intense fishing pressure are projected to continue for both adult and adolescent bluefin tuna. For the near future, ICCAT predicts a "substantial decrease in projected stock size of medium fish in 1992" and "projected increases in the fishing mortality rate on large fish to above the 1990 estimate" (ICCAT 1990). ICCAT's Standing Committee on research and Statistics has stated that current catch quotas "will cause the decline of the age 8+ group to continue" and "is expected to result in an increase in the estimated fishing mortality rate and a corresponding decline in the estimated stock size of large and medium fish" (ICCAT 1990).

ICCAT's population estimates go back to 1970, but by 1970 the bluefin was already in decline. The mean annual catch in the western Atlantic between 1960 and 1965 was 9,190 metric tons. Landings peaked during 1963-1965, averaging 15,744 mt/yr. By the years 1970-1975, landings were already down to an average of 5,050 mt/yr, 55% of the 1960-65 average and only 32% of the landings during the '63-'65 peak (ICCAT 1990). Woods Hole Oceanographic Institute scientist Frank Mather stated in 1974 that the "Atlantic bluefin tuna is in trouble. The danger signs are obvious. Catches of large bluefin tuna have declined catastrophically" (Mather, 1974). Note that this is the period from which Figure 1 begins.

Despite the declines that had occurred in all age groups since the early 1970s (Figure 10 from ICCAT 1990), ICCAT in 1983 allowed a doubling of the catch

quota that it had set only a year earlier in 1982. Since 1983 the total allowable catch has been unchanged (ICCAT 1990).

The species is extirpated from some of its former western Atlantic concentration areas. For example, in the nearshore waters (½ to 3 miles from shore) of Rhode Island, USA, the bluefin tuna was once so plentiful at certain times of year that several prestigious tuna tournaments were held there by sport fishermen. Areas near Rhode Island, such as Narragansett Bay, Nebraska Shoal, and others held concentrations of adult ('giant') bluefin. Many giant bluefin were caught in these tournaments. In 1956, for example, sport anglers caught 21 giant bluefin of over 400 pounds in one day's fishing in the Rhode Island Atlantic Tuna Tournament (Anderson, 1990). The fish are no longer found in these former high-concentration areas. According to charter boat captain and author Al Anderson "we have not seen a bluefin tuna in those areas in well over a decade" (pers. comm. 1991). On the south shore of Long Island, New York, giant bluefin tuna were taken in along-shore fish traps just off the beach earlier in this century (D. Scopper, former fish trap tender, pers. comm. 1991). Up until the late 1950's these traps sometimes caught several giant bluefin tuna in a single day, but no tuna were caught in such traps during the last two decades they operated (D. Scopper, pers. comm. 1991).

Eastern Atlantic and Mediterranean

For the eastern region as a whole, ICCAT (1990) states: "There still exists a great deal of uncertainty. However, it can be said that the population of older fish (age 10+, ICCAT 1990, Figure 15) is now lower, at about half the 1970 value. The medium fish (ages 5 to 9) also show a downward trend in the population of approximately 25 percent (ICCAT, 1990 Figure 15). The stock size of ages 2 to 4 is highly variable. Uncertainty about the youngest ages not only comes from the analytical technique and the variance in the abundance indices but also the high degree of uncertainty of the sampling of catches in the Mediterranean. For this reason, only limited confidence can be placed on the apparent upward trend" for fish in the 2-4 year old group (ICCAT 1990 Figure 15). Improved data collection would probably give a better means for assessing the status of this population.

For the eastern Atlantic, ICCAT's scientists estimate that "the size of the stock of medium-sized fish (ages 5 to 9 in 1989 was approximately three-fourths the 1970 value while that of ages 10+ (large fish) was a little more than half. Recent estimates of the stock size of ages 2 to 4 indicate an increasing trend since 1970 with large annual fluctuations over time. (ICCAT 1990, Figure 15; ICCAT 1990 Table 18). This implies high variability in recruitment of the east Atlantic bluefin stock" (ICCAT 1990).

Catches in the eastern Atlantic averaged 20,900 metric tons between 1960 and 1962. This dropped 74% by the years 1987-1989, to an annual average of 5,400 metric tons (ICCAT 1990 Table 1).

Fishing mortality estimates for adult (age 10+) bluefin tuna suggest an increase in fishing mortality of 25-50% between 1970 an 1989, with significant inter-year variability in the intervening period and no clear trend (Figure 16 from ICCAT 1990). Fishing mortality of juvenile fish has increased sharply in the last decade. Fishing mortality rates for all age groups have frequently been estimated as being substantially higher than natural mortality (Table 19 from

ICCAT 1990; for comparison, ICCAT considers natural mortality to have a value of 0.14).

The species may be wholly or partly extirpated from Norwegian waters and the Baltic Sea. Georgsson (1989) states "outside western Norway in the 50s, especially the area outside Bergen, commercial fishermen made unbelievable catches. By 1970 the fish was almost gone. Scattered catches were made as late as the beginning of the 80s and a group of Swedes made an expedition in the area in 1983 without even seeing a fish. When the fish were abundant they were big ones, and they were all over western Sweden as well. Today the fish are gone, I have been looking out for them in September-October when they normally were roaming the west coast of Sweden, just outside my summer house. But we have not seen a single fish. This year would have been a marvellous year because the mackerel (which the bluefins would normally have concentrated upon to feed) are plentiful all the way in to the shore...but todays situation is just another ecological tragedy." Norwegian catches dropped from a high of 8,153 metric tons in 1962 to zero since 1987 (ICCAT 1990; see also Tiews, 1978 for additional information).

The species may also be extirpated from the Black Sea. Excluding purse seiners, catches by Turkish fishermen, which averaged 704 metric tons annually between 1981 and 1984 dropped to zero in 1985 and thereafter (ICCAT 1990). Turkish purse seine catches appear in the ICCAT data beginning in 1985 (ICCAT 1990). It is unclear why this switch occurred, and whether Turkish purse seiners are fishing in the Black Sea or in more distant waters. Mather (1974) believed that Black Sea may have been a spawning area, but the Black Sea was not included as part of this species range by ICCAT (1978). Water quality in the Black Sea has severely deteriorated (Rozengurt, in press).

Catches in the Mediterranean have been at historic highs in the 1980s. However, current high catches of very young fish that weigh less that the minimum ICCAT allowed size of 6.4 kg. "may become crucial for the future of this stock" (ICCAT 1990). Mather (1974) referred to the "inexcusably wasteful slaughter" of fish less than a year old in the Mediterranean, and suggested that the numbers involved were well into the millions annually. An ICCAT regulation prohibiting the taking of bluefin tuna less that 6.4 kg in weight went into effect in 1975, but is largely ignored in the Mediterranean and catches of small fish are under reported (ICCAT 1990).

Bluefin tuna may be severely reduced in numbers around the Azores. Donald Merten, captain of a sport fishing charter boat reports that only one bluefin has entered the port of Horta, Island of Faial, Azores since 1986. According to the boat's owner, "Capt. Merten has visited the fish house some 200 times since 1985. He has not seen nor could identify any bluefins either large or small, though yellowfin and bigeye tunas were "readily seen in the local fish house" (Sloan, pers. comm. 1991a). Prior to the arrival of this charter boat, "we heard many reports of excellent bluefin tuna fishing very close to Port Horta. We heard of large numbers of bluefin tuna, and in fact this was one of our main reasons to begin operations there" (Sloan, pers. comm. 1991a). Part of this early information had been provided to Sloan by John Gill, a marine biologist at the University of the Azores and an ICCAT associate (Sloan, pers. comm. 1991a). More recent information, however, indicated that Japanese longliners are catching bluefins of the Azores (Sloan, pers. comm. 1991b).

23. Habitat: Generally continental shelf waters in temperate latitudes. Ranges into subtropical and tropical areas. Often close to shore, especially in previous years. Western Atlantic bluefins spawn primarily in the Gulf of Mexico, Caribbean, and the Straits of Florida (Mather, 1974). Spawning grounds of the eastern Atlantic fish are mainly in the Mediterranean (Mather, 1974).

Bluefin tuna habitat quality remains generally high (with the previously noted exception of the Black Sea). Although the effects of fisheries on the bluefin's food supply is not well known, the populations level of at least one key prey species, the Atlantic mackerel, is currently very high in at least the western Atlantic, according to recent US fisheries assessments. Georgsson (1989) suggest that prey have very recently been abundant in areas near Sweden where bluefin tuna have been absent (see quote above).

3. Trade Data

31. National Utilization: The bluefin tuna has long been part of the human economy. Prehistoric cave painters and ancient Greeks shared an admiration for the bluefin (Mowat, 1984). Mediterranean countries caught bluefins in fish traps for centuries (Mowat, 1984).

Earlier in this century, bluefin tuna had very low monetary value relative to prices commanded in recent years. In the 1950s growing demand for canned tuna meat sparked new interest. Younger bluefin tuna were often more valuable than adults, which usually sold for very low prices (e.g. a few pennies per pound at the dockside in the USA), generally for pet food, until the 1970s (Mowat, 1984). New wholesale capture techniques such as purse seining were developed and continually refined, as was sport fishing equipment. Interest in sport fishing increased substantially.

Wild live-caught tuna have been fattened in pens in Maine for exports to Japan. The Japanese are developing techniques for captive rearing of bluefin tuna captured as very young fish (Sloan, pers. comm. 1991c).

There are fisheries for bluefin tuna in the eastern and western Atlantic Ocean and in the Mediterranean Sea. Many different gears are used and the size of fish caught varies depending on the gear and location (ICCAT 1990). The 1989 catches are estimated to be 2800 mt in the west Atlantic, 5300 mt in the east Atlantic, and 13000 mt in the Mediterranean Sea (ICCAT 1990).

32. Legal International Trade: From the late 1950s, Japan offered the most lucrative trade (Mowat, 1984). Japan is now by far the most lucrative trade destination for adult bluefin tuna which are much in demand as fare at "suchi" bars. Japanese consumers now pay up to $50 for a plate of thinly sliced raw bluefin (Radonski, et al. 1990). These prices have brought much more effort into the fishery (Anderson, 1990). Japan is the final destination for most internationally traded bluefin tuna (Weber, 1990). Recently Japan has consumed approximatley three quarters of the bluefin caught in the Western Atlantic (Weber, 1990).

In 1987 Japan imported 5,101 mt of bluefin tuna (data from Japanese Ministry of International Trade and Industry, as compiled by Radonski et al., 1990). A major part of the supply to this market comes from the United States of America and the western Atlantic bluefin tuna population. In 1986 the US supplied more than 25 percent of the Japanese fresh bluefin tuna market (compiled by

Radonski et al., 1990). In 1987 approximately 70% of the US catch was exported to Japan (compiled by Radonski et al., 1990). Demand for both fresh and frozen bluefin is rising. Japanese buyers have set up business in foreign ports since the early/mid 1980s. Dockside prices paid to fishermen for giant bluefins sharply escalated during the 1980s, and many of these fish are now bought from fishermen for more than $10,000 each. Some fishermen ship their fish to Japan where it can be sold on consignment for as much as $30 per pound (Benjamin, 1989). Adult bluefin exported to Japan and sold on consignment have brought up to thirty dollars per pound (Benjamin 1989). Because giant tuna range from 300 to 1,000 pounds or more, considerable profits are possible. For additional information on Japanese trade in bluefins, see attached tables.

Until the middle 1970s US distribution and consumption was primarily in the ethnic markets of New York, Baltimore and Philadelphia. Large fish wholesale prices ranged from $0.03 to $0.10 per pound. One result of restrictions on catch imposed in US waters in response to ICCAT recommendations was the withdrawal of a sizeable fleet of Japanese longline vessels which had conducted a directed fishery for large bluefin in the Gulf of Mexico and Atlantic Exclusive Economic Zone (EEZ) of the United States of America. This withdrawal imposed a serious shortage in a Japanese market where high quality, (high fat content), large fish are an extremely valuable product. Since 1980 this shortage has been partially satisfied by direct, air freighted shipments of the high quality bluefin from the US waterfront to the Tokyo market. Japanese buyers work on the docks along the US Atlantic coast (McHugh, 1991).

33. Illegal Trade: Fish caught by US longline fishermen in excess of trip quotas cannot be landed in the US and must be discarded (usually dead), but many are apparently traded to non US boats in exchange for fish which can legally be landed in the US after these trips, or to other US boats that still have room in their trip quota. Thus there is incentive to take them from their only western Atlantic breeding grounds, contrary to US policy which is to discourage a directed fishery for bluefin tuna in the Gulf of Mexico breeding area (H. Upton, Centre for Marine Conservation, Washington DC, USA, pers. comm. 1991).

34. Potential Trade Threats: The current legal trade is not sustainable, as evidenced by the collapsing breeding population, especially in the western Atlantic. Giant bluefin, taken as longline by catch from their only western Atlantic spawning grounds in and near the Gulf of Mexico, can be legally traded if the catch is within the allowed trip bycatch quota.

4. Protection Status

41. National: The international management body entrusted with responsibility for managing bluefin tuna is the International Commission for the Conservation of Atlantic Tunas (ICCAT). Countries which are parties to ICCAT are bound to observe ICCAT catch allocations. Not all do. For example, the US has frequently overfished its quota by approximately 25 percent in recent years (Table 1 in ICCAT 1990). Countries which are parties to ICCAT have adopted a 6.4kg. minimum size. Many countries which catch bluefin tuna are not members of ICCAT.

42. International: ICCAT member nations include Angola, Benin, Brazil, Canada, Cape Verde, Côte d'Ivoire, Cuba, France, Gabon, Ghana, Japan, Morocco,

Portugal, Republic of Korea, Sao Tome and Principe, Senegal, Soviet Union, South Africa, Spain, United States of America, Uruguay and Venezuela.

ICCAT allots annual catch quotas to member nations. ICCAT has also adopted a 6.4kg. minimum size to protect fish in their first year. This is largely ignored in the Mediterranean. ICCAT (1990) noted "A regulation prohibiting the catch and landing of bluefin tuna less that 6.4kg. in the entire Atlantic went into effect in August 1975, with a 15 percent (in number) tolerance for incidental catches. A study of the percentages of under-sized fish in the Mediterranean (SCRS/84/83) indicate that landings may be under-estimated. Countries which fish in the eastern Atlantic and Mediterranean continue to target small fish. The group concluded the regulation is largely not enforced.

In 1981 ICCAT's Standing Committee on Research and Statistics (SCRS) recommended that the harvest of bluefin in the western Atlantic be kept, "as close to zero as feasible" (ICCAT 1981). However, ICCAT's managers rejected their scientists' zero catch recommendation, and accepted the US proposal for a catch of 565 metric tons as an interim measure until the major participants in the western Atlantic fishery could meet and agree on an acceptable catch level. ICCAT qualified this action by providing that any amount of bluefin catch agreed to by that meeting would be for purposes of "scientific monitoring" of the status of the stocks. Early in 1982 the harvesting nations did meet and, after extensive discussions, increased the 565 metric tons to 1,160 tons for scientific monitoring of the stock. In 1983 ICCAT recommended that this scientific monitoring allocation be increased to 2,660 metric tons for the western Atlantic, a regime that remains today.

43. Additional Protection Needs: In evaluating the effect of the regulations adopted in 1982-1983 and presently in place on the western Atlantic population, ICCAT (1990) states that "Since implementation of catch limits in 1982, fishing mortality rates of large fish have increased to values greater than those immediately prior to 1982" (ICCAT 1990 Figure 11), and that part of this "is due to the increase allowed for by the ICCAT regulations (doubling of the catch from 1982 to 1983). Other factors include increased efficiency among the fisheries and the effect of a constant TAC (total allowed catch) on a declining population.)

The trade has been especially damaging to the western Atlantic population, where the number of adults has declined each year since the early 1970s. The breeding population shows no fluctuation, only constant decline (Figure 1, ICCAT 1990 Figure 10). Fishing pressure continues to intensity, fuelled by escalating prices paid for large fish by exporters, despite greatly reduced catches per unit of effort in at least some parts of the fishery.

Limits on fishing implemented by ICCAT in 1982-1983 have been insufficient to halt the decline of the bluefin tuna's spawning population, especially in the western Atlantic. ICCAT's scientific committee recognizes this. ICCAT scientists (1990) stated their "serious concern over the status of Atlantic bluefin stocks, especially for the west Atlantic". ICCAT's scientific committee's predictions for the western Atlantic are for the fishing pressure to further intensify and the populations of both adolescent (medium) and breeding (giant) bluefin tuna to continue to decline; " the 2660 mt of the recommended catch for monitoring will cause the decline of the age 8+ group to continue for at least the near term, given the various assumptions of the analysis. Deterministic projections to 1992 conducted by the working group indicate the continued

harvest of 2660 mt is expected to result in an increase in the estimated fishing mortality rate and a corresponding decline in the estimated stock size of large and medium fish" (ICCAT 1990). ICCAT's scientists thus project continued population decline for both adults and for the medium size fish. Yet ICCAT's managing body has refused as recently as their last meeting (November 1990) to move to decrease mortality.

Despite ICCAT's statistical committee's recognition that the adult population has continued to shrink to a very low level, ICCAT's managing body continues to refuse to enact stronger measures to reverse this decline and avert a possible collapse of the bluefin tuna population and the fishery. Both international action at ICCAT and individual nations' fisheries continue to be driven by short-term concerns, not consideration of the long-term health of the resource and the economic benefits that a properly managed, restored bluefin tuna population could provide on a sustainable basis for the future. The economics of the bluefin tuna fishery is such that as the number of fish has diminished, the value of each fish has risen dramatically. Catch per unit of effort may be at an all-time low, but the return on each fish caught is at an all-time high. Therefore, those currently profiting of the remnants of the bluefin population have little financial incentive to stop overfishing, much less rebuild the population to a higher, more productive level. If revenues rise at a rate greater than costs, fishermen will continue to fish despite declining abundance. This can be a serious problem because there is no economic disincentive to harvest fish as abundance is reduced (Strand and Norton, 1980).

The price paid for high quality, "export grade" bluefin tuna flesh is often as high as $30 per pound at the dock. Not all fish caught and landed are of this quality and command such an extraordinary price, but the prospect of landing such valuable fish is so attractive to so many fishermen that fishing pressure on bluefin tuna (measured as fishing mortality rate) is greater now than it has ever been (ICCAT 1990).

The highest prices paid for those fish which are of export quality. The fact that not all fish landed are of exportable grade does not deter many from seeking to share in this bonanza. The rush to sell has become so intense that it is commonly agreed that there is no longer a recreational fishery for large bluefin tuna. Rod and reel fishermen are as anxious to sell their catch as are the professional commercial fishermen. Unfortunately, significant numbers of non-professional participants in the fishery lack the knowledge and/or the facilities with which to preserve the necessary quality. As a result, many bluefin have little or no market value when offered for sale in amounts far in excess of the fishermen's capacity for personal use.

While the high price paid for export grade bluefin tuna is driving this fishery, pressure from the small sector of the fishing industry involved in the bluefin tuna trade prevents ICCAT's managing body from taking the action necessary to stop overfishing.

It thus appears that action to halt the 20 year decline in the bluefin population must come from outside the present ICCAT system, and must affect the present economic incentive to continue depleting the bluefin tuna population.

ICCAT's statistical committee has expressed "concern regarding the lack of improvement in stock abundance" and has recommended better monitoring of catches: "The Committee recommends that data on all Japanese imports from

the west Atlantic be provided by country of origin. The Committee also recommended that information on national consumption and transshipment also be provided be participating nations. There is still concern that despite improved data collection, serious difficulties remain about under-reporting small bluefin catches (ages 0 and 1). There is also uncertainty under-reporting of catches of ages 2 and 3 in the Mediterranean." (ICCAT 1990).

For the eastern Atlantic bluefin population, ICCAT (1990) states: "Many times the Committee has expressed serious concern about the lack of basic information on the catch and size composition. The Committee has greater uncertainty about the status of eastern Atlantic bluefin, "due in part to "incomplete reporting from the nations involved in fishing this stock and the general lack of participation by scientists with knowledge of the fisheries. The small number of scientists dedicated to the assessment of the eastern stock have difficulty acquiring timely information on the logistics of the diverse fisheries, especially of the Mediterranean. In recent years the Committee has not had sufficient participation of scientists to prepare a balanced and timely report."

ICCAT (1990) further states that "The SCRS (Standing Committee on Research and Statistics of ICCAT) wishes to stress that the high catch of small fish (in the eastern Atlantic and Mediterranean; ICCAT 1990 Table 16) indicates a lack of compliance with the minimum size regulation. This problem may become crucial for the future of this stock."

The most serious danger for the bluefin is that the number of spawning-age fish in the western Atlantic is at an extremely low level and, according to ICCAT scientists, will continue to decline, unless more is done to protect this animal.

Most important of all, the sooner the population is returned to a healthy level, the more productive the fishery will be for all who can benefit from the bluefin tuna resource.

5. Information on Similar Species

Southern bluefin (T. maccoyii). Australian and New Zealand waters (Migdalski, 1958). Also may be the bluefin tuna found off southern Africa and southeastern South America (Mather, 1974, ICCAT, 1978). Externally resembles T. thynnus and was formerly considered the same species, but reaches a much smaller maximum size of around 240 pounds (110 kg) (Midgalski 1958). Much international trade, especially for use in Japan.

Bigeye Tuna (T. obesus). Worldwide in deep tropical and temperate water (Migdalski, 1958, ICCAT, 1978). Pelagic and oceanic. This is the second largest tuna, after T. thynnus, attaining weights of at least 435 pounds (200 kg, Migdalski, 1958). Much international trade, especially for use in Japan.

6. Comments from Countries of Origin

7. Additional Remarks

Although ICCAT is an international body charged with conservation of the bluefin tuna, the political climate has made it impossible for ICCAT to manage the bluefin tuna fishery in a sustainable manner.

The bluefin tuna clearly qualifies for CITES designation, and the western Atlantic population clearly qualifies for addition to CITES Appendix I under the Berne Criteria (CITES Resolution Conf. 1.1). This resolution states that "to qualify for Appendix I, a species must be currently threatened with extinction", and calls for the following information, "in order of preference; (a) scientific reports on the population size or geographic range of the species over a number of years (b) scientific reports based on single surveys, (c) reports by reliable observers other than scientists." This proposal is based on the scientific information published by the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT). Thus these data are from an international scientific monitoring and assessment programme that has been in place for many years, the preferred source listed in the Berne Resolution. In addition to these scientific data, this proposal includes some anecdotal information by "reliable observers other than scientist;" fishermen who are not involved in catching bluefin tuna for profit. These observers include the Press Secretary to the Swedish Prime Minister, Mr. Lars Georgsson, whose observations for the waters around Sweden are quoted above. Also included are the observations of professional charter boat captains and a former commercial fish trap tender.

The internationally-assembled data speaks for itself. The breeding population in the western Atlantic is clearly headed in the direction of extinction, and if the trend of constant decline that has been documented for the last twenty years continues there will likely be no breeding fish left in the western Atlantic within the coming decade. The moderate increase in age 6-7 fish from a low point in 1983 (ICCAT Figure 10), if this is indeed a real increase within the very wide error bars around the data points, underscores the problem caused by the current very high fishing intensity: pressure on the larger fish is so great that fish that have survived to ages 6-7 since 1983 have not survived another year or two in sufficient numbers to alter the continuous downward trend of age 8+ fish in the west Atlantic population. If younger fish are not surviving to breeding age in quantities which result in a change in the downward trend in breeding fish, then in a few years there will be no reproduction in the western Atlantic. The Berne Criteria further states that "Species meeting the biological criteria should be listed in Appendix I if they are or may be affected by international trade". In so far as international trade is a main reason for the current fishing pressure on this species, evaluation of the biological and trade status of the species clearly suggests an Appendix-I listing for the western Atlantic population.

Because the eastern Atlantic breeding population is now approximately half its former level, and the fish is extirpated from large areas in the North Sea, and international trade is a major force in the fishery, Appendix-II listing is needed for the eastern Atlantic population. ICCAT itself has pleaded the case for improved record keeping in this region, as noted above.

By the early 1970s the bluefin tuna was so overfished that entire age classes were largely absent from the population (Mather, 1974). Tag return rates were extremely high (Mather, 1974), indicating that fishing pressure was intense and that overfishing was the cause of the changes in population structure. ICCAT's management plan was supposed to sustain this species by arresting the decline of small fish and allowing recovery. Because the decline of some of the smaller age classes slowed, and more age classes are now better represented as a proportion of the total population than in the past (see attached ICCAT Figure 10), some people have the impression that management measures are allowing a recovery. The data show that it is not the case. ICCAT (1990) predicts continued declines of both breeding age and subadult bluefins in the future.

The important points from the ICCAT data are that:

1) the adult population has declined every year for nearly two decades, for a loss of over 90% of the breeding population since 1970 (1970 is merely the year of the earliest population estimate, not a time of undamaged population numbers; by the early 1970s the catch reductions had already been called "catastrophic" (Mather, 1974);

2) while this decline has occurred, fishing mortality has escalated sharply due to extremely high prices now paid for bluefin tuna in Japan; and

3) ICCAT, the international body under whose stewardship the bluefin has so drastically declined, itself predicts continued declines in both the adult (giant) and subadult (medium) age classes, as quoted above.

It is sometimes mentioned that the bluefin tuna population dynamics are characterized by great fluctuation in abundance, as are those for many fish. However, in older data (e.g. bluefin tuna landings from Mediterranean fish traps, as appended to Suzuki 1991), the largest difference between peaks and troughs was a factor of ten approximately. According to the ICCAT 1990 report, the western Atlantic population of adults age 10+ is now nearly one twentieth what it was in 1970. This decline is thus twice the magnitude of any historic decline in other, older data sets for this species. This is cause for concern and for a change in the management regime. Additionally, the ICCAT report shows fishing mortality to have increased over 2,000%. Adding this much fishing effort on a population characterized by peaks and declines may destabilize recovery periods and exacerbate downward plunges caused by natural phenomena.

The ICCAT quotas are sometimes referred to as "scientific monitoring" quotas but the fishery is clearly a commercial fishery, and potentially informative non-lethal methods of scientific monitoring, such as aerial surveys with professional tuna spotter pilots, have not been seriously considered by ICCAT or its member governments.

Suzuki (1991) has said that "the continuous sustainable yield from the population for more than a decade demonstrates that the population is well able to support the monitoring catch quota". On the contrary, in order to sustainable support the catch the population would have to remain the same or increase. The ICCAT data shows that the population is declining and that there is a failure of younger fish to survive into the sexually mature adult age class under the present catch scheme. If the population is declining in response to fishing pressure, then by definition the catch is not sustainable, and the catch will ultimately begin to collapse when the population reaches a point so low that increasing prices paid for internationally traded bluefin tuna will not be able to support enough increase in effort to maintain the landings.

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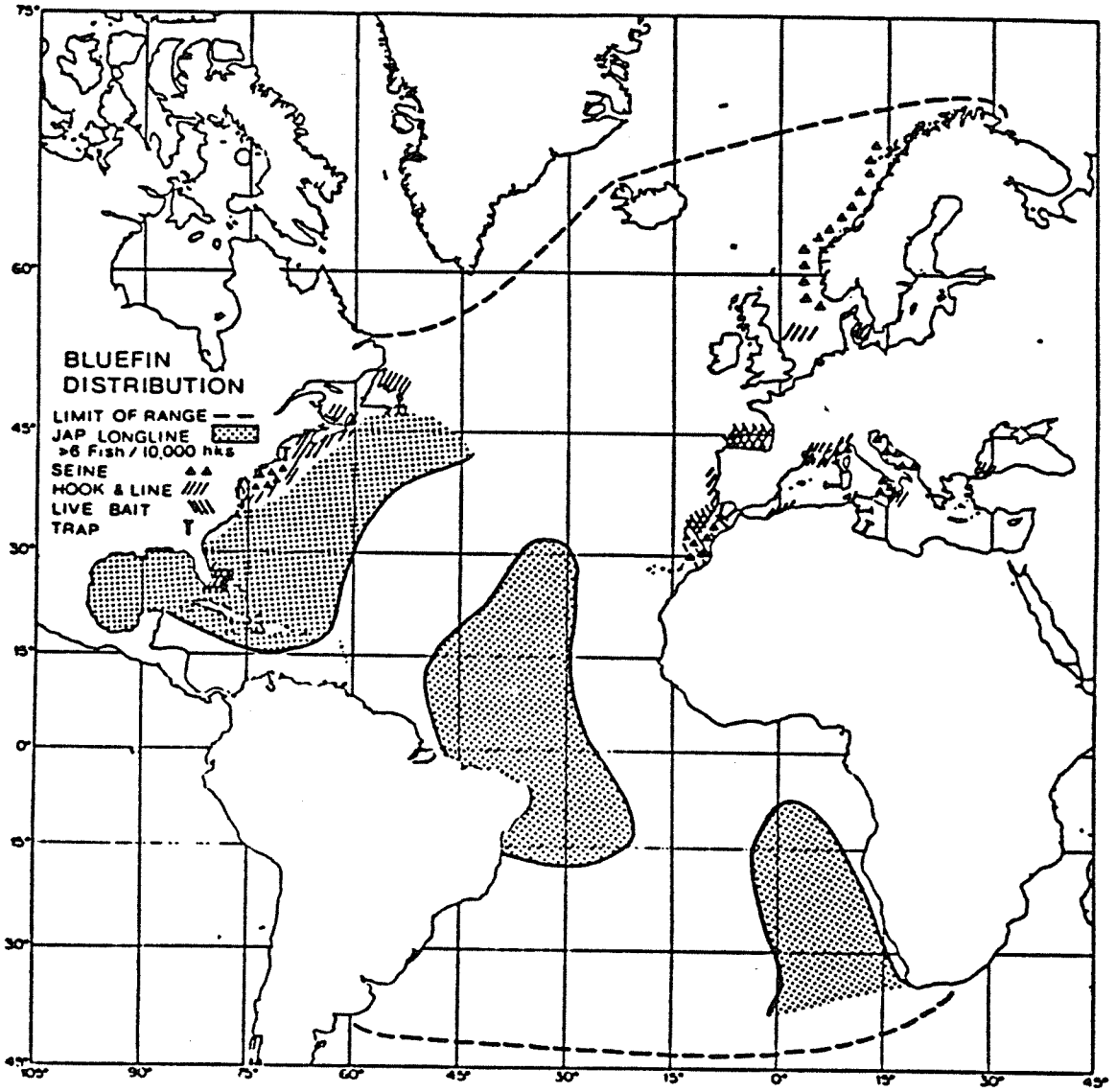
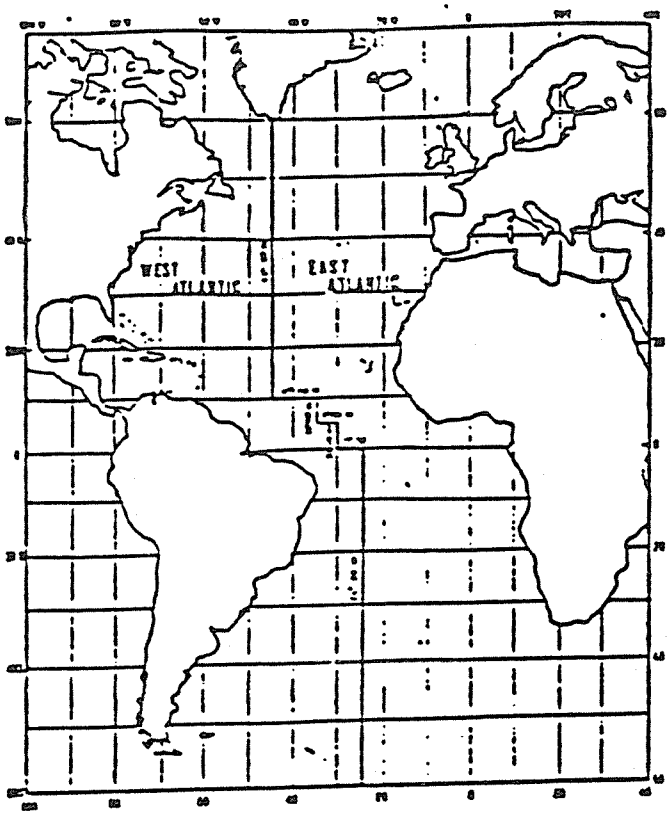


Figure 3

Preliminary Figure. The longline catches off southwestern Africa probably consisted mainly of southern bluefin, Thunnus maccoyii.

Fig. 3 from Mather 1974



BFT-Fig. 3. Map of the Atlantic Ocean showing the line used to separate the eastern and western components of the Atlantic bluefin tuna stock.

Figure 3 from ICCAT 1990

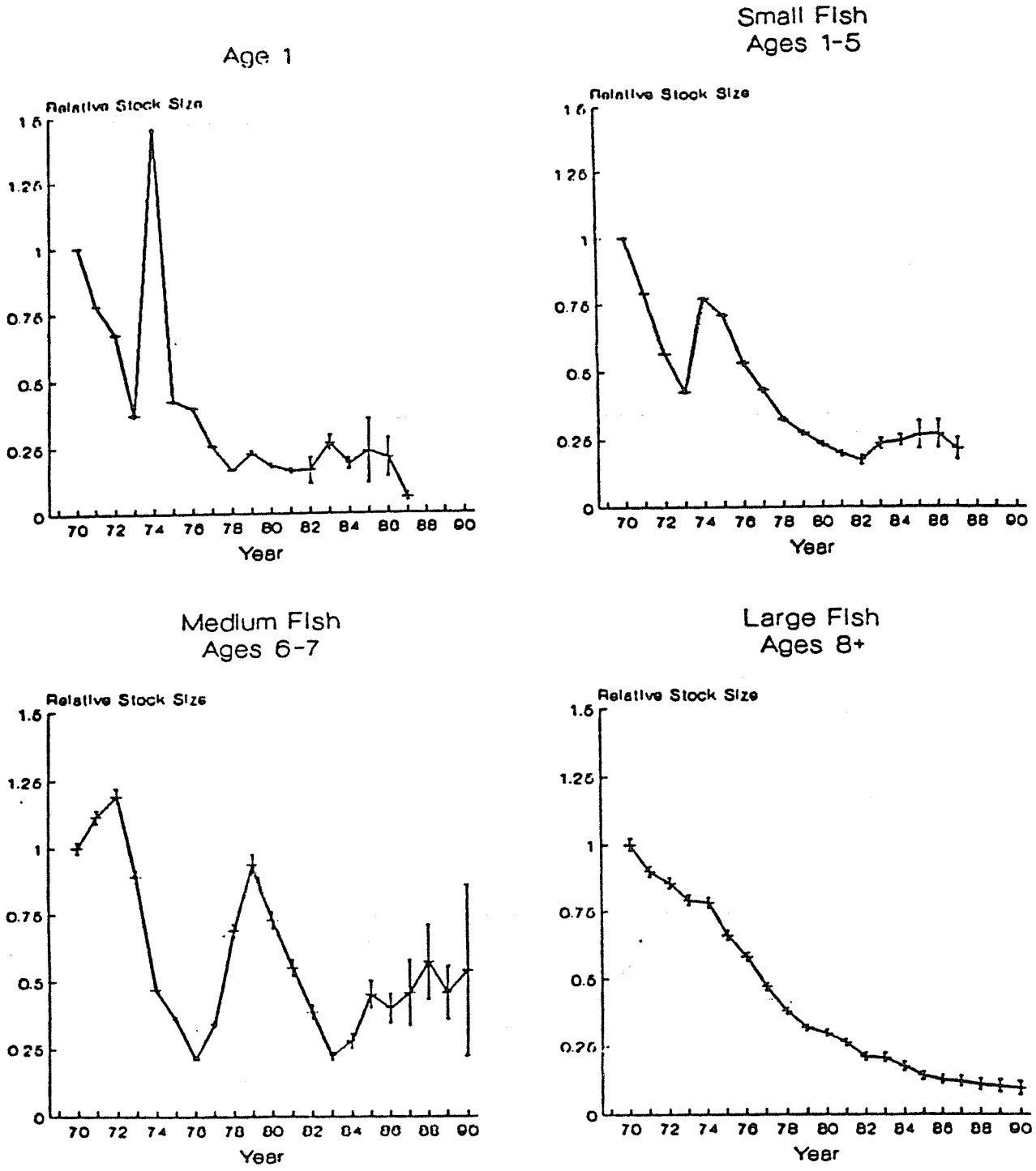
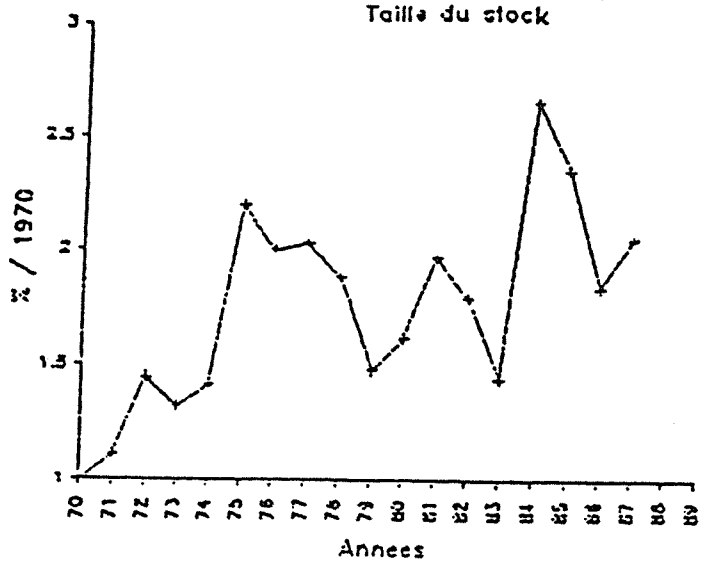


Figure 10. Population estimates (in numbers) for the west Atlantic bluefin from VPA. The terminal year estimates for the younger ages are dependent on the input values. The vertical bars indicate 1 standard deviation above and below the mean, given the assumptions of the assessment. Additional unquantifiable uncertainty does exist due to many assmptions of the biology of this species. (i.e. stock structure, growth, mortality, etc.).

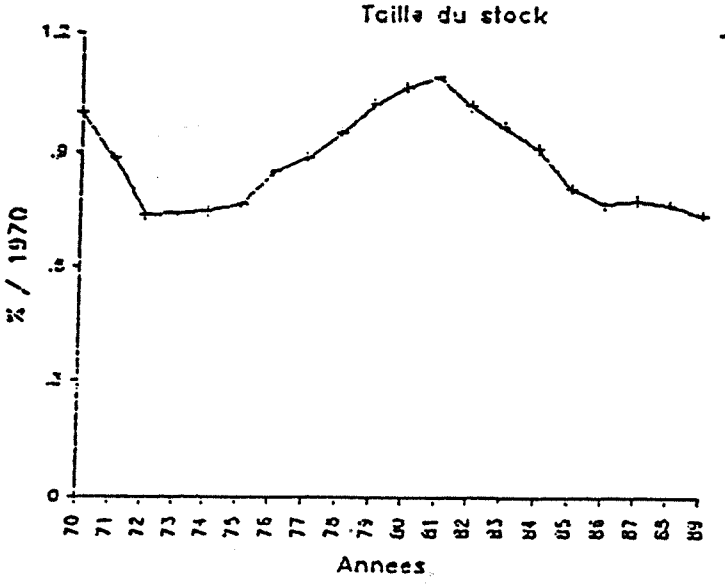
Figure 10 from ICCAT 1990

THON ROUGE ATLANTIQUE EST

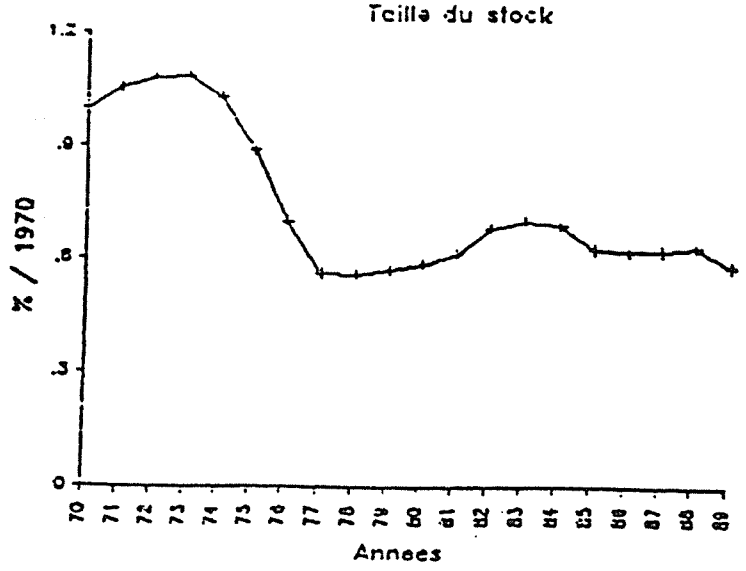
from ICCAT 1990



2-4 year olds



5-9 year olds

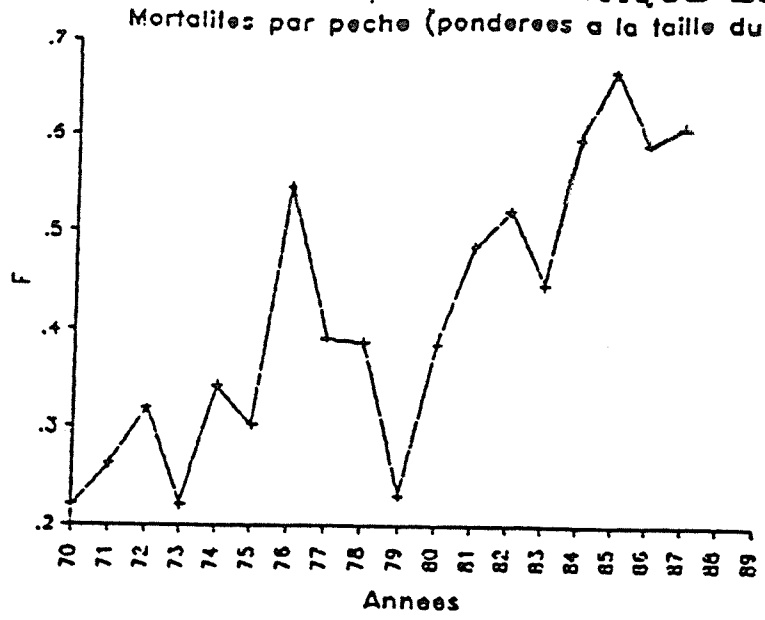


10+ year olds

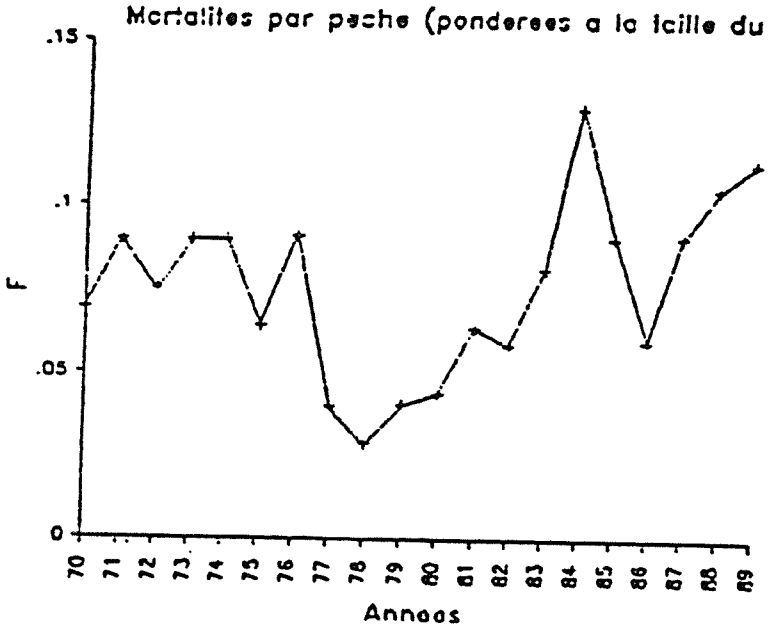
BFT-Figure 16. Fishing mortality raised to stock size for east Atlantic bluefin

THON ROUGE ATLANTIQUE EST

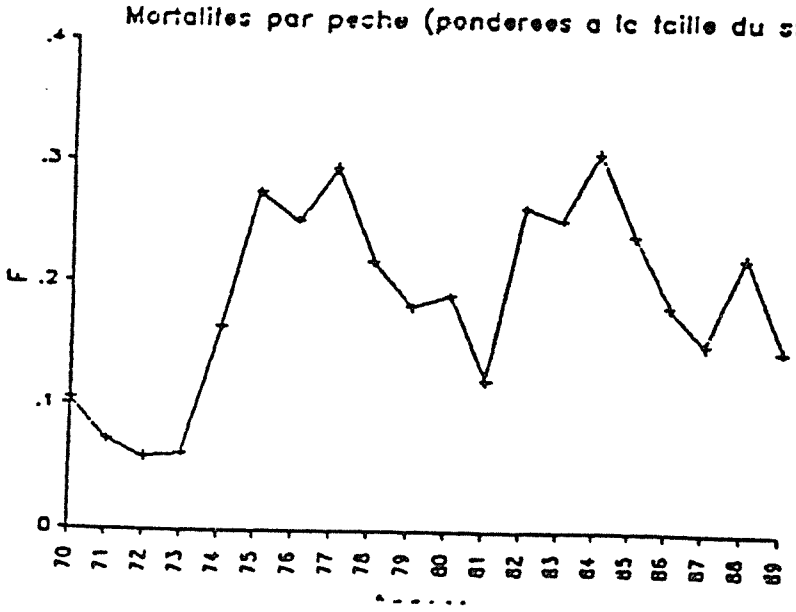
Figure 16
from ICCAT 1990



2-4 year olds



5-9 year olds



10+ year olds

Table 1 from ICCAT 1990

3-NOV-1990 16:15:00
Rev.

FiFT-Table 1. ATLANTIC BLUEFIN CATCH (MT)
CAPTURA ATUN ROJO ATLANTICO (TM)
PRISE THON ROUGE ATLANTIQUE (TM)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TOTAL	34701	27984	33823	29318	25213	31402	22736	25207	15738	17385	16019	17433	14492	14532	23534	26121	28167	25457	20388	18347	19786	19487	23597	24008	26480	26525	22117	19747	24970	21195
WEST ATLANTIC	1022	1630	5799	13838	10679	14171	8990	5940	3176	3012	5466	6591	3940	3871	5393	5032	5803	6694	5763	6255	5801	5771	1431	2541	3292	2678	2322	2595	3011	2810
-PURSE SEINE	277	903	3768	5770	5158	3331	1006	2082	687	1110	4238	3769	2011	1656	960	2320	1581	1502	1230	1301	750	910	232	384	401	377	360	367	283	295
CANADA	0	0	0	323	579	461	0	0	0	0	1161	935	260	635	103	291	332	290	241	0	0	105	0	0	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	277	903	3768	5447	4571	2870	1006	2082	687	1110	3127	2834	1751	1021	857	2029	1250	1204	989	1301	750	805	232	384	401	377	360	367	283	295
-ROD & REEL + SPORT	29	101	380	1162	601	1063	3726	343	619	1630	587	1049	1084	519	2913	320	590	630	475	499	535	522	308	476	401	466	328	539	439	557
CANADA	5	41	40	90	99	91	111	56	180	170	151	88	108	229	409	206	342	302	208	214	259	279	0	71	1	1	2	1	7	0
USA	24	60	340	1072	502	968	3615	287	439	830	436	961	896	290	2504	122	248	328	267	285	276	244	308	405	400	465	326	538	432	557
-LONGLINE	340	373	1351	6558	12410	9469	3085	3126	1665	593	268	1390	339	1127	946	1522	3066	3752	3217	3691	3972	3879	349	828	835	1238	1278	1330	1528	899
ARGENTINA	0	0	106	271	204	100	100	60	21	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	14	10	2	3	1	1	**	1	0	2	**	2
CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	33	104	53
CHINA TAIW	0	0	0	0	0	0	0	0	12	7	2	13	7	2	20	1	0	1	1	49	15	7	11	3	3	3	3	0	0	3
CUBA	0	0	0	0	0	139	465	2352	1351	468	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JAPAN	339	373	1219	6191	12044	9147	2471	694	272	116	66	1375	331	1097	905	1513	2902	3658	3144	3621	3936	3771	292	711	696	1093	924	969	1119	668
KOREA	0	0	0	0	0	0	0	0	0	0	0	0	11	23	20	0	7	1	0	1	0	0	0	0	0	0	0	0	0	0
KOREA	0	0	0	0	63	4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	157	92	58	10	9	14	12	0	0	0	0	0	0	0
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	9	10	6	4	2	**
USA	1	0	26	96	99	79	39	20	9	2	0	**	0	1	1	0	0	0	0	0	10	83	30	114	127	132	653	331	373	373
-OTHER & UNCL. GEARS	386	243	300	348	510	309	373	309	205	293	323	383	514	569	574	662	645	810	841	684	536	459	542	853	655	547	356	359	691	979
ARGENTINA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	2	**	0
CANADA	32	79	137	229	310	81	87	174	101	193	130	59	29	144	256	144	172	372	221	31	65	41	291	362	263	141	39	49	292	520
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	23	29	39	24	37	14	26	22	10	20	14	0	0	0	0	0	0	0
POLAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA	0	0	0	0	0	0	0	**	3	3
USA	354	164	163	119	193	228	186	135	104	100	193	324	462	396	276	494	433	424	592	631	461	398	237	491	392	450	317	308	396	456
EAST ATLANTIC	18854	20750	23230	9020	10239	10834	9290	10523	4629	5483	5764	4675	4722	4685	6067	9976	5212	6977	5800	4767	4064	3331	6669	8010	7386	4756	4292	4199	6745	5368
-BAITBOAT	1198	1452	1537	1178	1079	1620	3347	1805	1471	1826	3017	3055	3032	3142	2348	2991	1803	2081	2904	2128	1874	1553	957	3032	2948	2366	2253	2128	2683	2643
CAP VERT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	0
FRANCE	553	907	965	543	400	621	1624	860	390	534	733	680	740	540	523	692	267	592	723	275	260	153	150	400	566	380	372	533	479	306
JAPAN	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	*			0	0	0	0	*	*	*	*	*	101	203	**	**	**	**	**	**	**	*						

BLUEFIN CONTINUED	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
-PURSE SEINE	6222	10962	9781	1575	3458	2378	2737	4022	1149	1435	669	598	961	922	1455	3612	860	1426	257	266	437	266	655	262	414	86	280	0	0	0
BARBC	2286	2994	1620	1419	2059	906	1778	2040	453	670	406	30	531	512	590	2624	331	662	26	206	155	105	600	107	127	86	122	0	0	0
BERMAT	3936	7968	8153	156	1399	2472	959	1974	696	757	263	568	430	420	865	988	529	764	221	60	282	161	50	1	243	0	31	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	3	0	123	0	0	0
S.AFRICA	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	12	0	0	0
USA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
-TRAP	10430	7576	9014	4472	5059	5172	3123	4540	1790	2220	1706	663	372	505	20	648	490	561	450	600	706	859	2309	1956	2271	1630	891	1062	2426	1470
BARBC	3714	1377	3640	2310	2256	1082	1681	1231	635	59	286	63	122	1	7	0	0	222	0	0	6	73	393	91	0	0	0	122	35	394
PORTUGAL	1016	1499	666	354	303	99	122	209	55	261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESPANA	5700	4700	4700	1800	2500	2200	1400	3000	1100	1900	1500	600	250	504	13	648	490	339	450	600	700	787	1916	1862	2271	1630	891	939	2389	1174
-LONGLINE	481	223	2484	1618	582	434	81	141	208	201	274	254	261	91	2243	2923	2048	1806	733	748	1002	575	2795	2626	1538	535	741	904	1169	847
CHINA(TAI)	0	0	0	0	0	0	0	0	130	114	46	12	2	1	12	5	3	2	0	3	5	6	16	2	0	0	0	0	0	0
JAPAN	481	204	2484	1618	582	404	50	100	13	2	21	157	240	44	2195	2900	1973	1594	577	630	800	515	2573	2609	1510	420	710	900	1169	832
KOREA	0	0	0	0	0	0	0	0	0	0	0	0	19	43	36	15	3	2	0	1	0	0	0	3	0	77	0	0	0	0
MOROCCO	0	19	0	0	0	30	31	41	57	85	207	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	69	200	156	14	117	48	12	0	17	22	11	4	84	0
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	100	0	6	184	12	7	16	20	0	0	15
-OTHER & UNCL. GEARS .	523	536	414	177	61	30	2	15	0	1	10	105	106	13	1	2	11	303	456	1025	45	70	43	134	215	139	119	105	470	309
DENMARK	47	191	202	0	61	30	2	15	0	1	**	1	**	2	1	**	3	1	3	1	0	4	**	**	0	2	1	0	0	0
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	36	110	76	0	245	154
GER.F.R.	434	331	212	**	**	**	**	0	**	**	14	1	6	2	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	5	0	0	0	0	0	0	0
MAROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	44	0	0	0	202	141
NETHERLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	**	**	**	**	**	**
NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	0	0	**	0	0	0	0	0	0	0	0
POLAND	0	0	0	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	7	1	11	47	16	26	42	105	19	2
ESPANA	0	0	0	173	0	0	0	0	0	0	0	0	0	0	0	0	0	300	450	998	38	70	27	2	119	1	0	0	4	0
SWEDEN	42	13	**	**	0	**	**	**	**	0	4	3	0	0	0	2	8	2	2	**	**	1	**	1	**	0	0	0	**	**
MEDITERRANEAN	4815	5614	4794	6460	6295	5997	5326	8744	7933	8690	4789	6277	5812	5976	12074	11113	17072	11786	8825	7325	9921	10305	15497	13457	16802	19091	15503	12953	15722	13647
-PURSE SEINE	225	472	419	1533	1261	435	1876	2919	3341	3629	2393	3904	4004	4324	8119	8065	12970	9232	7270	5990	8394	8432	12922	10374	9706	13292	10591	8437	10232	8269
FRANCE	0	0	0	0	0	0	1000	1500	2500	1500	1100	2200	1100	1400	1800	1600	3000	3182	1564	1527	1701	2300	4818	3600	3570	5400	3460	4300	5750	4404
ITALY	116	349	322	1256	990	301	630	1008	691	1828	1203	1336	2783	2700	6000	6270	9607	5431	4663	3705	6120	5704	6442	5532	5382	4522	4799	2579	2229	2345
MAROC	0	0	0	0	0	0	0	0	0	0	0	42	1	0	2	40	1	7	0	2	**	2	**	0	0	0	0	0	0	0
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	277	0	79	56	22	0	0	0
TUNISIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	50
TURKEY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2220	1524	910	910	910
YUGOSLAV	109	123	97	277	271	134	246	331	150	301	90	326	200	224	317	153	562	932	1049	756	573	376	486	1272	755	1084	796	648	1523	560
-TRAP	2859	3043	2861	2059	3081	3872	2250	3337	3082	3768	1489	1372	1023	566	880	819	718	820	331	326	611	563	421	401	1020	677	545	949	788	901
ALGERIA	**	**	44	**	**	**	150	150	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITALY	1229	1423	1260	1227	1652	1264	945	1949	1739	1324	961	1044	835	367	739	713	650	699	219	195	152	209	155	284	327	255	293	319	301	301

ICCAT 1990

BFT-Table 1 (Cont'd)

2-NOV-1990 16:15:00

BLUEFIN CONTINUED	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
LIBYA	1100	1000	800	100	400	600	700	800	1000	2000	0	0	0	0	0	0	0	0	0	0	339	255	130	0	0	0	0	0	0	0
MAROC	0	0	0	0	0	172	11	27	5	0	0	27	36	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESPANA	561	620	377	472	653	1235	151	104	4	217	280	53	98	146	11	3	3	2	1	0	0	3	66	37	621	302	168	219	228	231
TUNISIE	0	0	404	260	376	601	293	307	184	77	248	238	64	52	123	101	65	120	120	131	120	98	100	80	80	80	84	83	83	83
-LONGLINE	0	0	0	800	300	400	500	300	600	400	69	129	236	320	2387	1363	1210	592	153	199	219	300	1499	939	1146	1064	539	461	434	361
ITALY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	41	62	1	65	63	63
JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	112	246	2195	1260	960	520	61	99	119	100	961	677	1036	873	421	280	236	234
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
ESPANA	0	0	0	800	300	400	500	300	600	400	69	129	124	274	192	103	250	68	92	100	100	200	538	233	69	129	117	116	135	98
-OTHER & UNCL. GEARS	1700	2099	1514	2060	1653	1290	790	2188	910	892	838	822	469	566	688	868	1166	822	1063	810	697	1008	1524	1743	4842	4058	2828	3106	3548	3516
ALGERIE	0	0	0	0	0	0	0	0	0	0	100	100	1	++	33	66	49	40	20	150	190	220	250	252	254	260	566	420	677	820
FRANCE	600	599	214	660	953	290	0	0	0	0	0	0	0	0	0	0	0	0	31	51	0	50	60	60	30	30	30	30	30	30
GREECE	900	1100	1000	1200	600	700	500	600	500	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131	131	131	131	131
ITALY	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	113	134	110	120	0	104	61	0	1390	2220	2493	1608	1563	1563
LIBYA	0	0	0	0	0	0	0	0	0	0	500	600	300	400	500	634	799	336	677	424	59	16	100	300	300	300	300	300	300	84
MALTA	100	100	100	100	100	100	100	100	100	++	++	++	++	++	21	37	25	47	26	23	24	32	40	31	21	21	41	36	25	25
MAROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	12	18	0	44	9
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	88	72	15	23	101	108	542	1974	984	249	581	770	854
TURKEY	300	300	200	100	0	100	100	1488	310	393	138	22	68	66	34	17	101	177	127	27	391	565	825	557	869	0	0	0	0	0
UNCL. REGION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

++ CATCH: < 0.5 MT
AA CATCH: UNKNOWN

ICCAT 1990

BFT-Table 6. **Fishing mortality rates estimated by VPA for the west Atlantic bluefin tuna by the 1990 SCRS.**

F AT AGE DURING YEAR

Year	70	71	72	73	74	75	76
ge							
	0.2337	0.3008	0.2452	0.0456	0.1330	0.4033	0.0454
	0.8121	1.2308	0.9853	0.7344	0.2335	0.5634	0.2985
	0.9799	0.7476	0.9563	0.9104	0.4440	0.1359	0.5558
	0.2958	1.1694	0.1271	0.4950	0.4548	0.4430	0.0570
	0.1178	0.0134	0.2562	0.0923	0.3935	0.0967	0.1800
	0.0236	0.0582	0.0026	0.1427	0.0402	0.1065	0.0496
	0.0119	0.0576	0.0225	0.0212	0.1072	0.0208	0.0432
	0.0025	0.1186	0.0207	0.0862	0.0266	0.0834	0.0951
	0.0174	0.0285	0.0261	0.0238	0.0710	0.0611	0.0954
)+	0.0174	0.0285	0.0261	0.0238	0.0710	0.0611	0.0954

	77	78	79	'80	81	82	83
	0.0164	0.1084	0.0400	0.0591	0.1316	0.0736	0.0524
	0.2490	0.1762	0.3143	0.3224	0.2386	0.1038	0.0627
	0.2148	0.3392	0.4000	0.5733	0.5919	0.0548	0.1170
	0.4761	0.2062	0.4320	0.3719	0.5229	0.0298	0.0364
	0.1353	0.2593	0.1514	0.1349	0.4481	0.0553	0.0561
	0.3087	0.1460	0.1182	0.1718	0.2195	0.0801	0.1953
	0.1858	0.0799	0.1239	0.2542	0.2393	0.0387	0.2010
	0.1407	0.1173	0.0969	0.2377	0.2345	0.0545	0.1312
	0.1133	0.1198	0.1584	0.2093	0.2459	0.0782	0.1449
+	0.1133	0.1198	0.1584	0.2093	0.2459	0.0782	0.1449

	84	85	86	87	88	89
	0.0152	0.0079	0.0087	0.0845	0.0518	0.0584
	0.1176	0.1184	0.0993	0.2710	0.9105	0.1769
	0.0583	0.2685	0.2084	0.2049	0.3844	0.3858
	0.0913	0.1064	0.1026	0.2289	0.1162	0.1808
	0.1041	0.2648	0.0569	0.1733	0.2543	0.0708
	0.1496	0.2865	0.1487	0.1510	0.2327	0.1753
	0.1732	0.1167	0.0956	0.1709	0.2062	0.2141
	0.1424	0.2792	0.0754	0.1690	0.2743	0.2273
	0.1334	0.1765	0.2092	0.2025	0.2809	0.3890
)+	0.1334	0.1765	0.2092	0.2025	0.2809	0.3890

Table 6 from ICCAT 1990

ICCAT 1990

BFT-Table 7. **Population numbers (stock size) of west Atlantic bluefin tuna as estimated from VPA by the 1990 SCRS.**

STOCK AT AGE AT BEGINNING OF YEAR

Age \ Year	70	71	72	73	74	75	76
1	332661	259007	223101	122644	480724	139971	130689
2	200585	228932	166683	151776	101871	365871	81296
3	216324	77409	58124	54099	63307	70123	181064
4	87568	70588	31865	19419	18925	35303	53215
5	39107	56633	19057	24395	10291	10440	19708
6	45037	30219	48579	12823	19339	6036	8240
7	16490	38242	24786	42124	9665	16149	4717
8	50310	14166	31384	21069	35853	7548	13750
9	33710	43630	10938	26725	16804	30350	6037
10+	234911	229505	230776	204723	196484	172712	16606

	77	78	79	80	81	82	83
1	83974	53479	74957	59007	52810	53229	87597
2	108576	71817	41717	62609	48356	40248	42991
3	52439	73588	52349	26486	39431	33114	31539
4	90288	36777	45572	30507	12979	18966	27253
5	43699	48759	26016	25720	18284	6689	16004
6	14311	33181	32707	19441	19538	10155	5502
7	6817	9137	24927	25264	14232	13638	8149
8	3928	4922	7333	19146	17034	9740	11407
9	10869	2966	3805	5786	13123	11713	8019
10+	136007	114010	90211	69763	53278	45144	45710

	84	85	86	87	88	89	90
1	61660	77390	69294	19978	102821	14826	0
2	72268	52796	66751	59717	15961	84873	1215
3	35104	55855	40773	52544	39593	5583	61824
4	24392	28791	37124	28777	37218	23436	3300
5	22846	19354	22504	29126	19899	28807	17005
6	13154	17897	12911	18483	21293	13415	23331
7	3934	9846	11683	9073	13817	14667	978
8	5794	2877	7617	9231	7088	9774	1029
9	8697	4369	1892	6141	6777	4684	6769
10+	40409	37360	30407	22779	20533	17927	13322

Table 18 from ICCAT 1990

, 18. Stock numbers at age (1000's) at the beginning of the year for BFT East Atlantic and Mediterranean

1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
[illegible]	629	577	660	1341	1354	1025	933	613	703	1065	877	1273	2320	1116	943	1700	847	2440	1654
	381	537	393	440	992	528	800	608	392	540	822	624	459	1362	810	618	902	502	1367
	240	249	328	279	261	593	283	426	348	309	320	403	333	242	589	372	290	380	279
[illegible]	105	159	144	207	189	195	253	204	229	210	156	176	173	178	165	220	169	153	126
[illegible]	110	77	128	120	121	146	132	160	159	153	155	123	131	127	121	114	123	119	109
100	99	84	60	108	97	100	108	113	135	132	125	121	102	103	93	93	92	98	96
103	80	83	67	49	89	80	82	89	97	115	110	103	102	86	80	72	75	73	77
92	85	65	68	52	40	75	67	68	75	82	97	92	85	80	69	66	60	58	54
90	77	65	54	52	41	31	63	56	57	61	69	80	72	68	63	57	55	49	46
67	73	61	54	39	35	30	24	53	47	46	51	57	65	58	50	52	47	45	39
46	52	62	52	45	30	26	24	18	42	38	37	42	45	44	40	38	42	36	33
40	34	44	53	44	36	21	19	18	14	35	29	29	30	34	30	29	29	33	26
27	31	28	37	44	34	24	14	14	13	10	27	23	19	22	22	20	20	22	24
34	22	25	23	30	33	21	15	8	9	9	6	21	14	11	12	14	13	14	15
56	73	71	75	76	74	69	57	42	30	22	17	15	18	19	17	16	19	22	23
2013	2091	2188	2195	2927	3427	2962	2875	2489	2349	2828	2899	3182	3969	3551	3103	3481	2783	4044	3966

1990
0
716
911
136
87
86
77
57
42
36
29
25
19
18
28
2465

Y BY AGE GROUPS

970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
[illegible]	629	577	660	1341	1354	1025	933	613	703	1065	877	1273	2320	1116	943	1700	847	2440	1654	0
[illegible]	726	945	865	926	1443	1315	1337	1238	969	1060	1298	1203	966	1782	1565	1211	1361	1035	1772	1962
510	451	375	377	380	388	432	452	486	522	543	556	520	493	464	425	401	405	397	382	348
271	285	292	293	279	241	190	153	152	155	160	167	186	191	188	171	169	170	172	159	155

Table 19 from ICCAT 1990

BFT-

Table 19 Fishing mortality rates at age for BFT East Atlantic and Mediterranean

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	0.28	0.02	0.24	0.26	0.16	0.80	0.11	0.29	0.31	0.12	0.12	0.20	0.88	0.39	0.18	0.28	0.49	0.38	0.44	0.35
2	0.26	0.29	0.35	0.20	0.38	0.38	0.48	0.49	0.42	0.10	0.38	0.57	0.49	0.50	0.70	0.64	0.62	0.72	0.45	0.38
3	0.21	0.27	0.41	0.32	0.25	0.15	0.71	0.19	0.48	0.36	0.55	0.46	0.70	0.49	0.24	0.84	0.65	0.50	0.97	0.58
4	0.13	0.16	0.08	0.05	0.40	0.12	0.25	0.32	0.11	0.26	0.17	0.09	0.15	0.17	0.25	0.23	0.45	0.21	0.20	0.23
5	0.09	0.13	0.12	0.03	0.07	0.06	0.16	0.02	0.04	0.05	0.07	0.10	0.05	0.11	0.18	0.12	0.08	0.09	0.08	0.10
6	0.09	0.04	0.09	0.06	0.05	0.05	0.06	0.05	0.01	0.02	0.04	0.05	0.03	0.04	0.11	0.11	0.07	0.09	0.10	0.08
7	0.05	0.06	0.06	0.11	0.07	0.04	0.04	0.05	0.04	0.03	0.03	0.04	0.05	0.11	0.08	0.05	0.04	0.12	0.15	0.16
8	0.04	0.13	0.04	0.13	0.10	0.09	0.03	0.04	0.03	0.06	0.03	0.05	0.11	0.08	0.09	0.05	0.03	0.07	0.10	0.13
9	0.07	0.08	0.06	0.18	0.25	0.15	0.14	0.04	0.02	0.07	0.04	0.05	0.07	0.07	0.17	0.06	0.06	0.07	0.10	0.10
10	0.11	0.02	0.02	0.03	0.15	0.17	0.10	0.15	0.07	0.08	0.08	0.07	0.10	0.26	0.23	0.13	0.07	0.12	0.18	0.14
11	0.17	0.03	0.02	0.03	0.09	0.23	0.16	0.18	0.13	0.07	0.12	0.12	0.18	0.14	0.24	0.20	0.13	0.11	0.19	0.14
12	0.12	0.04	0.03	0.03	0.12	0.26	0.23	0.20	0.15	0.13	0.10	0.12	0.29	0.17	0.28	0.24	0.22	0.15	0.18	0.14
13	0.09	0.07	0.09	0.06	0.16	0.37	0.36	0.39	0.29	0.22	0.43	0.11	0.33	0.40	0.50	0.29	0.29	0.20	0.27	0.16
14	0.07	0.15	0.12	0.11	0.23	0.30	0.31	0.39	0.41	0.44	0.46	0.26	0.56	0.40	0.46	0.45	0.34	0.23	0.31	0.16
15+	0.07	0.15	0.12	0.11	0.23	0.30	0.31	0.39	0.41	0.44	0.46	0.26	0.56	0.40	0.46	0.45	0.34	0.23	0.31	0.16

AVERAGE F BY AGE GROUPS

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	0.28	0.02	0.24	0.26	0.16	0.80	0.11	0.29	0.31	0.12	0.12	0.20	0.88	0 39	0.18	0.28	0.49	0.38	0.44	0.35
2-4	0.20	0.24	0.28	0.19	0.34	0.22	0.48	0.33	0.34	0.24	0.37	0.38	0.45	0.38	0.40	0.57	0.57	0.48	0.54	0.40
5-9	0.07	0.09	0.07	0.10	0.11	0.08	0.09	0.04	0.03	0.04	0.04	0.06	0.06	0.08	0.13	0.08	0.05	0.09	0.11	0.11
10+	0.10	0.08	0.06	0.06	0.16	0.27	0.25	0.29	0.24	0.23	0.28	0.16	0.34	0.29	0.36	0.30	0.23	0.17	0.24	0.15

AVERAGE F BY AGE GROUPS (weighted by N)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	0.28	0.02	0.24	0.26	0.16	0.80	0.11	0.29	0.31	0.12	0.12	0.20	0.88	0.39	0.18	0.28	0.49	0.38	0.44	0.35
2-4	0.22	0.26	0.32	0.22	0.34	0.30	0.55	0.39	0.39	0.23	0.39	0.49	0.51	0.44	0.59	0.67	0.60	0.61	0.60	0.40
5-9	0.07	0.09	0.08	0.09	0.09	0.06	0.09	0.04	0.03	0.04	0.04	0.06	0.06	0.08	0.13	0.09	0.06	0.09	0.10	0.11
10+	0.11	0.07	0.06	0.06	0.17	0.28	0.25	0.30	0.22	0.18	0.19	0.12	0.26	0.25	0.31	0.24	0.18	0.15	0.22	0.15

AVERAGE F BY AGE GROUPS (weighted by the catch)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	0.28	0.02	0.24	0.26	0.16	0.80	0.11	0.29	0.31	0.12	0.12	0.20	0.88	0.39	0.18	0.28	0.49	0.38	0.44	0.35
2-4	0.23	0.27	0.36	0.26	0.35	0.34	0.59	0.43	0.43	0.29	0.43	0.53	0.56	0.47	0.65	0.71	0.60	0.66	0.71	0.42
5-9	0.08	0.10	0.09	0.12	0.13	0.08	0.13	0.05	0.03	0.05	0.05	0.07	0.07	0.09	0.14	0.10	0.06	0.09	0.11	0.12
10+	0.12	0.11	0.09	0.08	0.18	0.29	0.28	0.33	0.31	0.30	0.30	0.15	0.36	0.29	0.34	0.28	0.24	0.17	0.23	0.15

Table A. Bluefin tuna imported into Japan, 1990 cumulative. These include all kinds of shipments (fresh, chilled, frozen, etc.) of bluefin tuna species from all oceans. Data compiled from Japanese trade statistics.

Country	Period	Cumulative Kg.	Cumulative Value (Yen 1000s)
R Korea	1/90-12/90	149,217	94,768
Taiwan	" "	826,539	1,304,770
Singapore	" "	256	217
Indonesia	" "	55,111	46,569
U Kingdom	" "	4,142	8,015
France	" "	31,429	92,812
Azores	" "	1,927	5,908
Spain	" "	808,792	2,608,965
Italy	" "	21,209	60,527
Malta	" "	3,307	5,759
Greece	" "	84,289	318,545
Turkey	" "	140,128	372,097
Canada	" "	311,572	1,100,504
USA	" "	814,968	3,343,010
Mexico	" "	18,904	73,397
Puerto Rico	" "	324	926
Venezuela	" "	29,581	30,833
Ecuador	" "	1,582	4,011
Morocco	" "	242,538	1,046,888
Tunisia	" "	381,883	1,472,029
Libya	" "	1,093	3,826
Australia	" "	2,788,287	1,576,679
New Zealand	" "	255,084	659,483
Guam	" "	1,110	2,865
Palau	" "	4,200	4,846
Portugal	" "	74,506	108,821
Honduras	" "	18,012	33,328
Panama	" "	12,240	37,944
Uruguay	" "	971	1,389
Argentina	" "	1,790	1,651
So. Africa	" "	3,492	2,023
P. Ocean	" "	8,923	6,033
Totals	1/90-12/90	7,097,406	14,430,041

Table B. Fresh or chilled bluefin tuna imported into Japan from June 1990-June 1991.

Country	1 yr. period	Kg.	Value (Yen 1000s)
Canada	6/90-6/91	302,062	923,814
USA	" "	847,282	3,269,664
Portugal	" "	14,596	35,062
Italy	" "	22,686	70,391
Greece	" "	70,098	236,071
Tunisia	" "	415,327	1,268,690
Libya	" "	37,496	132,550
Morocco	" "	179,514	812,148
Spain	" "	432,785	1,674,514
France	" "	8,121	25,688
R Korea	" "	141,809	59,298
Taiwan	" "	277,032	325,505
Indonesia	" "	54,512	48,247
Singapore	" "	256	217
U Kingdom	" "	4,673	9,622
Azores	" "	1,427	2,882
Malta	" "	37,692	75,956
Turkey	" "	91,289	237,275
Mexico	" "	8,361	23,043
Puerto Rico	" "	324	926
Ecuador	" "	1,766	5,410
Australia	" "	590,461	403,589
New Zealand	" "	6,620	8,736
Guam	" "	710	1,206
Palau	" "	4,825	2,953
Microne	" "	212	497
Canary	" "	4,906	7,432
Totals	6/90-6/91	3,556,842	9,661,386

Table C. Frozen bluefin tuna imported into Japan from June 1990-June 1991. These include bluefin tuna species from all oceans. Data compiled from Japanese trade statistics.

Country	1 yr. period	Kg.		Value (Yen 1000s)
Canada	6/90-6/91	8,409		14,645
Argentina	" "	1,735		1,601
R Korea	" "	5,636		19,785
Taiwan	" "	1,143,291	1,267,898	
Indonesia	" "	6,313		4,145
Australia	" "	59,500		39,546
P Ocean	" "	480		586
Spain	" "	346,413	769,826	
Italy	" "	2,512		5,448
Morocco	" "	17,918		59,631
Honduras	" "	47,872		57,082
Venezuela	" "	29,507		30,410
Panama	" "	12,240		37,944
Uruguay	" "	971		1,389
Tunisia	" "	25,233		91,894
Malaysia	" "	1,230		233
Singapore	" "	346		532
Canary	" "	53,384		46,977
Portugal	" "	74,506		108,821
Totals	6/90-6/91	1,837,496		2,558,393

Table D. Bluefin tuna fillets and other meat, excluding fresh, chilled and frozen fillet imported into Japan from June 1990-June 1991. Data compiled from Japanese trade statistics.

Country	1-yr. period	Kg.	Value (Yen 1000s)
Spain	6/90-6/91	183,645	563,955
Morocco	" "	204,514	638,171
Totals	6/90-6/91	388,159	1,202,126

TABLE 1

Total Catch of Western Atlantic Bluefin Tuna
By Nation
1982-1988
(in metric tons)

Country	1982	1983	1984	1985	1986	1987	1988
Argentina				6		2	
Brazil	1	1		1		2	
Canada	291	433	264	142	73	83	445
Dom. Rep.	115	168	207	81	109	199	
Japan	292	711	696	1092	584	960	
Mexico	14						
Panama	12						
Taiwan	11	2	3	3	3		
Uruquay	3		9	10	6	4	
U.S.A.	812	1394	1320	1423	1142	1351	1290
Total	1540	2707	2496	2755	1914	2601	

Source: International Commission for the Conservation of Atlantic Tunas

Note: Complete figures for 1988 not yet obtained.

This series of tables compiled by Radonski et al. 1990

TABLE 2

Catch of Bluefin Tuna in the Western Atlantic
By Country and Method
1982-1988
(in metric tons)

Method	1982	1983	1984	1985	1986	1987	1988
Total	1546	2709	2499	2759	1917	2602	
PURSE SEINE	232	384	401	377	360	367	
United States	232	384	401	377	360	367	
ROD & REEL, AND SPORT	308	476	401	466	328	539	
Canada		71	1	1	2	1	
United States	308	405	400	465	326	538	
LONGLINE	349	828	835	1238	764	1138	
Brazil	1	1		1		2	
Canada					32	33	
Japan	292	711	696	1092	584	960	
Panama	12						
Taiwan	11	2	3	3	3		
Uruguay	3		9	10	6	4	
United States	30	114	127	132	139	139	
OTHER AND UNCLASSIFIED GEAR	657	1021	862	678	465	558	
Argentina				6		2	
Canada	291	362	263	141	39	49	
Dominican Rep	115	168	207	81	109	199	
Mexico	14						
United States	237	491	392	450	317	308	

Source: International Commission for the Conservation of Atlantic Tunas

Note: Totals differ from those in the previous table due to rounding. Also, only partial figures are available for 1988.

TABLE 3

Participation of Countries Exporting Bluefin Tuna To Japan in the Western Atlantic, Eastern Atlantic, And Mediterranean Fisheries 1986-1987

Country	West	East	Med
Argentina	x		
Australia			
Azores			
Brazil	x		
Canada	x		
Denmark		x	
France		x	x
Ghana			
Greece			x
Guam			
Honduras			
Hong Kong			
Indonesia			
Ireland			
Italy			x
Libya			x
Malaysia			
Malta			x
Morocco			x
New Zealand			
Norway		x	
Oman			
Panama		x	
Philippines			
Portugal		x	
Rep. Korea			
Singapore			
South Africa			
Spain		x	x
Taiwan			
Tunisia			x
U.K.			
U.S.A.	x		
Uruguay	x		
Venezuela			
West Germany			

Sources: Japanese Ministry of International Trade and Industry import statistics
Biennial reports of the International Commission for the Conservation of Atlantic Tunas

TABLE 4

Total Catch of Western Atlantic Bluefin Tuna by Country and Their Total Bluefin Tuna Exports to Japan 1986-1988 (in metric tons)

Country	Export Type	1986		1987		1988	
		Catch	Export	Catch	Export	Catch	Export
Argentina	frozen		1	2			3
Brazil				2			
Canada	fresh	73	25	83	43	445	302
Dominican Rep		109		199			
Japan		584		960			
Panama	frozen				66		57
Taiwan		3	139		226		295
Uruguay	frozen	6	5	4	3		3
United States	fresh	1142	584	1351	939	1290	856
	frozen		230		27		15
Subtotal	frozen		236		96		78
Subtotal	fresh		609		982		1158
Total			845		1078		1236

Source: Japanese Ministry of International Trade and Industry

Note: Some countries fish for bluefin elsewhere in the Atlantic and elsewhere in the world, most notably Taiwan and, in the past, Panama, which fished the Eastern Atlantic. The destination of the significant Dominican catch is unknown.

TABLE 5

Japanese Imports of Bluefin Frozen Fish Meat Excluding Fillets (MITI Code 0304.90.091) (in metric tons)

Country	1986	1987	1988	1989
Argentina	1			
Australia	2497	2796		
Greece	1			
Honduras	10	93		
Indonesia	6	11		
Italy	25	14		
Morocco		6	154	7
New Zealand	74	53		
Panama		66		
Republic of Korea	134	1		
Singapore	3	2		
South Africa		3		
Spain	50	95	239	60
Taiwan	61	146		
Turkey		6		
Uruguay	5	3		
United States	230	27		
Venezuela		47		
Total	3095	3378	393	73

Source: Japanese Ministry of International Trade and Industry

Note: This category was redesignated 0303.49.010 in 1988. See Table 6.

TABLE 6

Japanese Imports of Frozen Bluefin Tuna, Except Fillets, Other Fish Meat, Livers, and Roes
(MITI Code 0303.49.010
(in metric tons)

Country	1988	1989
Argentina	3	<1
Australia	1703	2084
China		1
Ghana	53	
F. Oceania		7
Honduras	324	282
Indonesia	7	39
Italy	6	1
Mexico		11
Morocco	6	<1
New Zealand	84	122
Panama	57	
Rep. of Korea	11	39
Singapore		<1
South Africa	2	86
Spain	773	378
Taiwan	243	889
Turkey		116
Uruguay	3	2
United States	15	6
Venezuela	121	19
Total	3410	4086

Source: Japanese Ministry of International Trade and Industry.

TABLE 7

Japanese Imports of Bluefin Fresh or Chilled Meat, Except Fish Fillet, Other Fish Meat, Livers, and Roes
(MITI Code 0302.39.010)
(in metric tons)

Country	1986	1987	1988	1989
Australia	263	73	458	325
Canada	25	43	302	454
Denmark				2
France	1	6		4
Greece	71	54	56	72
Guam				1
Indonesia		1	5	51
Ireland	3		2	1
Italy			14	8
Malta				3
Mexico				1
Morocco		21	59	170
New Zealand	2	3		
Norway				1
Portugal				4
Republic of Korea	344	89	32	71
Singapore				2
Spain	104	171	389	250
Taiwan	78	80	52	66
Tunisia				225
Turkey	669	243	104	156
United Kingdom			2	
United States	584	939	856	889
Total	2104	1723	2331	2656

Source: Japanese Ministry of International Trade and Industry

Note: The following countries exported less than one metric ton of fresh bluefin to Japan in one or more years: Brazil, Hong Kong, Malaysia, New Zealand, Oman, Philippines, Portugal, Singapore, and United Kingdom

TABLE 8

Tonnage, Value, and Dockside Price For Bluefin Tuna Landed at U.S. Ports 1981-1988

Year	Metric Tons	Value ($000s)	Average Price for Large Size	Average Price ($0.00)	Index Price ($0.00
1981	2170	3787		.79	1.25
1982	2497	5108		.45	1.24
1983	1983	8737	2.00-5.00	2.00	3.15
1984	1776	9250	1.93-3.40	2.32	3.65
1985	4471	12410	3.45	1.26	1.99
1986	4849	6791	3.33	.64	1.00
1987	1965	16463		3.80	5.98
1988	1702	17305		4.62	7.27

Source: Fisheries of the United States for 1982-1988
Note: The base year for the index of prices is 1986.

TABLE 9

1986 Cost for Consignment Sale of 400-pound Tuna in Japan (in dollars)

Cost Item	Total Cost	Cost/ lb
Price of fish at dock	2000	5.00
Crate and insulation	67	.17
Ice	20	.05
Transport to Boston	20	.05
Labor and handling	112	.28
Airfreight to Tokyo	504	1.26
Subtotal	2723	6.81
Import Duty (@ 5%)	136	.34
Customs charge	15	.04
Commission, handling	400	1.00
Total Costs	3274	8.19

Source: Harry Upton (pers. com.)

Note: These costs assume that the crate and ice weight 200 pounds.