PROBABLE UNDERESTIMATES AND MISREPORTING OF ATLANTIC SMALL TUNA CATCHES, WITH SUGGESTIONS FOR IMPROVEMENT

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SUMMARY

Catches of small tunas in the Atlantic appear to be seriously underreported at present. Various methods of estimating total catches suggest that 37,000 to 90,000 tons are caught but not reported each year, principally by coastal artisanal fisheries. The most promising areas in which to concentrate efforts for improvement in reporting of coastal artisanal catches are North and West Africa. Suggestions are made for improving other catch statistics and for solving nomenclatural problems.

RESUME

Les prises de petits thonidés de l'Atlantique semblent très peu déclarées à l'heure actuelle. Plusieurs méthodes d'estimation de la prise globale suggèrent que chaque année 37.000 à 90.000 TM sont capturées sans être communiquées, surtout pour ce qui est des pêcheries côtières artisanales. Les secteurs pour lesquels on obtendrait les meilleurs résultats en concentrant les efforts sur l'amélioration de la transmission des prises côtières artisanales sont le nord et l'ouest de l'Afrique. Des suggestions sont formulées pour améliorer d'autres statistiques et résoudre les problèmes de nomenclature.

RESUMEN

En el momento actual, las capturas de pequeños túnidos en el Atlántico parecen estar muy subestimadas. Varios métodos de estimación del total de captura sugieren que se obtienen entre 37.000 y 90.000 toneladas anualmente, si bien no se informa de ello, en especial por parte de las pesquerías artesanales costeras. Las zonas en las que se obtendrían mejores resultados, si se concentrasen los esfuerzos en mejorar la información de las capturas artesanales costeras, son Norte y Oeste de Africa. Se presentan sugerencias para mejorar otras estadísticas de captura y para resolver los problemas de nomenclatura.

The total reported Atlantic and Mediterranean catch of small tunas increased by a factor of six from 1950 to 1983 (Table 1). The number of countries reporting more than doubled during the same period:

Year	Number of countries
1950	16
1960	15
1970	28
1980	33
1983	42

It is difficult to relate directly the increase in total catch reported to the increase in number of countries reporting. There was a strong upward trend in total catches from 1975 to 1983, but the recent (1981-1983) total is comparable to the 1969 level, and less than 30 percent above the 1955 catch (Table 1).

A large part of the variation is due to fluctuations in the figures for Atlantic bonito, overall about 45 percent of the 1950-1983 total, but varying annually from 10 to nearly 80 percent. Total reported catches of bonito show no clear trend for the 34 years-- the largest catches, about 30-50 percent above recent levels, were reported in the mid-1950s and in 1969.

Two thirds of all the Atlantic bonito have been taken by Turkey. Turkish catches have been half or more of the total in almost every year since they were first reported in 1953. But these catches have fluctuated over at least an order of magnitude during the 31 years they have been reported, without any apparent long-term trend.

The picture changes when the Turkish bonito catch is excluded. The total reported catch of small tunas minus the Turkish bonito has increased reasonably regularly at about four percent per year over the 34 years. This rate is comparable to the roughly three percent annual increase in the number of countries reporting catches.

Such a relationship leads inevitably to the question of completeness of the present coverage. Tables 2-6 show that 43, slightly less than half, of 89 Atlantic and Mediterranean coastal countries and areas (arbitrarily limited to 40°N-40°S) report at least some catches of small tunas. Eight of the 43 report catches of less than 50 tons annually. Thus, well under half of the countries report catches of 50 tons or more per year.

Note: "Small tunas" include blackfin tuna (Thunnus atlanticus), Atlantic little tuna (Euthynnus alletteratus), Atlantic bonito (Sarda sarda), other bonitos (Sarda spp.), frigate tuna (Auxis thazard), bullet tuna (bullet mackerel) (A. rochei), wahoo (Acanthocybium solandri), and king and Spanish mackerels (Scomberomorus spp.).

Catches and reporting in coastal artisanal fisheries

Some of these reported zero or very small catches are real, but it is almost certain that many catches are not reported. When the countries and areas are examined in their geographical relation to one another (Tables 2-5), certain possibilities of omission stand out.

For example, in Table 2, none of the Central American countries with a combined coastline of about 2,400 kilometers between Mexico and Colombia report any local catch. Mexico and Colombia taken together show about three tons per kilometer. Haiti and the Dominican Republic share the same Caribbean island. The Dominican Republic reports several hundred tons of small tunas annually, Haiti none (Table 3).

Egypt and Libya, with about 2,700 kilometers of Mediterranean coast, report almost no catch, while many of their neighbors report catches on the order of one ton per kilometer (Table 4). In Table 5, Gambia does not report any catch, while Senegal has large catches. Togo, Nigeria and Cameroon, with 1,200 kilometers of coastline on the Gulf of Guinea do not report any catch, but their neighbor Ghana has the highest catch per kilometer of any country reporting.

If one assumes that the coastal artisanal catches of small tunas by countries not reporting may be related to length of coast in a similar fashion to those of countries that do report, estimates of under-reporting can be made:

	Estimates of under-reporting Low	High
	- metric tons -	
North, Central, and South America (Table 2):		
4,300 kilometers (non-reporting) x 1.6 tons/km (reported)	3,440	6,880
West Indies (Table 3):		
3,550 kilometers (non-reporting) x 1.1 tons/km (reported)	1,953	3,905
Mediterranean and Black Seas (Table 4)		
5,100 kilometers (non-reporting) x 2.5 tons/km (reported)	6,375	12,750
or,		
5,100 kilometers (non-reporting) x 0.7* tons/km (reported)	1,785*	3,570*
West Africa (Table 5):		
8,100 kilometers (non-reporting) x 2.6 tons/km (reported)	10,530	21,060
Total	22,298	44,595
or		
Total*	17,708*	35,415*

*Turkey not included

The low estimate in each case assumes that "non-reporters" catch small tunas at half the rate in proportion to length of coast as that of the "reporters." The high estimate assumes the rates are equal.

These estimates are at best only the crudest sort of first approximation. They incorporate the assumption that countries which report some catch report all of their catch. They combine species that have little in common in their geographic distribution, life histories or ecological niches. They do not take into account differences in human population, numbers of the population that are fishermen, local economics, food habits, other cultural differences, etc. They combine countries that bear small resemblance to each other, such as the United States, Suriname and Uruguay, or Mauritania, Togo and South Africa. They project catches made along part of a country's long coastline to the whole coast-- Brazil (Table 2) and Cuba (Table 3) are probably the most egregious examples.

C. Nauen of FAO comments on these figures (pers. comm.) that she has seen recent estimates of several thousand tons of small tunas taken by artisanal fleets both in Cape Verde and in Senegal, which are at least partly accounted for in official statistics. (The ICCAT Statistical Bulletin shows only about 200 tons or less of small tunas per year for Cape Verde, nearly all Atlantic little tuna, although there are unofficial reports of substantial catches of wahoo. The Statistical Bulletin shows several thousand tons for Senegal, principally Atlantic little tuna.) Nauen indicates, however, that in most other West African countries the local fishermen concentrate on inshore and lagoon fisheries, and for this reason that the estimates of under-reporting given above for West Africa may be too high.

L.A. Zavala Camin of São Paulo mentions (pers. comm.) that Brazilian statistics for Scomberomorus spp. and blackfin tuna are reasonable, but that the figures for frigate tuna are doubtful. He points out that Atlantic little tuna is fished along the whole Braziian coast, but landing statistics for the species are problematic. (The ICCAT Statistical Bulletin shows no catches of frigate tuna before 1981 and at most a very few hundred tons/year since for Brazil, and almost no landings of Atlantic little tuna.)

Doubtless the comparison of length of coast with the amount of small tuna catch overestimates non-reported catch for some countries and underestimates it for others. As mentioned above, the estimates should not be considered as other than first approximations. But, such as they are, they suggest that under-reporting of coastal artisanal catches of small tunas in the Atlantic and Mediterranean could be substantial, perhaps on the order of 30,000-40,000 tons per year.

Catches and reporting by industrial fleets

Only about five percent of the reported Atlantic small tuna catch in recent years has been reported as taken by purse seines. Nearly 90 percent of the five percent has been Atlantic little tuna and frigate and bullet tunas. A substantial part of the catch now assigned to otherwise unclassified "surface" fisheries in the ICCAT Statistical Bulletin is almost certainly taken by industrial purse seine fleets. For example, the USSR's unclassified surface catches of small tunas, over half Atlantic little tuna and frigate tunas, average about 10,000 tons annually. They are most probably taken by purse seiners and by pole and line, as well as by trawlers. The reported catches of small tunas taken by purse seiners, whether or not assigned to purse seine in the Statistical Bulletin, are thus probably something over 10,000 tons per year in recent years.

Quantitative information on catches and discards (and/or occasional landings) of small tunas by industrial purse seine fleets is not easily available. Honma and Suzuki (1974a, 1974b) estimated catches of hundreds to a few thousand tons of frigate tunas per year by Japanese purse seiners operating in the eastern tropical Atlantic in 1964-72. These catches are included in the ICCAT Statistical Bulletin. Total catches of all species by the Japanese purse seiners were from a few hundred to over 10,000 tons per year. Reported catches by Japanese purse seiners fishing the same areas after 1974, between 2,000 and 3,000 tons/year since 1982, do not include any small tunas. Z. Suzuki of the Far Seas Fisheries Research Laboratory indicates (pers. comm.) that most of the previous frigate tuna catches were made by double-boat purse seiners, which no longer operate in the Atlantic.

Sakagawa (1977) estimated incidental catches from logbook data on the order of tens of tons per year each of Atlantic little tuna plus frigate and bullet tunas by American purse seiners fishing in the eastern tropical Atlantic from 1967 to 1975, a period when the American seiners frequently took up to 25,000 tons of tunas a year from the area. These estimates are partially reflected in the ICCAT Statistical Bulletin. Sakagawa cautioned that the recorded catches probably did not include discards.

Diouf (1981) called attention to incidental catches of a few hundred tons of Atlantic little tuna in the Senegalese industrial fisheries. As much as 40 tons at a time are taken occasionally by industrial purse seiners, some are taken by boats fishing for Sardinella, and trawlers take appreciable amounts in incidental line fisheries. These catches are included in the ICCAT Statistical Bulletin.

Bard and Amon Kothias (1985) estimated on the order of 3,000 to 4,000 tons of Atlantic little tuna and frigate tuna landed annually at Abidjan from 1981 to 1983, principally by the FISM and Spanish tropical purse seine fleets. The FISM estimates are partially reflected in the ICCAT Statistical Bulletin. Fernández (1985) also mentions catches of frigate tunas and Atlantic little tuna by Spanish purse seiners fishing in the eastern tropical Atlantic, but the Statistical Bulletin does not report any catches of small tunas by the Spanish tropical purse seine fleet. Bard and Amon Kothias noted that the FISM and Spanish fleets have landed over 100,000 tons of other species annually,

principally skipjack and yellowfin tunas, at Abidjan in the same years. They pointed out that the landings of small tunas at Abidjan represent only a fraction of the catches, the rest being discarded at sea.

Total purse seine catches of yellowfin, bigeye, skipjack and bluefin tunas in the Atlantic and Mediterranean in recent years have been about 180,000 to 200,000 tons annually. Based on the fragmentary evidence available, the associated unreported catches of small tunas, mostly discarded at sea, could be about five to ten percent of the total of the other species, that is from 10,000 to 20,000 tons per year.

Incidental unreported catches by other industrial fisheries can be guessed to be on the order of 5,000 to 10,000 tons/year, although the only mention found of this sort of catch was in Diouf (1981).

Catches and reporting in sport (recreational) fisheries

National Marine Fisheries Service (1980) estimated USA recreational catches in the Atlantic in 1979 of about 1,000 tons of Atlantic little tuna, 3,100 tons of king mackerel, 2,200 tons of Spanish mackerel, and 2,400 tons of "mackerels and tunas" during a survey of recreational fisheries. ("Mackerels and tunas" includes, among others, Euthynnus, blackfin tuna, bonitos, king mackerel, wahoo and bullet mackerel.) National Marine Fisheries Service (1985b) estimates some three million individual king mackerel caught by USA recreational fishermen in the Atlantic during March-December 1981, and two million caught in 1982. National Marine Fisheries Service (1985a) reports some 16,000 tons of tunas and tuna-like fishes caught by USA recreational fishermen in the Atlantic in 1983, and 11,000 tons caught in 1984. These estimates are not shown in the ICCAT Statistical Bulletin.

Brusher et al. (1984) and Williams, Brusher and Trent (1984) recorded catches of several thousand individuals of Scomberomorus, over a thousand Atlantic little tuna, over 100 wahoo, and few hundred Atlantic bonito and blackfin tuna in a pilot study of nine recreational charterboats carried out in March-December 1982 from North Carolina to Texas (USA). Figley and Preim (1984) report catches of 18 tons of wahoo and 7 tons of king mackerel in a survey of marine recreational fishing for tunas and marlins conducted from New York through Virginia (USA) during 1983. Williams et al. (1984, 1985) report substantial catches in numbers of small tunas in a charterboat survey from North Carolina to Texas plus Puerto Rico and the Virgin Islands (USA) in 1983 and in a somewhat reduced survey in 1984. These estimates do not appear to be reflected in the ICCAT Statistical Bulletin.

No country other than the USA reports sport or recreational catches of small tunas, although there undoubtedly are some. Thus, the amount of sport or recreational catches of small tunas not included in the ICCAT Statistical Bulletin can be conservatively estimated at 5,000-15,000 tons per year.

Total non-reported catches

It is obvious that improved reporting would lead to larger apparent catches of Atlantic small tunas. The annual totals could range from:

	Minimum	Maximum
	- - metric tons - -	
Coastal artisanal fisheries	17,000	45,000
Industrial purse seine fisheries	10,000	20,000
Other industrial fisheries	5,000	10,000
Recreational fisheries	5,000	15,000
Total	37,000	90,000

Other problems with reliability of catch data

The principal other problem with fisheries catch data for small tunas is the question of correct nomenclature, as Miyake (1982) and others have pointed out. Probably the most serious case in the Atlantic fisheries is the wahoo, whose reported catches have increased markedly since about 1970. They are now on the order of 5,000 tons a year (Table 1), 80-90 percent reported by Mexico.

These figures are hard to reconcile with what is known about the biology of the creature, which Collette and Nauen (1983) describe as "frequently solitary or forming small loose aggregations rather than compact schools." E.L. Nakamura of the U.S. National Marine Fisheries Service suggests (pers. comm.) that there may be a confusion of common names, since both wahoo and king mackerel are called "peto" in Mexico.

A generic problem is the tendency of fishermen and markets to describe tunas which are small in size-- either small adults or young of larger species-- as "bonito", "bonite" or "bonita" in several languages. In this manner, a single species is mis-named or, worse, several species are grouped under one or a small number of names.

Some possible solutions

Examination of Tables 2-5 in detail suggests priorities in attempting to improve coverage for coastal artisanal fisheries:

1. The most fruitful region in which to concentrate efforts appears to be West Africa. Guinea-Bissau to Liberia, plus Togo to Zaire, a total of 4,200 kilometers with very little catch reported, appear to be the most interesting areas. Large artisanal catches, both absolutely and in proportion to coastline, are reported by neighboring Senegal, Ghana and Angola.

2. A second promising area is Egypt and Libya, with 2,700 kilometers of coast but less than 50 tons of reported catch, as mentioned above.

3. Another area of interest is the Central American countries from Belize to Panama, with 2,400 kilometers of coast but no reported coastal artisanal catch, also mentioned above.

Reasonable quantitative estimates of catches of small tunas by industrial purse seine fleets could be obtained by encouraging captains to record in their logbooks incidental catches of small tunas, even when they are discarded. However, as long as the small tunas have very limited or no commercial value to the purse seine fleets, the captains will take little interest in them. An alternative might be to begin an intensive interview system with the more cooperative captains, and to extrapolate estimates of total catches from these interviews. Such work has been initiated in Ivory Coast (Bard and Amon Kothias, 1985) and in Senegal (T. Diouf, pers. comm.), and should be continued and encouraged. The USSR should be encouraged to report the gear used to make its substantial surface catches of small tunas.

Reliable estimates of sport or recreational catches are notoriously difficult to obtain. Surveys such as the ones reported by Brusher et al. (1984), Figley and Preim (1984), National Marine Fisheries Service (1980, 1985a, 1985b), Williams et al. (1984, 1985) and Williams, Brusher and Trent (1984) are perhaps the only way these estimates can be made. It is also necessary for national authorities to make sure estimates from surveys of recreational fisheries are included in national statistics submitted to ICCAT.

The problem of correct nomenclature could be at least partially solved by sampling, that is by sending fishery biologists and/or ichthyologists periodically to visit landing points and markets to note what species are actually being landed, and using this information to adjust catch statistics. Perhaps priority should be given to verifying the large amounts of wahoo reported by Mexico.

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Table 1 - Reported Atlantic (inc. Mediterranean) catches of small tunas, 1950-1983

YEAR	BON	LTA	KGM	FRI	SSM	WAH	MAW	BLF	OTH	TOTAL
	thousand metric tons									
1950	1.9	3.3	.7	6.3	5.8	-	-	.3	1.2	19.5
1951	2.1	.9	1.4	4.2	6.9	-	-	.3	1.2	17.0
1952	3.7	2.6	1.1	2.1	6.7	-	-	.3	1.7	18.2
1953	11.3	3.4	1.2	10.6	6.0	-	-	.3	2.0	34.8
1954	20.5	5.1	.9	9.4	5.6	-	-	.4	2.0	43.9
1955	60.5	4.3	1.2	7.7	6.2	-	-	.1	2.7	82.7
1956	61.3	2.2	1.7	4.0	6.5	-	-	.3	2.5	78.5
1957	48.9	2.3	1.5	6.0	6.4	-	-	.1	2.6	67.8
1958	33.4	3.4	1.5	10.3	8.2	-	-	.5	6.1	63.4
1959	17.9	9.7	1.6	6.2	7.6	-	-	.6	4.7	48.3
1960	40.7	3.0	3.7	8.8	9.2	1.0	-	.6	2.5	69.5
1961	50.7	2.5	4.6	10.1	8.3	1.0	-	.4	3.8	81.4
1962	14.8	5.1	4.9	8.2	8.7	1.0	-	.7	4.6	48.0
1963	28.2	4.0	5.9	8.0	7.5	1.0	-	.8	4.6	60.0
1964	16.8	1.7	4.1	6.8	7.8	.9	-	.8	4.1	43.0
1965	31.4	4.1	5.7	9.5	8.4	1.0	-	.7	2.0	62.8
1966	29.1	3.3	6.3	7.2	9.2	.9	-	.7	2.2	58.9
1967	49.1	4.0	7.8	11.5	7.9	1.0	-	.9	2.8	85.0
1968	31.9	3.2	10.3	8.6	7.1	.8	1.8	.7	2.4	66.8
1969	61.7	3.5	9.5	16.2	7.3	1.1	2.7	.8	4.8	107.6
1970	29.7	8.6	8.8	12.7	9.1	1.0	3.7	.2	5.1	78.9
1971	44.3	5.3	7.7	11.2	9.1	1.6	1.3	1.8	1.7	84.0
1972	24.5	2.9	11.1	13.4	11.5	1.8	2.1	1.8	1.2	70.3
1973	12.1	2.3	14.2	10.1	13.4	2.4	1.6	.8	1.2	58.1
1974	20.9	5.2	12.2	13.9	9.4	1.8	4.7	1.0	1.2	70.3
1975	15.2	4.1	10.3	10.2	10.6	1.6	.8	.7	1.5	55.0
1976	15.8	3.9	10.2	9.4	11.2	1.8	1.9	.9	1.2	56.3
1977	20.6	6.1	10.8	19.2	11.0	1.7	2.6	1.2	1.5	74.7
1978	17.0	16.6	10.0	7.2	9.9	2.0	6.8	1.2	2.0	72.7
1979	19.6	12.0	10.9	9.8	8.8	2.7	4.2	1.0	1.4	70.4
1980	32.9	17.5	10.5	14.5	12.1	2.4	4.9	1.0	1.6	97.4
1981	42.5	13.7	11.7	9.7	9.4	3.2	2.6	1.8	2.5	97.1
1982	48.7	13.0	14.1	13.7	8.8	5.0	4.3	1.7	1.6	100.9
1983	46.5	22.9	14.1	13.6	8.5	5.2	4.0	1.5	1.3	117.6

BON = Atlantic bonito
LTA = Atlantic little tuna
KGM = King mackerel
FRI = Frigate tuna
SSM = Spotted Spanish mackerel
WAH = Wahoo
MAW = West African Spanish mackerel
BLF = Blackfin tuna

Sources:

1950-69 - ICCAT Historical Statistical Bulletin, Vols. 1 & 2
1970 - ICCAT Statistical Bulletin, Vol. 11
1971 - ICCAT Statistical Bulletin, Vol. 12
1972 - ICCAT Statistical Bulletin, Vol. 13
1973-83 - ICCAT Statistical Bulletin, Vol. 14

Table 2 - North, Central, and South American countries and areas: recent reported annual catch of small tunas, and coastline length.

Country or Area	1981-83 average catch(mt)	Length of Atlantic coast(km) 40°N-40°S	Tons/km
USA (inc. Puerto Rico)	7600	5000	1.5
Mexico	11300	2600	4.3
Belize	0	300	0
Guatemala	0	100	0
Honduras	0	600	0
Nicaragua	0	500	0
Costa Rica	0	200	0
Panama	#*	700	0
Colombia	300	1200	.3
Venezuela	6100	2000	3.1
Guyana	0	500	0
Suriname	0	300	0
French Guiana	0	300	0
Brazil	2300	6500	.4
Uruguay	0	800	0
Argentina	1000	1000	1.0
Total	28600	22600	

#Less than 50
*Not caught in own coastal area

Sources:

1. Country and area designations from FAO Yearbook of Fishery Statistics.
2. Catches from ICCAT Statistical Bulletin, Vol. 14.
3. Coastline lengths estimated from maps.

Table 3 - West Indian countries and areas: recent reported annual catch of small tunas, and coastline length.

Country or Area	1981-83 average catch(mt)	Length of coast(km)	Tons/km
Bermuda	0	50	0
Bahamas	0	700	0
Turks and Caicos Islands	0	500	0
Cuba	1300	3000	.4
Cayman Islands	0	100	0
Jamaica	0	500	0
Haiti	0	1000	0
Dominican Republic	600	900	.7
British Virgin Islands	0	100	0
U.S. Virgin Islands	0*	100	0*
Anguilla	0	#	0
St. Christopher & Nevis	0	100	0
Antigua & Barbuda	0	100	0
Monserrat	0	#	0
Guadeloupe	500	300	1.7
Dominica	0	100	0
Martinique	1300	200	6.5
Santa Lucia	0	100	0
St. Vincent	0	100	0
Barbados	200	100	2.0
Grenada	200	100	2.0
Trinidad & Tobago	1500	500	3.0
Netherlands Antilles	300	300	1.0
Total	5900	8950	

#Less than 50
*Included in USA catch in Table 2

Sources:

1. Country and area designations from FAO Yearbook of Fishery Statistics.
2. Catches from ICCAT Statistical Bulletin, Vol. 14.
3. Coastline lengths estimated from maps.

Table 4 - Mediterranean and Black Sea countries and areas: recent reported annual catch of small tunas, and coastline length.

Country or Area	1981-83 average catch(mt)	Length of coast(km) 40°N-40°S	Tons/km
Spain (inc. Balearics)	3600	1300	2.8
Gibraltar	0	#	0
France (inc. Corsica)	0	900	0
Italy (inc. Sic. & Sard.)	1700	4200	.4
Malta	#	100	#
Yugoslavia	100	800	.1
Albania	0	300	0
Greece (inc. Crete)	900	2500	.4
Turkey	31400	3000	10.5
Bulgaria	100	200	.5
Romania	300	200	1.5
USSR	10700*	2000	0
Cyprus	#	500	#
Syria	100	100	.5
Lebanon	0	200	0
Israel	400	200	2.0
Egypt	#	1000	#
Libya	0	1700	0
Tunisia	600	900	.7
Algeria	800	1100	.7
Total	50700	21200	

#Less than 50 (less than .05 in Tons/km column)
*Not caught in own coastal area

Sources:

1. Country and area designations from FAO Yearbook of Fishery Statistics.
2. Catches from ICCAT Statistical Bulletin, Vol. 14.
3. Coastline lengths estimated from maps.

Table 5 - West African countries and areas: recent reported annual catch of small tunas, and coastline length.

Country or Area	1981-83 average catch(mt)	Length of Atlantic coast(km)	Tons/km
Morocco	1700	1700	1.0
Portugal (Madeira only)	#	200	#
Spain (Canaries only)	0	1000	0
Western Sahara	0	1000	0
Mauritanea	300	700	.4
Senegal	4200	400	10.5
Gambia	0	100	0
Cape Verde	200	500	.4
Guinea-Bissau	0	300	0
Guinea	0	300	0
Sierra Leone	#	400	#
Liberia	0	500	0
Ivory Coast	0*	600	0*
Ghana	7800	600	13.0
Togo	0	100	0
Benin	100	100	1.0
Nigeria	0	800	0
Cameroon	0	300	0
Equatorial Guinea	#	300	#
Gabon	0	800	0
Sao Tome & Principe	#	100	#
Congo	0	100	0
Zaire	0	100	0
Angola	2200	1300	1.7
St. Helena	#	100	#
Namibia	0	1300	0
South Africa (to 20°E)	0	800	0
FISM	2800	-----	-
Total	19300	14500	

#Less than 50 (less than .05 in Tons/km column)

*Included in FISM (a statistical artifact including most French, Ivory Coast, Senegalese and Moroccan tuna catch)

Sources:

1. Country and area designations from FAO Yearbook of Fishery Statistics.
2. Catches from ICCAT Statistical Bulletin, Vol. 14.
3. Coastline lengths estimated from maps.

Table 6 - Other Atlantic countries and areas: recent reported annual catch of small tunas, and coastline length.

Country or Area	1981-83 average catch (mt)	Length of Atlantic coast (km) 40°N-40°S	Tons/km
German D.R.	1100*	0	-
Portugal (inc. Azores)	100	1000	-
Total	1200	1000	

*Not caught in own coastal area

Sources:

1. Country and area designations from FAO Yearbook of Fishery Statistics.
2. Catches from ICCAT Statistical Bulletin, Vol. 14.
3. Coastline lengths estimated from maps.