

AN OVERVIEW OF THE ICCAT TASK II DATA BASE

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SUMMARY

The ICCAT Task II data base contains data for 34 years, for more than 20 species of tunas, and for more than 25 countries. The coverage, which is much more complete for certain countries, species, and fisheries than others, is analyzed. Problems of data standardization, data revision, and quality control are discussed, and solutions proposed.

RESUME

La base de données ICCAT (Task II) contient 34 années de données sur plus de 20 espèces de thonidés, pour plus de 25 pays. On analyse la couverture, qui est bien plus exhaustive pour certains pays, espèces et pêcheries que pour d'autres. Les problèmes de standardisation, révision et contrôle de qualité sont mentionnés, et des solutions proposées.

RESUMEN

La base de datos ICCAT (Task II) contiene 34 años de datos sobre más de 20 especies de túnidos, y más de 25 países. Se analiza la cobertura, que es mucho más exhaustiva en el caso de ciertos países, especies y pesquerías que en el de otros. Se mencionan los problemas de normalización, revisión y control de calidad, proponiéndose algunas soluciones.

The ICCAT Data Base, started in 1975, has now reached a size of about 20 megabytes, and is one of the largest of its kind in the world. It contains at least some data for each of 34 years, 1950-83, for more than 20 species of Atlantic tunas and tuna-like fishes, and for more than 25 countries, many of them fishing several different parts of the ocean with different kinds of fishing gear. It is maintained on computer tapes by the Secretariat and published in hard copy primarily in the ICCAT Data Record series, currently over 20 volumes-- over 5,000 pages.

The coverage for certain countries, species and fisheries in the Data Base is much more complete than it is for others. The differences reflect certain implicit priorities on the part of the Commission and its members. Which are the more important and less important elements is something that "everyone knows," but it is worth re-examining from time to time. One explicit statement of priorities is contained in the ICCAT Field Manual (Second Edition, 1978):

Priority should be given to the species most heavily exploited at present. For the ICCAT project, the following species are listed in descending order of importance...

- Yellowfin...
- Bluefin...
- Albacore...
- Bigeye...
- Skipjack...
- Atlantic sailfish...
- Atlantic blue marlin...
- Atlantic white marlin...
- Broadbill swordfish...

The most recent levels of exploitation are:

Species	Metric tons	Percent	Cumulative percent
Total	500,000	100.0	-
Yellowfin	129,000	25.8	25.8
Skipjack	117,000	23.4	49.2
Albacore	64,000	12.8	62.0
Bigeye	52,000	10.4	72.4
Bonito	30,000	6.0	78.4
Bluefin	18,000	3.6	82.0
Swordfish	18,000	3.6	85.6
Little tuna	14,000	2.8	88.4
King mackerel	11,000	2.2	90.6
Others	47,000	9.4	100.0

Another way of looking at priorities is in terms of economic importance:

Species	Thousand metric tons	US\$/ton*	Total Value (million US\$)	Percent	Cum. percent
Total	500	-	863.6	100.0	-
Yellowfin	129	1,800	232.2	26.9	26.9
Skipjack	117	1,500	175.5	20.3	47.2
Albacore	64	2,200	140.8	16.3	63.5
Swordfish	18	6,000	108.0	12.5	76.0
Bigeye	52	1,800	93.6	10.8	86.8
Bluefin	18	3,000	54.0	6.3	93.1
King mackerel	11	2,100	23.1	2.7	95.8
Bonito	30	400	12.0	1.4	97.2
Little tuna	14	400	5.6	.6	97.8
Others	47	400	18.8	2.2	100.0

*Approximate price to fishermen, Atlantic ports, 1983.

Ranking the various species by their tonnages and economic values for the whole Atlantic gives a very limited impression of their real importance, since relative value to the members of ICCAT differs considerably from country to country. There are many ways of ordering the importance of fisheries other than by their tonnages or values. For example, virtually all of the bluefin, yellowfin, skipjack, albacore, and bigeye (over three quarters of the total weight and value) are consumed in Japan, the USA, and Western Europe. But if one considers the importance of the tunas as food in developing countries, then little tuna, blackfin, bonitos, and the Spanish and king mackerels are at the top of the list. From the point of view of recreational or sport fisheries, significant contributors to the economies of some regions, the billfishes, bluefin tuna, the king and Spanish mackerels, and wahoo are of considerable importance.

A superficial evaluation of the coverage of the various species and fisheries can be made by surveying the overall coverage in the Data Base as shown in Appendix Tables 1-9:

Bluefin

Bluefin are caught primarily by French and Italian purse seiners in the Mediterranean, and by Japanese longliners in the Eastern Atlantic, with some catches by French and Spanish bait boats, and by traps operated in or near the Mediterranean by

France, Italy, Spain, and other countries. There are important sport fisheries in Canada and the USA.

The catch and effort data series are long and continuous, except for Italy, for which there are no data. The size data series, with the exception of that from Japan, are short and interrupted.

Yellowfin

Most yellowfin are taken in the Atlantic by FIS-FISM and Spanish purse seiners fishing off West Africa, and Japanese and Korean longliners fishing ocean-wide. Some are taken by Ghana-based Japanese, Korean, and other baitboats.

There are reasonably long and continuous catch and effort and size data series for all of these fisheries.

Skipjack

Skipjack are caught primarily by FIS-FISM, Spanish, and other purse seiners fishing off the coast of West Africa, and by Ghana-based Japanese, Korean, and other baitboats. There is a new and growing fishery by baitboats off the south coast of Brazil.

There are reasonably long and complete series of catch and effort and size data for all of these major fisheries.

Bigeye

Most bigeye are caught by Japanese and Korean longliners fishing ocean-wide, with much smaller amounts taken off West Africa by FIS-FISM and Spanish purse seiners, and by Ghana-based Japanese, Korean, and other baitboats.

There are long series of catch and effort and size data from Japanese and FIS-FISM vessels, and reasonable series of catch and effort and size data for the Korean and Kor+Pan fleets, with some interruptions.

Albacore

The principal Atlantic catches of albacore are made in the Bay of Biscay by Spanish baitboats and trollers, and Atlantic-wide by longliners from China-Taiwan. French surface catches in the Bay of Biscay, formerly a major component of the total, have decreased markedly in recent years.

There are reasonable series of catch and effort and size data for Spain and China-Taiwan. Only four years of catch and effort data-- 1975-78-- are available from the French fishery, and there is only a single French size sample after 1976.

Small tunas

Small tuna catches in recent years have been on the order of 20 percent of the total catch of tunas and tuna-like species in the Atlantic. Nonetheless, the information in the ICCAT Data Base on small tunas falls far short of being adequate. Examples:

1. Turkish catches of Atlantic bonito in the Mediterranean, the major component of the small tunas catch, are represented by neither catch and effort nor size data.
2. USA catches of king and Spanish mackerels are represented only intermittently by catch and effort and size data.
3. Spanish catches of bonitos and frigate mackerel are represented by only a single year of catch and effort (and no size) data.
4. Many of the other series of catch and effort and size data are short and/or interrupted.

Swordfish

Swordfish is caught in the Atlantic primarily by Canada, Italy, Japan, Spain, and the USA. The only respectable time-series of data for catch and effort and size are from Japan. There are no data from Italy, only two

years of catch and effort data (no size data) from Canada, a single year of catch and effort data from Spain (but a reasonable series of size data), and an interrupted series of catch and effort data plus a single year of size data from the USA.

Billfish except swordfish

The catch and effort data series for billfish fisheries appear reasonable, with long continuous series from China-Taiwan, Japan, Senegal (stopping after 1980), and the USA. The only long continuous series of size data in the base is from Japan (1970-81), although the USA has recently submitted a long series of sports tournament data that is not yet included in the Data Base.

Appendix Tables 1-9 show what series are presently available in the ICCAT Data Base by countries and species. (The species are grouped in the cases of the small tunas and billfish other than swordfish.) Tables 1 and 2 show the same information in negative form-- what data are lacking by country, year and species. Missing data for bluefin tuna are not shown, since bluefin data have recently been the subject of special attention. Only the years 1975-81 are shown in Tables 1 and 2, since the chances of recovering data for years before 1975 appear smaller than for more recent years, and not all of the expected data for 1981 and 1982 have yet been submitted.

In many cases, the data probably exist in national files, and efforts could be made to have them submitted for inclusion in the Data Base. Some examples for member countries are:

-Canada - Several years of swordfish catch and effort and size data.

-France - Several years of catch and effort and size data for albacore.

-Morocco - Several years of catch and effort and size data for yellowfin, skipjack, bigeye, etc.

-South Africa - Several years of size data for yellowfin, skipjack, albacore, etc.

-USSR - Catch and effort and size data for yellowfin and skipjack before 1978.

-USA - Several years of catch and effort and size data for small tunas.

In addition, there are several cases where data series for non-member countries are not up-to-date. Examples:

-Argentina - No catch and effort data since 1977.

-Italy - No catch and effort data since 1979.

-Tunisia - No catch and effort data since 1979.

-Venezuela - No catch and effort data 1975-80.

-Yugoslavia - No catch and effort data since 1977.

Many of these data series and others can probably be recovered. The probability of recovering catch and effort data appears to be higher than that of recovering size data. The Sub-Committee on Statistics should consider assigning the task of establishing priorities in attempts to recover these and other data to an appropriate working group.

Miyake (1983) reported on a mail survey carried out in 1982 of statistical methods used by member countries. He noted that although the standard adopted for reporting weights is in round weight, several countries, notably Brazil, Cuba, France and Portugal, were reporting at least some data in weights of gilled and gutted fish. He remarked further that the standards used for reporting lengths varied considerably from one country to another.

While it may be necessary to utilize internal standards that are not consistent with those adopted by ICCAT, the responsible national office should be required either to convert data before submitting them or to furnish appropriate conversion factors to the Secretariat so that the data can be converted before they are entered in the Data Base.

Wise (1983) reported on comparisons of length frequency measurements of longline catches. The measurements were taken at sea by Taiwanese and Korean fishermen, and ashore under the port sampling scheme administered by the Secretariat. Both the at-sea and the port sampling measurements showed undesirable characteristics in some cases. Some of the samples taken at sea contained only one

or two fish, and port samples taken at St. Maarten in the Netherlands Antilles in 1979 and 1980 seemed obviously incorrect.

Another problem that arises with a data base derived from as many sources as is the ICCAT Data Base is that national data bases are revised from time to time, but it is not always certain that the version contained on the computer tapes at the Secretariat is the most up-to-date one. In the case where the tapes at the Secretariat are revised on the basis of information submitted by a national office, the hard copy in the Data Record is not changed, but the reference to publication is removed from the catalog.

The data contained in the Data Base are of generally high but varying quality. Secretariat statistical personnel scan the data as they are entered for obvious inconsistencies, but sometimes national offices do not respond to inquiries, and data that for one reason or another are suspect are entered and/or retained in the base. In other cases, errors are not discovered until the data are used in analyses or compared with data from other sources. See for example the discussion of problems encountered in preparing for the recent Bluefin Workshop in Section III(4) of the current Secretariat Report on Statistics and Coordination of Research (COM/SCRS/83/22).

There is at present no method for positive identification of data in the Data Base that are suspect or that have been challenged. It would be useful to establish a system to "flag" data that might contain errors, and also to develop criteria for removal of obviously erroneous data from the base.

While the basic responsibility for the submission of credible data must remain with the national offices, it would be useful to submit all incoming data to an expanded system of quality control by computer program at the Secretariat. At present data are validated principally by programs that verify coding. New programs could, for instance, compare this year's catch and effort data with last year's from the same source and "flag" numbers that are more than, say, twenty percent above or below last year's figures. Other programs could scan length frequency samples for appropriate sizes for the species and fisheries involved, and for appropriate shapes to length frequency curves. Another set of programs that could be useful would be one to compare catch and effort data between sources that would be expected to show similar relations-- for instance in the baitboat fisheries in the Gulf of Guinea.

No system of computer programs of this sort can catch all errors, but an appropriately designed one would discover an appreciable number, and inquiries could be made of the national offices early enough so that appropriate corrections could be made. Such a system could render a valuable service for statistical offices in member countries that do not presently have their own computer systems.

Summary of Recommendations

The Sub-Committee on Statistics should:

1. Review the priorities among species and fisheries and make recommendations:

(a) with regard to emphasis to be applied currently and in the near future in national statistics and sampling programs, and;

(b) with regard to priorities in attempts to recover catch and effort and size data for past years.

2. Review the standards for reporting weights and sizes in samples to be included in the Data Base, making substitutions, raising, etc., as discussed above and in Section III(4) of COM-SCRS/83/22, and make recommendations to the member countries about observance of the standards.

3. Advise the Secretariat on methods to be used for positively identifying suspect or challenged data in the Data Base, and on procedures to be used for removing data from the Base that are obviously in error.

4. Advise the Secretariat on establishing an improved system of quality control by computer program for data to be entered in the Data Base.

REFERENCES

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1983

Survey of the procedures used in estimating and compiling tuna statistics. ICCAT Collective Volume of Scientific Papers, Vol. XVIII, pp. 701-703 (SCRS/82/14).

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A preliminary critical examination of the ICCAT data base. ICCAT Collective Volume of Scientific Papers, Vol. XVIII, pp. 711-718 (SCRS/82/27 (Rev.)).

Table 1 - Missing catch and effort data, ICCAT Data Base, 1975-81, by year, country and species.

COUNTRY/YEAR	75	76	77	78	79	80	81
ANGOLA	yf sj sm	yf sj sm bi	yf sj sm			bi	bi
ARGENTINA	yf be al sm sw bi		sw	yf be al sm sw	yf be al sm sw bi	yf be al sm sw bi	yf be be sm sw bi
BRAZIL	sm	sm			sm	sm	sm
CANADA	sw	sj sw		sw			sw
CAPE VERDE	yf sj be	yf sj be	yf sj be	yf sj be	yf sj be	sj be sm	
CHINA-TAIWAN			sw	sw	sw	sw	sw
CUBA	sm sw	sm	sm sw	sm sw	sm sw	sm sw	sm
FRANCE				al	al	al sw	al
GHANA	sm	sm				sm	sm
ITALY	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw
IVORY COAST	sm	sm	sm	sm	sm	sm	sm
KOREA	sj						
MEXICO	sj sm	sj sm	sj sm	sj sm	sj sm	sj sm	sj sm
MOROCCO	yf be sm	sj be sm	sj be sm sw	sm sw	sm sw	sm sw	yf sj sm sw
PANAMA	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi
PORTUGAL	sw	sw	sw	sw	sm sw	sm	sw bi
SENEGAL							bi
S. AFRICA		sj sm be			sw	sw	
SPAIN	sm	sm sw	sm sw	sm sw	sm sw	sm sw	sm sw
USSR	yf sj be sm bi	yf sj be al sw bi	yf sj be sm sw	sw	bi	bi	bi
USA	al sm		sm		al		be bi
URUGUAY	yf be al bi	yf be al bi	yf be al bi	yf be al bi	yf be al bi	yf be al bi	
VENEZUELA	yf sj al sm sw bi	yf sj al sm sw bi	yf sj al sm sw bi	yf sj al sm sw bi	yf sj al sm sw bi	yf sj al sm sw bi	al sm sw bi

yf = yellowfin sj = skipjack be = bigeye
al = albacore sm = small tunas sw = swordfish
bi = other billfish (bluefin tuna not included)

Table 2 - Missing size data, ICCAT Data Base, 1975-81, by year, country and species.

COUNTRY/YEAR	75	76	77	78	79	80	81
ANGOLA	yf sj be sm	yf sj be sm				be	
ARGENTINA	be al sm sw bi	be al sm sw bi	sj be al sm sw bi	sj be al sm sw bi	sj al sm bi	sj al sm bi	sj al al bi
BRAZIL	sm sw bi	sj sm sw bi	yf be bi	yf be sw bi	yf be sw bi	yf be sw bi	yf be al sm sw bi
CANADA	sw	yf be sw	sw	yf sw	sw	sw	sw
CAPE VERDE	yf be	yf sj be	yf be	yf be	yf be	yf be sm	yf sm
CHINA-TAIWAN	sw bi	sw bi	sw bi	sw	sw	sw	sw
CUBA	be al sm sw bi	yf sj be al	yf sj be al	yf be be al	yf be al sw bi	yf be al sw bi	yf be al sm sw bi
FRANCE	sm		al	al		al sw	al be
GHANA	sm bi	sm bi	sm bi	sm bi	sm bi	sm sw bi	sm sw bi
ITALY	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw	al sm sw
IVORY COAST	sm	sm	sm	sm	sm	sm	sm
KOREA	bi	sw bi	yf sj be al sw bi	sw bi	sw bi	sw bi	sw bi
MEXICO	sj sm	sj sm	sj sm	sj sm	sj sm	sj sm	sj sm
MOROCCO	yf sj be sm sw	yf sj be sm sw	yf sj be sm sw	yf sj be sm sw	yf sj be sm sw	yf be sm sw	yf sj be sm sw
PANAMA	al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi	yf sj be al sw bi
PORTUGAL	sj be al sw	sj be al sw	sj be al sw	yf sj be al sm sw	yf sj be al sm sw	sm sw	sw
SENEGAL	bi	bi	bi	bi	bi	sm bi	sm bi
S. AFRICA	yf sj al	yf sj al	al	al	sj be al sw	yf sj be al	yf sj be al sw
SPAIN	sm	sm	sm	sm	sm	sm	sm
USSR	sj sm sw bi	yf al sm sw bi	be al bi	sj al sm sw bi	al sm sw bi	al sm sw bi	al sm sw bi
USA	al sw	sm sw	al sw	al sm	al sm		be
URUGUAY	yf be al bi	yf be al bi	yf be al bi	yf be al bi	yf be al bi	yf be al bi	
VENEZUELA	yf sj be sm sw bi	yf sj be sm sw bi	yf sj be sm sw bi	yf sj be sm sw bi	yf sj be sm sw bi	yf sj be sm sw bi	yf sj be sm sw bi

yf = yellowfin sj = skipjack be = bigeye
al = albacore sm = small tunas sw = swordfish
bi = other billfish (bluefin tuna not included)

Appendix Table 1 (a) -

ICCAT DATA BASE
ALL CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82				
ANGOLA																								X	X	X	X	X			
ARGENTINA					X	X	X	X	X			X	X										X	X							
BRAZIL																	X	X	X	X	X	X	X	X	X	X	X	X			
CANADA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
CAPE VERDE																												X	X		
CHINA-TAIWAN																												X	X		
CONGO																												X	X		
CUBA																												X	X		
FRANCE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
FIS & FISM																												X	X		
GHANA																												X	X		
ITALY																												X	X		
JAPAN																												X	X		
KOREA																												X	X		
KOR+PAN																												X	X		
MOROCCO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
NORWAY																													X	X	
PORTUGAL																												X	X		
SENEGAL																												X	X		
S. AFRICA																												X	X		
SPAIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
TUNISIA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
TURKEY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
USSR																												X	X	X	
USA																												X	X	X	
URUGUAY																												X	X	X	
VENEZUELA																												X	X	X	
YUGOSLAVIA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
OTHER																												X	X	X	X

Note: 1950-55 -
 France - 52-55
 Spain - 50-55
 Tunisia - 54-55
 Yugoslavia - 50-55

Appendix Table 1 (b) -

ICCAT DATA BASE
ALL SIZE DATA 1959-82 (THROUGH DATA RECORD 22)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82													
ANGOLA																			X	X	X	X	X	X	X	X	X	X			
BRAZIL																			X	X	X	X	X	X	X	X	X	X	X		
CANADA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
CAPE VERDE																													X	X	
CHINA-TAIWAN																												X	X	X	
CONGO																												X	X	X	
CUBA																												X	X	X	
FRANCE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
FIS & FISM																												X	X	X	
GHANA																												X	X	X	
ITALY																												X	X	X	
JAPAN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
KOREA																												X	X	X	
KOR+PAN																												X	X	X	
MOROCCO																												X	X	X	
NORWAY																												X	X	X	
PANAMA																												X	X	X	
PORTUGAL																												X	X	X	
SENEGAL																												X	X	X	
S. AFRICA																												X	X	X	
SPAIN																												X	X	X	
TUNISIA																												X	X	X	
USSR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
USA																												X	X	X	X
VENEZUELA																												X	X	X	X
OTHER																												X	X	X	X

Note: 1959-64 & 83 -
 Brazil - 64
 Canada - 64
 Turkey - 61
 USSR - 59, 61, 62, 64
 Venezuela - 83

Appendix Table 2 (a) -

	ICCAT DATA BASE																										
	BLUEFIN CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)																										
	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
ARGENTINA						X	X	X				X	X														
CANADA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CHINA-TAIWAN																											
FRANCE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
JAPAN						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KOREA																											
MOROCCO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NORWAY						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PORTUGAL																											
S. AFRICA																											
SPAIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUNISIA	X	X				X	X	X	X	X	X	X	X	X													
USSR																											
USA						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
URUGUAY																											
YUGOSLAVIA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OTHER																											

Note: 1950-55 -
 France - 52-55
 Spain - 50-55
 Tunisia - 54-55
 Yugoslavia - 50-55

Appendix Table 2 (b) -

	ICCAT DATA BASE																		
	BLUEFIN SIZE DATA 1959-82 (THROUGH DATA RECORD 22)																		
	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
CANADA																			
FRANCE					X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ITALY										X	X	X	X	X	X	X	X	X	
JAPAN					X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NORWAY																			
PORTUGAL										X	X	X	X	X	X	X	X	X	
SPAIN										X	X	X	X	X	X	X	X	X	
TUNISIA																			
USA																X	X	X	X
OTHER										X									

Notes: 1. 1959-64 - No data.
 2. A separate catalog of bluefin size data made by M. Parrack (USA) was published in Data Record 18.

Appendix Table 3 (a) -

	ICCAT DATA BASE																										
	YELLOWFIN CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)																										
	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
ANGOLA																											
ARGENTINA																											
BRAZIL																											
CAPE VERDE																											
CHINA-TAIWAN																											
CONGO																											
CUBA																											
FIS & FISH																											
GHANA																											
JAPAN																											
KOREA																											
KOR+PAN																											
MOROCCO																											
PORTUGAL																											
S. AFRICA																											
SPAIN																											
USSR																											
USA																											
URUGUAY																											
VENEZUELA																											
OTHER																											

Note: 1950-55 - No data.

Appendix Table 3 (b) -

	ICCAT DATA BASE																	
	YELLOWFIN SIZE DATA 1959-82 (THROUGH DATA RECORD 22)																	
	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
ANGOLA																		
BRAZIL																		
CANADA																		
CAPE VERDE																		
CHINA-TAIWAN																		
CUBA																		
CONGO																		
FIS & FISH																		
GHANA																		
JAPAN																		
KOREA																		
KOR+PAN																		
PANAMA																		
PORTUGAL																		
S. AFRICA																		
SPAIN																		
USSR																		
USA																		
VENEZUELA																		
OTHER																		

Note: 1959-64 - No data.

Appendix Table 4 (a) -

ICCAT DATA BASE
SKIPJACK CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82		
ANGOLA																													
BRAZIL																									X	X	X	X	
CANADA																												X	X
CAPE VERDE																													
CUBA																												X	X
FIS & FISM																													
GHANA																													
JAPAN																													
KOREA																													
KOR+PAN																													
MOROCCO																													
PORTUGAL																													
S. AFRICA																													
SPAIN																													
USSR																													
USA																													
VENEZUELA																													
OTHER																													

Note: 1950-55 - No data.

Appendix Table 4 (b) -

ICCAT DATA BASE
SKIPJACK SIZE DATA 1959-82 (THROUGH DATA RECORD 22)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ANGOLA																			
BRAZIL																			
CANADA	X																		
CAPE VERDE																			
CONGO																			
CUBA																			
FRANCE																			
FIS & FISM																			
GHANA																			
JAPAN																			
KOREA																			
KOR+PAN																			
MOROCCO																			
PANAMA																			
PORTUGAL																			
S. AFRICA																			
SPAIN																			
USSR																			
USA																			
VENEZUELA																			
OTHER																			

Note: 1959-64 & 83 -

Canada - 64
Venezuela - 87

Appendix Table 5 (a) -

ICCAT DATA BASE
BIGEYE CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ARGENTINA																												
BRAZIL																												
CAPE VERDE																												
CHINA-TAIWAN																												
CUBA																												
FIS & FISM																												
GHANA																												
JAPAN																												
KOREA																												
KOR+PAN																												
MOROCCO																												
PORTUGAL																												
S. AFRICA																												
SPAIN																												
USSR																												
USA																												
URUGUAY																												
OTHER																												

Note: 1950-55 - No data.

Appendix Table 5 (b) -

ICCAT DATA BASE
BIGEYE SIZE DATA 1959-82 (THROUGH DATA RECORD 22)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ANGOLA																			
BRAZIL																			
CAPE VERDE																			
CHINA-TAIWAN																			
FIS & FISM																			
GHANA																			
JAPAN																			
KOREA																			
KOR+PAN																			
PANAMA																			
PORTUGAL																			
S. AFRICA																			
SPAIN																			
USSR																			
USA																			
OTHER																			

Note: 1959-64 - No data.

Appendix Table 6 (a) -

ICCAT DATA BASE
ALBACORE CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 221)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ARGENTINA		X	X	X	X	X					X	X										X	X					
BRAZIL																						X	X	X	X	X	X	X
CHINA-TAIWAN														X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CUBA																						X	X	X	X	X	X	X
FRANCE																						X	X	X				
JAPAN		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KOREA																						X	X	X	X	X	X	X
KOR+PAN																						X	X	X	X	X	X	X
PORTUGAL														X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S. AFRICA																						X	X	X	X	X	X	X
SPAIN														X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
USSR																									X	X	X	X
USA																								X	X	X	X	X
URUGUAY																												X
VENEZUELA																						X	X					X
OTHER																								X	X	X	X	X

Note: 1950-55 - No data.

Appendix Table 6 (b) -

ICCAT DATA BASE
ALBACORE SIZE DATA 1959-82 (THROUGH DATA RECORD 221)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82										
BRAZIL		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
CHINA-TAIWAN																			X	X	X	X	X	X	X	X	X	
FRANCE																						X	X	X	X	X	X	X
JAPAN		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KOREA																						X	X	X	X	X	X	X
KOR+PAN																						X	X	X	X	X	X	X
PORTUGAL																						X	X	X	X	X	X	X
S. AFRICA																						X	X	X	X	X	X	X
SPAIN																						X	X	X	X	X	X	X
USSR		X	X	X	X																							
USA																								X	X	X	X	X
OTHER																						X	X	X	X	X	X	X

Note: 1959-64 - No data.

Appendix Table 7 (a) -

ICCAT DATA BASE
SMALL TUNAS CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 221)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82						
ANGOLA																												X	X	X	X	X	
ARGENTINA																													X	X			
BRAZIL																													X	X	X	X	X
CAPE VERDE																													X	X	X	X	X
GHANA																													X	X	X	X	X
JAPAN																													X	X	X	X	X
KOREA																													X	X	X	X	X
KOR+PAN																													X	X	X	X	X
MOROCCO																													X	X	X	X	X
PORTUGAL																													X	X	X	X	X
SENEGAL																													X	X	X	X	X
S. AFRICA																												X	X	X	X	X	X
SPAIN																													X	X	X	X	X
USSR																													X	X	X	X	X
USA																												X	X	X	X	X	X
VENEZUELA																													X	X	X	X	X
OTHER																													X	X	X	X	X

Note: 1950-55 - No data.

* Includes Blackfin, Little Tuna, Bonitos, Frigate and Bullet Mackerels, Spanish and Cero Mackerels, and Wahoo.

Appendix Table 7 (b) -

ICCAT DATA BASE
SMALL TUNAS SIZE DATA 1959-82 (THROUGH DATA RECORD 221)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82															
ANGOLA																			X	X	X	X	X	X	X	X	X	X	X	X	X		
BRAZIL																													X	X	X	X	X
CUBA																													X	X	X	X	X
PORTUGAL																													X	X	X	X	X
SENEGAL																													X	X	X	X	X
USSR																													X	X	X	X	X
USA																													X	X	X	X	X

Note: 1959-64 -

USSR - 59, 61, 62, 64

* Includes Blackfin, Little Tuna, Bonitos, Frigate and Bullet Mackerels, Spanish and Cero Mackerels, and Wahoo.

Appendix Table 8 (a) -

ICCAT DATA BASE
*SWORDFISH CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ARGENTINA				X	X	X	X	X																				
BRAZIL													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CANADA																												
CHINA-TAIWAN										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CUBA																												
JAPAN				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KOREA							X	X	X	X																		
KOR+PAN																												
MOROCCO													X	X	X	X	X											
PORTUGAL																												
SPAIN																												
S. AFRICA																												
TURKEY		X	X	X	X	X																						
USSR																												
USA																												
URUGUAY																												

Note: 1950-55 - No data.

Appendix Table 8 (b) -

ICCAT DATA BASE
*SWORDFISH SIZE DATA 1959-82 (THROUGH DATA RECORD 22)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
CHINA-TAIWAN																			
JAPAN		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
KOREA																			
SPAIN																			
USA																			
OTHER																			

Note: 1959-64 -

Turkey - 61
 USSR - 62

Appendix Table 9 (a) -

ICCAT DATA BASE
*BILLFISH CATCH AND EFFORT DATA 1950-82 (THROUGH DATA RECORD 22)

	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	
ARGENTINA																												
BRAZIL																												
CAPE VERDE																												
CHINA-TAIWAN																												
CUBA																												
JAPAN																												
KOREA																												
KOR+PAN																												
SENEGAL																												
USSR																												
USA																												
URUGUAY																												
VENEZUELA																												
OTHER																												

Note: 1950-55 - No data.

*Other than swordfish.

Appendix Table 9 (b) -

ICCAT DATA BASE
*BILLFISH SIZE DATA 1959-82 (THROUGH DATA RECORD 22)

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
CHINA-TAIWAN																		
JAPAN		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
USA																		

Notes: 1. 1959-64 - No data.

2. A series of size data from 1935 has been received from the USA but not yet entered in the data base.

* Other than swordfish